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Social Determinants Associated with the Employment of Athletic Training Services in Secondary Schools

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Social Determinants Associated with the Employment of Athletic Training Services in Secondary Schools

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ABSTRACT

Social Determinants Associated with the Employment of Athletic Training Services in Secondary Schools

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CONTEXT: Sport participation in athletics has continually been on the rise for the past decade. With athletic participation, comes injury risk. As the numbers continue to increase, so will injuries. SSs need to employ proper medical services, athletic trainers (ATs), in order to educate, recognize, diagnose and treat injuries seen across all sports. **OBJECTIVE:** To examine associations between three social determinants and AT employment. **DESIGN:** Cross-sectional study, mixed-method approach. **SETTING:** Secondary school athletic programs nationwide. **PARTICIPANTS:** A total of 20,426 SSs were identified in the United States. **INTERVENTION:** Identify SSs with athletic programs and the AT services provided at each school. **MAIN OUTCOME MEASURES:** Frequencies (n) and percentages with 95% confidence intervals (CI) were reported for the following: number schools per state, number of schools per NATA district, school classification status, AT employment status, number of ATs per school, school size, Title 1 status (public only) and locale classification (city, suburban, rural). Mean and standard deviations were reported for continuous data i.e. (#ATs, #students and #student-athletes per school). Chi-squares and p-values ($p<0.05$) were calculated to find associations between AT employment status and social determinants. Chi-squares were conducted between locale classifications to identify associations and levels of the associations. Odds ratios (OR) and confidence intervals (CI) were calculated to find the strength of the associations of the chi-squares. **RESULTS:** There are 20,426 SSs with school sanctioned athletic programs. A large portion of SSs had some level of AT services at their school (65.9%) versus no services (34.1%). Schools with greater than 501 students have a 6.9x greater odds of employing an AT versus those schools less than 500 students ((Chi-square: 3187.712, $p<0.0001$*) [95%CI: 6.431, 7.414]). Schools without Title 1 funding had a larger percentage of ATs than schools receiving Title 1 funding however there was no statistical significance found ((Chi-square: 230.149, $p= 0.0526$) (OR: 0.6) [95%CI: 0.3, 1.0]). City schools are at 1.3x greater odds of employing an AT than suburban schools ((Chi-square: 586.091, $p<0.0001$*) [95% CI: 1.203, 1.426]). Suburban schools have a 3.5x greater odds of employing an AT than rural schools ((Chi-square: 914.443, $p<.0001$*) [95%CI: 33.1, 37.9]). City schools have a 4.4x greater odds of employing an AT than rural schools ((Chi-square: 1056.3) $p<0.0001$*) [95%CI: 42.7, 50.3]). **CONCLUSIONS**: Hiring an AT in SSs is clearly a multi-factorial process that cannot be pin pointed down by one social determinant or one barrier. School size had the largest association to AT employment, displaying the larger the school, the greater odds of employing an AT. The city locale has the largest percentage of AT services, followed by suburban and rural. Previous authors have investigated social determinants and barriers to employing ATs in SSs, however a population dataset regarding AT employment has never been acquired until now. **Key words:** athletic trainers, sports, athletics, secondary schools, athletes

CHAPTER I

REVIEW OF THE LITERATURE

Introduction

Athletic trainers (ATs) are health care professionals who collaborate with physicians to optimize patient health and participation in a physically active role or task in work, life and athletics. The range of responsibilities of ATs are wide and comprehensive, and include prevention, examination, diagnosis, treatment, and rehabilitation of emergent, chronic and acute musculoskeletal injuries and conditions.[1,2] ATs may be found in the youth, middle and high school, college and professional-level athletic programs.[3,4]

Injury risk in secondary school (SS) athletes is becoming an increasing topic of discussion in the public health setting.–Due to the inherent nature of injury from sports participation, interventions are warranted to mitigate the risk of these injuries.[5,6] According the National Federation of State High School Associations, the number of participants in SS sports has increased for the 25th consecutive year in 2014 with an estimated 7.8 million student-athletes accounting for about half of all students enrolled in high schools.[2] The importance of ATs working and providing medical care to student-athletes and communities will be increasingly important as the sport participation numbers continue to climb. Schools need to take proactive measures to provide for their students in the case of injury and illness. Employing an AT help and assist with the process.[7–10]

Budget issues have been identified as an important factor in deciding if and how many ATs a school can afford. It could be argued that having an AT on staff could actually save money. Recent articles have attempted to demonstrate the cost savings or value added by the AT in the SS setting.[1,11,12] The national median salary for ATs as stated by the Bureau of Labor Statistics is

$46,630.[13] This amount is not an exorbitant by any means and is often lower than salaries of educators ($58,030).[14] The savings to an athletic program as a result of preventative and rehabilitative practices and timely attention to injuries by ATs will likely reduce medical costs and related care expenses for athlete injuries. This savings may be equal to or even greater than the AT salary.

The value of an athletic trainer is multidimensional, including (but not limited to) risk minimization, cost containment, medical and administrative services, and communication. Students, schools, administrators, parents and their communities all benefit from the unique value that is added by having an athletic trainer on staff.[11] The purpose of this literature review is to present evidence that ATs provide a pivotal role in athletics in regards to safety and the health and wellness of student-athletes in SSs.

Athletic Training Domains

The Commission on Accreditation of Athletic Training Education (CAATE) is another nationally-recognized organization that is committed to ensuring excellence in the field of AT. These (and other organizations) are continuing to develop and define the role of ATs and are helping to educate those involved with student athletics about the vital need for ATs in their programs.

CAATE created and requires all ATs to learn all the competencies set forth by the CAATE program.[2] ATs are an essential component needed to round out athletic programs. Work must be done to ensure that this is communicated, valued and supported within athletic communities and especially for the long-term health of student athletes.

