Summer 2021

Examining the Use of Immersive Clinical Experiences in Athletic Training Education

Bailey Christine Jones
Old Dominion University, jones.baileyc@gmail.com

EXAMINING THE USE OF IMMERSIVE CLINICAL EXPERIENCES IN ATHLETIC TRAINING EDUCATION

by

Bailey Christine Jones
B.S. May 2016, James Madison University
MSAT May 2018, Old Dominion University

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

HEALTH SERVICES RESEARCH

OLD DOMINION UNIVERSITY
August 2021

Approved by:

Julie Cavallario (Director)

Cailee Welch Bacon (Member)

Bonnie Van Lunen (Member)

ABSTRACT

EXAMINING THE IMPACT OF IMMERSIVE CLINICAL EXPERIENCES IN ATHLETIC TRAINING EDUCATION

Bailey Christine Jones
Old Dominion University, 2021
Director: Dr. Julie Cavallario

Clinical experiences are an essential aspect of athletic training education that offer students opportunities to practice their skills and engage in a variety of settings. The Commission on Accreditation of Athletic Training Education (CAATE) sets accreditation standards for athletic training programs to meet, including clinical education standards. In fall 2020, new standards took effect that include a few additions to the standards surrounding clinical education; these additions require programs to afford students opportunities to engage in immersive clinical experiences (ICEs), implement behaviors associated with core competencies, and identify strategies that account for patients' social determinants of health. Educators believe ICEs will help give students a more realistic sense of athletic training practice and provide more patient encounter opportunities for skill development. Students reported that participating in ICEs gave them a higher quality clinical experience, including higher patient encounter volume, feelings of more responsibility and autonomy, and increased incidence of interprofessional education and collaborative practice.

Despite the adoption of ICEs into athletic training clinical education, no research has been conducted to confirm the effectiveness of ICEs to enhance students' clinical skill practice opportunities. Additionally, no research has been conducted to examine the effect of ICEs on students' implementation of behaviors associated with the core competencies or on their knowledge of the social determinants of health (SDoH). The purpose of this dissertation was to

examine the current impact of immersive clinical experiences on characteristics of patient encounters at clinical experiences, the implementation of behaviors associated with core competencies, and students' knowledge of the SDoH.

We found no significant difference between immersive and non-immersive clinical experiences in student role, length of patient encounter, clinical site type, total number of diagnoses and procedures used, or implementation of patient-centered care behaviors. Students did implement significantly more behaviors associated with evidence-based practice, interprofessional education and collaborative practice, and health information technology during ICEs. Immersive clinical experiences also had no impact on students' knowledge, comfort, and familiarity score surrounding the SDoH. Athletic training programs should look to establish specific objectives for the implementation of ICEs in order to take advantage of benefits they may offer to students.

ACKNOWLGEMENTS

My completion of this dissertation and doctoral program could not have occurred without the immense support and guidance from a multitude of individuals. First, I would like to thank my dissertation committee for guiding me on this whirlwind marathon. To Dr. Julie Cavallario, my advisor and encourager-in-chief, I am not sure I can convey the magnitude of my thanks to you in these words. Your persistence in ensuring my success during the last 3+ years made me feel seen and valued. Thank you for not only taking me under your wing as a student but also supporting me as a person. I also want to thank Dr. Cailee Welch Bacon for providing me with sound advice that greatly enhanced the quality of my projects and for affording me professional connections that have set me up for the next phase of my career. Lastly, I'd like to thank Dr. Bonnie Van Lunen for her support of my educational endeavors (from my master's degree to my PhD), including serving as an accomplished voice that has guided my research from start to finish.

I feel truly grateful to have spent the last 5 years here in my hometown, surrounded by an entire host of family and friends during this time in my academic career. I want to thank my family members for always lending encouragement and admiration, even in my most panicked moments. Most notably, I would like to thank my parents for supporting me in a multitude of ways – this degree is not only my accomplishment but yours as well.

Lastly, I would be remiss in these acknowledgements if I did not mention my group of friends who gave me plenty of opportunities to relieve stress through the last 3 years. I want to thank my community of volleyball friends and fellow coaches for the many road trips, beach days, and other fun times that provided an escape when I needed it most. I also want to thank all

of the roommates I shared a living space with over the last 3 years as well as my friend, Gary Cohen, for all of the times that we laughed, commiserated, and proof-read for the other during this endeavor.

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INTRODUCTION

Background

Athletic training education has evolved over the last few decades in order to mirror the ever-increasing demands of the athletic training profession. One of the avenues for major change within athletic training education is in clinical education; programs use clinical experiences to allow students to have hands-on attempts at skills, engage with patients and clinicians, and observe various duties and responsibilities associated with athletic training practice.[1] This dissertation will examine the current impact of a clinical education structure newly required of the athletic training profession, immersive clinical experiences (ICEs), as well as the intersection of clinical education and the social determinants of health. Ultimately, this dissertation aims to provide insight on approaches to assign specific purposes to ICEs, including but not limited to exposing students to patient populations with potentially impactful social determinants of health.

Clinical Education

In 2018, The Commission on Accreditation of Athletic Training Education (CAATE) established a new set of programmatic standards for athletic training programs to implement by the fall semester of 2020.[2] One of the major changes that was made within these new standards was the elevation of the level of the professional degree from an undergraduate to graduate level, a decision made by the CAATE, the National Athletic Trainers' Association (NATA), the NATA Foundation, and the Board of Certification in 2015.[3,4] With this change, those governing bodies hope to establish the athletic training profession at a higher level, matching that of other healthcare professions.[4] They stated that elevating the level of the professional degree would

align athletic training programs with other health professions education programs within the same institution, lead to more opportunities for interprofessional education and collaboration, facilitate an increase in student use of behaviors associated with professional competencies, and ultimately, enhance the quality of care given to patients.[4]

Athletic training programs use clinical experiences to allow students to practice their skills in simulated or authentic scenarios as well as engage with clinicians, peers, and patients.[1,5,6] Studies have shown that clinical experiences are vital to students' ability to successfully transition to autonomous practice.[5-7] Athletic training students are paired with supervisors called preceptors who are directly responsible for monitoring the students' learning and providing professional mentorship. This mentorship, in addition to diversity in clinical experiences, is integral for students' perceptions of their preparedness to enter the workplace.[7] Preceptors offer guidance to students surrounding implementation of clinical skills as well as on professional topics, and they are used in athletic training programs to ensure that students are meeting the objectives set for their clinical experiences; proper selection and training of preceptors is integral to the overall function of clinical experiences in athletic training programs.[1,8,9]

As stated, one change listed in the 2020 standards is the addition of curricular standards surrounding the core competencies, which are patient-centered care, evidence-based practice, interprofessional education and collaborative practice, health information technology, quality improvement, and professionalism.[10,11] Behaviors representing these competencies were adapted for implementation in athletic training programs. In order to gain or maintain accreditation with the CAATE, athletic training programs are required to demonstrate that students learn and are assessed on these behaviors both didactically and clinically. The CAATE also now requires

students to have exposure to patients with a variety of social determinants of health and levels of health literacy.

In past years, athletic training student clinical experience placement may have been driven by the need to meet requirements set by the CAATE. Programs must demonstrate that students have experiences in a variety of environments and exposure to the unique demands and characteristics of different patient populations. Athletic training programs may rely on assumptions and anecdotal reports of the characteristics of their clinical sites without ensuring that students actually have the opportunities that placement at that particular clinical site is intended to provide. In recent years, programs have started to use patient encounter tracking to gain a more accurate picture of the opportunities that students have at their clinical sites. Program administrators can use this information to better place students at sites depending on the students' needs, strengths, weaknesses, or preferences.

Clinical experiences have historically taken place in an integrated format, where students are engaged in didactic, classroom education while also participating in clinical experiences; this often limits students' abilities to observe and participate in athletic training responsibilities outside of providing rehabilitation and practice coverage.[1] Students are perceived to be less prepared in administrative tasks, such as billing for insurance and coordinating comprehensive, interprofessional care plans; however, diversity and quality in clinical experiences can address this deficiency.[1,9] Programs' abilities to allow students to gain insight to the totality of athletic training practice centers around a new standard's requirement for students to attend at least one immersive clinical experience during their athletic training program.[2]

Immersive Clinical Experiences

The CAATE defines an immersive clinical experience (ICE) to be a "a practice-intensive experience that allows the student to experience the totality of care provided by athletic trainers."[2] Programs are not required to convert all of their scheduled clinical experiences into ICEs, but they must minimally include one immersive experience that continuously spans over at least 4 weeks.[2] The structure of an ICE was designed to afford students minimal academic obligations in order to gain a comprehensive understanding of the reality of athletic training clinical practice; this could allow students more diverse clinical site opportunities, as they would not necessarily be geographically restricted by their institution.[1] Additionally, with the increased time spent in the clinical setting, students may have more opportunities to attend referral appointments with patients and witness other aspects of health care administration such as filing claims with health insurance agencies.[1]

Programs can also use ICEs to address specific objectives within the CAATE accreditation standards. However, the athletic training education body of literature does not provide a clear picture as to the current use of ICEs. It is possible that ICEs are currently used with no intended purpose other than to meet the requirement specified in the standard. The current lack of guidance given by the CAATE may lead program administrators to consider if ICEs should be used to address specific clinical education requirements, such as having experiences with patients that have different levels of socioeconomic statuses, patients with varying levels of activity and athletic ability, and non-sport patients.[2] If programs aim to use ICEs for any of these purposes, they will need to set specific objectives for the experiences and also provide comprehensive and relevant training to preceptors regarding what they expect students to be able to achieve in those experiences.

While the implementation of ICEs may offer athletic training students many benefits, it does not come without potential challenges and disadvantages. Stakeholders have claimed that ICEs can be hard for preceptors to manage, leading to a lower overall quality of the hours spent at clinical sites for students.[12,13] Educators have also expressed concerns regarding the balance of didactic education and clinical education once ICEs are implemented; students may miss out on opportunities to immediately practice newly learned skills, since didactic and clinical instructional opportunities will largely be conducted separate from one another in ICEs.[12] Although educators and other stakeholders have expressed legitimate concerns about the consequences of this type of structural change to clinical education, students can take advantage of the potential benefits of ICEs through implementation strategies already documented in literature.[12]

Social Determinants of Health in Athletic Training Education

In order to satisfy the CAATE accreditation standards implemented as of 2020, programs must demonstrate that students are able to "identify health care delivery strategies that account for health literacy and a variety of social determinants of health."[2] Public health literature has established that there are disparities in the delivery of and access to healthcare between differing ethnic, racial, socioeconomic groups, and that teaching health professions students about the social determinants of health (SDoH) is an effective way to increase student awareness of these disparities.[14,15] The impact of social factors such as access to health care services, employment and economic opportunities, other socioeconomic conditions, educational opportunities, access to transportation, and social support on the delivery of health care services in communities across the United States is well established.[14,16-19]

Researchers have demonstrated that health professions students can benefit from formal, structured training in the SDoH and can use that information to help address health disparities in their patient populations.[15,17,19] Educators in these professions are using didactic education, including case-based discussions and dedicated presentations regarding certain SDoH, as well as aiming to provide clinical experiences that give students an opportunity to apply this knowledge to a patient population.[20,21] One study reported that pediatric physician residents were more aware of the SDoH and their impact on patients' health, and that the residents felt more comfortable with documentation of the SDoH and creating a SDoH-specific care plan after having completed an internship with a formal SDoH curriculum.[15] Experts and educators in clinical medicine agree that a large proportion of the curriculum should be taught with the SDoH in mind. While there is significant research in preparing nurses and physicians to handle patient cases with varying SDoH, less is known about opportunities for students to consider these concepts with real patient cases in clinical experiences and how competency is measured.[20] The knowledge and awareness of the SDoH directly impacts a health professionals' ability to provide culturally competent care; therefore, it is essential that healthcare professionals be made aware of these factors and their influence on patients' health.

It is well established in athletic training and medical education literature that health care services and resources are less available to those areas with lower socioeconomic status.[22-24] Athletic trainers' presence in a multitude of settings, especially secondary schools, can address a gap in health care services for underserved populations. Due to this placement as well as placement in emerging settings such as industrial workplaces or public safety, athletic trainers have opportunities to observe and create care plans that involve impactful social determinants of health; however, recent research indicates that athletic trainers perceive their own knowledge of

the social determinants of health to be limited. Athletic trainers currently perceive themselves to have minimal to moderate levels of knowledge, comfort, and familiarity surrounding the social determinants of health.[25] Preliminary data also suggests that athletic trainers have varying levels of agreement surrounding the impact of specific social determinants of health on patients' health and well-being, reporting that they had managed less cases where government policies or employment status negatively affected patients' care.[26]

Several studies across professions suggest that relying on experiences alone is not enough to ensure that health professionals gain a sufficient understanding of and are able to appropriately manage the social determinants of health in patient cases.[19,26,27] In athletic training education, purposeful didactic instruction as well as intentional clinical experience placement are needed to ensure students gain the ability to provide whole person health care with the social determinants of health in mind. Examining professional athletic training students' current knowledge of the SDoH can aid educators and preceptors in adjusting both didactic curricula surrounding these topics and clinical experiences to best prepare students for this aspect of autonomous practice and impact future patient health outcomes.

Statement of the Problem

Although the implementation of ICEs in athletic training programs has been widely accepted by educators and researchers, little is known regarding the ways in which athletic training programs currently use ICEs.[1] There has been little research to establish whether or not programs are using ICEs in ways that take advantage of their inherent structure, with specific goals and objectives for students to achieve during the experience. Additionally, there is minimal research that has investigated athletic training students' knowledge of the SDoH and its relation

to student preparedness to identify and manage patient cases that are positively or negatively affected by those SDoH. Allowing students to engage in clinical experiences with a higher potential for varying and adverse social determinants of health may serve as an impactful purpose of ICEs.

Purpose of the Dissertation

There were four purposes of this dissertation. The first purpose was to compare characteristics of athletic training student patient encounters that occur during ICEs and non-immersive clinical experiences (N-ICEs). These characteristics included clinical site type, student role (observed, assisted, performed), patient diagnoses, and procedure(s) performed. The second purpose was to examine use of professional behaviors associated with five of the six athletic training core competencies in ICEs and N-ICEs. The five core competencies used in that project were patient-centered care, interprofessional education and collaborative practice, evidence-based practice, health information technology, and quality improvement. The third purpose was to examine athletic training students' current level of awareness of the social determinants of health. The fourth purpose was to examine athletic training students' perceptions of the impact of specific social determinants of health on patient cases.

Specific Aims and Hypotheses

These studies were designed to address the following specific aims:

1. To examine the differences in patient encounter characteristics reported by professional athletic training students between immersive and non-immersive clinical experiences.
    a. To examine the differences in clinical site types used in immersive and non-immersive clinical experiences.

i. We hypothesize that there will be no significant difference in the ratio of patient encounters held at each clinical site type between immersive and non-immersive clinical experiences.
ii. We hypothesize that the majority of patient encounters reported during immersive clinical experiences will be at colleges and universities.

b. To examine the differences in number of diagnoses and procedures used by professional athletic training students during patient encounters in immersive and non-immersive clinical experiences.
    i. We hypothesize that students will report no significant difference in diagnoses and procedures used during patient encounters at non-immersive clinical sites as compared to immersive clinical sites.

2. To examine the differences in student role frequencies between immersive and non-immersive clinical experiences.
    i. We hypothesize that student role will not significantly differ between immersive and non-immersive clinical experiences.
3. To examine differences of athletic training students' reported use of professional behaviors associated with 5 of the core competencies between immersive clinical experiences and non-immersive clinical experiences.
    a. To determine the difference in athletic training students' reported use of behaviors related to patient-centered care in immersive and non-immersive clinical experiences.
        i. We hypothesize that there will be no significant difference in students' use of patient-centered care between immersive and non-immersive experiences.
    b. To determine the difference in athletic training students' reported use of behaviors related to interprofessional education and collaborative practice in immersive and non-immersive clinical experiences.
        i. We hypothesize that there will be no significant difference in students' exposure to interprofessional education and collaborative practice between immersive and non-immersive experiences.

   c. To determine the difference in athletic training students' reported use of behaviors related to evidence-based practice in immersive and non-immersive clinical experiences.
      i. We hypothesize that there will be no significant difference in students' use of evidence-based practice between immersive and non-immersive experiences.
   d. To determine the difference in athletic training students' reported use of behaviors related to health information technology in immersive and non-immersive clinical experiences.
      i. We hypothesize that there will be no significant difference in students' use of health information technology between immersive and non-immersive experiences.
   e. To determine the difference in athletic training students' reported use of a behavior related to quality improvement in immersive and non-immersive clinical experiences.
      i. We hypothesize that there will be no significant difference in students' consideration of quality improvement between immersive and non-immersive experiences.
4. To examine students' perceptions of their awareness of and their ability to endorse social determinants of health.
   a. To determine students' current levels of knowledge, comfort, and familiarity surrounding the social determinants of health.
   b. To determine the influence of program type (professional bachelor's versus professional master's) on students' knowledge, comfort, and familiarity surrounding the social determinants of health.
   c. To determine the influence of the completion of a specific clinical experience type (immersive versus non-immersive experiences) on students' knowledge, comfort, and familiarity surrounding the social determinants of health.
      i. We hypothesize that students will perceive themselves to be comfortable with the social determinants of health.

ii. We hypothesize that students will perceive themselves to be familiar with the social determinants of health.
iii. We hypothesize that students will perceive themselves to be knowledgeable of the social determinants of health.
iv. We hypothesize that students will not demonstrate consistent endorsement of the social determinants of health.

