

**INJURY RATES, FREQUENCY, AND  
TIME LOSS IN NCAA DIVISION I  
CHEERLEADING**

**By**

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INJURY RATES, FREQUENCY, AND TIME  
LOSS IN NCAA DIVISION I  
CHEERLEADING

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## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Statement of the Problem	4
Purpose of the Study	5
Hypotheses	5
Delimitations	6
Limitations	7
Assumptions	7
Definitions	7
II. REVIEW OF LITERATURE	11
History	12
Injury Data	13
Catastrophic Injury Data	17
Concussion Data	18
Legal Data	18
III. METHODOLOGY	20
Subjects	21
Instrument	22
Procedure	23
IV. RESULTS	25
Conference Participation	26
Medical Coverage Levels	26
Demographics	28
Practice Data	29
Injury Rates and Medical Coverage Levels	29
Injury Tracking	31
Hypotheses	31
Male and Female Injury Comparison	33
Injury Site Frequency Data	34
Time Loss Data	36
Injury Type Frequency Data	37
Medical Emergencies	38
V. DISCUSSION	39
Recommendations	50
REFERENCES	53
APPENDIX I	55
APPENDIX II	56

## **LIST OF TABLES**

TABLE 1. T-Test for Average Injury Rate Between Males and Females p. 32

TABLE 2. T-Tests for Male and Female Injury Site Comparison p. 33

## **LIST OF FIGURES**

FIGURE 1. Conference Participation	p. 27
FIGURE 2. Medical Coverage Data	p. 28
FIGURE 3. Average Number of Injuries by Level of Medical Coverage	p. 30
FIGURE 4. Injury Site Frequency Comparison	p. 35
FIGURE 5. Time Loss Data by Injury Site	p. 37
FIGURE 6. Injury Type Frequency Comparison	p. 38

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# CHAPTER 1

## Introduction

## INTRODUCTION

*“You’ve got to have athletic ability to be a flipper and a jumper, and a tosser-upside downer.”*

*-Tony Siragusa, Baltimore Ravens Defensive Tackle, commenting on cheerleading-*

Many people through the world are involved in some type of organized sport. Even at a very young age, kids are participating in football, basketball, little league baseball, soccer, and any number of other sports. One activity that one may not place into that group for whatever reason is cheerleading. Some people may view cheerleading as a part of a game, but not a sport in itself. From junior high to college, spectators are likely to see cheerleaders on the sidelines of football and basketball games and see them as a nice distraction when the game is on a time-out.

The word cheerleader means exactly what it says, someone who leads cheers, chants, or crowd involvement during athletic contests. This was the sole purpose of cheerleaders during the start of cheerleading up until recent times. In recent years, cheerleading has become much more than pretty girls leading student bodies in chants and cheers. Cheerleading has evolved in to a highly skilled and athletic sport in which well trained athletes perform high risk skills with grace and spectacular athleticism and the possibility of serious injury. Most high schools and universities do sponsor



cheerleading squads, but there is great debate going on as to how to support cheerleading in athletics.

One of the principles mandated by the National Athletic Trainers' Association (NATA) Code of Ethics is that all athletes and sports are to receive equal care ([www.nata.org](http://www.nata.org)). Cheerleaders; however, are sometimes not given the same quality of care, or no care at all in the National Collegiate Athletic Association (NCAA) setting. Cheerleading is not recognized as a sport by the NCAA, however, the vast majority of NCAA Division I schools have a cheerleading squad, either co-ed or all female. With the implementation of the Title IX gender equity code in NCAA athletics, which requires a certain ratio between the total number of male and female athletes at colleges ([www.ncaa.org](http://www.ncaa.org)), cheerleading has never been seen as a sport even though large numbers of females participate and compete at competitions for their universities.

Cheerleading has become more and more athletic and competitive over time. The root of cheerleading leads one all the way back to 1898 and the University of Minnesota (Boden, et. al., 2003). The original style of cheerleading was mainly as a show of support for athletic competition. Mostly females would hold up signs for crowd involvement and lead the student body in chants. There was not much athleticism involved at this point. Over the past couple of decades, cheerleading has really evolved into an activity requiring a great deal of athleticism and physical strength. Cheerleaders today perform tumbling skills that can rival gymnastics routines and air skills often seen in diving competitions. They also incorporate skills from dance and power lifting. Cheerleading has evolved into a sport and the time has come for the understanding of cheerleading injuries to evolve as well.

## Statement of The problem

The problem in this study is threefold. The first problem to be investigated in the study is that the amount of literature on the subject of cheerleading is very limited. Even less information is specifically devoted to cheerleading injuries. Athletic trainers and coaches have a limited body of research to draw upon in order to examine injury rates and types of injuries that are the most common to cheerleading. That information could help the prevention of injury and alterations in rules for the overall safety of cheerleaders. Accurate injury data may help broaden the general base of literature on cheerleading and the injury information related to cheerleading. The second problem is that currently schools afford different levels of medical coverage to cheerleading as opposed to a basic level of medical coverage afforded to most contact and high risk sports. There is no clear reason as to why this occurs. If there is no consistency in medical coverage and record keeping, it is difficult to gain a database on injury statistics in cheerleading. Universities are also not addressing the needs of a group of students that they have a special relationship with, which could cause legal problems. The third problem is that no central injury tracking system is in place to monitor injury data that comes from cheerleading and obtain descriptive data pertaining to the injuries. A central data system could provide easy access for athletic trainers and coaches to aid in injury prevention as stated in the first part of the problem. The NCAA tracks the injuries of its sanctioned sports through its own system. Cheerleading is not included in this system. One study (Boden, et al., 2003) tracked cheerleading injury data over a twenty year period using the National Center for Catastrophic Sports Injury (Boden, et al., 2003). Currently, ATC's have to

rely on research studies and case studies for injury data from cheerleading. This study has attempted to add to that base and perhaps has shown a further need for a central tracking system, or for the NCAA to include cheerleading in its injury surveillance system.

### Purpose of the Study

The fact that cheerleading has been shown to account for 57% of direct fatalities and catastrophic injuries throughout competitive athletics, (Cheerleading injury, 1999) should lead schools to give the sport of cheerleading the same basic amount of medical coverage and care as any other sport receives. The purpose of this study was to compare and describe inferential and descriptive injury data reported by athletic trainers, concerning conference participation in this study, practice data, average number of injuries for males and females, injury site frequency, injury type frequency, and time loss per injury site. It was also the purpose of this study to describe levels of medical coverage that were provided to each institution along with other descriptive data.

### Hypotheses

The following are the null hypotheses which were examined in this study:

Ho1

There will be no significant differences in the average number of injuries between males and females.

Ho2

There will be no significant difference in frequency of injuries by site between males and females.

Ho3

There will be no significant differences in frequency of injuries by type between males and females.

#### Delimitations

This study had the following delimitations:

1. Injury data was only gathered from injuries of NCAA Division I cheerleaders participating on co-ed or all female squads.
2. Only Certified Athletic Trainers were allowed to complete the survey.
3. Six major Division I conferences were surveyed. The conferences were: Atlantic Coast Conference (ACC), Big Ten, Big XII, Conference USA, Pacific Ten (Pac Ten), and the Southeastern Conference (SEC).
4. The only way to report data was via the internet.
5. Injury was defined for this research as any condition which requires treatment by an athletic trainer or other allied health professional, and results in loss of practice or game time, and/or altered practice or game participation.
6. This study did not use illnesses for data.