Within athletic training, there are six domains that the medical professionals are trained in and required to follow. The domains include: 1. professional development and responsibly, 2. injury prevention and risk management, 3. clinical evaluation and diagnosis of pathologies, 4. immediate and emergency care, 5. treatment and rehabilitation and 6. administrative duties and professional health and well-being.[1,2]

The first domain, professional development and responsibilities of the AT, consists of collecting and disseminating injury and health care information to other health care professionals, parents/guardians and any other appropriate personnel.[14,26] As part of their professional responsibility, ATs are expected to earn continuing education units, as well as stay up to date on the most current research and policy.[26]

The second domain, creating injury prevention programs and implementing risk management plans for the physically active, is another important aspect of the ATs role that is critical to minimize the number of injuries to athletes.[14] The mere presence of an AT on site for practices and competition is a risk management plan in itself because the AT is the most qualified and appropriately trained healthcare professional in the event of an athletic-related emergency. In order to help prevent injuries, ATs instruct athletes about the proper choice and fit of equipment. In addition, educating athletes about, illnesses, nutrition, healthy performance and sleep are key areas ATs focus on when working with their patients.[14]

Another important component of an injury prevention plan is designing and implementing conditioning and sport-specific conditioning programs to reduce injury risk and illness.[15] In the case of an imminent emergency, the AT, coaches, administrators or other trained personnel may be on site and required to carry out a plan to provide care for an injured athlete. Emergency, step-by-step action plans (EAPs) are developed, rehearsed and implemented for every venue that

athletes train or compete at. These are step-by-step plans for what to do in the case of an emergency.[1] A comprehensive EAP will include key personnel and their roles, address of the venue, and specific directions to enter the facility. The EAP may also indicate what care is to be provided if the AT is not present.[1]

In addition to the provision of care for the athlete, the AT obtains and interprets environmental temperatures and makes modifications to practices and competitions based on this information.[15] For example, during the warmer months with extreme temperatures and/or high humidity, the AT is responsible for intervening and making adjustments to sessions to prevent heat, cold and other weather-related illnesses or death.[15] An AT ensures that all EAPs are followed with fidelity in order to keep the best interest of each athlete consistently at the forefront of their practice.

ATs are responsible for evaluating, assessing and referring student injuries in a timely fashion within the frameworks established in the medical field, and communicating this to all involved.[13] Clinical evaluation and diagnosis of pathologies is another domain in which the AT excels.[15] On and off-field evaluation, assessment, and referral of injuries are within the purview of the AT and can be critical for the treatment and return to play of an injured individual.[15] Taking extensive medical histories, scheduling physical exams and providing and working thorough differential diagnosis are tasks of the AT as well as educating all parties on the process as it is carried out.[15] ATs are able to provide various medications to athletes depending on the standing orders that are agreed upon by the physician and medical team.[15] ATs can recognize and provide care for general medical conditions and refer out to the appropriate personnel instances that require more advanced treatment.[7] Having an AT on-site is key for providing immediate first aid and acute medical care to athletes. On-field assessment and a timely recognition is critical to providing

optimal care for student-athletes. ATs provide care to the athlete while coordinating and activating emergency medical systems for varies medical conditions occurring.[14, 15] ATs are trained and skilled at assessing musculoskeletal injuries, illnesses or other conditions to determine the best treatment for the patient with specific short-term and long-term goals. ATs modify treatment plans based on progress and responses of the patient.[2,15] ATs select and apply modalities to injuries, instruct rehabilitation exercises, educate patients on injuries and home exercise plans and mediate return-to-play protocols.

Referrals from the AT to an outside medical professional are common as well as coordinating outside care for the patient's well-being.[16] ATs document and store protected healthcare information regarding diagnosis, treatments, and referrals ~~are~~ in conformation with the Health Insurance Portability and Accountability Act (HIPAA) and Federal Education Rights Privacy Act (FERPA)[15] and comply with the Occupational Safety and Health Administration's (OSHA) required practices of appropriate infection controls: equipment safety, environmental hazards and facility maintenance.[15] ATs develop, administer and manage the athletic training room or facility designated for AT services. Inventory upkeep, ordering of supplies and documenting are all key roles of the AT. Communication between the AT, coach, parent/guardian, nurse, athletic director and team physician is key in order to have a well-coordinated health care team.[15] In doing so, ATs minimize injuries and recovery time for athletes and ensure that consistent treatment and recovery plans are understood and followed by all who interact with the athletes.[16]

An AT's constant commitment to professional development is important because it not only prepares the AT for what they will encounter working with student-athletes, but also allows them to share their knowledge with others in order to deepen their understanding and enhance their

professional practice. With this up-to-date knowledge, the AT will provide the most current and effective care to student-athletes participating in SS athletics.

In short, ATs practice and follow the domains set forth by the Board of Certification for athletic trainers.[17] The domains provide a framework of the AT role and profession and highlight the wide range of services the AT can provide. In the SS setting, student-athletes participating in sports need ATs who are trained and certified professionals. Certified ATs have extensive knowledge about injuries and medicine in athletic populations and are well equipped to deliver the services student athletes need in a timely fashion.

Athletic Trainer Employment

Currently, there is no state or place in the country that mandates SSs to provide an AT for the student-athletes and athletic program. There is a serious risk of injury to athletes in the absence of an on-site AT who can provide proactive care and immediate attention to injuries and medical concerns.[18] There are only two places currently, where funding for the AT position is allocated and cannot be spent elsewhere, those being Washington DC and Hawaii.[19] It is not a requirement to have an AT in schools in Washington DC and Hawaii as most believe; there is no legislation that requires the position to be filled, just that there are funds for the position if the schools choose to employ at AT. As long as the school can find an appropriate candidate, the school is able to employ an AT and the funding resources available.[19]

AT services have been expanding over the past decade simultaneously with the increase in sport participation. Looking back to 1994, AT services in were only found in 35%[12] of athletic programs. This data was collected via an online literature review of AT employment is SSs. Data collected via another literature review, eleven years later (conducted by the NATA), established

42%[4] of schools provided AT services to the student-athletes. In 2015, Pryor et al. explored AT employment and found 70% of public schools employ an AT. In a follow-up investigation, Pike et al. found that 58% of private schools employ some variation of AT employment. Both Pryor and Pike's investigations were conducted via phone interviews and email.[4,20,21] These pivotal studies have enabled the profession to advance with the increased demand by tracking the hiring and employment of ATs in this setting. However, these findings do not come without barriers or limitations.

B**arriers to Hiring an Athletic Trainer**

Previous research has evaluated various facilitators and barriers that exist surrounding hiring of an AT.[4] An investigation by Pike et al. into the barriers of employing an AT in the SS in both private and public schools found multiple factors that influence employment of an AT such as funding and lack of awareness of the AT role.