5. To examine students' perceptions of the impact of the social determinants of health on a patient's health.
    a. To examine students' perceptions of the impact of income on a patient's health.
    b. To examine students' perceptions of the impact of level of education on a patient's health.
    c. To examine students' perceptions of the impact of employment status on a patient's health.
    d. To examine students' perceptions of the impact of living arrangements on a patient's health.
    e. To examine students' perceptions of the impact of social support on a patient's health.
    f. To examine students' perceptions of the impact of access to health care services on a patient's health.
    g. To examine students' perceptions of the impact of childhood experiences on a patient's health.
    h. To examine students' perceptions of the impact of government policies on a patient's health.
    i. To examine students' perceptions of the impact of lifestyle choices on a patient's health.
    j. To examine students' perceptions of the impact of access to transportation on a patient's health.
        i. We hypothesize that students will report more agreement that determinants related to individual circumstances (for example: income, level of education, employment status, and lifestyle choices) have more

impact on patients' health than determinants not related to individual circumstances (for example: living arrangements, social support, access to health care services, childhood experiences, government policies, access to transportation).

Operational Definitions

Athletic Training Clinical Experiences – Direct client/patient care guided by a preceptor who is an athletic trainer or physician. Athletic training clinical experiences are used to verify students' abilities to meet the curricular content standards. When direct client/patient care opportunities are not available, simulation may be used for this verification.[2]

Athletic Training Student – A role held by an individual enrolled in a professional athletic training program. This individual is not yet a certified athletic trainer, but must practice under the direct supervision of a preceptor.[2]

Clinical Education – A broad umbrella term that includes three types of learning opportunities to prepare students for independent clinical practice: athletic training clinical experiences, simulation, and supplemental clinical experiences.[2]

Commission on Accreditation of Athletic Training Education (CAATE) – the athletic training education governing body that seeks to establish and ensure compliance with accreditation standards that facilitate quality outcomes, continuous improvement, innovation and diversity to enhance athletic training education.[28]

Core Competency-Related Professional Behavior – An action that represents evidence-based practice, patient-centered care, interprofessional education and collaborative practice, health

information technology, or quality improvement. Professional behaviors relevant to this dissertation are identified in a previous study.[29]

Diagnosis – identification of the nature or cause of an injury or illness during a patient encounter evaluation. For the purposes of the studies in this dissertation, we categorized diagnoses reported from patient encounters into six groups: upper extremity, lower extremity, head/face, trunk, general medical, and non-specific.

E*Value – software program designed to allow health professions programs to collect information about various characteristics of students' patient encounters during clinical experiences, track hours spent at a clinical site, and manage preceptor evaluations.[30]

Evidence-Based Practice – The conscientious, explicit, and judicious use of current best evidence in making decisions about the care of an individual patient. The practice of evidence-based medicine involves the integration of individual clinical expertise with the best available external clinical evidence from systematic research. Evidence-based practice involves the use of best research evidence with clinical expertise and patient values and circumstances to make decisions about the care of individual patients.[31]

Health Care Providers – Individuals who hold a current credential to practice the discipline in the state and whose discipline provides direct patient care in a field that has direct relevancy to the practice and discipline of athletic training. These individuals may or may not hold formal appointments to the instructional faculty.[2]

Health Information Technology – The interdisciplinary study of the design, development, adoption, and application of information-technology-based innovations in the delivery, management, and planning of health care services.[32]

Immersive Clinical Experience – A practice-intensive experience that allows the student to experience the totality of care provided by athletic trainers.[2]

Interprofessional Education and Collaborative Practice – When students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes.[33]

Non-Immersive Clinical Experience – A clinical education experience that occurs concurrently with didactic course instruction, where students are expected to maintain a significant course load while completing the clinical experience; this is also referred to as an integrated clinical experience.[1]

Patient-Centered Care – Care that is respectful of, and responsive to, the preferences, needs, and values of an individual patient, ensuring that patient values guide all clinical decisions. Patient-centered care is characterized by efforts to clearly inform, educate, and communicate with patients in a compassionate manner. Shared decision making and management are emphasized, as well as continuous advocacy of injury and disease prevention measures and the promotion of a healthy lifestyle.[34]

Patient Encounter – An interaction between an athletic trainer or athletic training student and a patient.[10]

Procedure – Any service or action related to health care that is performed during a patient encounter. For the purposes of the studies in this dissertation, we categorized students' reported actions into six procedure types: evaluation/examination, care/treatment/rehabilitation, protection/prevention, application of therapeutic modality, assessment of specific impairment, and administration/facility management.

Professional Athletic Training Program – The undergraduate or graduate-level coursework that instructs students on the knowledge, skills, and clinical experiences necessary to become an athletic trainer, spanning a minimum of two academic years.[2]

Quality Improvement – Systematic and continuous actions that result in measurable improvement in health care services and in the health status of targeted patient groups.[35] Quality improvement includes identifying errors and hazards in care; understanding and implementing basic safety design principles such as standardization and simplification; continually understanding and measuring quality of care in terms of structure, process, and outcomes in relation to patient and community needs; and designing and testing interventions to change processes and systems of care, with the objective of improving quality.[36]

Social Determinants of Health – The conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.[16]

Socioeconomic Status – The social standing or class of an individual or group, frequently measured in terms of education, income, and occupation. Socioeconomic status has been linked to inequities in access to resources, and it affects psychological and physical health, education, and family well-being.[37]

Student Role – The amount of engagement an athletic training student demonstrates during a patient encounter; examples of student role are “observed”, “assisted”, and “performed”.[11]

Assumptions

For the purposes of this dissertation, it will be assumed that:

For Chapter 3:

1. Participants were students who were enrolled in CAATE-accredited professional athletic training programs at their institutions.
2. Participants received adequate training on logging patient encounters.
3. Participants logged all information regarding patient encounters honestly and consistently.
4. Participants were able to differentiate between actions that they performed, actions where they assisted their preceptor, and actions that they observed of their preceptor.
5. Participants were able to identify and report the diagnoses associated with patient encounters.
6. Participants were able to identify and report all procedures used during patient encounters.

For Chapter 4:

1. Participants were students who were enrolled in CAATE-accredited professional athletic training programs at their institutions.
2. Participants received adequate training on logging patient encounters.
3. Participants logged all information regarding patient encounters honestly and consistently.
4. Participants were able to differentiate between actions that they performed, actions where they assisted their preceptor, and actions that they observed of their preceptor.
5. Participants understood the behaviors associated with 5 professional competencies and were able to identify when they engaged in those behaviors during patient encounters.

For Chapter 5:

1. Participants were students who were enrolled in CAATE-accredited professional athletic training programs at their institutions.
2. Participants read and understood each question of the survey when providing responses.
3. Participants answered each survey question honestly and accurately.

Delimitations

For Chapter 3:

1. Participants were students who were enrolled in CAATE-accredited professional athletic training programs at their institutions.
2. Participants were enrolled in programs with at least an eighty percent aggregate three-year Board of Certification first-time pass rate and who had been using the E*Value case logging software for at least one year.

For Chapter 4:

1. Participants were students who were enrolled in CAATE-accredited professional athletic training programs at their institutions.
2. Participants were enrolled in programs with at least an eighty percent aggregate three-year Board of Certification first-time pass rate and who had been using the E*Value case logging software for at least one year.

For Chapter 5:

1. Participants were students who were enrolled in CAATE-accredited professional athletic training programs at their institutions.

2. Participants were students who had completed at least one clinical experience in their athletic training program at the time of the study.

Limitations

For Chapter 3:

1. Participants may not have accurately recorded all relevant and qualifying patient encounters, including those of which they did not directly perform.
2. Participants may not have adequately understood the difference between integrated and immersive clinical experiences.
3. Participants may not have been able to appropriately identify and report their role during patient encounters.
4. Participants may not have adequately understood or been able to identify the diagnoses and procedures used during their reported patient encounters, including the ICD-10 and CPT coding.

For Chapter 4:

1. Participants may not have accurately recorded all relevant and qualifying patient encounters.
2. Participants may not have adequately understood the difference between integrated and immersive clinical experiences.
3. Participants may not have adequately understood the differences between behaviors associated with the five professional competencies used in the study.

For Chapter 5:

1. The survey used was validated for use with athletic trainers, not professional athletic training students.
2. Survey question order was not randomized.
3. Participants may not have answer questions regarding their perceptions truthfully
4. Participants may not have adequately understood the questions regarding their perceptions or the social determinants of health.

CHAPTER II

REVIEW OF THE LITERATURE

Clinical Education

Clinical education is a component of health professions education programs that is used to expose students to a variety of situations and settings and practice their skills with real or simulated patient cases. Research in the athletic training profession has indicated that clinical experiences are vital for student retention, socialization, and development of professional and clinical skills.[5,6,8,9,38,39] Clinicians practicing in the fields of athletic training, physical therapy, occupational therapy, physician's assistant practice, and nursing practice are required to undergo weeks of supervised learning and skill practice outside of didactic instruction.[40] Historically, the athletic training profession has placed high emphasis on the importance of the concepts of apprenticeship and experience learning in the clinical setting via use of the internship model of certification. Prior to 2004, individuals wishing to pursue an athletic training certification were able to obtain one by either completing didactic requirements in a program approved by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) or by completing 1500 hours in an internship role as an athletic trainer.[40,41] The internship route was discontinued as a part of a reform effort in the athletic training profession that was introduced in 1996 but not fully implemented until 2004; the change was made due to internship students perceiving that they were not as adequately prepared for employment than their CAAHEP athletic training program counterparts and being not as likely to perform well on the Board of Certification exam.[41]

The National Athletic Trainer's Association (NATA) and Board of Certification (BOC) participated in reform efforts in order to combine the best components of the internship and

didactic educational routes.[41] This resulted in the implementation of structured, scheduled clinical experiences and clinical education competencies in the athletic training profession.[40,41] This reform, implemented in 2004, was the first to require athletic training programs to integrate clinical experiences into didactic curriculum, and it was the first time programs were mandated to assign competencies, objectives, and goals for clinical experiences in athletic training programs.[41] In 2006, the Joint Review Committee on Education Programs was dissolved and the Commission on Accreditation of Athletic Training Education (CAATE) was formed to continually ensure accreditation standard compliance and continual improvement of athletic training education.[42]

Integrated, or non-immersive clinical experiences (N-ICEs) have been historically used more frequently than immersive clinical experiences (ICEs) in athletic training programs to allow students opportunities to engage in clinical settings while they are still enrolled full-time in didactic coursework.[1] A N-ICE typically is seen as a part-time assignment, where a student may engage in classroom instruction during the morning hours of the day and attend their clinical site during the afternoon or evening hours.[1] While it offers consistency in hours spent at a clinical site per day or per week, this format may limit students in skills they are able to practice at that clinical site and a lack of variety of athletic training roles and responsibilities they are able to witness. Since students have reported that the diversity and quality of clinical experiences greatly impacts their perceived ability to transition into professional practice, it is essential to continuously evaluate and modify clinical experience format and requirements in order to offer the most genuine and effective experience for students.[5,43]

Immersive Clinical Experiences

As part of the accreditation standards implemented in 2020, the CAATE required athletic training programs to operate at the professional master's level, eliminating some of the inflexibility in planning an undergraduate curriculum.[1] Along with this change, the CAATE also began to require programs to include at least one ICE in their clinical education curriculum.[2] According to the CAATE, an ICE is defined as "practice-intensive experience that allows the student to experience the totality of care provided by athletic trainers" and lasts continuously for a minimum of four weeks.[2] The CAATE does not provide any other regulations for the implementation of ICEs, and it is important to note that programs may use a combination of ICEs and N-ICEs to fulfill other clinical education requirements outlined in the CAATE standards.

Health professions that use the clinical immersion model see it as a meaningful and clinically important way for students to gain a variety of experiences during their professional education.[1,44-46] The occupational and physical therapy fields use both immersive and non-immersive style clinical experiences with their students in order to reap benefits in all phases of their programs.[45,46] They justify having these experiences because research has indicated that clinical education plays an important role in ensuring that students have mastered the skills necessary for them to be successful and effective clinicians.[47] Being able to measure these skills and other indicators of future success is imperative to making sure that students are using their clinical experiences effectively.

There are instances of health professions education programs using ICEs in order to ensure that their students have opportunities to learn about various populations.[45,46,48] Physical and occupational therapy students engage in ICEs toward the later stages of their curriculum;

some of these experiences are in environments that specialize in pediatrics and/or cultural diversity. In the physical therapy field, it was found that immersive experiences that aim at providing interprofessional experiences can positively impact students' attitudes toward interprofessional collaboration in healthcare.[49] It was also found that through participating in shared learning experiences with other professions, students felt that they had an improved sense of competency and autonomy; students also reported that they learned from sharing responsibility and leadership in patient cases.[49] The use of ICEs to engage in a more extended, comprehensive form of interprofessional experiences may have a more lasting impact on students than short-term or one-day experiences.

Some researchers have identified potential barriers and challenges of implementing ICEs in athletic training programs; some of these challenges for students include isolation, financial burden, decreased quality of clinical hours.[13] For programs, challenges may include lack of additional guidelines and requirements, disruption of current clinical experience scheduling, and lack of proper preceptor training. One similarity across the two types of challenges surrounds the idea that the CAATE has provided minimal guidelines regarding the scheduling and implementation of ICEs. While this may have been intended to allow programs autonomy and flexibility to schedule ICEs in a way that appeases their institution's academic calendar, preceptor/clinical site availability, faculty availability, or course sequencing/schedule, it may leave program directors in a confusing spot and wondering how best to implement the experiences.

There is little research regarding appropriate timing for ICEs in athletic training education; however, physical therapy and occupational therapy programs schedule their students to participate in ICEs at the conclusion of the didactic curriculum.[13] While this would seemingly

allow students more opportunities to practice skills autonomously and work with more complex cases, there is no research to support that the environment in ICEs will allow for an increase in these opportunities. However, students have reported that diversity in experiences and preceptor mentorship were two of the most influential factors on their perceptions of their abilities to be successful in autonomous practice following completion of their program.[5,6] Students who completed ICEs have reported that they felt preceptors had a high level of influence on the overall success of their ICE, while preceptors felt they were unprepared by athletic training programs on the intended differences between ICEs and N-ICEs.[50,51] Preceptors, and their abilities to mentor students, play a large role in the success or failure of clinical experiences to prepare students for professional practice; therefore, proper preceptor development is essential to effective implementation of ICEs and N-ICEs.[6,7]

Recent studies have identified students' and preceptors' perceptions of ICEs and their impact on athletic training students' development.[50,51] Students perceived ICEs provided them with more exposure to administrative tasks, interprofessional and collaborative practice, and a higher volume of patient encounters.[51] Students also reported they experienced more preceptor influence and quality communication and professional relationship development during ICEs.[51] Additionally, students indicated that they received more autonomy at their clinical site and therefore felt more prepared for autonomous practice following completion of the experience.[51] It is important to note that this study examining students' perceptions of ICEs was conducted qualitatively, with no objective measure for comparison of factors to N-ICEs. When surveyed, preceptors highlighted operational benefits of the structure of ICEs that included giving students a more realistic sense of an athletic training work environment, opportunities for skill development and refinement, more exposure to administrative tasks, and more exposure to

interprofessional collaboration and practice; most of the preceptors' perceived benefits of implementing ICEs from an operational standpoint correlate with the responses listed above from students.[50] However, preceptors did identify some problems they experienced during ICEs including a lack of preceptor training on the programs' objectives and goals associated with ICEs and misunderstanding programs' intended differences between ICEs and N-ICEs.[50] The results of these studies identify perceived benefits of ICEs, but it is important to investigate the use of ICEs in athletic training programs on a large scale in order to identify actual strengths and weakness in their current implementation.

Another avenue that programs can pursue to add specific objectives to ICEs is through emphasized student implementation of behaviors associated with five core competencies: patient-centered care, evidence-based practice, health information technology, interprofessional education and collaborative practice, and quality improvement. These five competencies were developed by the Institute of Medicine (IOM) and the Pew Health Professions Commission in order to provide health care providers and education programs guidance on methods for improving patient health outcomes.[11,34] While research in the athletic training profession has mostly focused on clinician implementation of individual competencies, a few studies have been conducted examining student use.

One study examined athletic training student core competency use and found three significant factors that affect the total number of competencies that students implement: student role during the patient encounter, length of the patient encounter, and frequency of patient encounters.[11] Athletic training students who assist their preceptors or other professionals during patient encounters were found to implement more core competencies than patient encounters of which students performed or observed.[11] It was also found that students implemented a higher

number of core competencies if they were involved in a high frequency of patient encounters and if those patient encounters were short in length of time.[11] One factor not examined in this study was the type of clinical experience to which the patient encounter belonged (ICEs versus N-ICEs). Currently, there is no research that examines the difference in athletic training student use of core competencies, or behaviors associated with core competencies, between ICEs and N-ICEs.

In the past, athletic training patient encounter tracking has been used to create a picture of the use of athletic training services in many settings.[52,53] However, patient encounter tracking can also be used as a method of examining characteristics of athletic training student clinical experiences. Previous studies have been able to identify trends and deficiencies in students' experiences through the use of a software called E*Value (MedHub, Minneapolis, MN).[10,11]

With information collected from their students' patient encounters, program administrators can examine strengths and weaknesses of each clinical site and use it to intentionally place students at clinical sites that can help them develop any skills they lack. Additionally, patient encounter data that compares several factors, such as student role and core competency behavior implementation, at ICEs and N-ICEs can be used to inform program administrators what objectives and goals might be most effectively achieved at those experience types. While qualitative research can identify anecdotal differences between ICEs and N-ICEs, patient encounter data can provide an objective look into their use in athletic training education. Patient encounter data combined with survey and interview questions that aim to investigate the most and least efficient uses of ICEs can provide impactful information relative to the enhancement of clinical education in the athletic training profession.

