Financial benefits of on-site athletic training services for a performing arts show

RitaSue Morgan Campbell
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FINANCIAL BENEFITS OF ON-SITE ATHLETIC TRAINING SERVICES
FOR A PERFORMING ARTS SHOW

by

RitaSue Morgan Campbell
Bachelor of Science
Kansas State University
2005

A thesis submitted in partial fulfillment
of the requirements for the

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ABSTRACT

Financial benefits of On-Site Athletic Training Services for a Performing Arts Show

by

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Dr. James Busser, Thesis Committee Chair
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The purpose of this study is to examine the cost of providing on-site athletic training treatments for a performing arts show, versus the cost that would be incurred for off-site treatments. As a profession, athletic training is growing quickly and entering a wide expanse of new settings. The physical nature of work, profit driven mindset of organizations and non-traditional occupational settings all contribute to the need for cost benefit analysis research regarding on-site athletic training. Using a cost avoidance formula, this research will examine if there is a difference in the direct cost of treating employees through an on-site athletic training program compared to the cost of sending employees off-site for the treatment. Using data from injuries that occurred on-site at a professional performing arts show the on-site cost was compared to estimated cost of sending same injuries off-site for treatment. Results from the current study suggest having on-site athletic trainers' treating work injuries on-site will be cheaper then sending those injuries off-site.
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CHAPTER I

INTRODUCTION

As a profession, athletic training began with intercollegiate athletics. The popularity of sport was at all time high and staying healthy and involved in sport was important. In the past, athletic training was the occupation that "rubbed down" athletes and had little technical knowledge. Dr. S.E. Bilk was the first to acknowledge "trainers" as legitimate providers of healthcare to athletes. His book The Trainer's Bible (1917) was the first true textbook for athletic trainers. Despite this early publication, it took over 30 years to establish the National Athletic Trainers' Association (NATA). When the NATA was established in 1950 there were only 50 members and now there are over 30,000 members. Certified athletic trainer or trainers (ATC) provide injury evaluation, treatment, and rehabilitation to the physically active. ATC are the only healthcare professionals that provide coverage of athletes from pre-injury through the return to competition (Prentice, 2003). The setting for certified athletic trainers (ATC) has traditionally been sport and athletics, but, currently, ATC have expanded their focus to any person who is physically active.

As a profession, athletic training is growing quickly, although these allied healthcare providers are predominantly in college and university settings. A recent survey of ATC found that about 34 percent of ATC are still in the college
or university environment. However the unique education of ATC allows for a broader range of opportunities. In the same survey, 42 different job settings were noted by the ATC that responded. The wide expanse of new settings included secondary schools, hospitals, industrial/corporate, military and performing arts (New, 2005). As the athletic training profession branches out and expands, the public, managers of corporate organizations, government officials and other allied healthcare providers' understanding of the profession needs to be broadened. With the ATC being involved increasingly with people outside of sport settings, the extensive education and knowledge of ATC needs to be better explained. Understanding how ATC can help people in numerous venues will benefit both the public and the athletic training profession. Specifically, understanding the exact benefits that ATC can provide is needed to better explain what ATC bring to an organization.

There are two main reasons that ATC have had to branch out to other job settings. The prevalence of musculoskeletal injuries in other areas and the increasing saturation of jobs in the university athletic setting have led ATC to find a niche with many different occupations. Ficca (2003) reported the financial impact of healthcare in the United States to be over $240 billion for direct and indirect costs combined. Athletic trainers' education makes their profession well suited to help deter costs related to healthcare. An athletic trainer can be utilized by an organization while people are healthy, evaluate injuries as they occur, treat actual injuries, and facilitate other healthcare providers' treatments. It is an easy transition from treating athletes to treating the physically active (Allivato, 2003).
The sport arena is a very large field and what activity qualifies as sport often comes under scrutiny. There are numerous activities that are physically active that fall under the sport category, such as NASCAR, cheerleading and bowling. Kaiser, Wakefield, and Merill (2002) explained how dance is one of the activities that falls under the sport arena. Due to increasing injuries of dancers, a dance-medicine facility was established at Brigham Young University to provide treatment to dancers and performing artists. Kaiser et al. (2002) acknowledge that this facility will “open future doors for them as athletic training and therapy expand more and more into nontraditional settings” (p. 21). These “nontraditional” settings are allowing for an increasing number of employment opportunities with a variety of responsibilities.

As ATC are getting into a broader range of occupational settings, they are also dealing with different administrative and managerial roles than their ATC counterparts are dealing with at a university or college athletic setting. Two of those roles are quantifying the costs and benefits of the healthcare provided by athletic trainers and analyzing any impact on the workers' compensation process, specifically the costs saved by having ATC. Studies have been sponsored by the NATA to determine the “value” of athletic trainers which can provide justification of ATC employment in other settings. Research has either been completed or is in progress for both the industrial/corporate and secondary school settings (Halls, Bradbury, Schnefke, & Kandler, 2003; Robinson, 2007).
Statement of the Problem

The performing arts arena as an occupation for athletic training professionals has very little support from research based literature. Since it is such a new occupation for the ATC, beginning a body of knowledge surrounding this setting is important.

Studying the impact of athletic training on the workers’ compensation insurance process is an important management issue as well. Lowering the potential costs of workers’ compensation insurance costs for a performing arts organization is of interest to all involved in the organization, including corporate stakeholders. Reducing workers’ compensation costs would allow employers to focus on other areas that are important to the organization. Pizzi, Carter, Howell, Vallow, Crawford and Frank (2005) noted that future research looking at the “cost-effectiveness of different pain-management interventions is warranted, particularly within industries where occupational injuries are common” (p. 207). Many direct and indirect costs are associated with workers’ compensation claims, so it is also important to specify the exact area to be studied. Examining these costs separately will be beneficial to any employer.

The actual act of quantifying the benefits that ATC can provide an organization creates a problem when explaining the professions’ worth. CEOs, CFOs, and presidents of organizations want examples of hard dollar savings when looking at the “value” of a program or investment. It is important to understand how healthcare has been measured by these same organizations. Healthcare is often measured in time; either time spent with a patient or time
saved by returning employees to work quickly. Time is an example of a soft dollar savings not hard dollar savings; these are savings that are not quantified by true dollar amounts so they do not have a monetary value attached (Dmytrenko, 1997). Supplying ATC with a methodology to examine the cost benefit of having them on-site will allow ATC to better support their “value” to an organization. Being able to put a monetary value on the on-site athletic training programs' savings will provide a hard dollar savings and add to a larger knowledge base regarding business management aspects of athletic training which are becoming increasingly important. The physical nature of work, profit driven mindset of organizations and non-traditional occupational settings all contribute to the need for cost benefit analysis research regarding on-site athletic training.

Purpose of Study

The purpose of this study is to examine the cost of providing on-site athletic training services, specifically the on-site treatments that can be provided by having an on-site ATC, versus the cost that would be incurred for off-site treatments. The study will analyze an on-site athletic training program at a professional performing arts show. This research will help show why entertainment organizations should investigate having on-site athletic trainers involved in their organizations and the effect ATC will have on the charges to their workers' compensation insurance companies with medical related visits and treatments. Using a cost avoidance formula this research will examine if there is a difference in the direct cost of treating employees through an on-site athletic
training program compared to the cost of sending employees off-site for the treatment. Additionally, descriptive statistics such as the total number of injuries in different injury categories, difference in the cost of treatments, as well as implications for further applications of the research, will be included. With this research, a monetary value, a hard dollar savings, will be placed on the benefit that having an on-site athletic training program has provided a performing arts organization.

This study has three main hypotheses that will be tested. Due to the fact that research regarding these specifics questions have never been undertaken the hypotheses are null hypotheses. The hypotheses examine the cost of providing on-site athletic training treatments versus using off-site facilities for treatments for a performing arts company.

H1: There will be no difference in the cost for treating post surgical injuries provided by an on-site athletic training services compared to off-site treatment facilities.

H2: There will be no difference in the cost for treating strain/sprain injuries provided by an on-site athletic training services compared to off-site treatment facilities.

H3: There will be no difference in the cost for treating wound care injuries provided by an on-site athletic training services compared to off-site treatment facilities.
Organization of Study

This study will consist of a thorough literature review examining the athletic training profession, workers’ compensation insurance processes and measures of financial benefits. All sections of the chapter are vital to an extensive study of athletic training in professional performing arts. Chapter 3 will focus on the methodology that will be used to conduct the study. Chapter 4 will provide results of the study, including descriptive information and a test of hypotheses. The final chapter will conclude the study with discussion of the results, implications for ATC and management, as well future possible research.

Definitions

1. Certified Athletic Trainers (ATC): allied healthcare providers who prevent, recognize, manage and rehabilitate injuries to people who are physically active. ATC is both plural and singular

2. Professional Performing Arts Show: a show that contracts employees, i.e. actors, acrobats, gymnasts to perform in a show for others’ entertainment

3. Off-Site Treatment Facilities: facilities or programs where employees can seek treatment for work-related injuries (hospital based programs, outpatient rehabilitation programs, physical or occupational therapists’ offices)
4. **On-Site Athletic Training Program**: full-time staff and facility on-site to provide athletic training services to employees of an organization. Specifically for this study, the on-site treatments provided to employees for work-related injuries.