## Limitations

This study may have been limited by the following factors:

1. The survey that was developed for this study had not been used for any other research.
2. The data that was reported had to come from accurate records.
3. The athletic conferences were not chosen at random.

## Assumptions

The following assumptions were made for this research:

1. All ATC's made an honest attempt to complete the survey according to instructions.
2. All school's cheerleading squads perform stunting, tumbling, and build pyramids of a relatively similar skill level.
3. All cheerleaders were between the ages of 18 and 25.
4. All cheerleaders had cheerleading or gymnastics training prior to becoming a cheerleader at their respective schools, due to the level of skill required to make these squads.
5. All female cheerleaders were considered fliers and males were considered bases.

## Definitions

Athletic Training Student (ATS) – A student who is in an athletic training education program and gaining clinical experience working under ATC's, or, for the purpose of this study only, any student who has been hired by the athletic training staff and university to help provide basic levels of health care.

Arabian – A move completed during a tumbling pass or during stunt where the athlete performs a front flip while turning their body 180 degrees in the opposite direction to which they were facing.

Base – A person who throws a flier or supports another in the air.

Basket Tosses – When a group of no more than 4 people tosses another girl into the air up to heights of 30 feet while she performs flips and twists.

Certified Athletic Trainer (ATC) – Allied health care professional who works specifically with an active population. They deal in the day to day emergency care, injury evaluation, treatment, and record keeping of the athletes under their care. They gain a professional certification through the National Athletic Trainers' Association Board of Certification by passing a standardized examination (Arnheim & Prentice, 2000).

Direct Medical Coverage - An ATC and/or Athletic Training Student (ATS) is present at cheerleading practice(s) or game(s), in which cheerleaders are cheering, and providing athletic training services along with full access to team physicians and athletic training facilities.

Double Full – When a tumbler or basket tosser completes two full body twists while performing a flip.

Flier – A person who leaves the ground for the purpose of a stunt, pyramid, or basket toss.

Flip – A person completing a 360 degree head over heels revolution of their body.

Full – When a tumbler or basket tosser completes one full twist of their body while performing a flip.

High Level of Medical Coverage – Providing direct medical coverage to cheerleading in which an ATC is present and providing athletic training services at no less than some cheerleading practices and some games in which cheerleaders are participating.

Indirect Medical Coverage - There is no ATC or ATS present at cheerleading practice(s) or game(s), in which cheerleaders are cheering. However, cheerleaders do have access to athletic training services, team physicians, and athletic training facilities if needed.

Injury – For the purpose of this study, it will be defined as any condition which requires treatment by an athletic trainer or other allied health professional, and results in loss of practice or game time, and/or altered practice or game participation.

Low Level of Medical Coverage – Providing indirect medical coverage to cheerleading.

Medical Coverage – Being placed under the universities athletic training or sports medicine department for health care, injury prevention, and injury rehabilitation.

Moderate Level of Medical Coverage – Providing direct medical coverage to cheerleading in which an ATS is present and providing athletic training services at no less than some cheerleading practices and some games in which cheerleaders are participating.

Punch Front – A move completed during a tumbling pass in which the athlete performs a forward flip off of both feet and in which their arms do not make contact with the ground.

Stunting – A skill in which a base (male or female) lifts another female into the air while performing an acrobatic skill.

Time Loss – Being withheld from practice or competition.

Whip Back – A move completed during a tumbling pass in which the athlete performs a back flip in a straight position taking off from their feet. As the athlete performs the flip, their arms do not make contact with the ground.



# **CHAPTER 2**

## **REVIEW OF LITERATURE**

## **REVIEW OF LITERATURE**

### *History of Cheerleading*

The modern style of cheerleading can be traced back to Lawrence Herkimer, who is considered the father of modern cheerleading. In 1948, Herkimer founded a company known as the National Cheerleaders Association (NCA) in Dallas, Texas ([www.nationalspirit.com](http://www.nationalspirit.com)). His goal was to spread information and skills on how to improve crowd involvement during athletic contests. In 1949, he started his first cheerleading camp at Sam Houston State University in Texas. The camp had 52 girls in attendance to learn new cheerleading skills. Herkimer employed a speech professor and an English teacher to teach the girls public speaking skills and rhyming techniques for the cheers. Herkimer also taught the girls how to use gymnastics and grandiose movements to encourage crowd involvement. These ideas and skills are now the basis of the style of cheerleading we currently see. Today, Herkimer has sold his many companies to various investors, with the parent company being the National Spirit Group (NSG). NSG owns NCA along with Cheerleader&Danz Team, a cheerleading apparel company which leads the industry in uniform and apparel business, and the National Dance Association (NDA). Today NSG holds over 1,500 camps worldwide for boys and girls of all ages. Each year, over 180,000 boys and girls will participate in the NSG camps. NCA and NDA also hold annual competitions throughout the calendar year which attract teams from all over the United States. The College National Competition incorporates several different categories including: Large Co-ed, Small Co-ed, All Girl, Partner Stunt, and all Dance

categories. There are also different divisions according to the size of your school, along with junior college divisions. This competition is held over 3 days in April in its present location of Daytona Beach, Florida. These competitions feature over 65,000 competitors each year in various categories and draw audiences in the thousands. The main categories are the Large Co-Ed, Small Co-Ed, All Girl, and Partner Stunt. The collegiate and high school championships are also televised nationally ([www.nationalspirit.com](http://www.nationalspirit.com)). According to Boden, et. al., (2003) the American Association of Cheerleading Coaches and Advisors (AACCA) in 2002, estimated that there were 450,000 people involved in cheerleading at the high school and collegiate level combined. With this estimate, they also concluded that cheerleading was one of the top four organized sports, in which women were participating. Mueller also showed a total 75,000 high school participants in cheerleading from 1982-1999 (Mueller, 2001).

At the NCAA Division I level, co-ed squads are more common than at any other level of collegiate sport. In contrast to All-Girl squads, males take over as the base of stunts and pyramids, along with throwing basket tosses. In Co-Ed squads, females are typically known as fliers. They are the people who are on top of the stunts, pyramids, and basket tosses. Both males and females are tumblers and lead crowd involvement. In All-Girl squads, multiple girls will work together to act in the place of a male for stunts, pyramids and basket tosses.

### *Injury Data*

The amount of information on the topic of cheerleading injuries was very limited. Several case studies and legal cases were available (Sawyer, 2003), but little scientific

data on injury rate, frequency, or time loss was available. There were a few concussion studies and studies about catastrophic injuries that have included cheerleading in the study (Cantu & Mueller, 1999). One study also looked at the general fitness level of collegiate cheerleaders (Thomas et. al., 2004).

With the modernization of cheerleading since Herkimer revolutionized it into a more athletic and physical activity in 1949, today's squads perform high-risk maneuvers including athletes flying in the air at heights of 20 feet and above, building pyramids two and a half body lengths high, and elite level tumbling skills. These skills and stunts can cause a variety of injuries and potentially death. After a cheerleader was paralyzed from a fall in 2002, the University of Nebraska banned tumbling and stunting for their cheerleaders (Tecco, 2002). Through personal experience as a Certified Athletic Trainer (ATC), and conversations with other ATC's and cheerleaders, various reasons have been expressed as to why some universities do not place cheerleading under the care of the school's athletic training or sports medicine department. Reasons have ranged from cheerleading not being recognized as an NCAA sport to a belief that cheerleaders do not get hurt and are not athletes.