Even though some programs have voluntarily used this model for a few years, more research with concrete outcome measures is needed to measure the effectiveness of the use of ICEs on athletic training students' skill development and ability to successfully transition to practice. Health professions education programs are using ICEs in numerous ways; students are able to practice skills during real patient encounters, coordinate with other professionals or students of other healthcare professionals to build communication skills, or to enhance students' preparedness to enter the workplace. As with other educational tools, the use of ICEs should be continuously examined to ensure that they are used in the most impactful ways to benefit professional athletic training students.

Social Determinants of Health

The Social Determinants of Health (SDoH) were developed by the World Health Organization and are defined as "the conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks".[16] The five key areas of SDoH include an individual's neighborhood and built environment, health and health care, social and community context, education, and economic stability.[16] There is a growing body of literature that estimates that social and environmental drivers of health-related behaviors contribute to a high percentage of mortality in the United States.[18]

Athletic trainers are placed in a unique position within school and community health as they can often provide necessary medical services to underserved populations at little to no cost to the patient. With health care costs continuing to rise in the United States and fewer medical students choosing to pursue a discipline in family practice, athletic trainers can fill gaps in

coverage for many adults and adolescents.[54] Additionally, athletic trainers are in a position to combat adverse SDoH by educating individuals about their injuries as well as the medical care that they need and/or are receiving.[54] It is imperative for athletic trainers to be able to identify and consider an individual's SDoH when developing a plan of care following illness or injury. There is also a growing need for health education programs to ensure that topics surrounding the SDoH are a consistently weaved into didactic and clinical instruction.

The inclusion of the SDoH as a method for considering social and environmental factors in healthcare in nursing and medical health professions curricula are well cited in literature.[17,20,21,55] Some educators associated with medicine education programs are using a set of case-based modules formulated by a research team that includes the Baylor College of Medicine Committee on the SDoH; the modules prompt discussion of case management surrounding six situations where determinants such as access to care, food insecurity, home environment, human trafficking, immigrant health, language barriers, LGBT health, race/ethnicity, and women's health affect the patient's care.[21] Intensive didactic sessions lasting for a few weeks in between semesters seems to be a typical educational intervention for ensuring medical students receive instruction on the SDoH; these measures have been identified as affording medical students more knowledge of and comfortability talking to patients about the influence of their SDoH on medical care.[15]

The 2020 version of the CAATE's professional program accreditation standards also includes several new measures to expose athletic training students to more public health concepts within programs' curricular content. Standards have now been included that use specific terminology such as "health literacy" and the "social determinants of health."[2] However, the standards do not provide any other guidelines on how these principles should be taught,

including mode of instruction or placement in curriculum. Researchers in athletic training are currently investigating the most effective ways to incorporate public health topics, including the SDoH, into athletic training education curriculum.[56-58] Some researchers are proposing that students gain a foundation of knowledge in public health concepts in prerequisite courses prior to entering the athletic training program, and then programs should ensure that they use a spiral curriculum method to consider a variety of topics, cases, and situations with regard to public health concepts.[58]

Educators from one post-professional athletic training program used a three-pronged approach to incorporating instruction on the SDoH into their existing curriculum.[56] Students first participated in an hour-long information session designed to increase their knowledge and understanding of the SDoH. Following the session, students then engaged in an observational activity that tested their ability to identify both whether or not specific SDoH were in play during the patient case and whether it negatively affected the patient case. Finally, students were asked to engage in a 90-minute reflection and discussion session with peers regarding the patient cases. Following this activity, the post-professional students reported having a better understanding of the SDoH and their patients. While this study can provide a framework for introducing and continuing discussions surrounding the SDoH in didactic instruction, clinical education can also serve as a valuable tool for programs regarding these standards.

In clinical experiences, students can apply the concepts of SDoH into their patient cases. Through discussions with preceptors and patients, students may improve their ability to identify when specific determinants are adversely affecting a patient's health. It is currently unknown whether ICEs or N-ICEs provide the best opportunities for this learning experience and whether preceptors are prepared to teach students about the SDoH and their impact on patient cases. If

ICEs are being used to allow students more time spent at their clinical site and more opportunities to engage with increasingly complex cases, students may be more aware of the administrative details of the case, including a patient's socioeconomic status or access to health insurance and/or services. Further, students at ICEs can potentially spend more time working with their preceptor on ways to combat those SDoH that may be adversely affecting the patient's overall wellness or plan of care. If used in this way, ICEs can provide professional athletic training programs with a supplementary method of teaching public health principles and ensure that students are able to consider these concepts in future patient cases following completion of their program.

Situated Learning Theory

The situated learning theory was created in the field of education to account for the need for experiential or apprentice-based learning in a variety of teaching or health professions programs. It involves the use of legitimate peripheral learning, which involves students or "newcomers" actively engaging in full participation with professionals in "communities of practice."[59] This type of learning enables students to observe and engage with individuals that possess knowledge or mastery of certain skills. Ideally, Lave and Wenger define this phenomenon as "an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities".[59] The situated learning theory has been used to both describe learning phenomena in health care professions education programs as well as serve as an intervention for introducing opportunities for knowledge application.[60] The theory revolves around the concept that students can learn about the behaviors of a professional practice in a specific context by engaging directly in those

circumstances.[60] While this theory can be applied to clinical education in a broad sense, there is worth in the consideration of its use to address areas of weakness in athletic training students.

It has been identified that athletic training students lack experience with specific tasks such as administrative documentation, various forms of communication, and decision-making; this was one of the primary prospective benefits of introducing ICEs into athletic training programs.[1] Since ICEs involve more time spent at a clinical site, they may offer opportunities for students to practice a wider range of skills. Additionally, students may also be in a position to interact with more health care providers and potential mentors. Practicing skills and interacting with practitioners are important aspects of legitimate peripheral learning and the situated learning theory; this may indicate that ICEs are best suited to prepare athletic training students for handling the wide array of responsibilities that accompany autonomous practice.

New standards were implemented by the CAATE to ensure that students are obtaining information regarding the social determinants of health, health literacy, and health framework at some point in the program, meaning that these principles do not necessarily need to be taught in a clinical setting. However, according to the situated learning theory and other established literature in the field, athletic training students would be best served by programs if they were afforded opportunities to apply these specific public health principles in clinical education settings.[61] Unless the program specifically designated an objective that relates to students' abilities to practice in patient populations negatively affected by the social determinants of health, students may not gain clinical experience with patient cases that involve these and other public health concepts.

It is believed that ICEs can provide opportunities for enhanced clinical learning for athletic training students.[1,7] The situated learning theory can be applied to ensure that students

gain experience observing and assisting preceptors as they perform a variety of skills and work in many different settings, including those with diverse patient populations. In this dissertation, the situated learning theory can be used to consider athletic training students' abilities to practice skills in ICEs versus N-ICEs, including demonstrating their knowledge of the social determinants of health as well as their comfortability working with patient populations that may be adversely impacted by social determinants of health. Additionally, this theory will be used to investigate whether placing students in settings with patients that may be negatively affected by social determinants of health will make them feel as if they are more prepared for autonomous practice in those settings.

CHAPTER III

PROJECT I: ATHLETIC TRAINING STUDENT PATIENT ENCOUNTER CHARACTERISTICS DURING IMMERSIVE AND NON-IMMERSIVE EXPERIENCES: A REPORT FROM THE AATE RESEARCH NETWORK

Introduction

Immersive clinical experiences (ICEs) have been used in many health professions as a way to expose students to real-time clinical situations and patient encounters, unlike the experiences they receive in traditional, classroom education.[1,6] Physical therapy, occupational therapy, and nursing programs use immersive experiences in their curricula to enhance critical thinking skills and clinical decision-making among their students.[1] The use of ICEs in health professions education is well-established; nursing students have reported that immersive experiences helped them form better relationships with patients and see more patient progression through recovery.[62] It was also found that nursing students who completed more ICEs felt more prepared for clinical practice and scored better on end-of-program assessments as well as the profession's certification exam.[63] Many health professions education programs, such as in occupational and physical therapy, implement immersive-style clinical experiences toward the end of their curricula, after students have completed most or all relevant coursework.[1] The clinical experiences in the first year of an occupational therapy program are used for introducing the student to clinical practice and to allow students an opportunity to improve proficiency on their skills, while clinical experiences in the second year follow an immersive model to ensure that students are ready for autonomous clinical practice.[1]

New curricular standards regarding the content taught in athletic training programs have been released by the Commission on Accreditation of Athletic Training Education (CAATE) as a

result from the decision to elevate the athletic training professional degree from the bachelor's to the master's level.[3] One such change is presented in the CAATE's *2020 Standards for Accreditation of Professional Athletic Training Programs*[2] indicates that programs must include at least one immersive clinical experience in their program. An ICE is defined in athletic training education as a "practice-intensive experience that allows the student to experience the totality of care provided by athletic trainers" and that "students must participate in the day-to-day and week-to-week role of an athletic trainer for a period of time identified by the program".[2] This new standard also indicates that ICEs should minimally last for 4 weeks but does not provide any additional requirements or details regarding the delivery of these experiences.[2]

Clinical experiences typically involve either non-immersive or immersive formats, non-immersive serving as the more frequently used option in athletic training education. When a professional program uses a more integrated clinical experience format (i.e., non-immersive clinical experiences; N-ICEs), students engage in didactic instruction and clinical instruction simultaneously; students typically spend 4-6 hours per day in the classroom and 4-6 hours per day at their assigned clinical sites.[1] Non-immersive clinical experiences in athletic training often align with the length of a traditional academic semester or sports season.[1] Students who are involved in an ICE model of clinical education engage in full-time coursework for a defined period of time (e.g. the first half of an academic semester) and then engage in full-time clinical education for a defined period of time (e.g., the second half of an academic semester).[1] The CAATE permits programmatic autonomy in choosing the structure of their clinical experiences; this includes choosing the timing and length of ICEs and N-ICEs.[1]

The addition of ICEs in athletic training education is supported by research surrounding athletic training students' perceptions of their preparedness for autonomous clinical practice.[6]

One study found that students identified the diversity and extensiveness of all types of clinical experiences to be one of the most influential aspects of their perceived preparedness to practice autonomously following graduation.[6] Research indicates that ICEs may be used within athletic training programs to enhance clinical education by providing more opportunities for growth in student confidence and clinical decision-making.[7] Furthermore, transitioning from integrated to immersive experiences can be a way for programs to ensure that students are given more responsibility at their clinical sites, demonstrating increasing levels of autonomy (i.e., from observing a patient encounter to performing the encounter) and overall experiences. However, no research has assessed whether or not ICEs impact students' role during patient encounters, an indicator of clinical autonomy. Therefore, the purpose of this study was to examine and compare characteristics (clinical site type, student role, reported diagnoses, reported procedures) of patient encounters that occur during professional athletic training students' immersive and non-immersive experiences.

Methods

Design

This study used a multi-site panel design to record athletic training student patient encounter characteristics from 12 CAATE-accredited professional programs using the E*Value program (MedHub, Minneapolis, MN). Data collection spanned 1.5 academic years, beginning in January 2018 and concluding in May 2019. Institutional review board approval was received by the sponsoring and participating institutions in association with a larger study.[10] A more detailed description of the methods used for this study can be found in a publication associated with the larger study.[10]

Participants

Participants were recruited as a part of a broader study plan to examine various aspects of the characteristics of athletic training student patient encounters.[10] Recruitment was targeted towards CAATE-accredited professional athletic training programs that used the E*Value software for students to record patient encounters (case logging) during clinical experiences (N=37). The research team contacted the program director of programs identified as using the E*Value system to recruit program participation in the study. Program inclusion criteria was: 1) use of the E*Value case-logging system for more than 1 year prior to the start of the study, 2) requirement of students to log all patient encounters using the E*Value software, and 3) have and maintain a Board of Certification (BOC) 3-year aggregate first-time pass rate of 85%.[10] Twelve CAATE-accredited programs agreed to participate in the study (7 graduate and 5 undergraduate programs) which resulted in a total of 363 student participants.

Instrumentation

The Case Logs module within the E*Value software system was used for this study to document athletic training students' patient encounter characteristics during their clinical experiences. Students were asked to use the system to log specific details about the patient encounters they had while at their clinical sites. The variables related to patient encounters that the research team examined for this study were clinical experience type (immersive or non-immersive), clinical site type (college/university, secondary school, clinic, or other), student role (observed, assisted, performed), patient diagnoses, and procedure(s) performed.

Data Collection

Prior to the start of data collection, participating programs underwent training led by a member of the research team regarding proper patient encounter logging procedures in the Case Logs module of the E*Value system. More information regarding the training conducted with those programs can be found in another publication.[10] Students from the participating programs were instructed by their faculty members and clinical supervisors to log each patient encounter that they were involved with during each day of their clinical experiences. Patient encounter information was stored securely within the E*Value system every two weeks, and information regarding all encounters was downloaded from the E*Value system at the end of each month. A member of the research team de-identified the data, coded text responses into numeric entries, and organized the data into one singular file for data analysis purposes.

Data Analysis

Patient encounter data was analyzed using SPSS (version 23; IBM Corp, Chicago, IL). Descriptive statistics were used to summarize characteristics of the patient encounters. Generalized estimating equations with negative binomial links were used to compare student role, clinical site type, length of patient encounter, and number of diagnoses and procedures used between the two clinical experience types (ICEs and N-ICEs). Following data collection, diagnoses and procedures used during each patient encounter were used to create new variables such as diagnosis body region and procedure type. Binary logistic generalized estimating equations were used to compare patient gender and patient age between ICEs, N-ICEs. Generalized estimating equations were used to account for multiple patient encounter records per

student. Significance for all statistical tests used in this study was indicated at a p value of less than or equal to 0.05.

Results

Over one academic year, a total of 30,630 patient encounters were recorded by a total of 363 professional athletic training students; a total of 18,228 (59.5%) encounters occurred at N-ICEs, 10,999 (35.9%) encounters occurred at ICEs, and 1,403 encounters did not list an experience type.

Clinical Site Comparisons

The majority of patient encounters occurred at the college/university setting for both ICEs (at 64%, n=7,041) and N-ICEs (67.2%, n=12,257). Information regarding clinical site distribution among ICEs and N-ICEs can be found in Table 1. There were no significant differences in clinical site type between ICEs and N-ICEs ($\chi 2(1) = .139$, p=0.71; Table 1). Similarly, there were no significant differences between ICEs and N-ICEs in length of encounter ($\chi 2(1)=.505$, p=0.48), patient gender ($\chi 2(1)=.356$, p=0.55), and patient age ($\chi 2(1)=1.547$, p=0.21).

Student Role Comparison

Table 1 also lists the percentage breakdown of student role between ICEs and N-ICEs. Students reported they "performed" patient encounters more than "assisted" or "observed" during both ICEs (70.6%) and N-ICEs (72%). A generalized estimating equation with a negative

binomial link revealed no significant differences in student role between ICEs and N-ICEs ($\chi 2(1)=.475$, $p=0.50$; Table 1).

When examining student role across the four clinical experience settings, we found that students reported that they "performed" 71.5% of ICEs and 78.1% of N-ICE patient encounters that occurred in the college/university setting. In both ICEs and N-ICEs, students reported similar student role patterns in college/university and secondary school patient encounters. Patient encounters that occurred in clinic settings during both ICEs and N-ICEs tended to have reserved student role patterns, where more patient encounters occurred where the student had "observed" or "assisted" with the encounter rather than having "performed" the actions associated with it. A break-down of student role with consideration of clinical site type for both ICEs and N-ICEs is displayed in Table 2.

Diagnoses and Procedure Comparison

Students reported an average of 0.80 ±0.64 diagnoses per patient encounter that occurred at ICEs, compared to 0.82 ±0.63 diagnoses per patient encounter at N-ICEs. A generalized estimating equation revealed there was no significant difference in total number of diagnoses used during patient encounters at N-ICEs compared to ICEs, $\chi 2(1)=1.643$, $p=0.20$. Table 3 and 4 display the percentage differences of procedure type and body region of diagnoses between ICEs and N-ICEs. Generalized estimating equations revealed no significant differences in the number of patient encounters involving diagnoses of specific body regions or procedures of specific categories between ICEs and N-ICEs with two exceptions; students reported significantly more general medical ($\chi 2(1)=4.342$, $p=0.4$) and non-specific ($\chi 2(1)=12.577$, $p<.001$) diagnoses in ICEs as compared to N-ICEs.

Students reported an average of 1.35 ±1.12 procedures per patient encounter that occurred at ICEs, compared to 1.33 ±1.04 procedures per patient encounter at N-ICEs (Table 2). A generalized estimating equation also revealed there was no significant difference in total number of procedures used during N-ICEs compared to ICEs, $\chi 2(1)=.339$, $p=0.56$. Generalized estimating equations revealed no significant differences ($p>0.05$ in all cases) in the number of patient encounters that involved each of the procedural categories created for the data in this study including evaluation/examination, care/treatment/rehabilitation, protection/prevention, application of therapeutic modality, or assessment of specific impairment.