5. **Current Procedural Terminology (CPT) Codes**: a uniform language that accurately describes medical, surgical and diagnostic services that are mandatory when billing insurance companies (National Athletic Trainers’ Association, n.d.).

6. **National Athletic Trainers’ Association (NATA)**: national organization of over 30,000 certified athletic trainers whose mission is “to enhance the quality of healthcare for the physically active through education and research in prevention, evaluation, management, and rehabilitation of injuries” (Prentice, p. 8, 2003).

7. **Workers’ Compensation Insurance**: the laws and benefits for injured workers mandated by the states through workers’ compensation commissions. The premiums and deductibles paid by employers to cover any illness or injury that occurs at work (NATA, n.d.).
CHAPTER II

LITERATURE REVIEW

Introduction

In the middle of an intense game of football, the plays stop and players take a knee on the field. Off to one side of the fifty yard line a player has not returned from the post-play pileup. A group of three people dressed in team jackets and khakis sprint across from the neighboring sideline. This could be a picture from a college game, a National Football League (NFL) football game, or a high school game. Those people sprinting onto the field are oftentimes not coaches but athletic trainers. People are educated for this specific arena, injured athletes and the athletic population. Although the athletic training profession started in the sport setting, the profession is quickly branching out.

The American Medical Association (AMA) has recognized the athletic training profession as an allied healthcare provider since 1991. Athletic trainers specialize in the prevention, assessment, treatment and rehabilitation of injuries and illnesses that occur to athletes and the physically active (Prentice, 2003). An ATC works under the supervision of a licensed physician. They work hand in hand with other healthcare professions to make the injury or illness process as easy as possible for the patient, athlete or employee (Monteiro, 2004). Athletic trainers are the liaison between an athlete or patient and the coach, doctor, and
other health professionals. With the profession of athletic training becoming stagnant in the university setting due to lack of open jobs the profession is diversifying.

Arthur Massey wrote in his guest editorial in *Athletic Therapy Today*, “In order to gain employment, we have migrated into ‘nontraditional’ settings that do not allow the full practice of the profession, thereby creating confusion on who we are” (Massey, 2004, p. 4). His editorial was in response to a shift by the NATA to address a possible name change. The title of athletic trainer falsely allows people to think that only athletes can be treated by the profession; both other healthcare providers and the public believe these myths to be true (Massey, 2004). Certified athletic trainers have moved beyond the university and school setting to physical therapy clinics, job sites, and hospitals. Since the set of job duties and responsibilities vary depending on the setting, the public’s view of the profession may be skewed; increasing the public knowledge of the profession is vital.

**Athletic Training Professional Domains**

To help outline exactly what it is that certified athletic trainers do, the Board of Certification regularly conducts a Role Delineation Study (Prentice, 2003). This job analysis is required for content validity of the examination that is taken to become a certified athletic trainer. The job analysis is used to determine if the certification exam is testing the proper skills and proficiencies that are needed to be a successful certified athletic trainer. The most recent role delineation study, the 5th edition, was finished in 2004. This study identified and
described the six domains of athletic training. The six domains consist of prevention; clinical evaluation and diagnosis; immediate care; treatment, rehabilitation, and reconditioning; organization and administration; and professional responsibility. To explain the education and skills utilized in the profession of athletic training, these domains will be the focus for the following section of the literature review on athletic training.

Domain I

Prevention is the first domain and concerns the ATC “ability to discern, evaluate, and communicate risk associated with participation in athletic and physical activities” (Role Delineation Study, p. 3, 2004). This definition is very specific to athletes and the physically active but currently ATC are proving there are numerous job settings that can benefit from the prevention of injury (Massey, 2004). Prevention includes educating patients on risks associated with activities they undertake, using preparticipation screening information to limit the exposure to physical risk for the individuals, as well as instructing patients on use of protective equipment. Taping and the use of supportive prophylactic devices, as well as strength and conditioning programs to minimize injury, also fall within this domain (Role, 2004).

Identifying safety issues with the surrounding environment and monitoring participation to ensure safety, along with monitoring the sanitation and safety of the treatment areas, also are the responsibility of a certified athletic trainer (Role, 2004). One of the most vital roles that fall into this domain, and can be utilized across many populations, is the ATC role of educating people. Communicating
and establishing intervention programs to minimize injury and more importantly, promoting the health and well being of individuals by encouraging lifestyle changes is all apart of educating the public. These traditional ATC skills can easily be utilized with different approaches in a variety of occupational and therapeutic settings.

Domain II

Domain II addresses clinical evaluation and diagnosis. Clinical evaluation and diagnosis occur both at pre and post injury. An important evaluation that an ATC must do is the pre-participation evaluation. Before someone even begins physical activity an evaluation may be conducted to rule out any pre existing injuries or medical conditions. This evaluation is key in determining if there is a medical condition that has gone unnoticed and might endanger the person. ATC also are the first on the scene of initial injuries so they must conduct on-field initial evaluations, as well as a more in depth evaluation, once the injured person has been removed from the field or scene of the accident/injury (Role, 2004).

Finally, ATC must constantly evaluate a person's progress when treating and rehabilitating an injury and be able to evaluate the person's readiness to return to the activity. ATC must possess the skills to obtain a detailed medical history from observing and talking with the injured person and reviewing medical records (Prentice, 2003). An ATC also must be able to inspect and palpate the injured area, as well as perform specific tests in accordance with established procedures, to determine the extent of the injury or illness. The ability of an ATC to educate the patient and people involved in the situation about the injury and
properly communicate assessment information to other necessary healthcare providers are also important parts of the evaluation and diagnosis domain (Role, 2004).

*Domain III*

Domain III is the domain of immediate care. ATC have a unique job description in that they respond to the initial injury or accident and must be prepared to handle numerous situations on-field or on-site. Unlike other healthcare providers, ATC treat people in a physically active environment and have a relationship with the injured person before the injury occurs (Role, 2004).

They also help in the decision of the comprehensive treatment plan. The Role Delineation Study (2004) states that “Domain III focuses on the knowledge and skills needed by an AT [C] to provide standard immediate care procedures used in emergency situations, independent of the setting” (p. 15). This domain covers the skills of life-saving techniques and also preventing the worsening of emergency non-life threatening situations. The act of supervising the transfer of care for situations beyond the scope of an ATC practice, as well as communicating to all people involved with the patient, are also within this professional domain. ATC must also effectively establish and execute emergency action plans for all locations and facilities covered by the ATC (Role, 2004).

*Domain IV*

Once all immediate care has been administered and the patient has been evaluated, Domain IV takes precedence. Domain IV deals with the treatment, rehabilitation, and reconditioning of all injuries. This is the obvious step after
someone becomes injured. This domain is a significant aspect of the ATC job description as this is what will allow the athlete or person to return to pre-injury activity levels.

This process is elaborate and contains numerous disciplines beginning with a comprehensive understanding of human anatomy and physiology. Then the “biomechanical needs for function, application of strength and conditioning principles, functional rehabilitation, and performance enhancement (Role, p. 19, 2004)” are assessed allowing for a complete and safe return to activity. This domain covers all therapeutic exercises, therapeutic modalities, and assistive devices, as well as the continual reassessment and education the patient will receive from the ATC.

Domain V

Domain V is made up of the administrative duties that ATC must possess to be competent in their field. Domain V is labeled the organization and administration domain and covers all the paperwork that must be done in order for an ATC and their practice to flourish. Establishing action plans for injuries and illness, policy and procedures for treatment guidelines and the management of facilities are important parts of this domain.

In addition, the management of human resource and financial aspects of the athletic training profession are also covered. Maintaining records and documentation relevant to their site is important for ATC. Being able to communicate with other people involved at the site and building relationships
with the public and different organizations are also vital aspects of the profession that fall into this domain (Role, 2004).

Domain VI

The last domain is one that the profession of athletic training depends on constantly. Domain VI is the domain covering professional responsibility. The Role Delineation Study states that “the BOC [Board of Certification] addresses professional responsibility in two significant ways: requirements for ethical practice and continuing education” (p. 30). All ATC must know medical standards and laws that govern their practice in whatever state they choose to practice. The ATC must be able to educate patients and organizations about the profession when possible.

There is a constant need to increase the knowledge of the profession which is so critical to successful practice of the profession (Massey, 2004). Lack of knowledge limits the profession and hinders the effectiveness of certified athletic trainers. As ATC begin to treat the broader population of the physically active, as opposed to focusing solely on athletes, understanding the profession and its role in each of those separate settings is important.

Occupational Settings

With a better understanding of the skills that ATC must possess and utilize on a daily basis, an in depth look at the settings in which they currently practice is necessary. The settings that ATC have branched into have many things in common. Examining the literature in these settings will help outline some things
that the performing arts setting may possibly offer ATC. While athletic training
was initiated by collegiate athletic departments it has quickly branched out into
numerous occupational settings (New, 2005).