When comparing gymnastics and cheerleading in terms of injuries, one can examine the NCAA ISS numbers for the 2002-2003 gymnastics season in Division I. A total of 110 injuries occurred during the year. The three most common injury sites were the knee (24 total injuries), the ankle (19 total injuries), and the shoulder and foot both third with 8 injuries per body part. Ligament sprains (incomplete and complete tears) accounted for 44 of the 110 injuries. Muscle strains accounted for 16 of the 110 injuries (NCAA.org, 2004).

On the topic of injury data in all NCAA Division I sports, the NCAA Injury Surveillance System (ISS) tracks all data concerning injuries in NCAA competition. Cheerleading is not involved in the ISS ([www.ncaa.org](http://www.ncaa.org)). No central data system is in place to track the amount of injuries that occur to cheerleaders during the course of a traditional school year. With available data information collected, proper safety guidelines and preventative measures may be developed to lower the injury rate of cheerleaders. Cheerleading has become similar to gymnastics in terms of the tumbling that is now being used in cheerleading. Cheerleaders frequently perform running tumbling skills such as double full back flips (see Double Full), punch fronts, arabians, and whip backs (see Definitions). One major difference between the two sports is that gymnastics uses a spring floor to gain greater heights and difficulty for their skills. Cheerleading at the collegiate level only uses mats on a wooden or concrete floor for competition. The National Cheerleading Association (NCA) and Universal Cheerleading Association (UCA) do not allow competition on a spring floor, due to reasons that are unknown to this researcher.

Cheerleaders sustain a comparable number of injuries and days lost due to injury when compared to other sports that are covered by medical departments of the university (Hutchinson, 1997). One study (Hutchinson, 1997) showed that cheerleading led all sports in average days lost due to injury with an average of 28.8 days lost. In a different study which examined time loss, football had an average of 5.6 days lost due to injury (Axe, 1997). These numbers could have been due to the fact that football players usually have access to athletic trainers and other treatment options. Injury prevention, proper evaluation, detection, and proper care and rehabilitation can return most athletes from an

injury to competition or practice faster than if any of those factors are absent. Those factors can also decrease the risk of re-injury. It could also be due to other factors dealing with the athletes and the injuries themselves. Studies are needed to show if cheerleading can also benefit in the way of injury prevention, rehabilitation, and time loss from higher levels of medical coverage. Cheerleading also involves many parts of the body when performed at this level. Most studies have shown that any injury can cost an athlete to miss time because the injury will most likely affect some aspect of performance (Hutchinson, 1997). Tumbling and partner stunting, two major categories of skill required for collegiate cheerleading, require all body parts to be functioning correctly to perform well.

With the data from the ISS for gymnastics in mind, one of the few major studies conducted on cheerleading injuries showed that cheerleaders had a low risk of injury, but had the highest rate of time loss (Hutchinson, 1997). This study concluded that collegiate cheerleading had the second lowest rate of injury per athletic exposure as compared to all other sports in this study. The most common sites of injury in cheerleading were the ankle, followed in order by the knee, hand, and back (Hutchinson, 1997). Tecco also showed a high rate of time loss to a rather low injury rate for cheerleaders (Tecco, 2002). In a study by Jacobson, et. al, (Jacobson, et. al, 2004) which focused on high school cheerleading injury rate, time loss, and injury site, it was found that 41.3% of all participants reported being injured in the previous year. The injury distribution rated the ankle as having the highest number of injuries with 24.4%, followed by the wrist/hand, and the back (Jacobson, et. al, 2004). This data did not quite match up with Hutchinson's data; however, Jacobson's study involved only high school cheerleaders.

### *Catastrophic Injury Data*

Most of the studies and case reports pointed to the severity of the injuries that had occurred. Due to athletes falling from pyramids and basket tosses, the risk of severe injury is very high in cheerleading. In a 1999 article in *The American Journal of Sports Medicine*, it was reported that cheerleading led all female sports in catastrophic injuries and direct fatalities from 1982 – 1997 (Cantu, 1999). Cheerleading had 34 out of 60 (57%) direct fatalities and catastrophic injuries. The next closest sport was gymnastics with 11 direct fatalities and catastrophic injuries (Cantu, 1999). A study by Boden, et. al., (Boden et. al., 2003) looked at data reported to the National Center for Catastrophic Sports Injury Research (NCCSIR). This study was a retrospective cohort study using data between 1982 and 2002 and was specific to cheerleading. The data was reported to the NCCSIR by coaches, athletic directors, and athletic trainers, and then given to the researchers. The researchers then tried to contact as many people as possible by telephone to obtain as much data as possible about each injury. A total of 42 injuries were reported and 29 were followed up with interviews with people who had more details of the injuries. The NCCSIR classifies a catastrophic injury as “any severe injury incurred during participation in a school/college sponsored sport.” That definition was further subcategorized into fatal, nonfatal, and serious categories. Nonfatal injuries were defined as injuries that caused a severe permanent disability. Serious injuries were defined as a severe injury with no permanent physical disability (Boden et. al, 2003). Boden showed that 2 of the reported injuries were fatal and 15 were nonfatal, but left with a permanent disability. Of the injuries reported, 59% involved a severe head injury, 28% involved a cervical spine fracture or major cervical spine ligament injury, and 10% sustained a

spinal cord contusion. Of the 18 head injuries, 72% of those contained a skull fracture (Boden, et. al., 2003). Another study by Mueller, at the University of North Carolina – Chapel Hill, covering a 17 year period, showed that cheerleading caused over 50 percent of all catastrophic injuries in female athletes (Mueller, 2001).

#### *Concussion Data*

A recent study by Schulz, et. al.(2004), looked at concussion data in North Carolina high schools from 1996-1999, and cheerleading was included in the study (Shultz, et. al., 2004). This study focused on risk factors and incidence of concussions. The results showed that two-thirds of the cheerleading concussions resulted from females falling from pyramids. Cheerleading also stood out in the data of the study because it was the only sport which showed a higher injury ratio for practice than in games. The authors discussed the cause of this to be the fact that most cheerleading squads perform less risky stunts and maneuvers at games, than they would at practice. They also discussed being judged at competitions as a reason for higher risk during practices. Data in Jacobson's study reports no relationship between the amounts of time spent at practice and the rate of injury; however it does state that physician treatment did rise as practice time increased (Jacobson et. al, 2004).

#### *Legal Data*

Even though some universities may not feel they owe a duty to cover cheerleading due to the fact that the NCAA does not recognize it as a sport, a case involving a University of North Carolina – Chapel Hill cheerleader's injuries, showed that the university owed a duty to protect the victim because of her status as a cheerleader



(Kozlowski, 2001). The university did not give cheerleading medical coverage through athletic training and did not recognize it as a sport. There was also not a full time coach for the cheerleading squad. The cheerleader in the accident was warming up for a game and performing a stunt. The stunt became unstable and the cheerleader fell thirteen feet onto her shoulders. She suffered permanent brain damage and injury from the fall. This stunt was practiced and taught without proper supervision because a full time coach was not employed. The defense argued that the university gave her improper supervision and instruction due to the fact that she was a cheerleader; however, she received benefits from the university including a practice venue, uniforms, and transportation to away games, creating a special relationship with the university. The state commission court originally ruled in favor of the school, stating that the school did not owe a duty since it was not designated for coverage as a sport. The case was appealed and the decision was overturned by the appellate court. They overturned the decision because the cheerleader received special benefits from the university based on the fact she was a cheerleader. The appellate court ruled that these benefits constituted a special relationship between the university and the cheerleader. The university thus owed a duty to provide her with proper instruction and safety (Kozlowski, 2001). If schools continue to neglect cheerleading as far as providing adequate medical coverage and access to proper coaching and training, they could find themselves in the same position.