Discussion

The data from this study details the current use of ICEs compared to N-ICEs in athletic training programs, providing a look into clinical education on a large scale. We examined differences between the two clinical experience types with regard to clinical site type, patient age, length of patient encounters, student role, and the complexity of patient encounters through examination of diagnoses and procedures used. While researchers have recently published studies using qualitative methodology to examine the use of ICEs, this is the first study to examine characteristics of ICEs through students' documentation of their patient encounters.[50,51]

Clinical Setting and Patient Demographic Comparisons

As of 2018, approximately 32.3% of athletic trainers practice in the secondary school setting, 29.8% practice in the collegiate/university setting, 19.0% practice in the clinic setting, and 11.06% are either still full-time students or practice in other emerging and unique settings.[64] These statistics contrast with the distribution of clinical experiences seen in our results for both

ICEs and N-ICEs. The majority of clinical experiences recorded in this study, for both ICEs and N-ICEs, were held at the college and university setting; additionally, the differences between the frequency of collegiate/university, secondary school, and clinic setting patient encounters was larger than the ±14% that is demonstrated in athletic trainer prevalence in the workplace. The results from this study suggest that students are not getting adequate opportunities to practice in settings outside of colleges/universities and secondary schools. This may have a negative effect on athletic training students' confidence level and skill implementation during entry-level practice as nursing literature indicates that student clinical placement at certain types of clinical sites increases students' confidence and desire to work in those settings.[65-67] As students gain confidence and increase their perceived preparedness to enter the workforce through various clinical experiences, athletic training programs need to ensure that students are afforded opportunities at sites similar to ones at which they may one day practice.[6]

Although there were over 7,000 more patient encounters recorded at N-ICEs than ICEs, the characteristics of those patient encounters were similar in almost all ways. The results indicate that there are no significant differences in the percentages of the various types of clinical settings used between ICEs and N-ICEs, meaning that programs may lack specific intention for students during ICEs. Many existing programs may be relying on the clinical sites that they already use for their N-ICEs in order to satisfy the CAATE's standard requiring at least one ICE. Research has indicated that students in various health professions gain confidence working with specific patient populations by spending time directly at clinical sites with those patient populations.[43,65,66,68,69] Placing athletic training students in clinical sites that provide meaningful experiences with different patient populations is vital to increasing their confidence to work in those settings with those patient populations. Immersive clinical experiences can be used to

afford students opportunities to gain experience working with a wide range of patient populations, in non-traditional settings, or in different geographic areas. If programs are not looking for new clinical sites or site types for ICEs, they may miss out on essential opportunities for both skill growth and increased confidence for students. Program administrators should consider the intentions behind their clinical site selection and examine where ICEs could fill any gaps in opportunities with regard to the CAATE standards surrounding clinical education or students' preferences.

Student Role and Length of Encounter Comparisons

Researchers have linked student role in patient encounters to students' perceptions of their skill level, confidence, and preparedness to enter the workplace.[39] The ability for programs to provide students with opportunities to apply learned skills as well as engage in authentic, diverse clinical experiences has been shown to increase student perceptions of successful autonomous practice following completion of their athletic training program.[6,39] However, these studies did not take the immersion clinical education model into consideration or make comparisons between ICEs and N-ICEs.[6,39] It is imperative for programs to find a way to promote a progression of skill autonomy for students, as this directly impacts their ability to transition to the workplace as a certified athletic trainer.[7] Research has indicated that ICEs may provide a unique opportunity for autonomy and clinical decision-making practice for students.[7] In a recent study, students anecdotally confirmed the estimations surrounding increased autonomy and responsibilities afforded by ICEs.[51] Additionally, considering that ICEs have the potential to offer students more time spent in their clinical experiences, both in length of assignment and in daily clinical hours, students may have an opportunity to engage in more

complex patient cases that may involve more time spent on those cases.[1] However, we did not see a significant difference in length of time spent on patient encounters between ICEs and N-ICEs.

The overwhelming majority of patient encounters in both ICEs and N-ICEs were reported by students as having "performed" them rather than "observed" or "assisted". In a recent study, athletic training students reported that they had more feelings of autonomy during ICEs and felt more prepared to enter the workforce.[51] We did not find an quantifiable, significant increase in student autonomy in the data for this study, but this could have been impacted by our methodology which requires accurate documentation of student activity. Some programs may attempt to demonstrate that their students achieve progressive clinical autonomy by placing ICEs in one of the final semesters of the curriculum with the intention that students would engage in more "performed" patient encounters during these experiences. The data from this study indicates that students are not necessarily more likely to have more autonomy at ICEs as compared to N-ICEs. Therefore, the timing of ICEs within a program structure may be irrelevant with regard to promoting clinical autonomy for students. If programs intend to use ICEs to demonstrate clinical autonomy, they may need to establish clear objectives and goals for student learning and development that differ from those associated with N-ICEs.

The number of "performed" patient encounters that were reported may also be attributed to student documentation error; students may have been more apt to document patient encounters that they themselves performed instead of all patient encounters they experienced, including those that they observed. If athletic training programs intend to use student documentation of role during patient encounters to demonstrate progressive clinical autonomy, more training may

be needed to ensure that students are more inclusive of "observed" and "assisted" patient encounters during their reporting.

Formal preceptor training has been shown to provide preceptors with programmatic expectations for their involvement in student learning; however, research indicates that preceptors may not get in-depth training on providing appropriate supervisory levels and allowing students to have progressive levels of autonomy in patient encounters.[8,70] This is a common occurrence in health professions education, as insufficient allowance for student autonomy has also been found with novice physical therapy clinical instructors and supervisors.[71] When asked about their preceptorship habits during ICEs as compared to N-ICEs, preceptors reported that they felt as though they received inadequate instruction from their programs on both their role during the two experience types and any specific objectives or goals that the program set for ICEs.[50] Students' positively perceived clinical education experiences are often tied to confidence in skill building, engaging opportunities, and discussion of patient cases and procedures with instructors; our estimates of student role during ICEs and N-ICEs as well as preceptor perceptions indicate that students may not be receiving appropriate levels of support and supervision from their preceptors.[9,72-74] Programs should ensure that preceptors understand the importance of students "observing" and "assisting" with patient encounters as well as "performing" them, allowing for students to demonstrate and practice using skills as they learn them didactically.

Characteristics of Diagnoses and Procedures Reported

The analyses showed that students did not report a significant difference in diagnoses and procedures used in patient encounters between ICEs and N-ICEs, which further demonstrates

that ICEs may not be currently used in programs to demonstrate progressive proficiency in handling complex cases. This apparent lack of progression may hinder students' clinical reasoning development, as more complex cases would require students to create and investigate differential diagnoses during their evaluation process. This may also be the result of students' not having enough patient encounters where they are observing or assisting their preceptors during evaluations, thus lacking a gradual progression in decision-making responsibility. Students' lack of confidence in athletic training skills and self-identified need for more clinical experiences has been documented in literature, though not specifically tied to clinical reasoning.[43] The idea of health professions students lacking critical thinking skills, even later in their curricula, is well-supported by previous literature.[72,75,76] We did not control for other variables that may impact athletic training students' clinical reasoning abilities at ICEs such as the timing of the ICE within the athletic training program, the ability of the clinical site to give the student time to complete a full clinical reasoning thought process, and the ability of ICEs to provide students with opportunities to evaluate more complex cases. These factors may be able to provide additional insight into the clinical reasoning implications of the current use of ICEs in athletic training programs.

The results also indicate that there is little variation in student reports of the types of injuries they diagnose and the types of procedures they typically use between ICEs and N-ICEs. However, students reported handling more general medical and non-specific diagnoses in ICEs without also reporting a significant increase in encounters seen in the "clinic" or "other" settings. This result echoes others presented in this study indicating the lack of differences in what students experience at both ICEs and N-ICEs.

The data in this study details the comprehensive lack of characteristic differences between ICEs and N-ICEs, which may contrast with assumptions made about these two experience types made due to differences in their curricular structure. Athletic training students perceive ICEs to provide better quality and quantity of patient encounters, but the lack of differences in various components of patient encounters between the two experience types identified in this study paints a different picture.[51] It is possible that the participating programs did not have established objectives or goals for ICEs at the time of this study, resulting in an inaccurate picture of the use of ICEs as compared to N-ICEs since more widespread adoption of the 2020 CAATE standards for accreditation. More research is needed to examine how ICEs are used over time, including adjustments made by programs to use each experience type more intentionally or effectively.

Limitations and Future Research

There are several limitations to this study, the first being that all data reported regarding patient encounter characteristics were reported by students. Students were given instructions on how to document patient encounters with a review of relevant terminology (e.g. immersive clinical experience), but some students may not have had a clear understanding of some of the terminology. Additionally, the research team did not designate an effort to investigate the reported ICE site with regard to demographic information related to that of the program's campus. This may have provided the research team with more detail regarding the use of ICEs to expose students to varied patient populations or geographic regions.

The results from this study indicate that several programs across the country are implementing ICEs voluntarily (as the data collection concluded prior to the time at which the

implementation of ICEs were required of programs by the CAATE) but may be relying on a combination of experiences to meet the educational standards set by the CAATE. Programs may be using ICEs to address specific needs within their program curricula that may not have shown in the results of this study; a qualitative analysis may be needed to fully understand the voluntary use of ICEs as well as programs' intended uses for ICEs as they have become a mandatory component of the professional level master's degree curriculum. Additionally, future research should work to examine other potential factors involved in patient encounters that may affect student role and clinical reasoning indicators during ICEs.

Conclusions

The results from this study have many implications for graduate-level professional athletic training programs and their clinical education structure. ICEs afford programs the opportunity to expose students to varied or non-traditional athletic training settings, to work with socioeconomically or agedly diverse patient populations, and explore healthcare delivery in other geographic regions. The lack of significant differences in these characteristics between ICEs and N-ICEs suggests that programs may not be currently intentionally using ICEs to expose their students to aspects of clinical education that cannot be achieved through N-ICEs.

Programs should use the information collected in this study regarding student role and setting type in order to create more meaningful clinical experiences for their students. If programs intend to use ICEs later in their curriculum to demonstrate progressive clinical autonomy, they will need to set clear and defined objectives for ICEs as compared to N-ICEs. Additionally, programs will need to ensure that their preceptors receive proper training on those objectives and on their role in student learning at both types of clinical experiences. If programs do not intend to

use ICEs to demonstrate progressive autonomy, the results from this study indicate that program administrators should not feel as though they must wait to send students to ICEs until the end of their programs.

Table 1. Comparison of ICE and N-ICE Clinical Site Types, Length of Patient Encounter, Patient Gender, and Patient Age

	Immersive clinical experiences		Non-immersive clinical experiences		
Clinical site type	%	n	%	n	p
College/university	64.0	7,041	67.2	12,257	.709
Secondary school	29.8	3,278	24.4	4,449	
Clinic	4.6	507	6.0	1,101	
Other	1.5	166	2.3	414	
Student role	%	n	%	n	p
Observed	12.0	1,343	11.7	2,136	.491
Assisted	17.2	1,892	16.3	2,973	
Performed	70.6	7,764	72.0	13,119	
Length of PE	%	n	%	n	p
0-15 minutes	59.6	6,556	58.0	10,571	.477
16-30 minutes	28.6	3,151	29.5	5,370	
31-45 minutes	0.07	817	0.08	1,454	
46-60 minutes	0.03	330	0.03	548	
61-75 minutes	0.008	84	0.007	127	
76-90 minutes	0.003	32	0.005	94	
91-105 minutes	0.001	15	0.001	23	
106-120 minutes	0.000	5	0.001	16	
More than 120 minutes	0.001	9	0.001	25	
Patient gender	%	n	%	n	p
Male	57.7	6,350	58.6	10,683	.534
Female	42.2	4,646	41.4	7,539	
Transgender	0.000	1	0.000	0	
Patient age	%	n	%	n	p
Pediatric	28.5	3,131	25.7	4,677	.179
Adult	71.5	7,868	74.3	13,551	
Total		10,999		18,228	

Table 2. Comparison of ICEs and N-ICEs with Regard to Student Role and Clinical Site Type

Site type	Student role	Number of PEs ICE, N-ICE	Percent of PEs at site type ICE, N-ICE
College/university	Observed	837, 1049	11.89, 8.56
	Assisted	1171, 1640	16.63, 13.38
	Performed	5033, 9568	71.48, 78.06
Secondary school	Observed	288, 577	8.79, 12.97
	Assisted	495, 961	15.10, 21.60
	Performed	2495, 2911	76.11, 65.43
Clinic	Observed	195, 474	38.46, 43.05
	Assisted	201, 350	39.64, 31.79
	Performed	111, 277	21.89, 25.16
Other	Observed	22, 36	13.25, 8.70
	Assisted	23, 22	13.86, 5.31
	Performed	121, 356	72.89, 85.99

Table 3. Procedure Use in ICEs and N-ICEs

Procedure	Immersive clinical experiences		Non-immersive clinical experiences		P (* indicates significance)
	% (of total)	N	% (of total)	N	
Evaluation/examination	34.4	3,780	31.1	5,669	.881
Care/treatment/rehabilitation	32.4	3,563	32.2	5,874	.142
Protection/prevention	14.1	1,555	12.2	2,230	.519
Application of therapeutic modality	26.1	2,874	27.6	5,029	.520
Assessment of specific impairment	11.3	1,238	12.2	2,231	.468
Administration/facility management	0.0	0	0.0	0	---

Table 4. Diagnoses by Body Region in ICEs and N-ICEs

Body region	Immersive clinical experiences		Non-immersive clinical experiences		P (* indicates significance)
	% (of total)	N	% (of total)	N	
Upper extremity	16.9	1,864	16.3	2,967	.268
Lower extremity	43.2	4,755	42.7	7,784	.610
Head/face	0.04	442	0.03	620	.552
Trunk	0.06	641	0.06	1054	.445
General medical	0.02	205	0.03	467	.037*
Non-specific	0.03	325	0.06	1,074	.000*

CHAPTER IV

PROJECT II: ATHLETIC TRAINING STUDENT CORE COMPETENCY PROFESSIONAL BEHAVIOR IMPLEMENTATION BETWEEN IMMERSIVE AND NON-IMMERSIVE EXPERIENCES: A REPORT FROM THE AATE RESEARCH NETWORK

Introduction

Clinical education serves as a vital tool for athletic training programs as it pertains to affording students opportunities for skill development and growth. These experiences are not only used for skill development, but they also provide students with opportunities for professional socialization and role awareness.[6,38] The ability to have realistic clinical experiences can ultimately advance students' dedication to the profession and ability to identify the practice setting that best suits their strengths and goals.[6,38] Clinical experiences also provide students with opportunities for preceptor and peer mentorship, which has also been identified as an influential factor to successful transition to practice in athletic trainers.[38,77] The importance of clinical education in athletic training is multi-faceted, and program administrators should use policy shifts to examine the weaknesses and challenges of current practices in order to best serve students.

Since fall of 2020, all professional master's athletic training programs are required to implement at least one immersive clinical experience into their curricula, which involves students spending at least 4 weeks at a clinical site under the supervision of an athletic trainer.[2] Since students spend more time at their clinical site during immersive clinical experiences, it is also believed that students may gain opportunities to practice skills with a larger volume of patient encounters. These experiences are also intended to provide students with more accurate

depiction of full-time athletic training practice, including administrative and other organizational responsibilities.[1] By serving as a more realistic picture of the profession for students, immersive clinical experiences may ultimately influence successful transition to practice.

The Committee on the Health Professions Education Summit was formed as a response to the Institute of Medicine Quality Chasm report, and it developed five core competencies that would improve the quality of health professions education programs and their students.[34,78] These core competencies include evidence-based practice (EBP), interprofessional education and collaborative practice (IPECP), patient-centered care (PCC), health information technology (HIT), and quality improvement (QI).[78] The Commission on Accreditation of Athletic Training Education (CAATE) has required these competencies in professional-level athletic training programs since 2020.[2] Athletic training education will now include these competencies, ideally through the use of professional behaviors, which can be directly implemented during patient encounters at students' clinical experience sites. In theory, immersive clinical experiences should provide the greatest opportunity for students to implement a higher frequency of behaviors associated with the core competencies; however, this has not yet been established.

Research examining the use of immersive clinical experiences is necessary in order to ensure that such experiences are being used effectively in terms of providing opportunities to practice skills or engaging students with the core competencies. Preliminary research has been conducted to examine the predictive abilities of certain clinical experience characteristics on professional behavior implementation, but this study did not differentiate between immersive and non-immersive clinical experiences.[11] Therefore, the purpose of this study is to examine the influence of clinical experience type on athletic training students' implementation of behaviors associated with 1 or more of the 5 core competencies during patient encounters.

Methods

Design

This study used a multi-site panel design to record athletic training student patient encounter characteristics from 12 CAATE-accredited professional programs (five undergraduate, seven graduate) using the E*Value program (MedHub, Minneapolis, MN). Data collection spanned 1.5 academic years, beginning in January 2018 and concluding in May 2019. Institutional review board approval was received by the sponsoring and participating institutions in association with a larger study.[10] A more detailed description of the methods used for this study can be found in a previous associated publication.[10]

Participants

A total of 363 students were recruited to examine various aspects of the characteristics of patient encounters experienced by athletic training students.[10] Recruitment was targeted towards CAATE-accredited professional athletic training programs that used the E*Value software (Medhub, Minneapolic, MN) for students to record patient encounters (case logging) during clinical experiences. The research team contacted the program director of programs identified as using the E*Value system to recruit program participation in the study (N=37). Program inclusion criteria was: 1) use of the E*Value case-logging system for more than 1 year prior to the start of the study, 2) program requirement of students to log all patient encounters using the E*Value software, and 3) have a Board of Certification (BOC) 3-year aggregate first-time pass rate of 85%.[10] At the conclusion of recruitment, 12 CAATE-accredited programs (7 graduate, 5 undergraduate) agreed to participate in the study.

Instrumentation

The Case Logs module within the E*Value software system was used for this study, documenting athletic training students' patient encounter characteristics during their clinical experiences. Students were asked to use the system to log specific details about the patient encounters they had while at their clinical sites. The variables related to patient encounters that the research team examined for this study were clinical experience type (immersive or non-immersive) and use of any of the professional behaviors associated with the core competencies (PCC, IPECP, EBP, HIT, and QI). A list of these behaviors can be found in Table 5.

Data Collection

Prior to the start of data collection for the study, program directors and/or coordinators of clinical education from all participating programs received training on study design set-up of patient encounters in the Case Log Module of the E*Value system.[10] A member of the research team then conducted a training session with students to review operational definitions and logging procedures, aiming to increase consistency between students of participating programs.[10] Students from the participating programs were instructed by their faculty members and clinical supervisors to log each patient encounter that they were involved with during each day of their clinical experiences. Patient encounter information was stored securely within the E*Value system and was downloaded by a member of the research team at the end of each month. A member of the research team de-identified the data, coded text responses into numeric entries, and organized the data into one singular file for data analysis purposes.