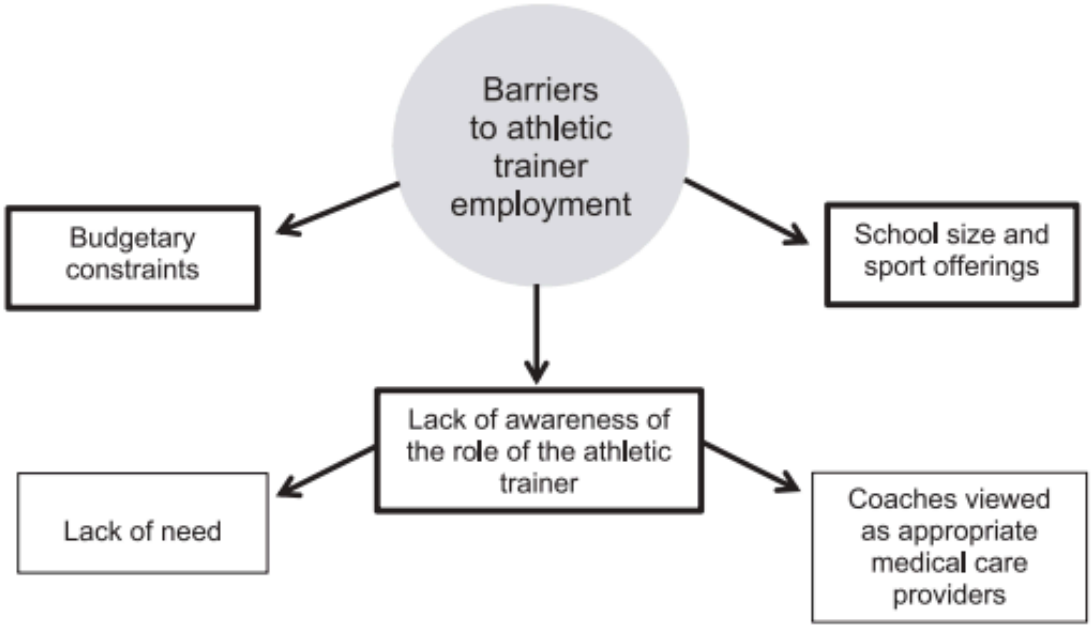

Figure 3. Barriers to employing athletic trainers in the private secondary school setting.

Looking further into the barriers of employing an AT in the SS level, limited funding has been identified as a large road block for school districts.[12,13] Figure 3 adapted from Pike's investigation in the private school setting, displays barriers to employment of the AT.[4] Funding and budget cuts are issues that occur nationwide.[22,23] Core classes as well as extracurricular classes are being cut from schools due to budgetary constraints so it is difficult to justify providing medical care when classes are being removed as well.[12,13] A large barrier ATs and administrators are facing is that they do not have the funds or the ability to support funding an AT when the budgets are tight.[12,13]

Another barrier to employing ATs, is the lack of awareness regarding an AT's qualifications and responsibilities.[3,4] Therefore, it is the duty of the AT to educate and promote the profession so that administrators, athletic directors and coaches better understand what it is that the AT provides and how they enhance the safety and performance of their athletes in addition to

providing medical care. Some locations do not recognize the need and are not advocating for the profession as the procedures they are carrying out currently are seemingly sufficient.[4] Many coaches and administrators will say: "We have a coach that can take care of our players" or "We are a small school we don't need one." Occasionally, the coaching staff is certified in CPR and first aid which is beneficial, but there is often a large number of staff members who do not hold addition certifications, trainings, or education.[24] Educating the administrators, coaches, parents and athletes about what an AT is and does is lacking and therefore employing an AT can be difficult to justify if the need is not apparent or understood. In both public and private schools, lack of awareness was a limiting factor in employing the AT, 13% and 19% respectively.[20]

Social Determinants

Social determinants are conditions of health in which people are raised, live and work.[24] These determinants are shaped by money, power and resources at the global, national and local levels, and they can be unfair and are unavoidable.[3] Social determinants previously explored that may be associated with the employment of ATs at the SS level are location of the school, school size, type of sports offered by the school. This holds true for both public and private SSs.[20] Number of sports is yet another factor associated with the employment of an AT. The fewer sports a school has, the less likely the school will employ an AT.[22] Investigating why a small number of sports at a school is associated with AT employment warrants further investigation.

A study conducted investigated 66 South Carolina High Schools, using various social determinants and the medical care provided to athletics programs.[15] Wham et al. explored, the presence, source, and number of ATs; school size; distance to nearest medical center; public or private status; sports medicine supply budget; and varsity football regional championships served

as explanatory variables, whereas the school setting, region of state, and rate of free or reduced lunch qualifiers served as control variables.[15] Data was collected via survey implementation and scored on the Appropriate Care Index (ACI) from the Appropriate Medical Care Assessment Tool (AMCAT).[15] This score provided a quantitative measure of medical care and was compared to the Appropriate Medical Care for Secondary School-Age Athletes (AMCSSAA) Consensus Statement. Investigators found AT services and the sports medicine supply budget were associated with higher levels of medical care.[15] Results showing again, funding is a factor with employment of the AT in the SS level.[4,15,20,22]

School size has been previously investigated and shown significant findings associated with AT employment.[4,20,21] The larger the school, the more likely the school with employ an AT, as found in both the public and private sector.[4,20,21] Pryor et al found, with a partial data set (~9,000 SSs) that as the student enrollment increases, there is an increase in ATs employed.[21]

Title 1 status is a social determinant as defined by the public health literature, however it is not a direct reflection of socioeconomic status. U.S. Department of Education identifies public schools that qualify for financial assistance with high numbers of low-income families as Title I schools.[23,25,26] Title 1 funding is quite low, averaging about $500-$600 per student, and the evidence collected has not shown significant benefits and success rates for programs and students receiving the funding.[27] This demonstrates that although Title 1 designation may be associated with funding for a school, it is likely not associated with socioeconomic status of an area. Despite this, it is imperative in the sports-medicine literature that we investigate as many social determinants as possible to identify what/if anything is associated with hiring an athletic trainer. These data are freely available via the National Center for Education Statistics (NCES) and could be used to help identify any associations with lack of AT services. However, at this time, such a

link remains unknown.[22,23,25,26] One would propose that given what is known regarding the lack of budget as a barrier to employing an AT, the Title 1 status of a school data might substantiate this reported barrier in a quantitative manner.

Another social determinant lacking research that has been theorized to influence whether or not a school has an AT is the locale of the school. Locale codes were developed and created by the NCES in the 1990s for general geographic description sampling as well as other statistically purposes.[28] Every SS in the country is given a locale code based on the location (proximity to metropolitan areas) and size of the school.[28] However, to date no data examining AT employment by locale or demonstrating the association between having and not having an AT by locale exists.[22] Locale classification may play a role in AT employment and warrants future exploration with the total population.