Winterstein and McGuine (2006) pointed out that the cost of sport injuries
to our healthcare system is significant. They used Consumer Product Safety
Commission (CPSC) data to show that in 2003 $61 million dollars were spent on
basketball players between the ages of 15-18 who strained or sprained their
ankles. These costs were accrued in emergency rooms and physicians’ offices.
Additional costs that could result from these visits, such as braces, physical
therapy, visits, transportation to and from visits, were approximated at ten times
that amount. Financial evidence such as this can be used to show the need for
certified athletic trainers in all secondary schools to help prevent these injuries
and treat the injuries that occur in school sponsored events. For example, athletic
trainers are educated in preventing as well as evaluating acute ankle injuries.
The direction athletic trainers can provide athletes, coaches and the athletes’
parents in the secondary school setting can reduce those healthcare costs by
providing the proper treatment and excluding unnecessary emergency room or
physician office visits.

Much like the evidence of a need for athletic trainers in the secondary
setting, Albensi (2003) looked at the productivity of workers’ suffering from
injuries in manufacturing. “The national cost of these chronic health conditions
has been estimated to be at least $234 billion annually” (Albensi, 2003, p. 14).
This estimation is not the healthcare costs alone but also the impact of those
injuries on absenteeism and the productivity of the employees. Employers are responsible for the healthcare costs of employees that are hurt on the job or for any chronic injuries/illnesses that result from their work. Employers have similar goals to coaches and parents in sport settings, which are to get their players back to work quickly and effectively (Chandra, Bush, Frank, & Barrett, 2004). For both groups it is important to be resourceful when it comes to medical costs. Explaining financial impacts on an organization provide a starting point for a possible need of the athletic training profession in these types of settings.

Increasing the employees' benefits by having someone available through the organization to treat these chronic conditions can help increase morale and decrease absenteeism (Monteiro, 2004). An ATC is best suited for this type of responsibility because of the broad nature of their education. There are healthcare providers that specialize in each of the separate domains of athletic training but ATC are the only profession with the broad knowledge to intervene in many unique situations (Role Delineation, 2004).

ATC are finding success in both secondary school and industrial/occupational settings. Parents, communities, and employers are recognizing the impact this profession can have on the prevention and treatment of injuries and illnesses (National Athletic Trainers' Association, 2004). The most recent setting in which ATC have found employment is the performing arts. At the upcoming 2007 National Athletic Trainers' Association Annual Meeting, a breakout session regarding employment in performing arts is scheduled (National Athletic Trainers' Association, 2007). No doubt ATC have been working with
dancers and cheerleaders for as long as they have been in sport settings (Peer & Dubois, 2004). In 2002, Kaiser, Wakefield, and Merrill presented a case study of their successful dance-medicine facility on the campus of Brigham Young University. The facility was constructed because of the increasing number of injuries reported by dancers on campus and the lack of access to the main training room on campus. In one academic year the ATC assessed 171 dance injuries and provided 3,202 treatments for those injuries (Kaiser et al., 2002). Dance medicine is a growing discipline in itself and has welcomed athletic trainers. Most dancers seek care for injuries from non-physician healthcare providers such as acupuncture and massage therapy, so athletic trainers appeal to the group, as well as meet their healthcare needs. Prevention is truly the key when dealing with dancers and a program that utilizes proper stretching, strengthening and screening can be utilized with dancers (Peer & Dubois, 2004). Having ATC on-site and involved in this process may help increase the effectiveness of these prevention programs.

Professional performing arts shows employ their dancers, acrobats, and gymnasts to perform in shows around the nation. Utilizing ATC in these organizations can assist with all aspects of healthcare much like they have done for industrial/occupational setting:

AT [C]s are extremely valuable providers in the industrial workplace providing injury prevention, early recognition and treatment of musculoskeletal injuries, expediting a safe and prompt return to
work, and developing an overall effective and cost-saving injury management program (Role Delineation Study, p. 31, 2004).

Since the injuries occur in the normal course of employees' work the employer is responsible for their healthcare costs. Similar to sport and dance settings, performing arts' jobs are physical and challenging. Since it is such a new occupational setting, the literature regarding professional performing arts shows is minimal. The number of these shows, as well as the number of jobs available for athletic trainers, makes this a very important job setting.

Workers’ Compensation Insurance

Workers’ compensation insurance is required by law and is a paid benefit for employees from the employer. This insurance makes the employer responsible for charges from an injury or illness that occurred while the employee was working. If this compensation for injuries or illness is accepted, the employee gives up their right to bring a lawsuit against the employer. Workers’ compensation insurance is based on the incidence of injury. The higher the incidence of injuries, the higher the cost of premiums and deductibles for a company. Workers’ compensation insurance protects the employer from the high costs of paying for all costs incurred by these injuries while the workers’ compensation system protects the employee (Dorfman, 2005). Employers in every state are required to participate in the workers’ compensation insurance system to cover any possible injury payments (Battersby, 2004).
There are numerous studies that examine workers’ compensation insurance and injuries or illnesses. The majority of these focus on the cost of all work related injuries or illnesses (Leigh & Robbins, 2004; Bernacki, Tao, & Yuspeh, 2006; Collins, Baase, Sharda, Ozminkowski, Nicholson, Billotti et al., 2005; Peele, Xu, & Colombi, 2005) and still more separate the injuries and illnesses per type of occupation. Studies on hotel room cleaners (Sherzer, Rugulies, & Krause, 2005), public versus private sector jobs (Macklin, Smith, & Dollard, 2006) and women specifically (Calvey & Jansz, 2005) were examined to understand the full extent of workers’ compensation claims. Along with these jobs, construction employees were also studied. Costs of workers’ compensation claims from the construction industry are the highest of all industries due to the risks of falling and the overall physical activity involved with the job (Lipscomb, Glazner, Bondy, Guarini, & Lezotte, 2006; Lipscomb, Glazner, Bondy, Lezotte, & Guarini, 2004). There is no literature regarding workers’ compensation insurance and performing arts directly, although performing arts settings that are physical in nature may closely resemble the costs of other physically demanding jobs.

There is no direct literature regarding certified athletic trainers and workers’ compensation insurance either so understanding what type of healthcare providers are being utilized by patients with workers’ compensation claims is important. There is literature regarding other healthcare providers that people have available to them if there are no on-site athletic training services. Freburger, Carey and Holmes (2005) studied individuals who sought physical therapy care for neck and back pain. They found that having a workers’
compensation claim was positively associated with seeking care from a physical therapist for their injury. The patients that had injuries from work were more likely to seek out care for their injuries. This could mean that these people might not have sought this care without the workers' compensation claim which covered their medical expenses.

In a study looking at the utilization and costs of chiropractic visits, Wasiak and McNeely (2006) found that payment policies from workers' compensation insurance carriers affected the number of services received per visit. Specifically, they found the more restrictive the payment policies of the workers' compensation insurance companies the fewer number of services per visit to the chiropractor office. The cost of workers' compensation insurance affects everyone involved; the employee who is injured by affecting the care they receive, the employer who is affected by the rising premiums and the healthcare providers by changing possible treatment plans due to payment policies.

To reduce the cost to employers and increase the benefits for employees there are some cost-reduction programs that have become popular among employers (Chandra et al., 2004). The use of these programs can actually lower one's premiums and help employees receive more overall care at less expense to employers and their workers' compensation insurance company. Barron, Beckett, and Utell (2005) studied the activities at a hospital based occupational medicine program. These are programs at local hospitals established to provide care for patients with occupational injuries. Programs like these can help with workers' compensation costs. Primary care physicians often refer patients with
injuries suffered at work to occupational medicine physicians and nurses since they have a better understanding of the workers' compensation process. The specific occupational medicine programs studied by the authors provided numerous services including injury care, physical examinations, medical surveillance, drug collections and tests, electrocardiograms, and immunizations. The most frequent injuries for which people sought treatment were strain/sprain, open wounds, and foreign bodies in the eye (Barron et al., 2005).

Hospital based occupational medicine programs are utilized by small to medium size companies who cannot afford to have occupational physicians on site. Having certified athletic trainers on-site with the skills to cover a majority of the services, including injury care and physical examinations could possibly reduce costs. Treating and assessing strain/sprain, open wounds and foreign bodies in the eye fall under the scope of practice of athletic training so the injuries seen in these clinics are frequently treated by ATC in all settings (Prentice, 2003). This type of on-site coverage would include elements in three of the six domains of athletic training. Immediate care would be provided by the on-site athletic trainer, as well as evaluation and diagnosis and treatment, rehabilitation, and reconditioning (Role Delineation, 2004).

Clearly, treating the injuries and providing physical examinations are important parts of workers' compensation. However, preventing the injuries is the first step and a large part of cost-reduction programs. Education, ergonomic training, and a healthy lifestyle all can lead to reductions in workers' compensation costs which lead to lower premiums in the future (Agerwal &
Everett, 1997; Chandra et al., 2004). There are healthcare professionals that provide these services with each intervention being charged separately (Halls et al., 2003).