Data Analysis

Patient encounter data was analyzed using SPSS (version 27; IBM Corp, Chicago, IL). Composite scores (counts) were calculated, which indicated the number of behaviors that were implemented for each core competency during each patient encounter. Differences in professional behavior implementation between immersive clinical experiences (ICEs) and non-immersive clinical experiences (N-ICEs) were assessed using a generalized estimated equation with a negative binomial link for behaviors associated with PCC, IPECP, EBP, and HIT ($p<0.05$) and a logit link for the QI behavior ($p<.05$).

Results

In 1.5 academic years, a total of 30,603 patient encounters were documented from the 12 participating programs, including 10,999 encounters occurring at ICEs and 18,228 encounters occurring at N-ICEs. A total of 1,403 patient encounters did not list a clinical experience type. Students implemented at least one professional behavior associated with any of the core competencies in 16,431 (90.1%) N-ICE patient encounters and 10,380 (94.4%) ICE patient encounters. The frequencies of behavior implementation for both ICEs and N-ICEs are reported in Table 5.

Evidence-Based Practice

A total of 13,139 (72.1%) N-ICE patient encounters and 8,673 (78.9%) ICE patient encounters involved use of at least one of the EBP behaviors. Students in ICEs implemented significantly more behaviors associated with EBP than those in N-ICEs *($\chi 2(1)=10.024$, $p=0.002$, $M_{diff}=0.10$, 95% CI: 0.04, 0.16)*. Students implemented the following behaviors more frequently

during patient encounters at ICEs as compared to N-ICEs: asking a question of a clinician *(χ2(1)=4.847, p=0.028, M_{diff}=0.04, 95% CI: 0.00, 0.07)* and applying previously learned information *(χ2(1)=6.484, p=0.011, M_{diff}=0.05, 95% CI: 0.01, 0.08)*.

Interprofessional Education and Collaborative Practice

A total of 2,944 (16.2%) N-ICE patient encounters and 2,439 (22.2%) ICE patient encounters involved the use of at least one of the IPECP behaviors. Students in ICEs implemented significantly more behaviors associated with IPECP than those in N-ICEs *(χ2(1)=9.640, p=0.002, M_{diff}=0.07, 95% CI: 0.03, 0.11)*. The data revealed that students interacted with another athletic trainer besides their preceptor significantly more frequently in ICEs as compared to N-ICEs *(χ2(1)=9.589, p=0.002, M_{diff}=0.05, 95% CI: 0.02, 0.08)*. The differences in frequency of students' reported interaction with another health care provider or another health professions learner between ICEs and N-ICEs were not significant.

Patient-Centered Care

A total of 10,747 (59.0%) N-ICE patient encounters and 6,058 (55.1%) ICE patient encounters involved use of at least one of the PCC behaviors. There was no significant difference in the total number of PCC behaviors implemented between ICEs and N-ICEs (p=0.099). There was no significant difference in students' use of a discussion of the patient's goals *(χ2(1)=2.829, p=0.093, M_{diff}=0.03, 95% CI: -0.01, 0.07)*, patient-reported outcomes *(χ2(1)=.004, p=0.95, M_{diff}=0.00, 95% CI: -0.03, 0.03)*, or clinician-reported outcomes *(χ2(1)= .424, p=0.52, M_{diff}=0.01, 95% CI: -0.02, 0.03)* between ICEs and N-ICEs.

Health Information Technology

A total of 6,900 (37.9%) N-ICE patient encounters and 3,579 (32.5%) ICE patient encounters involved use of at least one of the HIT behaviors. Students in ICEs implemented more total behaviors associated with HIT than those in N-ICEs *($\chi 2(1)=4.146$, $p=.042$, $M_{diff}=0.08$, 95% CI: 0.00, 0.15)*. Data further revealed that the significant difference in this core competency between ICEs and N-ICEs lies in students' use of information from an electronic health or medical record *($\chi 2(1)=4.455$, $p=0.035$, $M_{diff}=0.03$, 95% CI: 0.00, 0.05).*

Quality Improvement

A total of 12,396 (68.0%) N-ICE patient encounters and 9,080 (82.6%) ICE patient encounters involved use of the QI behavior. Students in N-ICEs implemented the QI behavior significantly more often than those in ICEs *($\chi 2(1)=11.466$, $p=0.001$, $M_{diff}=0.06$, 95% CI: 0.02, 0.09).*

Discussion

Immersive Clinical Experiences and Behavior Implementation

There is limited information regarding athletic training student implementation of professional behaviors associated with the core competencies, and our study is the first to compare implementation of these behaviors between ICEs and N-ICEs. Athletic training programs now must include one ICE within their clinical education curricula, but the CAATE provides little guidance or regulation as to how that ICE should be implemented. Potential goals of ICEs in athletic training clinical education are to provide students with opportunities for a higher volume of patient encounters, opportunities to refine skills and gain experience with more

administrative responsibilities, increase student feelings of confidence and preparedness, interact with clinicians of varied health professions, and potentially expose students to more complex and long-term patient cases.[1,5,12,51] Literature from the nursing field indicates that ICEs are essential to high certification examination pass rates and students' perceptions of preparedness for autonomous practice following completion of their professional program.[62,63]

Considering the versatility of ICEs in fulfilling clinical education requirements set by the CAATE or enhancing students' overall experience in clinical education, programs should strive to assign specific purposes or objectives for students to meet while completing ICEs versus when students are completing N-ICEs. One way for programs differentiate student experience between ICEs and N-ICEs may be to look at the implementation of professional behaviors associated with the EBP, IPECP, PCC, HIT, and QI core competencies. Our study indicates that athletic training students implemented significantly more professional behaviors associated with EBP, IPECP, and HIT during ICEs as compared to N-ICEs. This would indicate that students may be seeing more complex cases during ICEs and are given more opportunities to engage in these professional behaviors.

Evidence-Based Practice and Health Information Technology

The high percentage of patient encounters that involved at least one professional behavior associated with EBP is not surprising, as implementation of EBP in clinical practice has been heavily emphasized across the athletic training profession in recent years through continuing education efforts.[79] Such efforts have been conducted similarly in nursing education, where students are taught differences between research utilization and incorporating evidence-based practice using available resources and technology.[80,81] Researchers in athletic training have

identified students are largely influenced by the actions and tendencies of their preceptors, including during the implementation of evidence-based practice during patient encounters.[82,83] In this study, student-reported frequency of asking a question of a clinician and applying previously learned evidence was significantly higher in ICEs as compared to N-ICEs. Considering the impact that preceptor implementation of behaviors related EBP on student implementation of those behaviors, solely using athletic training students to increase preceptor use of EBP may not be effective.[84]

Students reported no significant difference in documentation of patient cases within an electronic health or medical record between ICEs and N-ICEs but students did report using health information from an electronic health or medical record keeping system more frequently during ICE patient encounters. Preceptors and other athletic trainers have frequently cited lack of time and resources as barriers to EBP and HIT behavior implementation in clinical practice.[85-87] Students in ICEs may be able to dedicate more time at their clinical site, which may lead to engagement in more administrative tasks such as patient case documentation and record maintenance. This increase could have also resulted from students having more opportunities in ICEs to work with increasingly complex cases or with long-term cases requiring updates to those patients' records.

There are a few potential reasons for less frequent reports of student use of behaviors associated with HIT. Previous research has identified that preceptors often allow athletic training students to perform documentation activities autonomously, with or without a feedback session planned to check the student's work and identify areas for improvement.[88] Students may experience less supervision while engaging in documentation habits during ICEs, and students may document less due to that reduction in supervision; this may serve as an explanation for the

lack of significance in the frequency of that HIT behavior in ICEs as compared to N-ICEs. Additionally, preceptors may not have an adequate understanding of programmatic expectations with regard to allowing students opportunities to engage in those behaviors associated with HIT. With the inherent differences in ICE characteristics such as increased time and opportunities to work with increasing complex cases compared to N-ICEs, students may benefit from program administrators and preceptors emphasizing use of these behaviors during ICE patient encounters. If programs are using clinical experiences to provide students with opportunities to engage in more behaviors associated with EBP and HIT, ICEs should be more frequently incorporated than N-ICEs due to increased frequency of reports of students implementing these behaviors. If ICEs cannot be implemented more than once in an athletic training program's curriculum, administrators should ensure that preceptors receive proper education related to emphasizing use of these behaviors in N-ICEs.

Interprofessional Education and Collaborative Practice and Patient Centered Care

According to one study, clinicians agreed with many statements regarding the importance of IPECP in athletic training practice but also reported engaging with other health care providers in only 42% of patient cases.[89] Clinicians have identified lack of access to other health care providers as well as a lack of communication and role identification with other health care providers as potential barriers to implementing behaviors associated with IPECP in their practice.[90] Some of these barriers may influence preceptor engagement with behaviors associated with IPECP and, therefore, opportunities for students. A few studies contribute to this idea, stating that challenges of providing students with opportunities to engage in IPECP include lack

of institutional readiness and resources available, improper institutional housing of athletic training programs, and influence from preceptors' biases about IPECP.[90,91]

Findings from this study indicate that students engaged in significantly more IPECP behaviors during ICEs as compared to N-ICEs, which aligns with athletic training researchers' hopes for ICE use in programs as well as students' reports.[12,51] However, according to our data, it seems as if most of that significant difference is driven by the occurrence of students interacting with other athletic trainers or other health professions learners and not necessarily clinicians of other health professions. Data collected from this study suggests that programs are not yet using ICEs to emphasize student exposure to IPECP with clinicians from other health care professions. However, ICEs involve students spending more time at clinical sites and potentially more opportunity for participating in tasks not usually conducted during competition hours, such as communicating referrals with specialists or accompanying patients to specialist visits.

Varying athletic training employment models have emerged in the last few decades as the profession has advanced as a major player in the health care team. The most commonly found models are the athletic model, where an athletic trainer is hired by and reports to an athletic director with no medical training, and the medical model, where the athletic trainer reports to another health care professional such as a team physician.[92] The medical model has been identified by researchers as the best employment option in order to foster professional relationships with other health care providers and open lines of communication within a health care team.[89] If programs intend to use ICEs to expose students to IPECP, model of athletic training employment may be a valid indicator of students' potential exposure to other health care providers. Even though placement at clinical sites where the preceptor is not an athletic trainer may offer students a unique perspective with regards to that profession, placing students at

athletic training sites housed in the medical model of employment may offer more opportunities for students to observe and take part in collaboration between professions.

Since students presumably spend more time at ICEs as compared to N-ICEs, educators may hope to see that students are able to engage in more complex, long-term patient cases. In these situations, students should be using patient and clinician-reported outcomes to track patient progress as well as maintain a continuous dialogue regarding the patient's goals. However, findings from this study reveals that clinical experience type did not affect professional behavior implementation for patient-centered care including the frequency of students' documented use of patient-reported outcomes, clinician-reported outcomes, or discussion of the patient's goals during the encounter. Previous research suggests that, out of all of the core competencies, PCC behaviors may be the most likely to be implemented during a patient encounter regardless of clinical experience type; however, with an average of 57.1% implementation of at least one of the PCC professional behaviors in all patient encounters, data from this study suggests that programs may need to examine student use of these behaviors more closely. If clinicians and preceptors are not using these specific behaviors to demonstrate patient-centered care in their practice, it serves as a possible explanation for why students are not as well. One study surveyed collegiate student athletes about their perceptions regarding patient-centeredness of the care they received from athletic trainers. Only 37% of patients reported that the athletic trainer asked about their goals for treatment and used said goals as part of their care plan.[93] It is possible that clinicians, preceptors, and students are providing patient-centered care without considering these specific competency behaviors. Additionally, another study found that only 21.7% of surveyed clinicians reported regular use of patient-reported outcomes, listing lack of resources and time as barriers to implementation.[52]

Quality Improvement

Quality improvement is essential to athletic training health care as a means for monitoring patient outcomes, increasing the quality of care, and reducing the cost of care.[94] For the purpose of this study, we asked students if they reflected on their role and actions pertaining to that patient encounter as well as potential areas for improvement and success. Reflection has been used in many health professions education programs as a means to foster students' clinical reasoning development and increase confidence in skills.[95] Students reported that they engaged in quality improvement behaviors such as reflecting on the patient encounter and identifying potential areas for improvement significantly more frequently during N-ICEs as compared to ICEs; however, this finding seems to be influenced by the distribution of the total number of patient encounters between ICEs and N-ICEs. Students reported engaging in the QI behavior at a higher percentage of the total number of ICE encounters as compared to N-ICEs. Since students may spend more total time at ICEs as compared to N-ICEs, they may have opportunity for more frequent patient encounters; as previously established, this factor may lead programs to establish student engagement in QI behaviors as a potential goal for ICEs.[11,96]

Quality improvement efforts in health care are generally conducted to improve patient or organizational outcomes over an extended period of time, as clinicians and institutions require time to implement strategies for measurement and improvement.[34] Strategies to implement QI are also cyclical in nature; for example, the Plan-Do-Study-Act cycle is commonly used by clinicians to make improvements in patient health outcomes.[94] Due to these features of implementing quality improvement in both health care practice and education, examining student use of QI in isolated patient encounters may not serve as an accurate view into those efforts.

Additionally, there are a multitude of behaviors that can contribute to student use of QI that may not have been captured in the single QI-related question included in this study.

Though students reported engaging in reflection during or after a patient encounter for a high percentage of the time, the question does not involve a way to check for accuracy of student responses and may be an inaccurate representation of true QI efforts in athletic training clinical education. Additional questions related to QI may have provided further insight to student implementation of specific QI-related behaviors, apart from solely reflection, during or following the patient encounter.

Limitations and Future Directions

Our study has inherent limitations related to data collection. Our data is self-reported by athletic training students and relies on their ability to log patient encounter information accurately and consistently. As it pertains to logging professional behavior implementation, students may be unfamiliar with how the professional behavior is presented in clinical skill situations. Additionally, we did not ask students to report the total length of time that they spent at ICEs or N-ICEs while they were in them, though we did have the students report the length of time of the individual patient encounter. This lack of data may limit the generalizability of the findings as it pertains to the specifics of how each program chooses to implement ICEs and N-ICEs in their curriculum. Future research should account for timing of ICEs within program curricula in order to examine the potential for increased professional behavior implementation as a student progresses in a program. Future studies should also aim to include preceptor verification of case logging in order to triangulate student-reported data.

Conclusions

Students in ICEs implemented significantly more behaviors associated with EBP, IPECP, and HIT; students in N-ICEs implemented the behavior associated with QI more frequently. Educators should consider the balance of opportunities to implement these behaviors within their clinical education curriculum and set specific objectives related to implementation of these behaviors in both ICEs and N-ICEs. Programs should also consider student implementation of professional behaviors associated with the core competencies when creating objectives specific to ICEs; some behaviors are better suited for experiences that allow for more time and opportunities for students to engage with more complex or long-term patient cases. Since previous literature has established that preceptors largely influence multiple aspects of athletic training student skill development and professional socialization, athletic training programs should ensure that their preceptors are made aware of the programs' specific objectives for both ICEs and N-ICEs, including student use of behaviors related to the core competencies.

Table 5. Frequencies of EBP, PCC, IPECP, and HIT Behavior Implementation

Core competency	Professional behavior	Implementation in N-ICEs N (%)	Implementation in ICEs N (%)	% Difference
Evidence-based practice	Ask a question of a clinician (including your preceptor)	5,868 (32.2)	3,916 (35.6)	-3.4
	Search for any available evidence	1,981 (10.9)	1,558 (14.2)	-3.3
	Apply evidence previously learned	10,792 (59.2)	7,476 (68.0)	-8.8
Patient-centered care	Discuss the patient's goals with the patient	7,524 (41.3)	4,294 (39.0)	2.3
	Collect information through a patient-rated outcome measure	6,163 (33.8)	2,810 (25.5)	8.2
	Collect information through a clinician-reported outcome measure	2,986 (16.4)	1,337 (12.2)	4.2
Health information Ttchnology	Document the information obtained from this encounter in an electronic health/medical record	6,653 (36.5)	3,402 (30.9)	5.6
	Use information from an electronic health/medical record to assist with the clinical decision-making process	938 (5.1)	448 (4.1)	1.0
Interprofessional education and collaborative practice	Interact with another athletic trainer, besides your preceptor	1,645 (9.0)	1,404 (12.8)	-3.8
	Interact with another healthcare provider(s) outside of athletic training, besides your preceptor	1,163 (6.4)	713 (6.5)	-0.1
	Interact with another learner, besides an athletic training student	561 (3.1)	518 (5.3)	-2.2
Quality improvement	As a result of this patient encounter, did you reflect on your experience to identify potential areas for improvement and success?	12,396 (68.0)	9,080 (82.6)	-14.6

CHAPTER V

PROJECT III: EXAMINING ATHLETIC TRAINING STUDENTS' AWARENESS OF THE SOCIAL DETERMINANTS OF HEALTH AND THEIR PERCEPTIONS OF THE INFLUENCE OF THE SOCIAL DETERMINANTS OF HEALTH ON PATIENT CASES

Introduction

Social determinants of health (SDoH) are defined by the World Health Organization as "the conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks."[16] Nursing and medical education literature both endorse the inclusion of the SDoH in their professional curricula as a means to familiarize students in the ways that these factors can influence a patient's health.[19,20] Implementing SDoH-specific didactic instruction into athletic training curricula can serve as a way to enhance students' abilities to use the SDoH in their clinical experiences and improve their familiarity with the concept of health literacy. Additionally, using clinical education to supplement didactic instruction and discussion surrounding the SDoH would provide students an opportunity to see these concepts and their influence in patient cases.