Gaps in the Literature

Despite the overwhelming evidence to support the need for ATs in the SS setting, only 70% of public schools and 58% of private schools have ATs in the SS setting.[4,21] There is a critical need to investigate potential factors influencing AT hiring. Social determinants are not frequently investigated in sports med literature. Previous qualitative research has shown that school size and location are barriers that affect the hiring of an AT in the SS setting, however, this research was a subset of the population. Quantitative research examining the associations between school size, Title 1, and locale and AT employment status remains unknown. An enhanced understanding of the role these social determinants play in the employment of the AT will help to tailor resources and/or provide evidence for administrators to hire an AT or extend the hours for an existing position.

CHAPTER II

INTRODUCTION

According to the U.S. Center for Disease Control, participation in athletics is on the rise and has continually increased over the past decade.[29] In the 2013-2014 school year there was a total of 7,807,047 student-athletes participating school-sanctioned athletics in the secondary school (SS) setting, accounting for over half of the student population.[30] With the inherent risk of injury in sports, there is a critical need for medical services to be provided in order to ensure the safety of athletes participating in the SS setting.[18] An athletic trainer (AT) is a multi-skilled healthcare professional who is trained in the prevention, recognition and care of medical conditions in a variety of settings.[8,15,16,31]

Looking back to 1994, AT services in SSs was only found in 35%[12] (move this to the end of the sentence) of athletic programs. This data was collected via an online literature review of AT employment is SS. Data collected via another literature review, 11 years following (conducted by the NATA), established 42%[4] of schools provided AT services to the student-athletes. In 2015, Pryor et al. explored AT employment and found 70% of public schools employ an AT. In a follow-up investigation, Pike et al. found that 58% of private schools employ some variation of AT employment. Both Pryor and Pike's investigations were conducted via phone interviews and email.[4,20,21] These pivotal studies have enables the profession to advance with the increased demand and track hiring and employment.

Previous research has investigated potential reasons for why SSs do not have access to AT services. Funding and lack of awareness of the AT role have been identified as barriers to the employment of ATs. Barriers as well as social determinates have shown associations with AT employments. Social determinants are conditions of health in which people live and work in and

are shaped by money and power. Though classified as a barrier by Pike et al., school size and location are classic social determinants as defined by public health and are factors associated with AT employment.[15] Remote location was the only territory defined in previous research regarding AT employment.[20] Additionally, in both the public and private sectors, larger SSs were reported to be more likely to have AT services[20]. However, this data was only a snapshot of the population. Findings regarding barriers (budget, location, awareness and lack of need) were obtained through phone interviews and collected via administrators' opinions.

A final social determinant that has not been investigated is Title 1 classification. Title 1 is a federally funded program for public schools that have at least 40% of low-come based families enrolled in a school. While public health research does not show a benefit to Title 1 programs, there may be a potential link to socioeconomic status (using Title 1 status as a variable) and ATs in the SS setting. These data are the extent to which social determinants have been examined related to AT services and a more comprehensive picture is needed to truly quantify AT services in this setting.

The purpose of this study was to describe and examine the association of social determinants on AT services in the SS population. The understanding of these determinants and the associations could provide promising findings that may lead to the improvement of AT employment in the SS setting. Social determinants such as school size, Title 1 school classification (federally funded programs), and locale have not been examined. Larger schools and schools in rural locales are proposed to have a greater odd of employing an AT. SSs without Title 1 funding will have greater odds of employing an AT.

CHAPTER III

METHODS

Participants

A population of SSs with school-sanctioned athletic programs from all fifty states and Washington D.C. were included in the data set. SSs with grades 9 through 12 or any combination of the four grades were included. The ATLAS Project created a directory for each state equipped with AT information, employment and facts about the school. The directory also assists AT state associations and members with strategic efforts for policy change, provides data related to AT services, and has helped to improve communication and delivery of healthcare services between medical providers in SSs.[23,25,26] ATLAS was created in an effort to elucidate the potential factors reported by schools that might be associated with AT services beyond previous findings.

SSs were identified from the NATA Benchmark[19] study database and ATLAS database and merged using a common identifier with the US Department of Education NCES database (NCES school ID). The following variables were obtained for every school in the ATLAS database: school type (public vs. private), locale, total # of students, and Title I status (public schools only). Schools are classified as Title 1 if at least 40% of the students come from low-income based family status.[23,25,26] These schools received funding from state educational agencies to improve educational programs and enhance achievements for all students. The National Center for Educational Statistics criteria for locale classifications was used. City, suburban, town and rural locals were identified and defined.[28,33] City, by definition is split in large, mid-size and small. For analysis, the three sizes were grouped together and defined as an urbanized area inside a principal city. Suburban and town were combined locales, as seen in previous public health literature and had the same three sizes, grouped together and defined as a census-defined rural territory.[28,33]

Suburban included the same three sizes in the analysis and was defined as a territory outside a principal city and inside an urban cluster.[25,26,28]

Procedures/ Instrumentation

Data collected by the ATLAS Project was performed using a longitudinal multi-modal acquisition process. Numerous data bases were merged and identified to obtain the population data regarding AT services in the SS setting. Approximately 10,000 schools' AT data were obtained from the previous two studies from our group[21] and merged with the secondary schools listed in the NCES database. Methodology from the Benchmark study can be found in Pryor et al.[21] After merging the lists, duplicates from the two databases were removed leaving a population list of SS with athletic programs. Finally, a survey was created to further update and display AT employment nationwide. The survey was created by the NATA, Secondary School Committee of the NATA and the Korey Stringer Institute. Survey was disseminated and publically available to ATs across the nation in the SS level. Questions covered demographic information, AT employment (Yes/No), and #students.

Data Analysis

Statistics were performed on SPSS (version 25, IBM Corp, Armonk, NY). Descriptive statistics were gathered for SS nationwide with athletic programs. Mean and standard deviations were reported for continuous data (i.e. #ATs, #students and #student-athletes per school). Frequencies are reported on all ordinal variables including: the number of schools per state, the number of schools per NATA district, and school classification status~~,~~. 95% confidence intervals around a proportion were calculated in portions of the data that were samples, rather than

population, to demonstrate the generalizability to the population. Chi-squared analysis of association and p-values ($p<0.05$) were calculated to find associations between AT employment status and social determinants. For school size, the total number of students was used to dichotomized schools into two groups based on Pryor et al, who demonstrated that 501 students was the crossing point from PT to FT services.[21] Chi-squared analysis of association were conducted between school size, Title 1 and the three locale classifications to identify associations and levels of the associations. Odds ratios (OR) and confidence intervals (CI) were calculated to find the strength of the associations of the chi-squares.