# **CHAPTER 3**

Methodology

## **METHODOLOGY**

The aim of this study was to compare and describe inferential and descriptive cheerleading injury data. Comparisons were made between males and females regarding average injury rate, injury frequency by injury site and injury type. Descriptions of conference participation in this study, practice duration and frequency, medical coverage levels, time loss, and emergency situations were made in this study.

### Subjects

Subjects for this study were Certified Athletic Trainers (ATC's) from each of the schools in the conferences that were selected. Conferences were selected by the size of the schools and overall participation of the schools in national cheerleading competitions.

The conferences used for this survey include:

1. Atlantic Coast Conference (ACC)
2. Big Ten
3. Big Twelve (Big XII)
4. Conference USA
5. Pacific Ten (Pac 10)
6. Southeastern Conference (SEC)

One ATC from each university was selected and asked to fill out the survey as instructed. If there was an ATC who was responsible for the medical coverage of cheerleading, they were selected. If there was no such individual, the Head Athletic Trainer was selected to participate. Subjects were solicited by e-mail and via the

telephone until a satisfactory return rate was reached. The injury data came from either Co-Ed or All Girl cheerleading squads. If a school had both, they were able use both squads. No dance or pom pon teams were used.

### Instrument

This survey was approved by the Oklahoma State University Internal Review Board (see Appendix 1). The survey was validated through a test and re-test procedure. The survey was given to a select group of individuals at a given date, and then repeated one week later.

This study was conducted by an on-line survey (see Appendix 2) that was developed specifically for this research. No instrument existed to extrapolate the data critical to this research. Similar questionnaires existed from Jacobson's (Jacobson et. al., 2004) studies and those were used as a basis for question formation. The study collected over a 21 month period. The 21 months covered the data on injuries which occurred from August 1<sup>st</sup>, 2002 to May 1st, 2004. Those dates were chosen to coincide with this researchers experience in cheerleading. Questions on the survey were open ended, multiple choice, and a combination of both. There were 16 total questions on the survey. Questions on the survey addressed: conference affiliation, level of medical coverage, squad size, practice duration and frequency, quality of coaching, injury tracking system, and injury data. Injury data questions were broken down into categories of injury frequency by body part and male and female categories. Injuries were also broken down into injury frequency by injury type. Time loss was also addressed with questions after

body part frequency. There were instructions on question #2 to cease filling out the survey if their athletic training department did not cover cheerleading.

## PROCEDURE

The link to the survey was sent to ATC's that were selected via e-mail. ATC's were selected on the basis of being in charge of the medical coverage of cheerleading at their particular school. If no person was found to be in charge of cheerleading, the Head Athletic Trainer was selected to participate in the study. These subjects' name and e-mail address were found on individual university web-sites along with the 2004-2005 NCAA Intercollegiate Directory. The e-mail that was sent to each participant contained a link to connect to the survey. The survey appeared on-line with statements of confidentiality and Oklahoma State University Internal Review Board (IRB) approval. Subjects were asked to complete the survey within three weeks of receiving the e-mail which contained the link to the survey. Due to an initial low return rate, the survey was resent to all of the participants 3 times. Phone calls were also made to individual schools that did not have good contact information. If any person volunteered to participate during a phone call, they were chosen as the participant from that school. Once an accepted return rate of 30 percent was reached, data was analyzed. Inferential data on average injury rate, injury site frequency, injury type frequency, was gathered, analyzed. Average number of injuries between males and females was compared by totaling the number of reported injuries for each gender and dividing that sum by the number of schools which reported injury data. Differences between male and female injury site frequency and injury type frequency were analyzed and compared using t-tests. An alpha level of  $p < .05$  was used to assess significance between means. Descriptive data concerning conference

participation, medical coverage levels, practice data, and time loss were averaged for the number of schools reporting data. Descriptions concerning these topics were made and reported. Comparisons between injury rate and medical coverage levels were made from the descriptive data.

# Chapter 4

## Results

## RESULTS

The study focused on six major conferences in NCAA Division I athletics. The total number of schools in those conferences is 73. Out of those 73 schools, 72 schools were sent the survey. Twenty-two schools returned the survey (N=22) for a return rate of 30%. The reported data was analyzed and reported. Most of the data collected was descriptive injury data. Due to the low number of respondents, a correlation between time loss due to injury and medical coverage levels could not be drawn.

### *Conference Participation*

Out of the six conferences surveyed, the Big Twelve Conference had the most respondents with nine, accounting for 40.91% of the results. Conference USA had the second most participants with five schools reporting (See Fig. 1, p. 27).

### *Medical Coverage Levels*

Concerning the levels of medical coverage of cheerleading, 13 out of the 22 schools (59%) responding to this survey, reported that cheerleading received either direct or indirect medical coverage from the athletic training or sports medicine department. Seven schools reported that they did not cover cheerleading and two schools did not answer the question. Out of the 13 schools that cover cheerleading, nine (69%) reported that they provide direct medical coverage to cheerleading as defined in this study, while the other four (31%) schools reported using indirect coverage as defined in this study. Seven of the nine (78%) schools reporting direct medical coverage stated that they



provided a High Level of direct medical coverage while the other 2 schools reported a Moderate Level of direct medical coverage (See Fig. 2, p. 28).