Athletic trainers are placed in a position to be able to provide comprehensive care to individuals of ages ranging throughout the lifespan due to their education in injury prevention, diagnosis, and rehabilitation. Specifically, athletic trainers who work in the secondary school setting have a direct, positive influence on adolescent health in the United States.[23,24] While some researchers have highlighted the need for athletic training integration to public health, they also identify that athletic trainers must change their point of perspective from the individual to the population level in order for this integration to occur.[57,97,98] Traditional public health perspectives

in athletic training center around the idea that athletic trainers are adept at providing individual patients with a comprehensive care plan for wellness or engaging in injury surveillance efforts for their employment setting.[57] However, there is little research regarding the importance and worth of athletic trainers in healthcare disparities in diverse patient populations or participating in more large-scale community health efforts.[57] The ability for athletic trainers to practice in a wide range of settings and fill gaps in health care coverage is essential to the professions' efforts to make positive public health impacts.

Since the change in athletic training education from a professional bachelor's degree to a professional master's degree, programs may find that students have varying levels of existing knowledge surrounding the social determinants of health. Though the Commission on Accreditation of Athletic Training Education (CAATE) requires programs to require applicants to complete pre-requisite courses such as chemistry, biology, physics, psychology, anatomy, and physiology, students are not mandated to take a course exposing them to health care systems, inequities, or the social determinants of health before entering a program.[2] Research indicates that students who take undergraduate coursework in public health may have a better understanding of the social determinants of health but are similar to other college students in their attitudes and beliefs toward them.[99] Athletic training students are now required, by the CAATE, to be able to "identify health care delivery strategies that account for health literacy and a variety of social determinants of health".[2] However, the standard does not mandate how programs must meet the standard or provide detailed direction for strategies to implement this information into a program's current didactic curriculum or clinical education objectives. This leaves students with the possibility of receiving varying levels of opportunity and instruction regarding this topic based on differences in programmatic structure and unstandardized guidance

from governing bodies such as the National Athletic Trainers' Association (NATA), Board of Certification (BOC), or the CAATE. Although one of the standards states that clinical experiences must plan to include opportunities for the student to practice in settings with diverse patient populations, the CAATE provides autonomy as to how athletic training programs interpret and meet this standard.[2] The CAATE used the World Health Organization's webpage detailing the social determinants of health and health literacy in order to operationally define those terms within the standards. At the time of this study, the National Athletic Trainers' Association had yet to publish a position statement or practice guideline regarding the responsibilities of athletic trainers with regard to the social determinants of health.

There is limited information surrounding athletic trainers' perceptions of the SDoH and no research regarding students' perceptions.[100] Ultimately, by identifying ways to improve student learning surrounding this topic, clinicians can strengthen their abilities to work with patient cases adversely affected by SDoH and, ultimately, improve patient outcomes. It is important to investigate whether or not students perceive that athletic training programs are adequately preparing them to utilize their knowledge about the SDoH within autonomous clinical practice. Therefore, the purpose of this project is to examine athletic training students' current knowledge of the SDoH and their perceptions of the influence of individual SDoH on health care delivery.

Methods

Design

This study used a cross-sectional survey design to investigate students' awareness of the SDoH as well as their perceptions of the influence of the SDoH on patients' health and well-being.

Participants

A member of the research team obtained contact information for 389 athletic training professional program directors and sent an email detailing the purpose and general design of the study. Contact information was obtained for all professional programs accredited by the CAATE and excluded those with statuses including "probation" and "voluntarily withdrawing accreditation". In the recruitment email sent, program directors were asked to forward the survey to any of their current students who fit the inclusion criteria of the study; the inclusion criteria were that participants (1) were at least 18 years of age, (2) were current students of a professional athletic training program, and (3) had completed at least one clinical experience. This resulted in a convenience sampling method for the study. This study was deemed to be exempt from IRB review by the Health Sciences Human Subjects Review Committee at Old Dominion University.

Instrument

The quantitative survey consisted of 70 questions, 24 of which were used for this study, that were separated into sections regarding participant demographics, assessment of students' awareness and knowledge of the SDoH, student perceptions of the influence of SDoH on patient cases, and characteristics of their clinical experience(s). Students were specifically asked to

identify their perceptions of the influence of a person's socioeconomic status, level of education, employment status, access to safe and affordable housing, social support, access to quality and/or timely health care services, early childhood experiences, government policies and programs, lifestyle choices, and access to transportation affect their health. Students were asked to identify the type of clinical experiences they have had (immersive, non-immersive), the clinical site type for those experiences, their professional program type (undergraduate, graduate) and a measure of where they are in their program curriculum (first year, second year, etc.). This survey was created by a research team at A.T. Still University and has been validated for use with athletic trainers.[100] It was edited for relevant content and piloted with athletic training students at one institution, who provided feedback on clarity of questions and length of time to complete the survey. The survey questionnaire can be found in Table 6.

Data Collection Procedures

Recruitment information for the study was forwarded to 389 athletic training program directors. The survey was distributed online to athletic training students. Survey responses were collected online via Qualtrics (Qualtrics, LLC, Provo, Utah) for a period of four weeks. At the conclusion of the four-week period, data from the responses was downloaded for analysis.

Data Analysis

Data from the quantitative survey was analyzed using SPSS (version 27; IBM Corp, Chicago, IL). Descriptive statistics were used to report frequencies, means, 95% confidence intervals, standard deviations, and percentages of demographic variables, program information, and student responses. A cumulative score representing students' perceptions of their knowledge,

comfort, and familiarity with the SDoH was created to give a scaled variable related to those responses from the survey. Several analyses of variances (ANOVA) tests were performed to examine differences in students' composite score between students of different genders, races, program types, and clinical experience types. Pearson's correlations were performed to examine relationships between students' endorsement of potential SDoH and their cumulative knowledge, comfortability, and familiarity score. Spearman's rank correlations were performed to examine relationships between students' knowledge, familiarity, and comfort scores.

Results

A total of 127 athletic training students completed the survey, representing programs in 28 states across the country. Since the study used a convenience sampling method, the exact number of students who received the survey information is unknown; however, based on estimated program cohort characteristics reported by the CAATE, we can estimate that a maximum of 7,780 students could have received the study information from their program directors.[101] Based on this estimation, our response rate was 1.6% and our completion rate was 81.9%. Students were recruited from both undergraduate and graduate professional programs, and response frequencies were similar between the two program types (49.6% undergraduate, 44.9% graduate). A total of 120 students (99%) indicated that they completed at least one clinical experience at a traditional clinical site (college/university, high school, elementary/middle school, professional sport), while 53 students (44%) reported having completed at least one clinical experience at a clinic setting (rehabilitation center, physician practice, hospital) and 11 students (9%) completed at least one experience at a non-traditional site (industrial/occupational health, performing arts, military, public safety). More than half of students (58.3%) reported

having completed at least one immersive clinical experience, while 30.8% reported not having completed an immersive clinical experience; a small percentage of students (10.8%) were unsure if they had completed an immersive clinical experience or not. Students selected "College/University" (46.5%) and "High School" (24.4%) as the most commonly used clinical site types for immersive clinical experiences. Participant demographic information can be found in Table 7.

Knowledge, Comfort, and Familiarity

Most students reported that they perceived themselves to be "minimally knowledgeable" (45.6%) about the SDoH with only 1 student who reported perceiving themselves as "extremely knowledgeable" (0.8%). Students primarily reported perceiving themselves as "moderately familiar" (44.2%) and "minimally comfortable" (46.5%) with the SDoH. Percentages of student responses for knowledge, comfort, and familiarity can be found in Table 8. Spearman's rank correlations revealed significant, strong, positive relationships between knowledge of and comfort with the social determinants of health ($r^2(120)=0.799$, $p<0.001$), knowledge of and familiarity with the social determinants of health ($r^2(120)=0.833$, $p<0.001$), and familiarity and comfort with the social determinants of health ($r^2(120)=0.773$, $p<0.001$).

There were no significant differences in the composite knowledge, comfort, and familiarity score (KCF score) between students when grouped by race ($f(5)=1.234$, $p=0.29$) or gender ($f(3)=.605$, $p=0.61$). Additionally, there was no significant difference in students' KCF scores between groups of students who had completed at least one immersive clinical experience and students who had completed no immersive clinical experiences ($f(2)=1.475$, $p=0.23$). There was a significant difference in students' KCF scores between undergraduate and graduate

professional students (f(1)=5.438, p=0.021), with professional master's students scoring significantly higher than professional bachelor's students.

Endorsement of Determinants

We asked students to identify social determinants of health from a list of 16 factors; the list of the 16 potential determinants can be found in Figure 1. The 16 terms included SDoH as well as structural inequities, health inequities, and other factors. For this study, we operationally defined the following as social determinants of health based on examples given by government agencies such as the World Health Organization or the Center for Disease Control: transportation, social environment, physical environment, income and wealth, housing, health systems and services, public safety, employment, education.

Students endorsed an average of 9.49 ±4.26 [95% CI: 8.23, 9.85] determinants when asked to identify examples of social determinants of health. The most frequently endorsed determinants were "Social Environment" (81% of students, N=98), "Education" (80.2%, N=97), and "Income and Wealth" (78.5%, N=95). The least frequently endorsed determinants were "Genetics" (28.1%, N=34), "Transportation" (43%, N=52), and "Sexism" (43.8%, N=53). Figure 1 details the frequency of student endorsement of each of the sixteen determinant options. A Pearson's correlation revealed a significant, moderately positive relationship between number of endorsed SDoH and higher levels of perceived knowledge, familiarity, and comfort with the SDoH ($r^2(120)=.516$, $p<0.001$). Most SDoH were endorsed similarly by students who completed experiences at all clinical site types, but determinants such as transportation, public safety, health systems and services, and physical environment were endorsed 14-29.7% more by students who had completed an experience at a non-traditional clinical site.

Influence of the Social Determinants of Health

"Social support" and "lifestyle choices" were the two determinants that students most strongly agreed influence a patient's health and well-being. The "access to transportation" and "education" determinants elicited the most "strongly disagree" and the least "strongly agree" responses in regard to influence on a patient's health and well-being. Student responses for all determinants can be found in Table 9.

Discussion

With the required changes outlined in the 2020 Standards for accreditation of professional athletic training programs, programs may find themselves in a period of curricular evaluation and adjustment. Among many additions to curricular content standards and programmatic structure requirements are the inclusion of a requirement to ensure students can engage in many patient-centered care behaviors such as to "advocate for the needs of clients, patients, communities, and populations" and to "identify health care delivery strategies to account for health literacy and the social determinants of health".[2] Ensuring that students receive adequate instruction on the social determinants of health is essential to their ability to provide whole-person health care as an athletic trainer, regardless of the clinical setting or patient population at hand. With this study, we aimed to better understand students' current levels of knowledge, comfort, and familiarity regarding the social determinants of health as these aspects of their awareness will influence their ability to treat patients with influential social determinants of health. It was also important to explore students' perceptions surrounding the influence of specific social determinants of health on patients' health as this will also influence their ability to deliver high quality, whole patient health care.

Student Knowledge, Comfort, and Familiarity

Students perceived themselves to possess minimal knowledge and comfort as well as a moderate level of familiarity regarding the social determinants of health. We hypothesized that students would report a high level of knowledge, comfort, and familiarity with the social determinants of health based on the presence of the curricular content standards surrounding the topic imposed by the CAATE. The significantly higher levels of knowledge, comfort, and familiarity with the social determinants of health reported by graduate professional students is promising that the new standards are making a positive impact on student outcomes in this topic area. We did not ask students about their own life experiences, including the differences between pursuing a professional athletic training degree in undergraduate and graduate programs; this may have also influenced the difference found in their scores.

Program administrators may need to consider whether or not their educational interventions surrounding this topic are evidence-based and best serve their students. Nursing literature has highlighted the importance of a multi-faceted educational approach to increasing student knowledge surrounding the social determinants of health; this includes the use of both didactic and clinical education interventions.[19,102,103] Research indicates that didactic efforts alone are not sufficient at increasing students' knowledge and ability to manage cases involving influential social determinants of health, indicating that the exclusion of clinical education may be harmful to students' progress in this topic area.[55] A recent effort to increase post professional athletic training students' knowledge regarding the concept of the social determinants of health proved successful, as students were able to participate in a three-pronged educational approach that included both didactic and clinical educational tools. Students engaged in a lecture regarding the social determinants of health and their influence on patient health outcomes, were given

opportunities to observe and determine the presence of influential social determinants of health in patient care, and lastly, participated in a reflective discussion with instructors and peers regarding their observational experiences.[56] Nursing education has also used a similar method to teach students about the social determinants of health, enrolling students in a social-determinants focused course that involved attending limited didactic seminars and spending most of their time at a clinical site in the community.[103]

Studies show that health professions students' confidence in their ability to manage certain types of patient cases are directly tied to having gained authentic or simulated experience directly in that environment.[43,68,69] Intentionally implemented immersive clinical experiences can provide students with unique opportunities to be involved in more administrative tasks and engage with more complex patient cases over the course of 4 or more weeks; these experiences could allow students to engage with more situations where any of the social determinants of health may influence a patient's treatment or health outcomes.[1,51] However, the results from this study indicate that these experiences may not currently be impacting students' perceptions regarding their knowledge or ability surrounding the social determinants of health. Students' knowledge, comfort, and familiarity with the social determinants may improve with more intentional clinical site placement for immersive and non-immersive clinical experiences.

Determinant Endorsement and Influence

Students were asked to identify potential SDoH from a list and the results indicated a wide variety in student endorsement of potential determinants. Students primarily endorsed determinants that relate to individual circumstances or decisions such as "education", "income and wealth", or "social environment". This is similar to what was found in nursing and other

college students.[27,99] It is possible that athletic training students enroll in athletic training professional programs with some preexisting knowledge surrounding the social determinants of health; however, one study found that public health students did not possess a higher level of perceived understanding of the social determinants of health and other terms such as "health disparity" or "health equity".[99] If a course on these topics was required as a pre-requisite to enrollment in an athletic training program, students then may be able to use didactic and clinical opportunities more effectively.

Students were not asked to provide justification for their determinant endorsement choices, but they may have selected specific determinants based on their own personal experiences, didactic instruction, clinical experiences associated with their program, or information provided by various governing bodies such as the Center for Disease Control or the World Health Organization. We asked students about their gender, race, and age in the demographic portion of the survey, but we did not investigate other circumstances or personal experiences that may have impacted their determinant endorsement. Additionally, we did not ask students to report the amount of didactic or clinical instruction they had received on the social determinants of health, which undoubtedly impacts students' knowledge surrounding the topic.

We did find some differences in determinant endorsement when considering clinical site type, with students who had completed clinical experiences in non-traditional settings (industrial/occupational, performing arts, military, public safety) more frequently endorsed determinants such as transportation, physical environment, and health systems and services. However, only 11 of 121 students indicated that they had completed at least one clinical experience at a non-traditional site. It is possible that athletic training students in these sites may observe more instances where those determinants need to be considered by their preceptor when

creating a plan of care. Athletic trainers in industrial or occupational settings often need to consider insurance or billing procedures and consider the patient's physical working environment, both have been noted as weaknesses in athletic training education.[104,105] This fact, along with our results, suggest this clinical site type may be most suitable for giving students opportunities to see these social determinants of health in patient cases; however, the incidence of non-traditional clinical sites increasing students' knowledge of and ability to identify the SDoH should be examined on a larger scale to confirm the educational implications of these results.

Students reported high levels of agreement that each social determinant listed on the survey influences a patient's health and well-being, with 77%-99% of the responses marked for this question being "agree" or "strongly" for each determinant. The differences in agreement of influence may be related to instruction students are receiving in athletic training programs regarding those determinants or to inherent bias that may have occurred due to the structure of the survey. Students may have indicated that they believe a certain determinant influences a patient's health simply because they were asked about that determinant.

Transportation (77%), Education (83.4%), and Government policies and programs (84%) had the least agreement responses related to influence. Situations where these determinants negatively influence patients' health may be hard to plan in settings where the patient population has similar access to transportation and education, such as colleges and universities. Students may not be aware of the influence of government policies on patients' health outcomes via their ties to insurance rates, pharmaceutical costs, or services available to the community. These findings suggest that students may need more didactic instruction as well as clinical or simulated

patient encounter opportunities in order to be able to accurately identify these determinants and explore their full influence.

There were some discrepancies between whether students could identify if one of the 16 options listed was a social determinant and whether or not they agreed that the determinant influences patients' health and well-being. Most all students agreed or strongly agreed that health care services and housing influence patients but there was a 37.7% and 42% respective difference in that number and the number of students that endorsed those as determinants. Students in this study seemed more willing to agree with influence statements than to identify those same choices as determinants, which may be partially influenced by government agencies' inconsistency while providing examples of social determinants of health. The Strategic Alliance, which includes the National Athletic Trainers' Association (NATA), the CAATE, the Board of Certification, and the NATA Research & Education Foundation, should endorse and align with a government agency's definition of the SDoH and address its influence in athletic training practice; providing information about the SDoH as well as a set of defined examples of SDoH will promote cohesion in didactic instruction for professional athletic training programs.

If students are unable to identify negatively influential social determinants, they may not be able to properly manage or mitigate them when creating treatment plans for patients. Athletic trainers are positioned to be able to fill gaps in health care through the many settings in which they are employed; their training in a multitude of skill sets allows for comprehensive health care that often involves low direct cost to the patient and easier access to services. Athletic trainers who are prepared to identify and mitigate adverse social determinants of health can serve as better providers and advocates for their patients, ultimately enhancing the health outcomes of their patients. It is essential for athletic training students to work through clinical or simulated

patient encounters that involve influential social determinants of health, so they are able to better provide whole person health care when they begin autonomous practice.