On-site fitness programs have developed in the past few years to increase the physical activity and capability of workers which has led to increased productivity and reduced healthcare costs. One study of on-site fitness programs examined the correlation between program attendance and short-term disability and productivity of employees. Burton, McAlister, Chen and Edington (2005) studied participants at three different on-site fitness programs. They found that those who utilized the program benefited from baseline testing, pre-participation exams, and education on an overall healthy lifestyle from the employees running the fitness programs.

As a result of these additional benefits, the employees who participated in on-site fitness programs had improved productivity and fewer days off for short term disability. This example of an education and fitness program falls under the first domain in athletic training, prevention. Based on their certification, an ATC is qualified to establish and run education and fitness programs. ATC can also analyze the biomechanics of job functions and provide ergonomic training to increase the safety on a job site. One of the most unique functions of an ATC is the training necessary to help employees to return to work quickly and safely.

Athletic trainers are taught to focus on returning an athlete or, in this case, employee back to pre-injury status. The same mentality used on the field for athletes is beginning to take shape in the industrial setting. These programs are
known as return to work programs (RTW). Chandra et al. (2004) explained what
employers can do to reduce workers’ compensation costs. This examination of
programs explained the idea of a RTW program and what it can do for a
company. The main goal of a RTW program, like a rehabilitation program for an
athlete, is returning the employee to pre-injury levels. An athletic team, whose
athletes return to play quickly so they do not lose their position to team members
and the coach does not have to find new players, is very similar to a RTW
program. Including the injured athlete in practice and team functions, even if they
are not completely back to full activity, correlates with goals for an employee
engaged in a RTW program.

Like the athletic team, the worker returns faster and the employer avoids
the time and energy of hiring and training new team members. The employee
can also stay included in the organization through limited or modified activity. An
on-site athletic training program can add the benefit of rehabbing and treating on-
site so as to lessen transportation time, as well as the amount of delay between
doctors’ visits and tests. If an employee spends time away from work with no
contact, everyone is hurt. Keeping people at work will help by reducing additional
disability costs and harm from improper or no treatment (American College of
Occupational and Environmental Medicine, 2006). Different options for
professionals that could be on-site included “healthcare workers’ such as
physicians, nurses and rehabilitation specialists …having the medical
professional onsite to ensure the quickest care possible (Chandra et al, p. 34,
The combination of the medical professionals and the RTW program will allow for more efficient care.

Although certified athletic trainers are not mentioned specifically in the article, the profession is well suited to participate in RTW programs. Since RTW programs are relatively new, the American College of Occupational and Environmental Medicine released a guideline in 2006 outlining problems with current stay-at-work/return-to-work processes. The guideline specifies 16 areas where work is needed to make these processes more efficient. An on-site ATC can address all 16 areas noted in the guideline in some way. Two examples are dealing with human emotions that are involved in the process and the sense of urgency that is required because prolonged time away from work is harmful (American, 2006). An on-site ATC can help with both of those suggestions in that the employee will have someone they feel comfortable around to help them through the process step-by-step and deal with the emotions that accompany the process. In addition, the urgency needed for this process is the specific area for which ATC are educated and quick return to play/work is the specialty of the profession.

To explain the correlation between an athlete returning to play and an injured employee returning to work, Allivato (2003) showed how the sports medicine model of care (Fig. 1) was applicable to the industrial setting, including a performing arts show. This flowchart explains how an injured employee can go through the sports medicine process. Getting the injured employee, just like an injured athlete, back to full activity is the main goal of the model. A visual
understanding of where the ATC fits into an employee's injury process can be used to explain what an ATC can bring to a job site.

Allivato's (2003) article uses the example of how a baseball pitcher with a shoulder injury from throwing a baseball is no different from the person on the manufacturing line who lifts overhead for their whole shift. The injuries these people incur are similar and so should be the care they receive. The athletic trainer can act as a liaison between an injured employee, manager and doctor just as they act as a liaison between an athlete, parents, coach and doctor.

Allivato (2003) helps clarify the numerous tasks for which ATC are educated including: prevention/education, fitness/wellness, early intervention/immediate care, biomechanics/ergonomics, on-site rehabilitation, and functional or work specific training. Having an ATC produces improvement in employee morale and productivity, decreased incidence and severity of injury, decrease in workers' compensation costs, and a unique and enhanced quality of care (Allivato, 2003).

With these potential benefits many organizations need cost-benefit analyses to show that having on-site services would be a wise investment. The quantifying of these benefits are needed to prove the "value" or worth of an on-site ATC. The lack of these quantifications has plagued the profession when trying to branch into more traditional occupational settings that are new for the profession (Halls et al., 2003). The lack of statistical data regarding placing a "value" on the athletic training service is a void in the literature that must be filled.
Injury

Emergency Care → Assessment

Immediate Care

Self Care ↔ MD Referral

Rehabilitation

Modified Work → Return to work

Figure 1 Sports Medicine Model of Care

Possible Measures of Financial Benefit

Cost Analysis

Investing in hiring an ATC can no longer be justified by subjective benefits. Cost benefit analyses (CBA) of some type have been used extensively to determine the worth of a program or investment. Dmytrenko (1997) explains how CBA's can be used in the Records and Information Management profession but
CBA's are used in every occupation. A cost benefit analysis is the best way to “cut costs, improve productivity, and justify every aspect” (Dymtrenko, p. 16, 1997) of an organization's day to day operations.

Bi and Wang (2006) used CBA and cost-effectiveness analyses to determine if an AirCare program used to reduce pollution was benefiting society and if it was cost-effective to implement. The authors found through both analyses that the program was reducing emissions into the air creating a benefit that outweighed the cost. In determining the cost-effectiveness, the authors compared this program to other similar programs to see if this was a financially viable option. The other programs were focused on global reduction of emissions while AirCare was focused on local and regional changes. Although there was not a significant difference between emissions of AirCare versus the other programs, AirCare was found to be a better option since the cost was the same with more benefits to the community (Bi & Wang, 2006).

From environmental awareness to business management, CBA’s are a prevalent form of proving worth or “value” (Halls et al., 2003). In healthcare CBA’s are used as well with mixed results on their success. McIntosh, Donaldson, and Ryan (1999) put forth some options to more thoroughly gauge the benefits of healthcare interventions and programs. The authors suggested listing all benefits associated with a specific program or investment even if the benefit cannot be listed in monetary value. This understanding that “unquantified benefits are important and can be included in CBA’s even when monetarism is not possible” (p. 357) is crucial to occupations such as healthcare (McIntosh et
al., 2006). Although listing all benefits, regardless if they are quantifiable or not, is an ideal situation for the healthcare setting, quantifying benefits of interventions and programs is crucial in the ever growing business market.

Menges, Gartner, Georg, Fischinger, and Zietz (2006) performed a CBA on colorectal screening for 40-50 year old relatives of cancer patients. They compared the cost of screening earlier in those with a family history to the benefit of catching the cancer early. Since the price of treating one cancer patient from diagnosis through treatment is so high, they reported that it would be economically beneficial to begin screening certain patients early to prevent the possible medical costs (Menges et al., 2006).

When analyzing a specific population for a specific cost, CBA is a legitimate methodological approach (Dmytrenko, 1997). An intense examination into the cost of an on-site athletic training program based on on-site treatments versus the employee having to go off-site can be undertaken to determine cost-effectiveness of services.

**Methods to Establish “Value”**

Stakeholders want to see a return on investment (ROI). For healthcare providers involved in the workers’ compensation process, this requires a careful analysis of the costs and benefits of all parts of the workers’ compensation insurance process, including on-site ATCs. One of the challenges to calculating ROI is determining the amount gained from having on-site athletic training services. To help quantify the work ATC do, there are some possible accounting
principles that can be used. In 2003, the National Athletic Training Association received an in-depth review from a committee established to document the effectiveness and efficiency of hiring ATC in the occupational arena. This investigation was titled the *Value Model of the Certified Athletic Trainer in the Occupational Setting*. This committee consisted of four ATC who investigated how to put a “value” on ATC working in the occupational setting. According to Halls et al. (2003), value is a function of four components: quality, service, cost and time. Quality and service are more researched in the athletic training literature. The next step in the body of knowledge is examining cost and time. More recently, a committee has been established to look at the “value” of an ATC in the secondary school setting (Robinson, 2007).

The committee that put together the *Value Model* said it best with, “the difficulty in quantification is partly related to the fact that healthcare professionals rarely have to prove their value simply because they are able to *demonstrate* they are valuable” (Halls et al., 2003, p. 11). ATC demonstrated their value by the appreciation from people they treat and the emotional and physical injuries that are healed, as well as numerous job responsibilities that an ATC may take on in a job setting. Never before have the ATC had to put a number on how valuable they are to a company (Halls et al., 2003). The *Value Model* (2003) outlined specific methods that are options for possible quantification of the “value” of an ATC. The options outlined are payback period, return on investment (ROI), net present value (NPV), and cost avoidance.
Payback period is literally the time it takes to recoup the amount originally invested in a project. A good example of utilizing payback period is when determining capital expenditures (Contino, 2001). Capital expenditures are large purchases, such as equipment for doctors (Gerhardus, 2003), facilities for a city or software for a large company; the definition of the expenditure is usually based on the price and length of usage (Farazmand & Neill, 1996). In regard to on-site athletic training services, payback period can be used when looking at the cost of starting an on-site athletic training program. Comparing the startup cost with an amount of savings will provide a difference that is then turned into how many years it will ultimately take for that company to make their money back on that investment (Halls et al., 2003).