CHAPTER IV

RESULTS

Secondary School Demographics

In the United States, there are 20,426 SS with school sanctioned athletic programs. The majority of the schools studied are public in nature (79.0%), versus private (21.0%) (Figure 1). Our findings demonstrate that AT services were provided to 65.9% of schools (Figure 2). In all SSs nationwide, there are 1 $\pm$ 1 AT per HS with a minimum zero ATs and a maximum of 7.0. Using the NATA District classifications (Table 1.), district 4 (IL, IN, MI, MN, OH, WI) had the largest number of total schools 19% (3862) [18.4, 19.5]). District 7 (AZ, CO, NM, UT, WY) had the smallest number of schools 5.0% (1027) [4.7, 5.3] in the nation (Table 1). One AT was present in was present in 55.9% of schools which is greater than having 2, 3, 4 or 5 ATs employed per school combined.

Figures 1-2 and Table 1-2 depict Secondary School Demographics

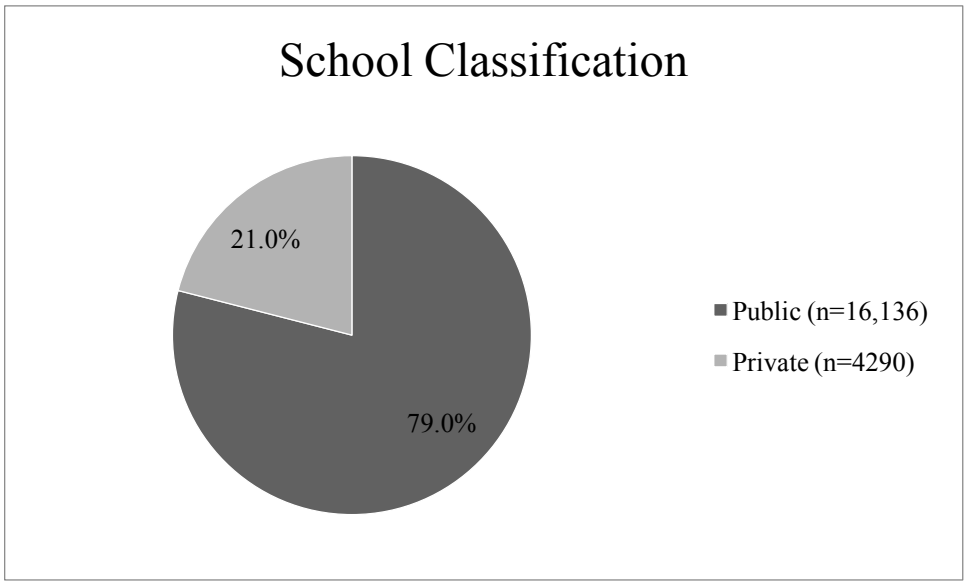

Figure 1. Schools classified into public and private.

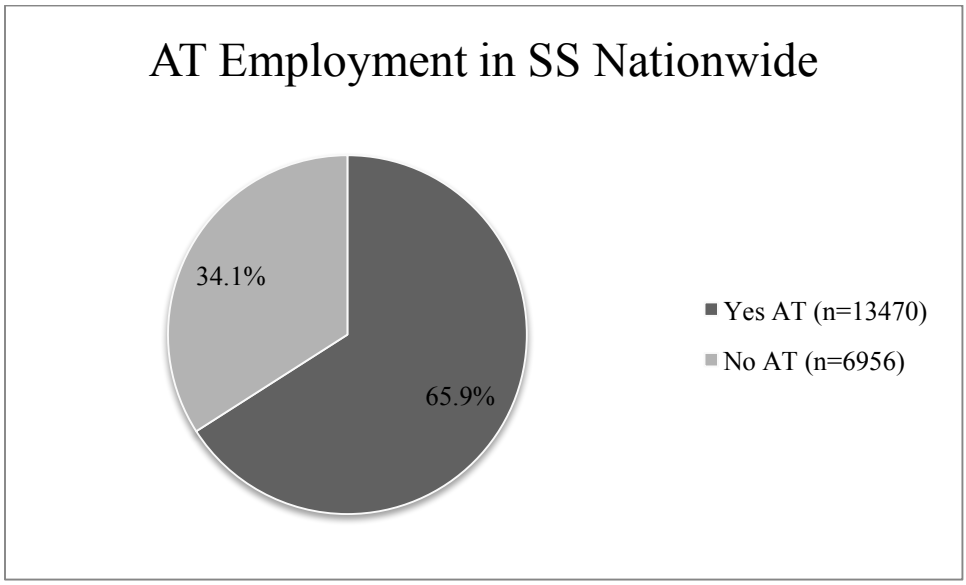

Figure 2. Schools with AT services versus schools without.

Table 1. Percentage of SSs divided in NATAs' 10 districts.

NATA District	State	%, n, 95% CI
1	CT	1.0% (213) [0.9, 1.2]
	MA	1.9% (388) [1.7, 2.1]
	RI	0.3% (64) [0.2, 0.4]
	VT	0.4% (85) [0.3, 0.5]
	NH	1.0% (204) [0.9, 1.1]
	ME	0.7% (149) [0.6, 0.9]
Total		**5.3% (1103) [5.1, 5.7]**
2	DE	0.3% (55) [0.2, 0.4]
	NJ	2.2% (448) [2.0, 2.4]
	NY	4.4% (902) [4.1, 4.7]
	PA	3.8% (783) [3.6, 4.1]
Total		**10.7% (2188) [10.3, 11.1]**
3	DC	0.2% (51) [0.2, 0.3]
	MD	1.5% (303) [1.3, 1.7]
	NC	2.6% (528) [2.4, 2.8]
	SC	1.5% (298) [1.3, 1.6]
	VA	2.3% (465) [2.1, 2.5]
	WV	0.6% (131) [0.5, 0.8]
Total		**8.7% (1776) [8.3, 9.1]**
4	IL	4.1% (833) [3.8, 4.4]
	IN	2.1% (425) [1.9, 2.3]
	MI	3.9% (794) [3.6, 4.2]
	MN	2.2% (440) [2.0, 2.4]
	OH	4.2% (863) [4.0, 4.5]
	WI	2.5% (507) [2.3, 2.7]
Total		**19% (3862) [18.4, 19.5]**
5	IA	1.7% (351) [1.5, 1.9]
	KS	1.8% (367) [1.6, 2.0]
	MO	3.0% (605) [2.7, 3.2]
	NE	1.5% (300) [1.3, 1.6]
	ND	0.8% (159) [0.7, 0.9]
	OK	2.5% (507) [2.3, 2.7]
	SD	0.8% (164) [0.7, 0.9]
Total		**12.1% (2453) [11.6, 12.5]**
6	AR	1.2% (245) [1.1, 1.4]
	TX	8.0% (1631) [7.6, 8.4]
Total		**9.2% (1876) [8.8, 9.6]**
7	AZ	1.4% (283) [1.2, 1.6]
	CO	1.6% (337) [1.5, 1.8]
	NM	0.7% (152) [0.6, 0.9]
	UT	0.9% (182) [0.8, 1.0]
	WY	0.4% (73) [0.3, 0.4]