Fig. 1. Conference Participation

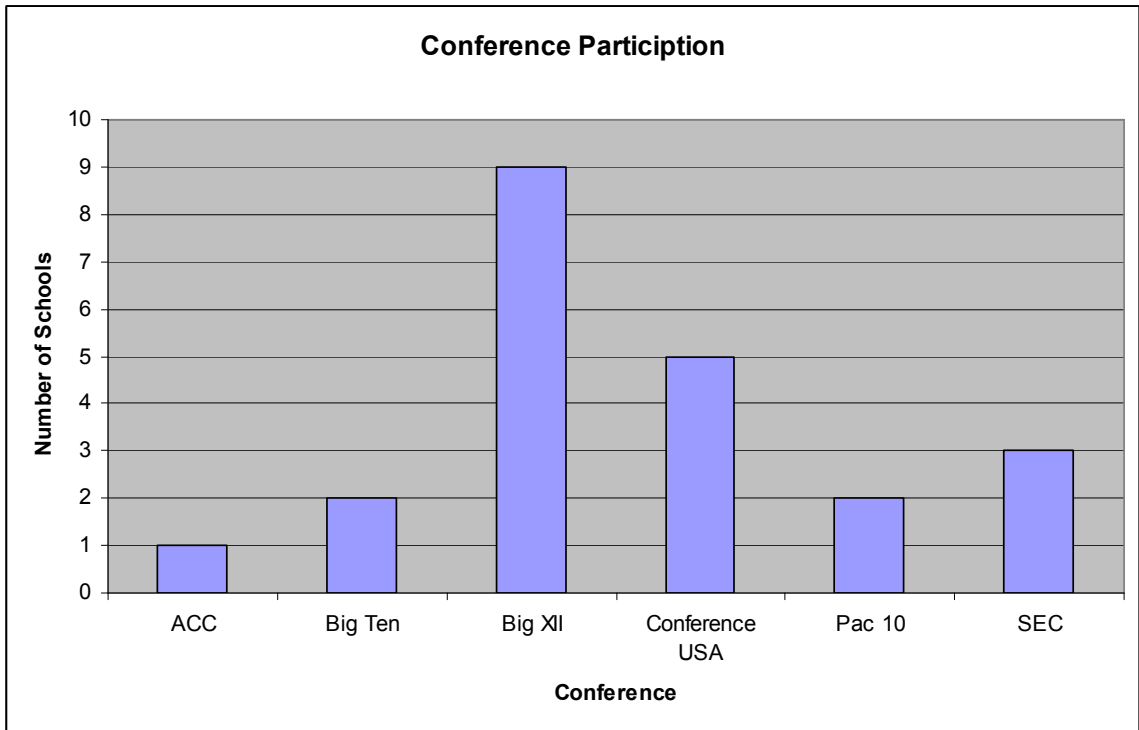
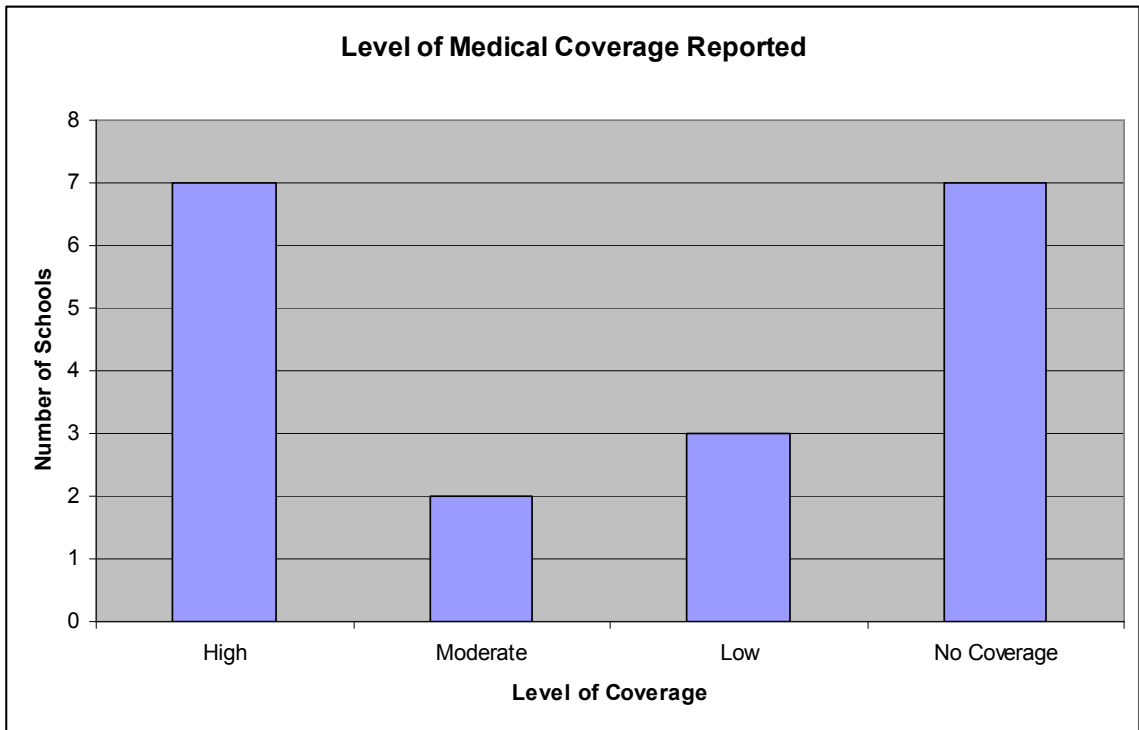


Fig. 2. Level of Medical Coverage Reported



The data also showed that the schools which reported a high level of medical coverage also had the highest average number of injuries with an average of 33.2 injuries per team over the time span of this study. Schools which reported moderate and low levels of coverage each averaged 15 injuries per team for the time span of this study (See Fig. 3, p. 30).

#### *Demographics*

With reference to demographics, a total of 169 males were counted on all 12 of the schools reporting for an average of 14 males per school. The total number of female athletes reported was 318 on 12 teams, for an average of 26.5 females per school. This number also includes All-Girl squads; therefore, the number of females should be larger than the males.

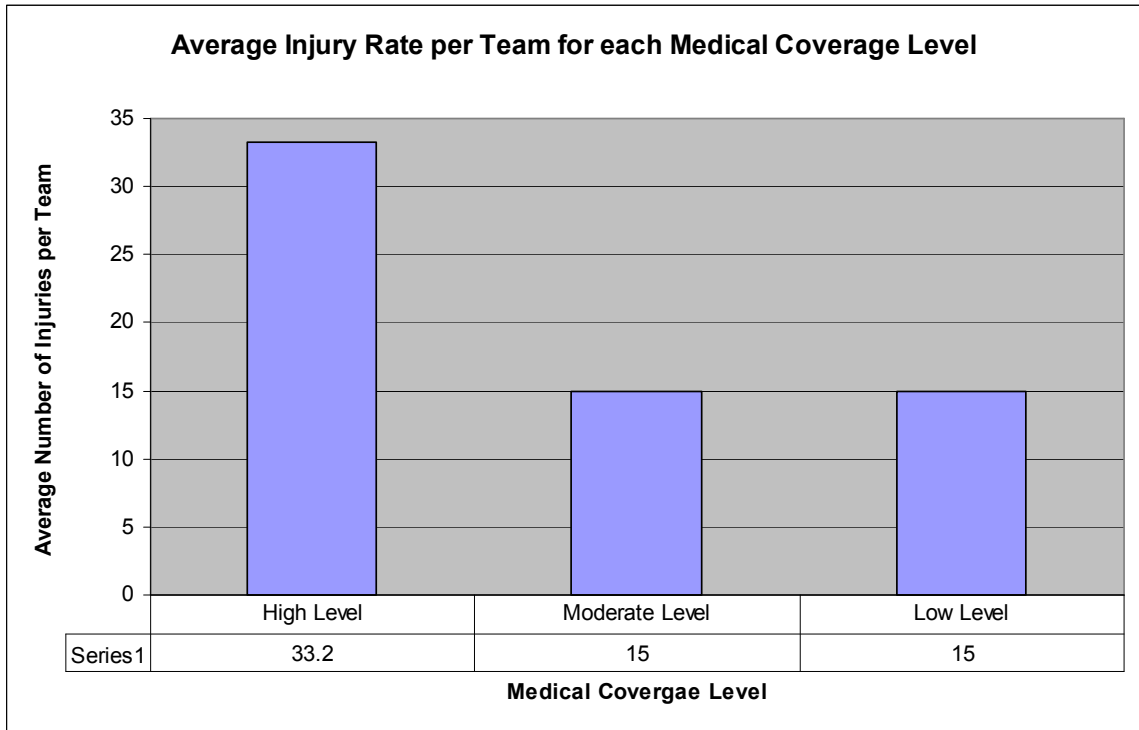
### *Practice Data*

Twelve schools responded to questions pertaining to practice data. These questions extrapolated data on practice frequency and duration. The average number of practices per week was reported as 4.41 practices per week. Eight out of 12 schools (67%) reported that the average practice lasted between one and two hours.