A very simple explanation of ROI is the dollar amount gained from a project divided by the dollar amount spent on the project then multiplied by 100 for a percentage. ROI is widely used and is easily accepted by stakeholders (Halls et al., 2003). Wynn (2003) expressed the need for ROI on ergonomics programs, as well as other health and safety professionals. ROI, like many cost justification calculations, includes looking at the effectiveness and efficiency of programs or projects. Return on investment in athletic training was also reported in *NATA News* officially introducing ROI to ATC and everyone involved in the athletic training profession. Separating a ROI into smaller parts that are studied individually is an easier task to undertake since an in-depth ROI for an athletic training setting would take much time, data and energy.
Net present value (NPV) is much like the payback period but NPV accounts for the value of money over time. Accounting for time value makes the NPV a more specific calculation than the payback period calculation for quantifying the benefits (Contino, 2001). NPV is the “most comprehensive and accurate decision-making tool” (Humphress & Burge, 2006, p.13) for people with a background in finance because it uses hard numbers versus percentages offered from ROI. It could be a very useful calculation for ATC to measure their value but the data on benefits are needed in a dollar amount ahead of time and the evaluator must know how long the program or treatment is expected to last (Humphress & Burge, 2006). This causes a problem for ATC because of problems with quantifying the physical, emotional or mental benefits to employees/athletes and because the program and treatments are constantly changing based on evaluations and patients' rehabilitation progress.

Cost avoidance is the last measure of financial benefit that will be examined. Cost avoidance examines how providing a certain program or service will be beneficial to an organization (Halls et al., 2003). Cost avoidance is literally the costs that are avoided by not having to get the services or programs somewhere else. This calculation is ideal for this research situation comparing on-site programs to treatment received off-site because understanding what a company is saving by not having to pay other costs is a valuable tool for stakeholders and CEO's. Beard, Rowell, Scott, van Beurden, Barnett, Hughes et al. (2006) examined a fall-prevention program for older adults in a community. They did a CBA in the form of a cost-avoidance formula. The authors compared
the cost to implement the program to the savings from hospitalization costs that had been avoided. Their analysis showed that the program was cost-effective due to the large numbers of costs avoided by possible hospitalizations and even larger number of direct and indirect costs combined; the benefit to cost ratio was a 20.6 to 1. With this research, more communities can take the information to implement this type of prevention program in their areas (Beard et al, 2006).

Wai, Frighetto, Marra, Chan and Jewesson (2000) did a cost avoidance analysis of an outpatient antibiotic therapy program versus hospitalization. The direct costs of treatment in the outpatient program were compared with the direct medical cost of hospitalizing these patients (Wai et al., 2000). Using cost avoidance to measure outcomes of disease management programs is also present in the literature (Ham & Ferrera, 2005). The “cost of the complications that were avoided or prevented” because of the effectiveness of the disease management program were discovered by using this formula (Ham & Fererra, p. 62, 2005).

The cycle continues with the problems of quantifying the benefits from athletic training services. Cost avoidance is a calculation that can show through hard numbers and data that by having on-site athletic training services a certain number of dollars were avoided by not using outside services. Studying only one domain of an on-site ATC many job functions, for example, will make the task of quantifying the benefits more meaningful. Additionally only focusing on either direct or indirect costs of on-site athletic training services will again narrow the focus of the analysis (Halls et al., 2003).
There are numerous indirect benefits on-site athletic training services may have on an organization, including no travel time between facilities, for which workers' compensation is responsible, and increased amount of time on job site increasing take home pay for employees. The organization, as a whole, may benefit indirectly from the decrease in workers' compensation premiums and bottom line dollars (Halls et al., 2003).

This chapter outlined the research needed for a full understanding of the topic of this study. An in depth look at the profession of athletic training and the settings in which they provide care is included as well as information regarding workers' compensation insurance process and possible measures of financial benefits. Workers' compensation and the measures that can potentially be used to define the "value" of the ATC are explained for an extensive overview of all the aspects of this current study. Most importantly the lack of literature regarding the performing arts setting and its relationship with the athletic training profession, workers’ compensation insurance process and possible measures of financial benefit were highlighted as a void in the literature.
CHAPTER III

METHODOLOGY

Introduction

The purpose of this study is to examine the cost of providing on-site athletic training services, specifically the on-site treatments, in comparison to the projected costs incurred through off-site treatments. This chapter focuses on the methodology that will be used to conduct this research. The chapter describes the sample of employees' injuries, the research design explaining independent and dependent variables, the procedure, and the treatment of the data.

Sample

The sample for this study is found in the daily treatment logs from employees' work-related injuries. The employees' injuries were all related to their employment in a professional performing arts show in Las Vegas, NV. This performing arts show is acrobatic in nature and the performers work on many different surfaces on a stage in a casino resort. The surfaces include the air on harnesses, the water, a stage, and other locations inside the theater. The sample was obtained from the on-site athletic training department and is a record of the treatments for injuries that occurred in the line of work provided by the ATC on-site.
The head of the on-site athletic training department was approached for permission to use the data from treatments performed December 28, 2004 to December 28, 2006. The treatments were split into three different injury categories and the treatments not in these categories were excluded. All treatments performed were for injuries that occurred on the job and would fall under a workers' compensation claim if treated off-site. IRB approval was obtained for the use of this sample.

Research Design

The design of the research for this study was a comparison of existing data in two different settings. Examination of archival data is a legitimate form of research methodology (Glesne, 2006; Marshall & Rossman, 2006). The design for this study is patterned after the work by Wai, Frighetto, Marra, Chan, and Jewesson (2000) who conducted a cost analysis of an outpatient therapy program versus hospitalization for the treatments. Their study compared the cost of providing patients with treatment in the form of an outpatient antibiotic program versus the hypothesized costs of hospitalizing the patients. In replicating that study, the current study will compare on-site athletic training services versus the off-site treatments they would have received if there was no on-site program.

Measures

*Independent Variables*

The independent variables for this study are the type of treatment setting and the injury category. The first independent variable, type of treatment setting,
is broken down into two levels. The first is the on-site athletic training program at a professional performing arts show. From 2004 to December of 2006 there were four certified athletic trainers at this particular show. Three of the certified athletic trainers are on salary while the fourth is on-call approximately 16 hours a week on the other ATC days off and is paid hourly. The on-site athletic training services are set up backstage at a professional performing arts show and treatments are provided there. The services relevant to this study are treatments received by performers. These treatments are given before and after each show. A treatment time at this performing arts show is a twenty minute period during which an artist can sign up to be treated by an on-site ATC. There are three ATC on-site at all times so there is a possibility that 9 treatments can be given every hour.

The second level of treatment setting is off-site treatment facilities. Off-site treatments are those treatments that these artists would have received if there were no treatments offered on-site. These facilities are in network with the organization's risk management department to handle the workers' compensation claims. For the analyses, the number of visits allowed for each type of injury is based on the average for treatments actually received on-site for each category and information from the risk management department at this organization. The treatments are authorized in 6 visit increments and there is a maximum number of visits for which an employee could be authorized per injury. The wound care category is capped at 6 rehabilitation visits, the strain/sprain category is capped at 24 rehabilitation visits and each surgery is capped off at 48
rehabilitation visits (personal communication, 2007). By capping each injury at the maximum visits a risk management group would approve, the estimated costs are more realistic. The first 6, 24, 48 visits received by the performer will be used as the off-site cost for the wound care, strain/sprain, and post-surgical categories respectively. These numbers represent the visits to the facilities based on the data received from the performing arts show. The treatments that would take place there are determined by the healthcare providers working with the employees. For this study, it is assumed that the treatments provided on-site would be the same as those given at the off-site treatment facility. The costs of the off-site treatments for this study are outlined in the following paragraphs.

There are three levels for the second independent variable, type of injury. The first level is a post-surgical category. Treatments that occur as a result of a job-related surgery fall into this first category regardless of body part. The second level is a strain/sprain category which includes strain and sprains for any body part that occur from job related situations. The last level is the wound care category which includes treating abrasions, lacerations, contusions, as well as eye, ear, and skin irritation related to the job.

**Dependent Variable**

The calculated dollar amount spent on on-site care per visit versus the calculated costs of off-site care per visit are the dependent variables in this study. The cost of having on-site athletic training services in relation to treatments given on-site includes the salaries of the full-time ATC, their benefits, workers'
compensation insurance to cover them, as well as the money they receive for continuing education every year. The hourly wage for the part-time ATC is included based on their 16 hour work week. The yearly budget for the whole on-site athletic training program has been added in to the cost as well as the initial setup budget for starting the on-site program. The analysis will also be conducted without the initial startup budget to show the value of an on-site program that is already up and running. All of these values are then multiplied by two to represent the two years that the data covers.