Limitations and Future Research

There are several limitations applied to the findings of this study. This study used a survey, validated for use with practicing athletic trainers, to measure students' knowledge and perceptions surrounding the social determinants of health. These findings may be limited by any bias that students had when answering questions about their perceptions of their own knowledge and abilities. Additionally, students may not have adequately understood questions on the survey related to their perceptions or the social determinants of health.

We were able to examine the differences in students' scores between undergraduate and graduate professional programs, which we used as a measure to examine the initial effects of the new CAATE standards regarding student learning of the social determinants of health. However, we used a cross-sectional design in this study to examine our aims in one moment, so we were unable to make any longitudinal comparisons to capture student progress. Future studies can examine athletic training students' knowledge of the social determinants of health upon entry to their professional program as well as at other points and prior to their exit. Future studies can also examine students', preceptors', and faculty members' knowledge of the didactic and clinical instruction students receive surrounding the social determinants of health.

Conclusions

Athletic training students currently perceive themselves to be minimally knowledgeable, minimally comfortable, and moderately familiar with the social determinants of health. Several

factors including gender, race, or completion of an immersive clinical experience did not affect students' knowledge, comfortability, and familiarity with the social determinants of health.

Students' ability to identify and feel comfortable with adverse social determinants of health can be influenced by intentional, structured didactic and clinical instruction. Intentional immersive clinical experiences can be used to allow students opportunities in emerging settings or a change in geographic area to engage with different patient populations. Purposeful didactic instruction and discussion can be used in athletic training programs to increase student knowledge and expose students to the full impact of some lesser endorsed determinants such as access to transportation, housing, and health care systems and services. It is essential for athletic training students to have opportunities to identify and mitigate adverse social determinants of health during their time in professional programs as these are skills essential to providing whole person health care.

Table 6. Project III Online Survey Instrument

Demographic information	What is your gender?
	What is your race?
	What is your age (in years)?
Program characteristics	Please select the type of professional athletic training program in which you are currently enrolled.
	Please select the state in which your professional athletic training program is located.
	How many semesters have you been enrolled in a professional athletic training program? Please include the current semester in your response.
	Please select the clinical practice settings where you have completed clinical experiences. Please include your current clinical experience setting. [Select all that apply]
	Have you completed any immersive clinical experiences as part of your professional athletic training program?
	(If "yes" to question 40) How many immersive clinical experiences have you completed as part of your professional athletic training program?
	(If "yes" to question 40) Please select the clinical practice settings where you have completed an immersive clinical experience. Please include your current clinical experience setting if it is an immersive experience. [Select all that apply]
Knowledge of the SDoH	How familiar are you with the social determinants of health?
	How knowledgeable are you about the social determinants of health?
	How comfortable are you with identifying the social determinants of health?
	In the list below, please select all factors that are considered social determinants of health. [Select all that apply]
Influence	A person's income or the amount of money a person has influences his/her health and well-being.
	A person's level of education influences his/her health and well-being.
	A person's job or employment status influences his/her health and well-being.
	Having a safe and affordable place to live influences a person's health and well-being.
	Having the social support of others (such as family, friends, neighbors) who can help a person when in need influences his/her health and well-being.
	A person's access to quality and/or timely health care services influences his/her health and well-being.

Table 6. Continued

Influence	A person's early childhood experiences (such as type of parenting or upbringing and problems in the home) influence his/her health and well-being.
	Government policies and programs that affect health, social services, education, and economy influence his/her health and well-being.
	A person's lifestyle choices – what they eat, whether they smoke, how much alcohol they drink, and how much exercise they get – influence his/her health and well-being.
	A person's access to transportation (such as bus, taxi, personal vehicle, guardian ride) influences his/her health and well-being.

Table 7. Participant Demographics

Gender	Number of participants	%
Male	33	27.3
Female	86	71.1
Transgender	1	0.8
Other	1	0.8
Total	121	100.0
Race	**N**	**%**
White	88	73.3
Black or African American	9	7.5
American Indian or Alaska Native	3	2.5
Asian	5	4.2
Other	13	10.8
Prefer not to respond	2	1.7
Total	120	100.0
Program type	**N**	**%**
Undergraduate	63	52.5
Graduate	57	47.5
Total	120	100.0
Semesters enrolled in professional program	**N**	**%**
1 Semester	1	0.8
2 Semesters	21	17.5
3 Semesters	22	18.3
4 Semesters	21	17.5
5 Semesters	12	10.0
6 Semesters	24	20.0
7 Semesters	2	1.7
8 Semesters	17	14.2
Total	120	100.0

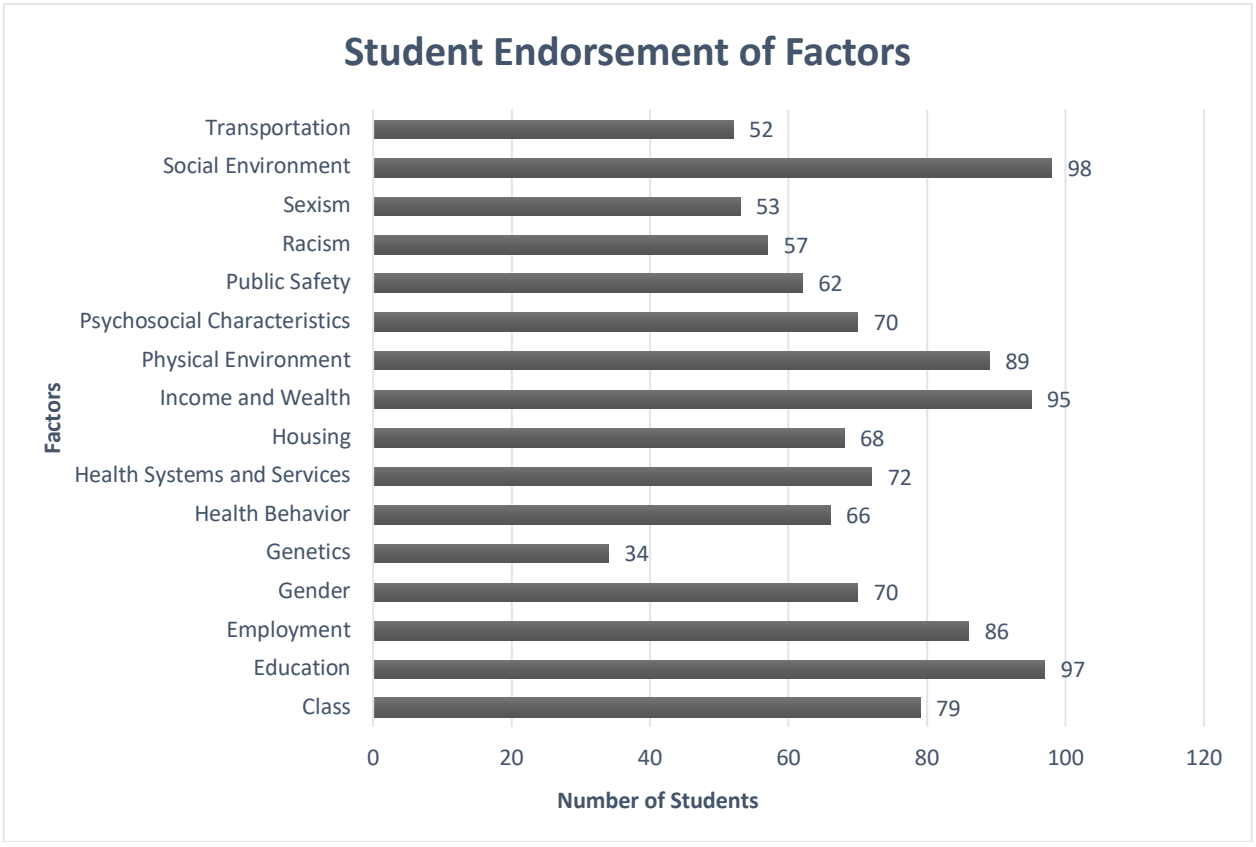
Table 8. Student Reports of Perceived Knowledge, Comfort, and Familiarity with the SDoH

Level of knowledge	N	%
Not knowledgeable at all	24	21.1
Minimally knowledgeable	52	45.6
Moderately knowledgeable	37	32.5
Extremely knowledgeable	1	0.9
Level of familiarity	**N**	**%**
Not familiar at all	21	18.6
Minimally familiar	40	35.4
Moderately familiar	50	44.2
Extremely familiar	2	1.8
Level of comfort	**N**	**%**
Not comfortable at all	27	23.7
Minimally comfortable	53	46.5
Moderately comfortable	31	27.2
Extremely comfortable	3	2.6

Table 9. Students' Responses with Regard to Specific Determinants' Impacts on a Patient's Health and Well-Being

	Strongly agree	Agree	Neither disagree nor agree	Disagree	Strongly disagree	Unsure
Income	51 (45.1)	57 (50.4)	5 (4.4)	0 (0.0)	0 (0.0)	0 (0.0)
Education	29 (26.4)	63 (57.3)	13 (11.8)	5 (4.5)	0 (0.0)	0 (0.0)
Employment	34 (30.6)	68 (61.3)	8 (7.2)	1 (.8)	0 (0.0)	0 (0.0)
Housing	53 (48.2)	55 (50.0)	1 (0.8)	1 (0.8)	0 (0.0)	0 (0.0)
Social support	68 (62.4)	37 (33.9)	2 (1.8)	0 (0.0)	0 (0.0)	2 (1.8)
Access to health care services	62 (57.4)	43 (39.8)	1 (0.8)	1 (0.8)	1 (0.8)	0 (0.0)
Childhood experiences	47 (43.5)	51 (47.2)	8 (7.4)	1 (0.8)	1 (0.8)	0 (0.0)
Government policies and programs	41 (38.7)	48 (45.3)	12 (11.3)	0 (0.0)	1 (0.8)	4 (3.8)
Lifestyle choices	88 (83.0)	17 (16.0)	1 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)
Access to transportation	27 (26.0)	53 (51.0)	18 (17.3)	5 (4.8)	0 (0.0)	1 (0.8)

Figure 1. Student Endorsement of Factors, Including Social Determinants of Health



CHAPTER VI

CONCLUSIONS

The overall purposes of this dissertation were to examine the current use of immersive clinical experiences in athletic training education and to examine athletic training students' awareness of the social determinants of health and their impact on patient cases. To achieve these purposes, three studies were conducted; the first two studies examined characteristics of immersive clinical experiences over the course of one academic year. Immersive clinical experiences were found to offer no impactful differences to students with regard to student role, complexity of patient encounters, length of patient encounters, or clinical site type. Immersive clinical experiences were found to affect student implementation of behaviors differently based on core competency. Students implemented more behaviors associated with evidence-based practice, interprofessional education and collaborative practice, and health information technology during immersive clinical experiences as compared to non-immersive experiences. Students implemented the quality improvement behavior more frequently in non-immersive experiences, and there was no difference in student implementation of behaviors related to patient-centered care between the two experience types.

The third study in this dissertation examined student knowledge, comfortability, and familiarity with the social determinants of health, student endorsements of determinants, and their perceptions of individual determinants' impact on a patient's health. Athletic training students perceived themselves to be "minimally knowledgeable", "minimally comfortable", and "moderately familiar" with the social determinants of health. Athletic training students most frequently endorsed determinants related to individual behaviors, also indicating they perceive individual behaviors to have the most impact on a patient's health. There were some

discrepancies between students' endorsement of some determinants and their agreement that those same determinants impact a patient's health and well-being. This may be related to students' ability to identify social determinants of health as opposed to structural or health inequities or other factors. Additionally, students may witness how determinants impact a patient's health and well-being at their clinical site but may not know that factor is a social determinant of health. Professional program type significantly influenced students' scores, with graduate professional students scoring higher than undergraduate professional students. Clinical experience type, such as immersive and non-immersive experiences, did not have a significant impact on students' scores.

The situated learning theory can be used by health professions programs to increase students' abilities and perceptions of preparedness to use specific skills or engage with patient populations by placing them directly in environments that will afford them direct opportunities to practice those skills. In future research, we should continue to examine whether ICEs afforded more comprehensive and authentic opportunities to athletic training students with regard to many desirable outcomes. If those objectives are established, the situated learning theory could be applied to ICEs to help students improve skills and feel more prepared for autonomous practice.

This dissertation examined several potential ways that the incorporation of immersive clinical experiences in athletic training education can benefit students including allowing students' more opportunities for autonomous roles during patient encounters, practicing with more complex or time-consuming cases, the ability to travel to different types of clinical sites, implementation of behaviors associated with five core competencies, or practicing management of patient cases that involve social determinants of health that negatively affect health outcomes. Ultimately, this dissertation sought to identify a common purpose or objective that athletic

training programs seem to be dedicating to immersive clinical experiences; due to the lack of differences found in these factors, it seems that programs have yet to establish and assign objectives that capitalize on the potential benefits of immersive clinical experiences. Establishing goals and objectives for students' experiences at immersive and non-immersive clinical experiences is essential for providing the best learning and practice opportunities for students in athletic training programs. Continually improving educational methods and outcomes can lead to higher skilled clinicians and, ultimately, better patient health outcomes.

This dissertation is the first to investigate students' knowledge of the social determinants of health and examine the use of immersive clinical experiences on a larger scale. Future research should look to explore many groups of individuals' perceptions of the differences between immersive and non-immersive experiences as it pertains to the objectives and goals set for each experience type. Program directors would be able to provide information regarding the programmatic objectives of immersive clinical experiences while preceptors and students have insight as to how those objectives are being carried out and evaluated in practice. Preceptors have unique insight to the implementation of specific objectives and goals for athletic training students at clinical experiences; preceptors can also speak to the presence or lack of diversity in social determinants of health that athletic training students may encounter at their clinical site.

Clinical education continues to evolve to best prepare athletic training students for autonomous practice. Programs should look to move past implementing clinical experiences to minimally meet accreditation requirements or assuming that students will receive specific opportunities at certain clinical site types. Findings from the studies in this dissertation suggest that programs can not necessarily rely on clinical experiences, especially immersive clinical experiences, to give students comprehensive practice opportunities. Patient encounter tracking

can reveal an accurate picture of the characteristics of not only each clinical site type, but also each specific clinical site. Program administrators can use this information as well as preceptors' perceptions of the characteristics of their clinical site to provide students with the best possible experiences. For example, preceptors' perceptions surrounding the social determinants of health of the patient population at their clinical site can be an invaluable tool for programs; with this information, programs may be able to ensure that a student would see the impact of a specific social determinant of health play out at a specific clinical site or type of clinical site. Program administrators can improve clinical education by purposefully selecting clinical sites that best align with students' needs, strengths, weaknesses, or preferences. More intentional placement for students during clinical education may better prepare them to practice in a wide variety of settings and improve patient health outcomes.

REFERENCES

1. Edler JR, Eberman LE, Walker S. Clinical education in athletic training. *Athl Train Educ J.* 2017;12(1):46-50.
2. The Commission on Accreditation of Athletic Training Education. 2020 Standards for accreditation of professional athletic training programs. https://caate.net/wp-content/uploads/2018/09/2020-Standards-for-Professional-Programs-copyedited-clean.pdf. Published 2018. Updated 2019. Accessed November, 2020.
3. AT Strategic Alliance. Strategic Alliance Degree Statement. https://www.atstrategicalliance.org/strategic-alliance-degree-statement. Published 2015. Accessed November, 2020.
4. Professional education in athletic training: an examination of the professional degree level. National Athletic Trainers' Association Web site. https://www.nata.org/sites/default/files/The_Professional_Degree_in_Athletic_Training.pdf. Published 2013. Accessed November, 2020.
5. Bowman TG, Mazerolle SM, Barrett JL. Professional master's athletic training programs use clinical education to facilitate transition to practice. *Athl Train Educ J.* 2017;12(2):146-151.
6. Mazerolle SM, Benes SS. Factors influencing senior athletic training students' preparedness to enter the workforce. *Athl Train Educ J.* 2014;9(1):5-11.
7. Bowman TG, Singe SM, Kilbourne BF, Barrett JL. Examining initial perceptions of transition to clinical practice from the perspective of professional master's students. *Athl Train Educ J.* 2019;14(3):167-173.
8. Mazerolle SM, Bowman TG, Dodge T. The professional socialization of the athletic trainer serving as a preceptor. *J Athl Train.* 2014;49(1):75-82.
9. Mazerolle SM, Dodge T. Role of clinical education experiences on athletic training students' development of professional commitment. *Athl Train Educ J.* 2015;10(2):138-145.
10. Welch Bacon CE, Cavallario J, Walker SE, Bay RC, Van Lunen BL. Core competency-related professional behaviors during patient encounter: A report from the AATE Research Network. *J Athl Train.* Epub, Online ahead of press.
11. Cavallario JM, Van Lunen BL, Hoch JM, Hoch M, Manspeaker SA, Pribesh SL. Athletic training student core competency implementation during patient encounters. *J Athl Train.* 2018;53(3):282-291.
12. Harris AM, Volberding JL, Walker SE. Stakeholder perceptions of clinical immersion in athletic training programs. *Athl Train Educ J.* 2020;15(1):75-84.
13. Mazerolle Singe S, Myers SL, Campbell M, Clements C, Eberman LE. Perceived challenges of clinical immersion in professional master's programs: a report from the Athletic Training Clinical Education Network. *Athl Train Educ J.* 2020;15(1):18-25.
14. Jackson CS, Gracia JN. Addressing health and health-care disparities: the role of a diverse workforce and the social determinants of health. *Public Health Rep.* 2014;129(2):57-61.
15. Klein MD, Kahn RS, Baker RC, Fink EE, Parrish DS, White DC. Training in social determinants of health in primary care: does it change resident behavior? *Acad Pediatr.* 2011;11(5):387-393.