Total		**5.0% (1027) [4.7, 5.3]**
8	CA	7.6% (1562) [7.3, 8.0]
	HI	0.4% (75) [0.3, 0.5]
	NV	0.5% (102) [0.4, 0.6]
Total		**8.5% (1739) [8.1, 8.9]**
9	AL	2.3% (478) [2.1, 2.6]
	FL	3.6% (739) [3.4, 3.9]
	GA	2.6% (535) [2.4, 2.8]
	KY	1.4% (294) [1.3, 1.6]
	LA	1.9% (397) [1.8, 2.1]
	MS	1.6% (331) [1.5, 1.8]
	TN	2.1% (426) [1.9, 2.3]
Total		**15.5% (3200) [15.2, 16.2]**
10	AK	0.8% (157) [0.7, 0.9]
	ID	0.8% (169) [0.7, 1.0]
	MT	0.9% (177) [0.7, 1.0]
	OR	1.5% (299) [1.3, 1.6]
	WA	2.0% (400) [1.8, 2.2]
Total	-	**6.0% (1202) [5.6, 6.2]**
National Total	-	20426

Social Determinant Demographics

In regards to school size by student enrollment, there are a greater number of schools with enrolled greater than 501 (as seen in Table 2). Title 1 funding was provided to a majority of public SSs nationwide (as seen in Table 2). The suburban locale had the largest number of schools, followed by rural schools, while cities have the smallest number of schools nationwide (as seen in Table 2.).

Athletic Trainer Employment and Social Determinants

Schools that have equal to or greater than 501 students demonstrate a 6.9x greater odds of employing an AT versus those schools (equal to or) less than 500 students ((Chi-square: 3187.7, $p<0.0001$) [95% CI: 6.4, 7.4]). No statistical significance was observed between schools classified as Title 1 and AT employment ($p>0.05$). There were associations found between locale classifications: city, suburban and rural. Schools in city locations are at 1.3x greater odds of employing an AT than schools in the suburban ((Chi-square: 586.1, $p<0.0001$) [95% CI: 1.2, 1.4]). Schools in the suburban locations have a 3.5x greater odds of employing an AT than schools in the rural locations ((Chi-square: 914.4, $p<.0001$) [95% CI: 33.1, 37.9]). Schools in the city locations have a 4.4x greater odds of employing an AT than schools in the rural locations ((Chi-square: 1056.3) ($p<0.0001$) [95% CI: 42.7, 50.3]). Statistical significance was found between all three locals $p<0.05$.

Social Determinant		%	n	95% CI
School Size	≤500	48.3%	9203/19044	47.6, 49.0
	≥501	51.7%	9841/19044	51.0, 52.4
Title 1	Yes	69.0%	10818/15657	68.4, 69.8
	No	31.0%	4839/15657	30.2, 31.6
Locale	City	18.5%	3535/19093	18.0, 19.1
	Suburban	41.6%	7947/19093	40.9, 42.3
	Rural	39.9%	7611/19093	39.2, 40.6

Table 2. SS percentage, number, and confidence interval measures for school size, Title 1 status and locale social determinates.

Social Determinants and AT Employment can be found in Figures 3-6

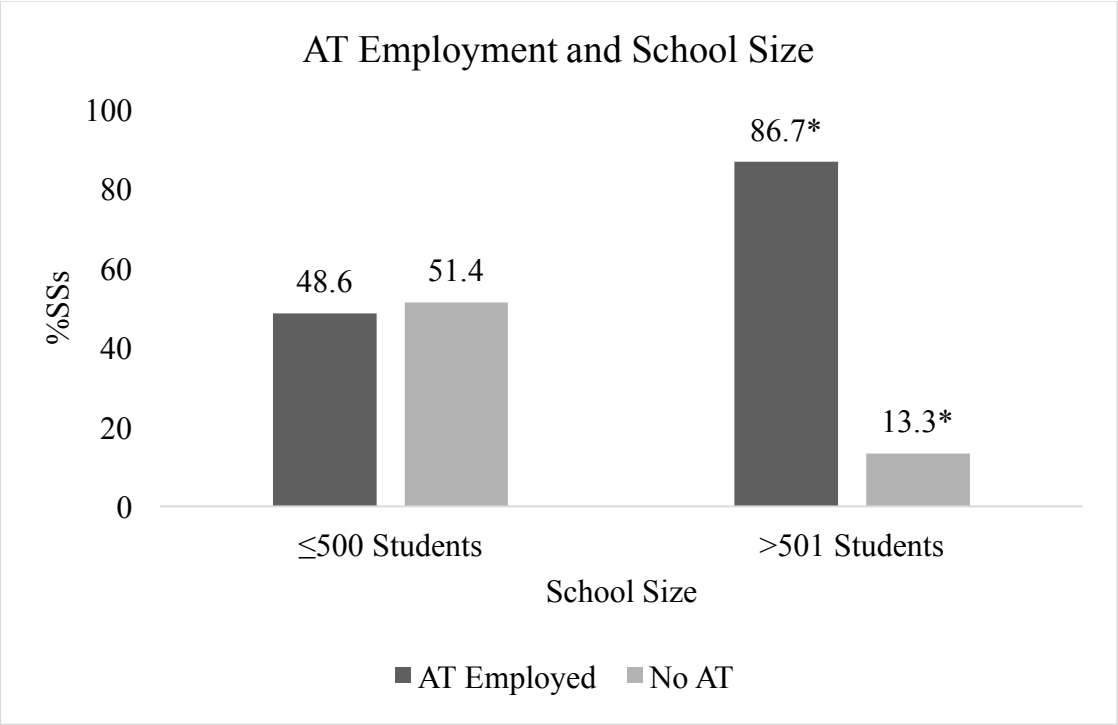

Figure 3. AT employment and school size of all SSs (n= 19,044). ≤500 students enrolled, ≥501 students enrolled per school *Significant difference between schools ≥501 and AT employed versus not.