### *Injury Rate and Medical Coverage Levels*

The only time cheerleaders compete as a school is in a national competition sponsored by a company independent of the NCAA. These competitions require squads to perform choreographed routines involving a very high level of stunt skills, tumbling, pyramids, and basket tosses. These routines often lead to more practice time and an increase in injury risk as compared to performing only at games and practices. Out of the 12 schools who answered the question regarding participation in a national competition,

Fig. 3 Average Injury Rate per Team for each Medical Coverage Level



nine (75%) stated that their school participated in a national competition. When comparing these numbers to the levels of coverage, six out of the nine (67%) schools competing in a national competition received a High Level of medical coverage. One of the remaining three schools that compete at a national competition provided indirect medical coverage for cheerleading. The two other schools out of these three did not answer the question. These numbers mean that seven (78%) schools compete at a national cheerleading competition and receive either direct or indirect medical coverage from their schools athletic training or sports medicine department.

### *Injury Tracking*

The current study also gathered data on how injuries were being tracked and recorded at these schools. There were four categories of tracking including: manually (paper copy), electronically, manually and electronically, and not tracking injuries. Twelve schools responded to this question and the results were equal. Manual, electronic, manual and electronic, and no tracking all accounted for 25% each of the responses.

### *Hypotheses*

The study failed to reject the first hypothesis which stated that there would be no significant difference ( $p < .05$ ) between the average number of injuries of males and females. A T-Test was used to analyze significance (See Table 1, p. 32). Males had an average of 7.25 injuries while females had an average of 8.58 injuries. No significant difference was found.

**Table 1. T-Test for Average Injury Rate Between Males and Females**

	<b>Mean</b>	<b>Std. Dv.</b>	<b>N</b>	<b>Diff.</b>	<b>Std. Dv. Diff.</b>	<b>T</b>	<b>df</b>	<b>p</b>
<b>Males</b>	7.25	7.54	12					
<b>Females</b>	8.53	7.57	12	-1.33	6.15	-.75	11	.48

The second hypothesis for this study was rejected. This hypothesis stated that there would be no significant difference in average injury frequency by injury site between males and females. This was rejected due to females having a significantly ( $p < .05$ ) higher rate of injury to the head and neck (See Table 2, p. 33). This; however, was the only injury site that showed a significant difference. Each injury site was compared by male to female. Significant difference was tested with a t-test with an alpha value set at  $p < .05$ .

This study also failed to reject the third hypothesis. This hypothesis stated that there would be no significant difference ( $p < .05$ ) between the average injury frequency by injury type between males and females. No significant differences were found for any type of injury.

**Table 2. T-Tests for Male and Female Injury Site Comparison**

	Mean	St. Dv.	St. Dv. Diff	t	df	p
<b>M. Foot</b>	3	1.41				
<b>F. Foot</b>	5.4	1.82	1.52	-3.54	4	.02
<b>M. Knee</b>	1	.71				
<b>F. Knee</b>	1.4	1.67	1.34	-.67	4	.54
<b>M. Thigh</b>	.6	.89				
<b>F. Thigh</b>	1.2	1.79	1.95	-.69	4	.53
<b>M. Hip</b>	.6	.89				
<b>F. Hip</b>	1	1.22	.89	-1	4	.37
<b>M. LowB</b>	2.67	2.42				
<b>F. LowB</b>	2.33	2.94	1.63	.5	5	.64
<b>M. AB</b>	.6	.55				
<b>F. AB</b>	.6	1.34	1.22		4	1
<b>M. Chest</b>	0	0				
<b>F. Chest</b>	.4	.55	.55	-1.63	4	.18
<b>M. UpB</b>	.6	.89				
<b>F. UpB</b>	.2	.45	.89	1	4	.37
<b>M. Shld</b>	4	5.05				
<b>F. Shld</b>	1.8	1.30	.45	.89	4	.42
<b>M. Elb</b>	0	0				
<b>F. Elb</b>	.2	.45	.45	-1	4	.37
<b>M. Wrist</b>	1.2	1.64				
<b>F. Wrist</b>	.8	.84	1.14	.78	4	.48
<b>M. Head</b>	.83	1.60				
<b>F. Head</b>	2.83	2.40	1.09	-4.47	5	.0065

*Male and Female Injury Comparison*

The first hypothesis was not rejected as there was no significant difference found between males and females for their respective average number of injuries over the time span of this study. Males had a total of 87 injuries reported by seven schools over the time span of this study for an average of 7.25 injuries. Females had a total of 103 injuries reported by seven schools over the time span of this study for an average of 8.58 injuries (see Table 1, p.32). This was not considered significant ( $p < .05$ ).

### *Injury Site Frequency Data*

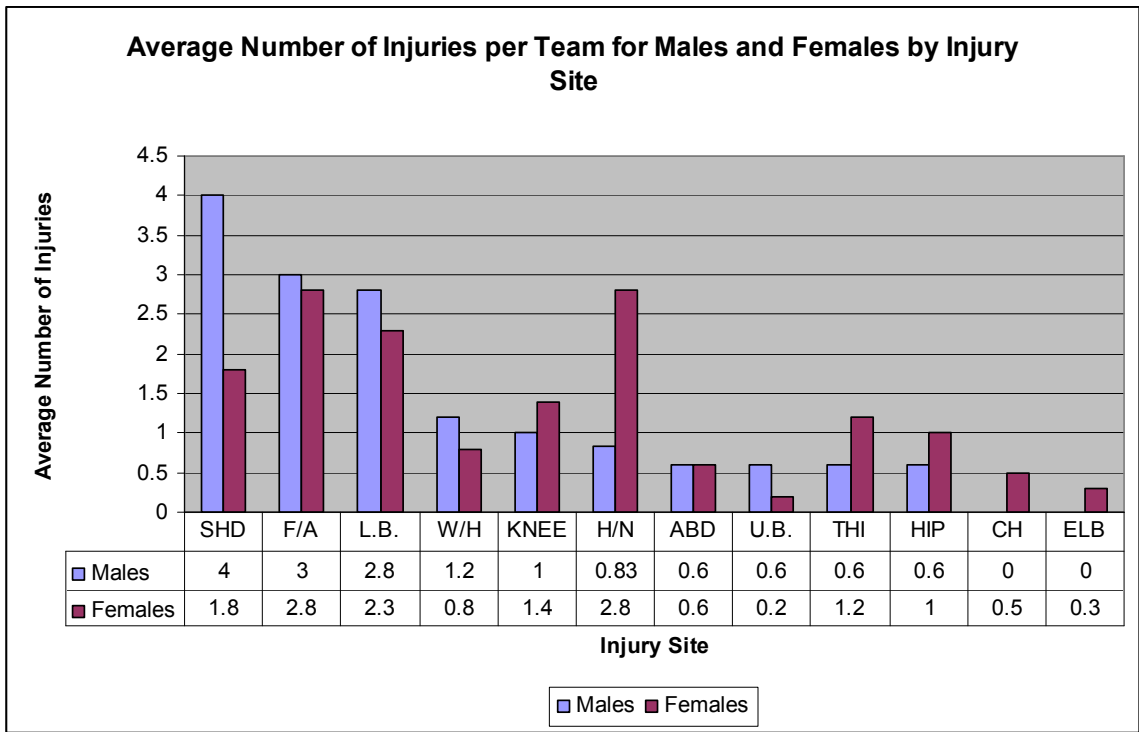
The next examination of the injury data was injury frequency by injury site. The body was separated anatomically into 12 different parts for this study. Injuries by site were divided into male and female categories. For the males, the shoulder ranked as the most often injured body part with an average of 4 injuries per team (See Fig 4, p. 35). The foot and ankle was second for males with an average of 3 injuries per team. The lower back was third with an average of 2.8 injuries per team, followed by the wrist and hand with an average of 1.2 injuries per team.