16. Social Determinants of Health. Healthy People 2020 Website. https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health. Accessed October, 2020.
17. Mogford E, Gould L, Devoght A. Teaching critical health literacy in the US as a means to action on the social determinants of health. *Health Promot Int.* 2010;26(1):4-13.
18. Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep.* 2014;129:19-31.
19. Thornton M, Persaud S. Preparing today's nurses: Social determinants of health and nursing education. *Online J Issues Nurs.* 2018;23(3).
20. Mangold KA, Bartell TR, Doobay-Persuad AA, Adler MD, Sheehan KM. Expert consensus on inclusion of the social determinants of health in undergraduate medical education curricula. *Acad Med.* 2019;94(9):1355-1360.
21. Song AY, Health. BCoMCotSDo, Poythress EL, Bocchini CE, Kass JS. Reorienting orientation: Introducing the social determinants of health to first-year medical students. *MedEdPortal.* 2018;14(10752).
22. Scarneo-Miller SE, DiStefano LJ, Mazerolle Singe S, Register-Mihalik JK, Stearns RL, Casa DJ. Emergency action plans in secondary schools: Barriers, facilitators, and social determinants affecting implementation. *J Athl Train.* 2020;55(1):80-87.
23. Post EG, Roos KG, Rivas S, Kasamatsu TM, Bennett J. Access to athletic trainer services in california secondary schools. *J Athl Train.* 2019;54(12):1229-1236.
24. Post EG, Winterstein AP, Hetzel SJ, Lutes B, McGuine TA. School and community socioeconomic status and access to atheltic trainer services in Wisconsin secondary schools. *J Athl Train.* 2019;54(2):177-181.
25. Picha KJ, Welch Bacon CE, Lewis JH, Bay RC, Snyder Valier AR. *The relationship between athletic trainers' perceptions of and expereinces with social determinants of health.* VNATA 2020 Free Comm Abstracts.
26. Wright-Fitzgerald AS, Snyder Valier AR, Welch Bacon CE, Lewis JH, Bay RC, Picha KJ. *Athletic trainers' perceptions of and experiences with social determinants of health in the collegiate and university setting.* VNATA 2020 Free Comm Abstracts.
27. Lee SK, Wilson P, Armstrong GL. BSN students' perceptions of social determinants of health. In. *Presented at the Sigma Nursing Education Research Conference*. Washington, DC.2018.
28. Commission on Accreditation of Athletic Training Education. About. https://caate.net/about/. Accessed April, 2021.
29. Welch Bacon CE, Van Lunen BL, Hankemeier DA. Postprofessional athletic training students' perceptions concerning the health care competencies. *Athl Train Educ J.* 2018;13(4):309-323.
30. Medhub. Medhub: Healthcare education management. https://www.medhub.com/. Accessed April, 2021.
31. Sackett D, Rosenberg W, Gray J, Haynes R, Richardson W. Evidence based medicine: what it is and what it isn't. *BMJ.* 1996;312(7023):71-72.
32. National Library of Medicine. Healthcare informatics defined. www.himss.org/health-informatics-defined. Published 2014. Accessed November, 2020.
33. Collaborative IE. Core competencies for interprofessional collaborative practice: 2016 update. IPEC. https://hsc.unm.edu/ipe/resources/ipec-2016-core-competencies.pdf. Published 2016. Accessed November, 2020.

34. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academies Press. https://doi.org/10.17226/10027. Published 2011. Accessed November, 2020.
35. U.S. Department of Health and Human Services. Quality Improvements. www.hrsa.gov/sites/default/files/quality/toolbox/508pdfs/qualityimprovement.pdf. Published 2011. Accessed November, 2020.
36. Health professions education: a bridge to quality. Institute of Medicine. https://www.nap.edu/catalog/10681/health-professions-education-a-bridge-to-quality. Published 2003. Accessed2020.
37. Fact sheet on ethnic and racial minorities and socioeconomic status. www.apa.org/pi/ses/resources/publications/minorities.aspx. Accessed November, 2020.
38. Benes SS, Mazerolle SM, Bowman TG. The impact of clinical experiences from athletic training student and preceptor perspectives. *Athl Train Educ J.* 2014;9(4):156-165.
39. Young A, Klossner J, Docherty C, Dodge T, Mensch J. Clinical integration and how it affects student retention in undergraduate athletic training programs. *J Athl Train.* 2013;48(1):68-78.
40. Weidner TG, Henning JM. Historical perspective of athletic training clinical education. *J Athl Train.* 2002;37(4 Suppl):S222-S228.
41. Craig DI. Educational reform in athletic training: a policy analysis. *J Athl Train.* 2003;38(4):351-357.
42. Commission on Accreditation of Athletic Training Education. Historical overview. https://caate.net/historical-overview/. Accessed April, 2021.
43. Morin GE, Misasi S, Davis C, Hannah C, Rothbard M. Entry-level athletic trainers' self-confidence in clinical skill preparedness for treating athletic and emergent settings populations. *Athl Train Educ J.* 2014;9(4):166-173.
44. Diefenbeck CA, Plowfield LA, Herrman JW. Clinical immersion: a residency model for nursing education. *Nurs Educ Perspect.* 2006;27(2):72-79.
45. Accreditation Council for Occupational Therapy Education. 2018 Standards and Interpretive Guide. https://acoteonline.org/download/3332/. Published 2018. Accessed November, 2020.
46. Ekelman B, Dal Bello-Haas V, Bazyk J, Bazyk S. Developing cultural competence in occupational therapy and physical therapy education: a field immersion approach. *J Allied Health.* 2003;32(2):131-137.
47. Jette DU, Nelson L, Palaima M, Wetherbee E. How do we improve quality in clinical education? Examination of structures, processes, and outcomes. *J Phys Ther Educ.* 2014;28(1):6-12.
48. Moerchen VA, Dietrich M, Dietrich A. Description and outcomes of a practicum model for experiential learning in pediatrics. *J Phys Ther Educ.* 2017;31(3):130-140.
49. Arth K, Shumaker E, Bergman A, Nolan A, Ritzline P, Paz J. Physical therapist student outcomes of interprofessional education in professional (entry-level) physical therapist education programs: a systematic review. *J Phys Ther Educ.* 2018;32(3):226-240.
50. Eldred CM, Neil ER, Dougal ZJ, Walker SE, Grimes AM, Eberman LE. Preceptor perceptions of the immersive clinical experience in athletic training education. *Athl Train Educ J.* 2021;16(1):42-52.

51. Grimes AM, Neil ER, Eldred CM, Walker SE, Dougal ZJ, Eberman LE. Athletic training students' perceptions of the immersive clinical experience and its influence on their development. *Athl Train Educ J.* 2021;16(1):32-41.
52. Lam KC, Harrington KM, Cameron KL, Snyder Valier AR. Use of patient-reported outcome measures in athletic training: common measures, selection considerations, and practical barriers. *J Athl Train.* 2019;54(4):449-458.
53. Lam KC, Snyder Valier AR, Andersen BE, Valovich McLeod TC. Athletic training services during daily patient encounters: a report from the athletic training practice-based research network. *J Athl Train.* 2016;51(6):435-441.
54. Wetherington JJ, Pecha FQ. Medically underserved populations: the athletic trainer's role. *Athl Train Educ J.* 2020;15(4):289-294.
55. Schmidt S, George M, Bussey-Jones J. Welcome to the neighborhood: Service learning to understand of social determinants of health. *Divers Equal Health Care.* 2016;13(6):389-390.
56. Freiburger R, Picha KJ, Welch Bacon CE, Snyder Valier AR. Educational technique: incorporating social determinants of health into athletic training education. *Athl Train Educ J.* 2020;15(4):321-330.
57. Hoffman MA, Johnson ST, Norcross MF. The intersection of athletic training and public health. *J Athl Train.* 2019;54(2):121.
58. Winkelmann ZK, Games KE, Rivera MJ, Neil ER, Eberman LE. Athletic trainers' knowledge and practice application of public health topics. *Athl Train Educ J.* 2020;15(4):308-320.
59. Lave J, Wenger E. *Situated learning: legitimate peripheral participation.* New York, NY: Cambridge University Press; 1991.
60. O'Brien BC, Battista A. Situated learning theory in health professions education research: a scoping review. *Adv Health Sci Educ Theory Pract.* 2020;25:483-509.
61. Gieselman JA, Stark N, Farruggia MJ. Implications of the situated learning model for teaching and learning nursing research. *J Contin Educ Nurs.* 2000;31(6):263-268.
62. Diefenbeck CA, Herrman JW, Wade GH, et al. Preparedness for clinical: Evaluation of the core elements of the clinical immersion curriculum model. *J Prof Nurs.* 2015;31(2):124-132.
63. Diefenbeck CA, Hayes ER, Wade GH, Herrman JW. Student-centered outcomes evaluation of the clinical immersion program: Five years later. *J Nurs Educ.* 2011;50(11):628-635.
64. McKinley Advisors. *National Athletic Trainers' Association 2018 Salary Survey Findings.* National Athletic Trainer's Association.2019.
65. Edwards H, Smith S, Courtney M, Finlayson K, Chapman H. The impact of clinical placement location on nursing students' competence and preparedness for practice. *Nurse Educ Today.* 2004;24:248-255.
66. Sheffler S. Clinical placement and correlaes affecting student attitudes toward the elderly. *J Nurs Educ.* 1998;37(5):216-218.
67. Phafoli S, Christensen-Majid A, Skolnik L, et al. Student and preceptor perceptions of primary health care clinical placements during pre-service education: Qualitative results from a quasi-experimental study. *Nurse Educ Pract.* 2018;28:224-240.

68. Barta K, Flores M, Edwards A. Experiential learning enhances physical therapist student confidence in management of neurologically involved adults and children. *J Phys Ther Educ.* 2018;32(3):295-299.
69. Ohtake PJ, Lazarus M, Schillo R, Rosen M. Simulation experience enhances physical therapist student confidence in managing a patient in the critical care environment. *Phys Ther.* 2013;93(2):216-228.
70. Hyland D, Cavallario J, Neil ER, Laursen M, Eberman LE. Socialization experiences of athletic training preceptors. *Athl Train Educ J.* 2020;15(2):102-112.
71. Greenfield BH, Bridges PH, Phillips TA, et al. Exploring the experiences of novice clinical instructors in physical therapy clinical education: a phenomenological study. *Physiotherapy.* 2014;100:349-355.
72. Bates DK, Sikkema JA, Nynas SM, Culp C. Critical-thinking skills of first-year athletic training students enrolled in professional programs. *Athl Train Educ J.* 2017;12(1):18-25.
73. Knight KL. Hyposkillia & critical thinking: What's the connection? *Athl Train Educ J.* 2008;3(3):79-81.
74. Geisler PR, Lazenby TW. Clinical reasoning in athletic training education: Modeling expert thinking. *Athl Train Educ J.* 2009;4(2):52-65.
75. Bartlett DJ, Cox PD. Measuring change in students' critical thinking ability: implications for health care education. *J Allied Health.* 2002;31(2):64-69.
76. Yuan H, Williams BA, Fan L. A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning. *Nurse Educ Today.* 2008;28(6):657-663.
77. Walker SE, Thrasher AB, S.M. M. Exploring the perceptions of newly credentialed athletic trainers as they transition to practice. *J Athl Train.* 2016;51(8):601-612.
78. Institute of Medicine. *Health Professions Education: A Bridge to Quality.* Washington, DC: National Academy Press; 2003.
79. Welch Bacon CE, Pike Lacy AM, Lam KC. Knowledge translation in athletic training: considerations for bridging the knowledge-to-practice gap. *J Athl Train.* 2021; pre-production.
80. Mackey A, Bassendowski S. The history of evidence-based practice in nursing education and practice. *J Prof Nurs.* 2017;33(1):51-55.
81. Jacobs SK, Rosenfeld P, Haber J. Information literacy as the foundation for evidence-based practice in graduate nursing education: a curriculum-integrated approach. *J Prof Nurs.* 2003;19(5):320-328.
82. Hankemeier DA, Van Lunen BL. Approved clinical instructors' perspectives on implementation strategies in evidence-based practice for athletic training students. *J Athl Train.* 2011;46(6):655-664.
83. Hankemeier DA, Van Lunen BL. Perceptions of approved clinical instructors: barriers in the implementation of evidence-based practice. *J Athl Train.* 2013;48(3):382-393.
84. Carr WD, Volberding JL, Timson B. Preceptor understanding, comfort, and use related to evidence-based practice competencies. *Athl Train Educ J.* 2015;10(3):236-243.
85. Keeley K, Walker SE, Hankemeier DA, Martin M, Cappaert TA. Athletic trainers' beliefs about and implementation of evidence-based practice. *J Athl Train.* 2016;51(1):35-46.

86. Welch Bacon CE, Hankemeier DA, Wyant AL, Hays DG, Pitney WA, Van Lunen BL. Future directions of evidence-based practice in athletic training: perceived strategies to enhance the use of evidence-based practice. *J Athl Train.* 2014;49(2):234-244.
87. McCarty CW, Hankemeier DA, Walter JM, Newton EJ, Van Lunen BL. Use of evidence-based practice among athletic training educators, clinicians, and students, part 2: attitudes, beliefs, accessibility, and barriers. *J Athl Train.* 2013;48(3):405-415.
88. Neil ER, Welch Bacon CE, Nottingham SL, Kasamatsu TM, Eberman LE. Preceptors' frequency and supervision of athletic training students' medical documentation during clinical education. *J Athl Train.* 2019;14(3):182-190.
89. Hankemeier DA, Manspeaker SA. Perceptions of interprofessional and collaborative practice in collegiate athletic trainers. *J Athl Train.* 2018;53(7):703-708.
90. Manspeaker SA, Hankemeier DA. Challenges to and resources for participation in interprofessional collaborative practice: perceptions of collegiate athletic trainers. *J Athl Train.* 2019;54(1):106-114.
91. Breitbach AP, Eliot K, Cuppett M, Wilson M, Chushak M. The progress and promise of interprofessional education in atheltic training programs. *Athl Train Educ J.* 2018;13(1):57-66.
92. Rapp GC, Ingersoll CD. Sports medicine delivery models: legal risks. *J Athl Train.* 2019;54(12):1237-1240.
93. Redinger AS, Winkelmann ZK, Eberman LE. Collegiate student-athletes' perceptions of patient-centered care delivered by athletic trainers. *J Athl Train.* 2020; In Review.
94. Lopes Sauers AD, Sauers EL, Snyder Valier AR. Quality Improvement in Athletic Health Care. *J Athl Train.* 2017;52(11):1070-1078.
95. Walker S. Journal writing as a teaching technique to promote reflection. *J Athl Train.* 2006;41:216-221.
96. Cavallario JM, Van Lunen BL, Manspeaker SA. Effect of procedure type on core competency implementation by athletic training students. *Athl Train Educ J.* 2019;14(3):208-214.
97. Shanley E, Thigpen CA, Chapman CG, Thorpe J, Gilliland RG, Sease WF. Athletic trainers' effect on population health: Improving access to and quality of care. *J Athl Train.* 2019;54(2):124-132.
98. Hoffman M, Bovbjerg V, Hannigan K, et al. Athletic training and public health summit. *J Athl Train.* 2016;51(7):576-580.
99. Rich R, Paschal A. US college students' perceptions of social determinants of health, health equity and racial health disparities. *Health Educ.* 2020;79(6):700-711.
100. Williams RM, Welch Bacon CE, Snyder Valier AR, Lewis JH, Bay RC, Picha KJ. *Athletic trainers' perceptions of social determinants of health.* VNATA 2020 Free Comm Abstracts.
101. Commission on Accreditation of Athletic Training Education. *2017-2018 CAATE Analytic Report.* 2018.
102. Schroeder K, Malone SK, McCabe E, Lipman TH. Addressing the social determinants of health: a call to action for school nurses. *Journal of School Nursing.* 2018;34(3):182-191.
103. Schroeder K, Garcia B, Snyder Phillips R, Lipman TH. Addressing social determinants of health through community engagement: an undergraduate nursing course. *J Nurs Educ.* 2018;58:423-426.

104. Schilling JF. Educational preparation and expereinces in the industrial-occupational setting: a qualitative study of athletic training graduates. *Athl Train Educ J.* 2011;6(2):99-106.
105. Eberman LE, Winkelmann ZK, Edler JR, Neil ER. Athletic trainers' knowledge regarding health care delivery systems and administration in the american health care system. *Athl Train Educ J.* 2020;15(4):295-307.

VITA

Bailey Christine Jones, PhD, ATC

Health Services Research
Old Dominion University
College of Health Sciences
2114 Health Sciences Building
Norfolk, VA 23529

EDUCATION

Doctor of Philosophy in Health Services Research
Old Dominion University. Virginia, USA 2021

Master of Science in Athletic Training
Old Dominion University. Virginia, USA 2018

Bachelor of Science, Athletic Training
James Madison University. Virginia, USA 2016

PRESENTATIONS & RESEARCH

National Athletic Trainers' Association Annual Conference Virtual; June 2021 Oral, Rapid-Fire Presentation	*Athletic Training Student Core Competency Professional Behavior Implementation Between Immersive and Non-Immersive Experiences: A Report from the AATE Research Network*
National Athletic Trainers' Association Annual Conference Virtual; July 2020 Oral, Rapid-Fire Presentation	*Athletic Training Student Patient Encounter Characteristics during Immersive and Non-Immersive Experiences: A Report from the AATE Research Network*
Old Dominion University Graduate Research Day Norfolk, VA; April 2020 Poster Presentation	*Athletic Training Student Patient Encounter Characteristics during Immersive and Non-Immersive Experiences: A Report from the AATE Research Network*
Commission on Accreditation of Athletic Training Education Conference Atlanta, Georgia; February 2019 Poster Presentation	*Athletic Training Student Application of Quality Improvement during Clinical Education: A Report from the Athletic Training Clinical Education Network*