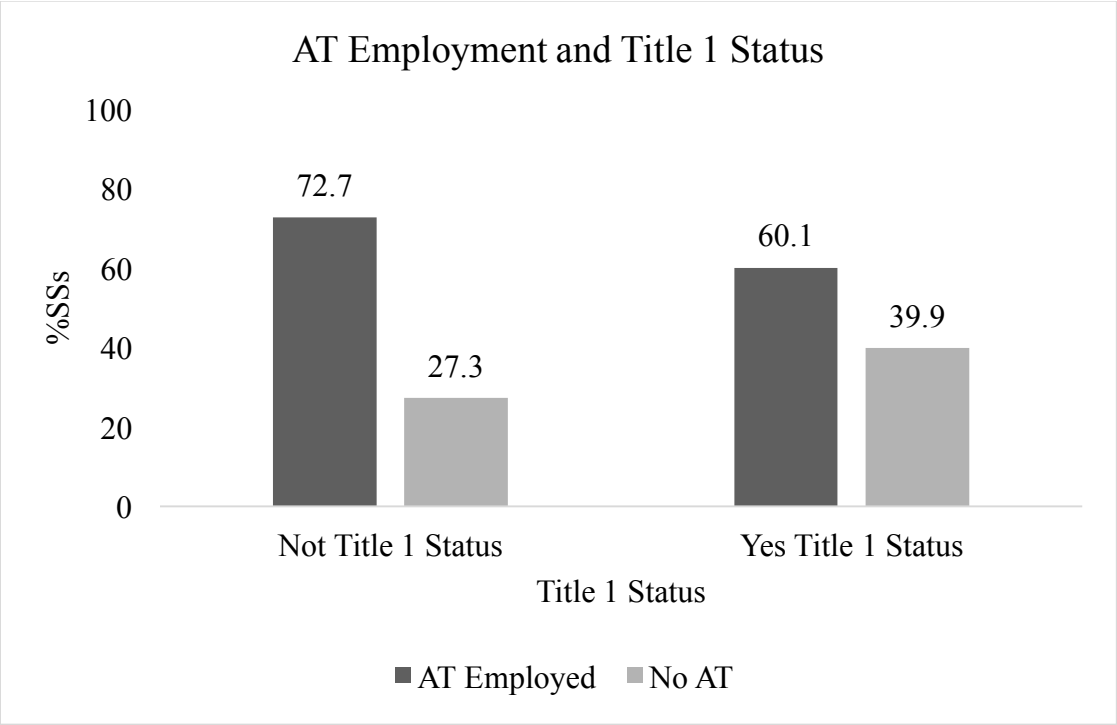

Figure 4. AT employment and Title 1 status of all SSs (n= 15,657). No significant findings between schools funded by Title 1 versus not.

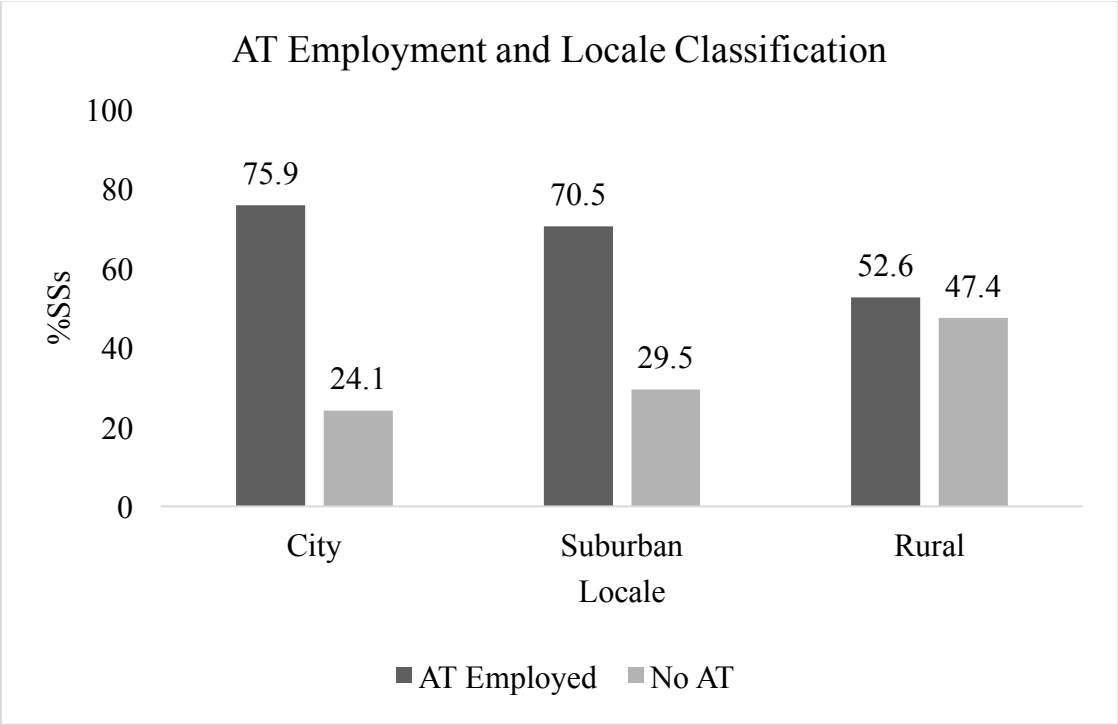

Figure 5. AT employment and locale classification of all SSs (n=19,093). City, suburban and rural locals showing representation of schools in respective territories. *Significant difference between city and suburban, suburban and rural, and city and rural.

CHAPTER V

DISCUSSION

The purpose of this investigation was to further examine social determinants associated with AT employment in the SS population. Social determinates are conditions of health in which people live and work in and are shaped by money, power and resources. Our study finds that school size demonstrated the largest association with AT employment. Additional variables associated with AT employment, as found in this investigation are Title 1 status and locale classification.