An example of the on-site athletic training cost is:

- Average salary= $50,000
- Average benefits= $10,000
- Average workers' compensation coverage= $2,500
- Average continuing education stipend=$1,500
- Yearly budget for athletic training department = $40,000

Total= $104,000 x 2 years = $208,000

With these values the cost the organization spent on the on-site program as a whole was given a monetary value. The total cost spent by the organization divided by the total number of treatments that were provided by the on-site ATC results in a cost per treatment for on-site ATC. Finding the percentage of treatments that fall into the three categories included in this study out of the total overall treatments is the next step. That percentage will determine the cost of treating injuries in these three categories.
The off-site costs for treatments are estimated using the number of visits from the data and established insurance costs for treatments. These costs are for every actual treatment that the workers' compensation insurance would be billed by an off-site facility. Instead of the on-site cost that does not change based on treatments, each individual treatment off-site has a defined cost known as Current Procedural Terminology (CPT) codes which are established by the American Medical Association (AMA). The CPT codes are the same for any healthcare facility or provider that wants to bill for that service. The off-site treatment costs that were examined were based on CPT codes from 2004 (Sportware, 2004). While CPT codes change, those in existence during the period from which the data was derived were used.

To determine the overall cost of possible off-site treatments, the CPT codes and monetary values in the data were used. All injuries were capped at the maximum allowable visits given by the risk management department of the organization. The average total cost of CPT codes for each category were determined from the data and used as the cost of off-site treatment visits. A visit to an off-site facility for strain/sprain treatment may look like this:

- Manual therapy= CPT code # 97140 = $49.63
- Therapeutic Exercise= CPT code# 97110= $42.79
- Cold packs= CPT code# 97010= $15.86
- Total possible billable amount for visit: $108.28

The strain/sprain category is capped at 24 visits so, for this example, that one patient's first 24 visits would be used as the total for that strain/sprain
category. This would be done for the other two categories, capping all post-
surgical injuries at 48 visits and wound care injuries at 6 visits. The sum of all the
injuries within the each category can then be compared to the cost of on-site
treatment services. The number of visits will be different between off-site and on­
site treatments. Since the risk management department approves only a set
number of off-site treatments to keep costs down, the total number of visits
included in the analysis for off-site costs is lower than the number of visits
provided on-site.

The direct costs are all that are analyzed in this study. The indirect costs,
such as travel to and from a site, time off of work, and doctors' examinations and
fees, were avoided in this study so as to narrow down the effect of on-site athletic
training services to treatments given only. The argument could be made that
workers' compensation costs are an indirect cost since the insurance company
actually pays the cost and the employer receives any increase in premiums or
fees from them. For this particular organization, the costs a workers' compensation insurance company would accrue due to off-site treatments are a
direct cost because of its high deductible. The organization pays the first
$250,000 of each claim. Only two claims in the history of the organization have
gone over the deductible so the majority of the workers' compensation charges
are paid for by the organization (personal communication, 2007).
Procedure

Permission to use this data was received from the head of the on-site athletic training services department at the organization. A letter was written to the Internal Review Board (IRB) stating what days of data would be made available. This letter was a part of an application for IRB exempt status since the methods comprise an examination of existing data and will not include human subjects. IRB approval for exempt status was granted from the Office for the Protection of Research Subjects (OPRS) on March 2, 2007.

Treatment of Data

The data was imported from the SportsWare program into an Excel file. The data was stripped of all identifying factors and coded into the three different injury categories depending on the type of injury sustained. Any treatments not falling into these categories were deleted so as to narrow the focus of the investigation. After the data was coded into three different categories, two copies were made of the data. The injuries were capped at the assigned maximum numbers for the off-site treatments. The original total numbers of treatments were used for on-site athletic training costs. Analyses were conducted to determine if a difference exists between the cost for on-site athletic training services and off-site charges by a workers' compensation insurance company. Descriptive statistics were run for the whole data set. Correlational analyses of the relationships among types of injuries, incidence of injury, and gender were included. For hypotheses 1-3 independent sample t-tests were performed to determine if a
difference exists between on-site athletic training services and off-site treatment costs.

Conclusion

This chapter outlines the variables studied by this project along with the process of OPRS approval for IRB exemption. A description of the analysis follows and concludes the methodology chapter for this study. With these methods, a study can be undertaken to add to the body of knowledge regarding on-site athletic training services, workers' compensation insurance charges and performing arts shows.
CHAPTER IV

RESULTS

Introduction

The results of the current study are outlined in this chapter. The data was coded into three injury categories to be analyzed separately. The three categories are post-surgical rehabilitation, strain/sprain, and wound care. Demographics of the performers and descriptive statistics of the visits, incidence of injury and injury categories are explained. Lastly, the tests for the hypotheses are present.

The Sample Demographics

The original sample used for on-site treatment costs consisted of 86 individual performers; 48 males and 38 females. These performers reported 218 different types of injuries over the two year period. There were 1,072 separate injuries for which the performers were seen for treatment. These injuries were grouped into the major categories of post surgical, strain/sprain, and wound care. The strain/sprain category had the highest frequency of injuries reported with 608. Males experienced 329 strains or sprains while women had 279 of this type of injury. The wound care category had 446 injuries reported; 245 from males and 201 from females. The post surgical category had by far the least number of
injuries with only 18 reported, with 14 males and 4 females receiving post surgical treatment.

A chi-square test was used to determine if there was a difference in the number of injuries and number of visits based on gender. The difference between the number of injuries and number of visits for men and women were statistically significant. Table 1 shows the values of the chi squared tests. Males experienced more injuries and therefore more visits than their female counterparts.

Table 1.

<table>
<thead>
<tr>
<th>Chi-Square Results for Sex by On-site Injury Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Post-Surgical</td>
</tr>
<tr>
<td>Strain/Sprain</td>
</tr>
<tr>
<td>Wound Care</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

* $X^2=1.21056E-05, p<.01$

** $X^2=1.4095E-144, p<.01$

The performers reported a total of 1,072 separate injuries, and from those injuries, the performers accrued a total of 6,072 treatment visits (see Table 1). The strain/sprain injury category had the most treatment visits with 4,194.

Although women had fewer injuries reported in this category, they had 198 more
treatment visits than men with 2,196. Interestingly, the post-surgical category had 965 treatment visits while there were only 18 injuries in this category. Male performers reported 822 treatment visits, while women were treated only 143 times. Wound care had only 913 performer treatment visits for its 446 injuries. Males came in 564 times while women only had therapy 349 times.

Table 2.

*Top Five Types of Injuries per Injury Category*

<table>
<thead>
<tr>
<th>Post Surgical Injury Type</th>
<th>N</th>
<th>Strain/Sprain Injury Type</th>
<th>N</th>
<th>Wound Care Injury Type</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder Post Surgical</td>
<td>4</td>
<td>Shoulder Strain</td>
<td>41</td>
<td>Eye Burning</td>
<td>23</td>
</tr>
<tr>
<td>Shoulder Strain, Post</td>
<td>3</td>
<td>Thoracic Spine Strain</td>
<td>35</td>
<td>Foot</td>
<td>20</td>
</tr>
<tr>
<td>Surgical</td>
<td></td>
<td></td>
<td></td>
<td>Contusion</td>
<td></td>
</tr>
<tr>
<td>Knee Meniscus Tear</td>
<td>2</td>
<td>Paraspinals Strain</td>
<td>30</td>
<td>Ear</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Barotrauma</td>
<td></td>
</tr>
<tr>
<td>Knee Sprain, Post</td>
<td>2</td>
<td>Ankle Sprain</td>
<td>27</td>
<td>Knee</td>
<td>16</td>
</tr>
<tr>
<td>Surgical</td>
<td></td>
<td></td>
<td></td>
<td>Contusion</td>
<td></td>
</tr>
<tr>
<td>Shoulder Sprain, Post</td>
<td>2</td>
<td>Toe Sprain</td>
<td>27</td>
<td>Ear Otitis</td>
<td>15</td>
</tr>
<tr>
<td>Surgical</td>
<td></td>
<td></td>
<td></td>
<td>External</td>
<td></td>
</tr>
</tbody>
</table>

*N= number of people reporting injury type*

The top five specific injuries for each category are listed in Table 2 where N is the number of performers that reported that injury. Again the strain/sprain
category had the most frequent occurrence of injury, with 41 performers reporting a shoulder strain. The most frequently reported post-surgical injury was a shoulder post surgical. This injury correlates with the frequent number of injured shoulders in the strain/sprain category. Burning eyes were the most frequently reported injury in the wound care category. This could be due to the artists performing the show in water.