The data for female injuries differed from the data of the males (See Fig. 4, p. 35). The foot and ankle had the highest frequency of injury for females with an average of 4.9 injuries per team. The head and neck was second with an average of 2.8 injuries per team. Third was the lower back with an average of 2.3 injuries per team followed by the shoulder with an average of 1.8 injuries per team.

After analysis of the injury site frequency data, males and females only had one significant ( $p < .05$ ) difference regarding injury to a body part. Females had a significantly higher number of head and neck injuries than did males. Females had an average of 2.8 head and neck injuries per team, while males had an average of 0.83 injuries per team. The t-test for these injuries indicated a p value of .007. Differences were considered significant at  $p < .05$  (See Table 2, p. 33). There were no other body parts that yielded a significant difference between males and females.



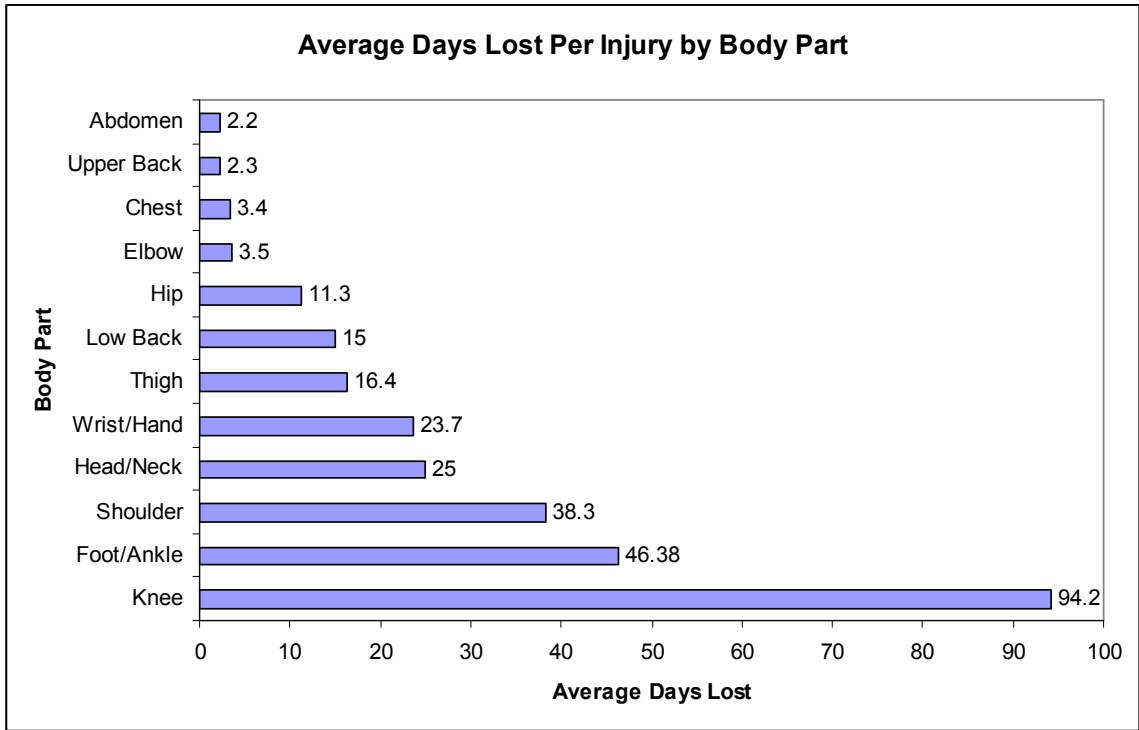
Fig. 4 Average Number of Injuries per Team for Males and Females by Injury Site



### *Time Loss Data*

Where the injury data reported for the current study correlates to the research already performed is when one looks at the total number of days lost per injury. When examining Hutchinson's (Hutchinson, 1997) data, he shows that cheerleading has one of the highest rates of days lost per injury, but an overall low number of injuries as compared to other sports (Hutchinson, 1997). The present study supports Hutchinson's data. In the current study, time lost due to injury was not separated into male and female categories. Time loss was reported in total days per body part in this study. When analyzing the reported data for the current study (See Fig. 5, p. 37), the knee led all injuries with an average of 94.2 days lost per injury, but was not in either genders top four most common injured body parts. In fact, the knee was the fifth most common injured body part for both males and females. The male average knee injury rate was 1 injury per team while the female average was 1.4 injuries per team. Second place, behind the knee, was the foot and ankle with an average of 46.38 days lost per injury. The third highest days lost per injury was the shoulder with an average of 38.3 days lost per injury. Behind the shoulder was the head and neck with an average of 25 days lost per injury.

Fig. 5. Average Days Lost per Injury by Body Part



*Injury Type Frequency Data*

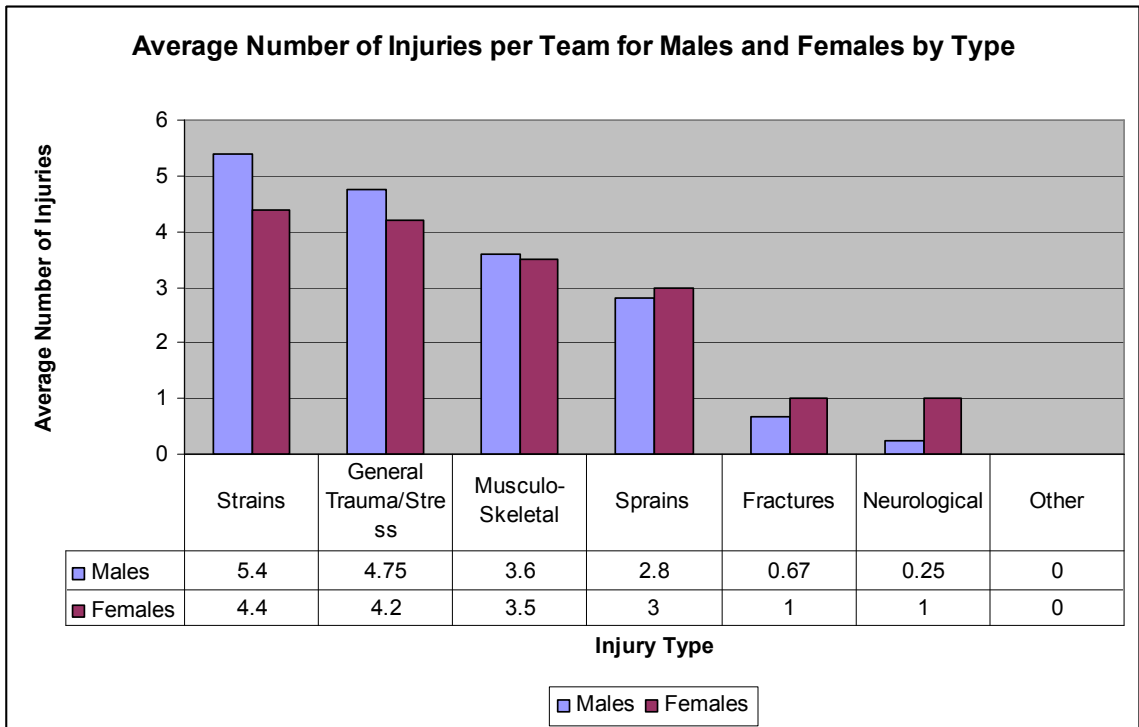
After the injury data was analyzed by body part, the data was broken down and analyzed by the type of injuries reported. Injuries were divided into seven different categories. The data was divided into male and female categories. For the males (See Fig. 6, p. 38), the most common type of injury was a muscle strain with an average of 5.4 injuries per team. Second for males was general trauma or general stress with an average of 4.75 injuries per team. In third place for males were musculo-skeletal injuries with an average of 3.6 injuries per team followed by ligament sprains with an average of 2.8 injuries per team. For the females (See Fig. 6, p. 38), the most common type of injuries were muscle strains followed closely by ligament sprains. Muscle strains in females had an average of 4.4 injuries per team while ligament sprains had an average of 4.2 injuries per team. Those two were followed, for females, by general trauma or general stress and