Previous investigators have found that large schools offered AT services more often than smaller ones, which aligns with the new data explored.[4,20,21] The previous findings corroborate this finding that schools ≥501 students have a 6.9x greater odds of employing an AT than schools with ≤500 students. In other words, for about every seven SSs with an AT and ≥501 students, there will be only one small school (≤500 students) that has an AT. Proactive measures need to be taken for schools with ≤500 students in order to help with the employment of an AT. Outreach clinics, hospitals and universities may be a valuable source for funding AT contracts for SS in territories. An AT working at multiple schools, splitting their services between them may also be a way to provide services for athletes in more remote, rural locations. This may also be an effective solution if there is no hospital or clinic close by.

Title 1 status in relation to AT employment was not previously investigated. In public health literature, socioeconomic status as well as demographic considerations have been crowned social determinants.[34] AT literature as well as public health literature has found that a barrier to AT employment is financial limitations,[4,20] and therefore we aimed to evaluate if Title 1 status, a potential measurement of financial status, was associated with AT employment. This determinant was used to see if associations were present between government funded schools and AT

employment. The majority of public schools (69.1%) qualify for Title 1 status. There were no significant findings indicating Title 1 status has a greater or lesser odd of employing an AT. Findings did show trends however, that schools without funding had a larger number of AT services than schools that received funding. This may be due to the fact that Title 1 funding is heavily targeting the education and school atmosphere, as opposed to allocating the funds to the athletics' setting and medical care. Future research should investigate AT employment and Title 1 district wide (or across districts). Having an AT on staff and providing services will be pivotal in the lives of these student-athletes' health and wellness as this may be their only source of medical care.[35]

With partial samples of data nationwide, location of SSs has been shown to be associated with AT employment.[4,20] As mentioned, the data was divided into three locals, city, suburban and rural. City schools had 1.3x greater odds of employing an AT than suburban schools. Suburban schools have a 3.5x greater odds of employing an AT than rural schools. City schools had a 4.4x greater odds of employing an AT than rural schools. Similar findings agreed, however, did not splice out various locales, concluding, the more rural the location of the school, the smaller number of ATs employed.[4,20] Suburban schools had the greatest number of SSs (7947/19093). Because there are a large number of rural schools, with a low level of AT employment, many students may be affected by the lack of proper medical services for their athletic programs. Schools in rural areas especially need on-site ATs who can provide immediate evaluation and assessment of, and referrals for, student-athletes due to the distance to emergent care facilities and treatment.

Overall, there may be effective global strategies to help employ the AT in the SS setting, which may help to overcome some of the struggles of the social determinants investigated here. Findings from this study need to be disseminated to large corporations and organizations working

to employ ATs in SSs. Organizations such as the NATA, NFL and Secondary School Committees formed by the NATA need to target schools with ≤500 students, rural communities as well as low socioeconomic status locales (these are the schools lacking AT services). Pay-to-play fees, grant funding as well as working with legislators to pass policies requiring ATs and allocating funding for the position may be strategies to help schools districts in the pursuit of hiring an AT or increasing AT services provided. With the understanding that the fees will not cover the AT in entirety, partial contributions from athletic participants may be enough to offset a portion of the AT's salary, making it possible for school budgets to cover the remaining amount. Additionally, a case might be made that hiring an AT would be a value-added addition to a school and save money. The AT would provide immediate evaluation, treatment and rehabilitation and provide communication around safety and wellness to athletes, families and the community.

Limitations

The study conducted was a limitation in itself due to that it was cross-sectional in nature. The data cannot be used to analyze behavior over time, as it captures a specific point in time to describe the population.[36,37] Cross-sectional studies help to prove or disprove associations. Causation cannot be identified in this setting and population.[36,37]

School size and locale classifications had just under the total population datasets due to schools not reporting or answering questions regarding these social determinants. Therefore, complete datasets were not found for the two social determinants.

Future Research

With the comprehensive ATLAS population database acquired, there are many areas for potential future research. Further investigation of school size, splicing out various cutoffs and determining where most schools with ATs are found may be beneficial to have a greater understanding of the schools in need of ATs. While only dichotomizing into two groups did show significance, further dividing the population may show an even more precise sample to target.

AT employment in the full-time and part-time setting, and its association with social determinants warrant further investigation. It has been found that schools with equal to or greater than 501 students have a significantly greater odd of employing an (than those with less than equal to or less than 500). Examining full-time capacity versus part-time may have an association with school size however that remains unknown.

Other sources of information including median incomes of student families within locales, as well as reduced or free lunch provided, may provide helpful, accurate representations of socioeconomic status and the data to support the need for the AT in the SS setting. In these settings of low socioeconomic status, the AT may be the only source of medical care for the student-athletes, showing the importance of and need for AT support for athletic programs. Furthermore, they may provide a value to the parents, school district, and member of the community.

Conclusion

The barriers and social determinants studied here represent variables that can not be changed or require significant time and resources to alter. Changing the socioeconomic status for large populations of students within schools is not something that can be done at the school level, but these barriers and social determinants reveal significant disparities in the AT services and

appropriate medical care provided for students in schools across the country. It is vitally important that those in charge of making AT hiring decisions understand the impact that AT can have on the health and wellness of their students but also how these barriers and social determinants impact their student populations directly and help establish the need for AT staff in the athletic programs at their schools.

There are many factors that are shown to be associated with AT employment in the SS setting, creating a range of barriers and social determinants that need to be overcome in order to hire an AT at the SS level. Quality of care is absolutely essential and athletic programs with certified ATs are able to deliver this. In the absence of any AT for a program, no trained services can be delivered. In programs with part-time ATs, the ATs may be spread too thin to meet the needs of all athletes, or not present for all practices and competitions. Both quality and quantity of onsite ATs are required to ensure that athletes receive the services they need and deserve. Whether they live in large cities or small rural communities, attend large or small SS, or come from affluent or lower-income families, they should have an AT to support them and their teammates.

Hiring an athletic trainer in the secondary school is clearly a multi-factorial process that cannot be pin pointed down by one social determinant or one barrier. School size, Title 1 status as well as locale classification were investigated and the data gathered from all have shown associations with AT employment. School size had the largest association to AT employment in the SS setting, showing the larger the school, there will be a 6.9x greater odds of employing an AT. Locale classification also provided findings of AT employment prevalence in suburban and city territories in relation to the rural territory. Previous authors have investigated social determinants and barriers to employing ATs in the SS, however a population dataset regarding AT employment has never been acquired until now.

CHAPTER VI

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