Descriptive Statistics

Treatment Costs

Off- Site Treatments

The descriptive statistics regarding both off-site and on-site treatments will be presented before testing the hypotheses. The number of visits analyzed was less than on-site due to the caps on off-site visits given by the risk management department at this specific organization. Those visits each have CPT costs associated with them. CPT codes denote the minimal amount of money that an insurance company can be charged for specific treatments during a visit. These monetary values assigned to each code were used to determine the final visit costs. The visits were determined by using the caps received by the risk management group of the organization being studied. Post- surgical visits were capped at 48 while strain/sprain injuries were capped at 24 visits. The wound care category injuries had a cap of 6 visits per injury. Any visits that occurred above those caps in the data were deleted for the off-site calculations.
The off-site costs were determined and are shown in Table 3. Each visit cost was calculated and then summed across each of the three categories. The total cost for all treatments' off-site costs was $432,926.29. The strain/sprain category's total cost was the largest at $290,580.03 which is not surprising due to 3,510 visits in that category. The wound care category was the second highest cost with a total of $87,365.79 with 821 visits. Lastly was the post-surgical category with a total of $54,980.47 for 637 off-site visits.

Table 3.

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Cost</th>
<th>Number of Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Surgical</td>
<td>$54,980.47</td>
<td>637</td>
</tr>
<tr>
<td>Strain/ Sprain</td>
<td>$290,580.03</td>
<td>3,510</td>
</tr>
<tr>
<td>Wound Care</td>
<td>$87,365.79</td>
<td>821</td>
</tr>
<tr>
<td>Grand Total</td>
<td>$432,926.29</td>
<td>4,968</td>
</tr>
</tbody>
</table>

The descriptive statistics for all three injury categories' visits are provided in Table 4. The higher average cost of a visit in the wound care category attests to the fact that wound care treatments are usually longer and often deal with open wounds and bodily fluids. The more invasive nature of wound care therefore is more expensive than other visits.
Table 4.

Descriptive Statistics for Off-Site Costs

<table>
<thead>
<tr>
<th></th>
<th>Post Surgical</th>
<th>Strain/ Sprain</th>
<th>Wound Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>$86.31</td>
<td>$82.79</td>
<td>$106.41</td>
</tr>
<tr>
<td>Median</td>
<td>$91.43</td>
<td>$60.96</td>
<td>$116.96</td>
</tr>
<tr>
<td>Mode</td>
<td>$99.05</td>
<td>$45.72</td>
<td>$155.06</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>$32.09</td>
<td>$47.02</td>
<td>$46.01</td>
</tr>
<tr>
<td>Range</td>
<td>$200.78</td>
<td>$257.92</td>
<td>$208.39</td>
</tr>
<tr>
<td>Minimum</td>
<td>$15.23</td>
<td>$0.00</td>
<td>$11.43</td>
</tr>
<tr>
<td>Maximum</td>
<td>$216.01</td>
<td>$257.92</td>
<td>$219.82</td>
</tr>
<tr>
<td>Sum</td>
<td>$54,980.47</td>
<td>$290,580.03</td>
<td>$87,365.79</td>
</tr>
<tr>
<td>Total Visits</td>
<td>637</td>
<td>3510</td>
<td>821</td>
</tr>
</tbody>
</table>

On-Site Treatments

For on-site athletic training costs, a cost per visit was determined for the on-site athletic trainers. By combining the costs in Table 5 a total cost of providing the on-site athletic training program was determined. Dividing that cost by the 8,883 total treatments comes up with an average cost per visit for on-site certified athletic trainers. These costs per visits were $96.02 with the startup cost included and $85.89 without the startup costs.
Table 5.

Costs Used to Determine the Cost per Treatment for On-Site

<table>
<thead>
<tr>
<th>Type of Cost</th>
<th>Dollar Amount w/ startup cost</th>
<th>Dollar Amount w/out startup cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>$439,920.00</td>
<td>$439,920.00</td>
</tr>
<tr>
<td>CEU</td>
<td>$9,000.00</td>
<td>$9,000.00</td>
</tr>
<tr>
<td>Benefits</td>
<td>$195,000.00</td>
<td>$195,000.00</td>
</tr>
<tr>
<td>W/C</td>
<td>$39,000.00</td>
<td>$39,000.00</td>
</tr>
<tr>
<td>Yearly</td>
<td>$80,000.00</td>
<td>$80,000.00</td>
</tr>
<tr>
<td>Start up</td>
<td>$90,000.00</td>
<td></td>
</tr>
<tr>
<td>Total Year</td>
<td>$852,920.00</td>
<td>$762,920.00</td>
</tr>
<tr>
<td>Total Visits</td>
<td>8883</td>
<td>8883</td>
</tr>
<tr>
<td>Total Cost per visit on-site</td>
<td>$96.02</td>
<td>$85.89</td>
</tr>
</tbody>
</table>

The treatments analyzed in this study consisted of 6,072 visits which was 68.36% of the total visits. This percentage was used to determine a cost per visit for the three categories which was $65.29 with startup costs included and $58.41 per visit when not including the startup costs. These dollar amounts were used as the values to the estimate off-site costs. The total cost of treating the individuals on-site and the breakdown of each injury category total are listed in Table 6.
Table 6.

*Total Cost for On-Site Treatments per Category*

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost per Visit w/ startup</th>
<th>Total w/ startup cost</th>
<th>Cost per Visit w/out startup</th>
<th>Total w/out startup cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Surgical</td>
<td>$65.29</td>
<td>$63,004.85</td>
<td>$58.41</td>
<td>$56,365.65</td>
</tr>
<tr>
<td>Strain/ Sprain</td>
<td>$65.29</td>
<td>$273,826.26</td>
<td>$58.41</td>
<td>$244,971.54</td>
</tr>
<tr>
<td>Wound Care</td>
<td>$65.29</td>
<td>$59,609.77</td>
<td>$58.41</td>
<td>$53,269.92</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>$396,440.88</strong></td>
<td><strong>$354,607.11</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the all visits cost the same, the totals fall in the same order as the number of visits. The more visits in the category, the higher the total cost. The same estimated cost for on-site treatment visits was used for every visit so there was zero variance or standard deviation among the data. The twenty minute wage also occurs as the mean, median and mode since all treatments are at the same cost, $65.29 including startup cost and $58.41 when startup costs are not included. The difference in rank between off-site and on-site treatments attests to the fact that the on-site treatments treat post-surgical patients well over the cap that is put on during the workers' compensation process.
Hypotheses Tests Analysis

Table 7.

**T-tests of Treatment Costs per Injury Category**

<table>
<thead>
<tr>
<th></th>
<th>On-site Treatment</th>
<th>On-site Treatment</th>
<th>Off-Site Treatment</th>
<th>df</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>w/ startup</td>
<td>w/out startup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Post-Surgical</td>
<td>$65.29</td>
<td>.00</td>
<td>$58.41</td>
<td>.00</td>
<td>$86.31</td>
</tr>
<tr>
<td>Surgical</td>
<td>$65.29</td>
<td>.00</td>
<td>$58.41</td>
<td>.00</td>
<td>$82.79</td>
</tr>
<tr>
<td>Strain/Sprain</td>
<td>$65.29</td>
<td>.00</td>
<td>$58.41</td>
<td>.00</td>
<td>$106.42</td>
</tr>
</tbody>
</table>

*p<.01

**H1: There will be no difference in the cost of treating post surgical injuries provided by an on-site athletic training services compared to off-site treatment facilities.**

A t-test for two independent samples with unequal variance was used to determine if the difference in costs between on-site and off-site treatments was statistically significant. Using the t value for a two tail test, the difference between post surgical injury category was significant at the p<.001 level. As a result the null hypothesis was rejected (see Table 7). This analysis showed that there is a
difference between on-site versus off-site treatments. The costs of off-site treatments were significantly higher than on-site treatment costs for treating post-surgical injuries.

**H2: There will be no difference in the cost of treating strain/sprain injuries provided by an on-site athletic training services compared to off-site treatment facilities.**

Hypothesis two looked at the strain/sprain category which was where the most cost was incurred due to the high number of injuries and visits. Hypothesis two was also found to be statistically significant at the p < .001 level (see Table 7). Using the t-test assuming unequal variance, again the hypothesis was rejected. There is a difference between on-site treatment costs and the cost of off-site treatments for the strain/sprain category as well. The on-site treatments are a less expensive choice for treating injuries from a performing arts show.

**H3: There will be no difference in the cost of treating strain/sprain injuries provided by an on-site athletic training services compared to off-site treatment facilities.**

The third hypothesis examined whether there was a difference in the cost of treating wound care injuries on-site versus off-site. This t-test was also statistically significant at the p < .001 level. Table 7 shows that this third null hypothesis can be rejected as well. On-site treatment costs for wound care injuries are significantly lower than off-site costs for treating the same injuries.
Conclusion

This chapter outlined the results of the current study. Analysis of gender differences showed that men were seen for more injuries than women yet women received more treatment of their specific injuries. The differences between on-site and off-site treatment within each category were statistically significant as well. All three null hypotheses were rejected; each t-test was statistically significant at the p<.001 level. On-site athletic training treatments for each category of injury (post-surgical, strain/sprain, and wound care) were less expensive for this performing arts company than sending performers off-site for their treatments. The difference in cost between on-site treatments and off-site treatments can be used to promote the profession of athletic training. With these results, numerous implications and topics for discussion can be undertaken.
CHAPTER V

DISCUSSIONS AND IMPLICATIONS

Introduction

The purpose of this study was to examine the cost of providing on-site athletic training services, specifically the on-site treatments that can be provided by having an on-site ATC versus the cost that would be incurred for off-site treatments. This research project was exploratory in nature; however the findings will be an addition to the body of knowledge. This chapter will discuss the results of the current study as well as implications for managers of entertainment companies. Additionally, implications for the athletic training profession will be given. Limitations of the current study and recommendations for future research will be discussed as well.

Discussion of Results

Due to the uncharted waters regarding this topic, there is littler research with which to compare the current findings. Since a study of ATC services in this occupational setting has never been done, there is no comparison study from which to work. By correlating the research found throughout the literature review a better understanding of the results can emerge.
Athletic Training Professional Domains

The athletic training domain that was studied in this research was specific to treatment. The six ATC domains were highlighted earlier, but from the 5th edition Role Delineation Study (2004) this research examined Domain IV, which is entitled treatment, rehabilitation and reconditioning of injuries. While working on-site every domain of the profession is important but Domain IV was the only domain examined in detail in this research. The most obvious domains that are used by on-site ATC are evaluating injuries and immediate care of those injuries. The cost of those domains fell into the data set that was studied so they are included in this discussion. The injuries that occurred to these performers were similar to injuries found in the findings exposed by other literature.

Occupational Settings

Not uncommon to other physically demanding occupational settings, the strain/sprain category had the most injuries for performers of the show. Winterstein and McGuire (2006) studied the cost of ankle sprains alone for adolescent athletes. They reported a cost of close to $61 million in the U.S. for this injury. The study on ankle sprains examined emergency room visits for ankle sprains which are acute or new injuries. The current study found that this injury fell into one of the top five injuries within the strain/sprain category. Albensi (2003) investigated the cost of chronic injuries on manufacturing employees. The author stated an approximate cost of $234 billion for these chronic injuries. In this study, chronic injuries fall into both strain/sprain and post-surgical...
categories. Some performers have been suffering through their injuries for an extended period of time before they seek surgery.

To compare the current findings to previous dance medicine research the findings of total injuries and visits can be compared. Kaiser et al. (2002) reported a total of 171 injuries and 3,202 treatments for dance performers in one year at a Division I university. In the current study, there were 1,072 separate injuries with 6,072 visits for those injuries alone. This was over a two year period but the only injuries analyzed were the ones that fell into one of the three categories. The large difference can be attributed to the university dance setting versus professional dance as well as the acrobatic and stunt work that is involved in this study's performing arts show.

The differences in gender found from the chi-square test in the current study could be due to the physical nature of the majority of the male performers' jobs. The male performers are all acrobats while the female performers consisted of acrobats and synchronized swimmers. Male performers were treated more often than female performers. Regardless of the gender, there were a large number of treatments provided to performers. The cost to the organization would have been larger without on-site athletic training services. One cost that would be most affected would be workers' compensation costs to the company.

**Workers' Compensation**

Employees with workers' compensation claims are more likely to seek care from a physical therapist (Freburger et al., 2005). Without on-site athletic training treatments, these performers would have to seek treatment from
somewhere else, possibly a physical therapist. The higher cost for off-site treatment would increase the workers' compensation costs for the organization since they are responsible for each injury. Wasiak and McNeely (2006) found that the strict payment policies of workers' compensation insurance companies were associated with fewer treatments by a chiropractor. The study illustrated the limitations of the workers' compensation system; the amount of care that was provided to the employee decreased simply due to the workers' compensation process. The on-site treatments remove the issue of payment policies. Another possible outlet for off-site treatments would be a hospital based occupational medicine program. Barron et al. (2005) reported that the injuries most treated by these types of programs were strain/sprain and open wounds. By analyzing the current data, there was evidence that the injuries seen on-site at the performing arts show mirror injuries seen off-site at the hospital based programs. Barton et al. (2005) found evidence that people who participated in an on-site fitness program had increased productivity and took fewer short term disability days. Having an on-site ATC would highlight some of the same benefits of a successful on-site fitness program. The potential measures of financial benefit that can be used to quantify the financial “value” to ATC follow in the next paragraphs.

**Measures of Financial Benefit**

**Cost Benefit Analysis**

An overall cost benefit analysis (CBA) is the best formula for understanding the value of a program, profession, and equipment. To undertake a professional cost benefit analysis, all of the costs and all of the benefits must
be compared. These are then analyzed to determine if there is a difference in totals for costs and benefits. McIntosh et al. (1999) supports the importance of adding in all benefits, even if they can not be quantified. All of the social and psychological benefits of healthcare must be included in a proper cost benefit analysis (McIntosh, 1999). This type of analysis is complex and the current study takes one small part of a possible larger and complete cost benefit analysis. By analyzing one domain on one specific group of people the focus of the research was narrowed to make the data more significant to the profession.

Menges et al. (2006) did an extensive CBA for the screening of colorectal cancer. The analysis was used to see if it would be cost effective to start screening relatives of current cancer patients earlier to prevent more cancer cases. These researchers were able to look at the cost of screening versus the benefit of keeping additional people safe from long term damage from cancer. The cost benefit analysis is the whole formula while the cost avoidance formula used in the current study is a small piece of the larger picture (Halls et al., 2003).

Cost Avoidance Formula

Halls et al. (2003) undertook the task of explaining the “value” of ATC in the industrial/occupational setting. Their work is a cornerstone of this study due to the numerous correlations between industrial setting and professional performing arts, especially in relation to workers’ compensation. The cost avoidance formula is most often used to gauge how a certain program or service will benefit an organization (Halls et al., 2003). Beard et al. (2006) studied the cost of a fall prevention program versus the cost of treating the possible falls that
could occur. The prevention program was found to be cost effective. The money spent on the programs was easily made up in avoided hospital costs. In this study of performing arts employees there was a statistically significant difference for all three injury categories showing that the cost of treating injuries on-site was lower than off-site.

The analysis shows there is a significant difference in the cost for treating post surgical, strain/sprain and wound care injuries provided by on-site athletic training services compared to off-site treatment facilities. Wai et al. (2000) also found a significant difference in the cost of providing outpatient antibiotic therapy versus the cost of providing the same treatment during a hospital stay. Disease management programs have also used cost avoidance formulas in analyzing the cost of the program versus the complications that can be avoided by the education provided by this program (Ham & Ferrera, 2005). The specific nature of the current research allows for a statistically significant value to be placed on the on-site athletic training program. By no means are treatments the only benefits an on-site ATC can provide but it is a stable starting ground for managerial implications and future research.

Athletic Training Profession Implications

Understanding that the injuries that occurred at the performing arts show are similar to the injuries addressed within many other athletic training professional settings has vital implications for the athletic training profession. The strain/sprain category was highest in number of injuries and visits. Having a
better understanding of the injuries that are treated at a professional performing arts show can help better prepare professionals for this new occupational setting. For the ATC in charge of proving their “value” to the organization where they are employed, this data can be used to show the costs that are avoided by having on-site athletic trainers. Lastly, the current study can provide a better understanding of the workers’ compensation insurance process to the profession. An ATC can play a vital role in this process and can be a significant asset to their organization. Correlating the work an ATC does with return to work (RTW) programs, on-site fitness programs and occupational medicine assists in clarifying what the profession can offer an organization in regards to workers’ compensation. When managers of entertainment companies or organizations that house an entertainment division are interested in lowering costs, on-site healthcare services are now a viable option.

Limitations and Future Research

The limitations of this study mostly revolve around estimating possible costs that may be avoided. Not being able to show costs that were actually accrued is a limitation undertaken when using the cost avoidance formula. The number of visits used for off-site treatments were reduced to make the estimations closer to what would happen through the workers’ compensation process. The CPT codes that were used as the number of the off-site visits were the codes that came with the data. The CPT code amounts change frequently so the actual number of the treatments may be more or less currently. Another
limitation of the study may be that all the treatments were not recorded at the time they were done. The on-site ATC may have forgotten or not have found some injuries important enough to document. Although the maximum amount of money was used to determine the cost per visit of an on-site ATC, the number may still be low compared to the work that was done.

Recommendations for future research from this study are analyzing pre on-site athletic training records to records after an on-site athletic training program has been put into place at an acrobat show. That way true pre and post numbers can be determined. There are current performing arts shows without on-site athletic training services but the level of the physical nature of the show does not compare to the current performing arts show that was analyzed. Lastly, studying the “value” of other domains of athletic training would be beneficial for an overall “value” of the many aspects of the profession. This current study focused on the domain that consists of treatments given to individuals with injuries that occurred at work. Possible other domains that could be focused on are initial evaluations of all injuries or the prevention programs that an on-site athletic training program provides.

Conclusion

This study will hopefully open the doors for an increase in this area of the athletic training literature. Quantifying the benefits of the ATC, as well as showing the costs that may be saved by utilizing these services, can help the profession tremendously. Managers of entertainment organizations that are interested in
reducing workers' compensation costs may want to consider seriously adding on-site athletic trainers to their staff.
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