musculo-skeletal injuries in that order. General trauma or general stress averaged 3.5 injuries per team for females while musculo-skeletal injuries averaged 3.0 injuries per team for females.

*Medical Emergencies*

Injuries were further broken down by whether the injury was classified as a medical emergency and required immediate transportation to a medical facility such as a hospital. A total of 19 emergencies were reported by 8 schools. Most of the injuries were described as dealing with the head, neck, or spine in some way. The range of emergencies per school was one to six with an average of 2.7 emergencies per team.

Fig. 6. Average Number of Injuries per Team for Males and Females by Type



# **Chapter 5**

## DISCUSSION

## **DISCUSSION & CONCLUSIONS**

The purpose of this study was to compare and describe inferential and descriptive injury data reported by athletic trainers, concerning conference participation in this study, practice data, average number of injuries for males and females, injury site frequency, injury type frequency, and time loss per injury site. It was also the purpose of this study to describe levels of medical coverage that were provided to each institution along with other descriptive data. Not enough information was received on medical coverage levels to gain any significant conclusions.

The main problem this study dealt with was to gain a general database on cheerleading injuries among NCAA Division I schools. This study attempted to look at differences between male and female injury rates by injury site and total days lost due to injury. It also looks at differences between males and females and injury type frequency. This study also examined related areas, such as time loss, level of medical coverage by each school, practice frequency and duration, squad size, and medical emergencies.

The first hypothesis for this study stated that there would be no significant difference in the average injury rate between males and females for each team. This study failed to reject this hypothesis as males had an average injury rate of 12.4 injuries per team, while females averaged 14.7 injuries per team (see Table 1, p. 32).

The second hypothesis stated that there would be no difference shown between males and females in average frequency of injuries at each stated injury site. The study

rejected this hypothesis due to the head and neck, where females had a significantly higher injury rate ( $p < .05$ ) (See Table 2, p. 33).

The third hypothesis stated that there would be no difference in injury type frequency per team between males and females. The study failed to reject this hypothesis due to no significant differences being found.

The results of this survey provided an obvious conclusion. That conclusion is that there is no consistency in how these participating universities treat cheerleading according to sports medicine coverage. Only 7 of the 22 schools which participated could provide injury data. However, when the data is interpreted, cheerleading injuries provide a very high number of days lost per injury.

When analyzing injuries by gender, there were some differences in the frequency of the average number of injuries per body part and per injury type. The shoulder was shown to be the most common site of injury in males. Qualitative analysis of cheerleading as a sport shows that most of the male's activity and skills involve overhead movement with some type of toss. Through this researcher's personal experience, these tosses are usually of females weighing between 80 and 130 lbs. This repetitive and highly intense activity can lead to repeated overuse injuries of the shoulder, especially if the tossing technique is poor. Overhead movements, especially with weight in hand, places stress on the shoulder girdle that the muscles surrounding the girdle are not normally strong enough for. The other action which predisposes the male cheerleader to shoulder injuries is the catching of the girl who is the flier. This motion causes a deceleration of the rotator cuff muscles and all of the supporting muscles of the shoulder girdle, placing a great deal of stress on a joint that is not designed for high stresses.

Anytime a body part tries to slow itself down, the muscle that perform a concentric contraction in the opposite motion, perform an eccentric contraction to slow down the body part. Eccentric contractions lengthen the muscle instead of shortening it, as in a concentric contraction. The muscles performing this eccentric contraction with the catching motion are not as strong as the muscles they oppose. This predisposes the shoulder to injury. After the shoulder, for males, the next most common site of injury according to this study is the ankle. In this researcher's experience, the ankle has not been a highly injured body part for males, but it could be hypothesized that the high number of injuries is due to tumbling. Tumbling is a very violent and traumatic action to the ankles as it is the main push off and landing site for tumbling. Collegiate cheerleading does not use spring floors for competition. This means that all tumbling is taking place on a foam mat on top of a gym or concrete floor most likely. Tumbling in this manner places a great deal of stress on the ankle joint and is very slow to recover. Any time ligaments are damaged, they need time to heal. Any stress to the ligament in a painful manner, damages the healing process. Tumbling causes the ankle mortise to move, which stresses the ligaments. This explains why tumbling would not allow ankles to heal quickly. The third most common site of injury in males was the lower back, which can be directly related to stunting. When males stunt with a female partner, their arms are supporting the female directly overhead while their backs are in a slightly extended position. This position creates a great deal of emphasis on the core muscles for lumbar spine stability. If any weaknesses exist in a male's core, stunting will exacerbate these weaknesses and result in injury. The other reason as to why low back injuries happen more often than some others is poor technique for a repetitive motion.



Cheerleaders stunt most frequently; therefore, if technique is poor, the low back and shoulders are likely to be the first body parts to suffer injury.

When examining the female injuries, the data indicates that the most common site of injury is the foot and ankle. This researcher believes that this concurs with the argument for why ankles are injured in the males. Females who tumble, place a great deal of stress and force to the ankle and foot. Possibly, the difference between the males and females with regards to foot and ankle injuries is stunting. The foot and ankle are always the first body parts to make contact with the ground and last to leave the ground when a girl stunts with a partner. The males do not have this risk because they are not being thrown in the air for stunting. Any type of dropped stunt or hard landing puts the foot and ankle at increased risk for injury. Combine that fact with all of the tumbling that females do, and one has a very reasonable explanation as to why the foot and ankle is the most common site of injury in females. After the foot and ankle, the head and neck is the second most common site of injury. These injuries can be directly related to falling. Cheerleaders who fly in the air are at risk for a head and neck injury every time they go in the air. Any normal overhead co-ed stunt involves the females feet being anywhere between 6 and 8 feet high in the air. This means that a typical cheerleader at the collegiate level could have their head approximately between 11 and 13 feet in the air several times per practice, game, or competition. Any type of fall from that height could be potentially catastrophic or fatal. Unfortunately for the fliers, participating in pyramids and basket tosses involves greater heights and therefore a greater risk than stunting.

Pyramids are prohibited from being built more than two and a half people high at this level of cheerleading. This still places the top cheerleader at a height of about 15

feet. The other danger with pyramid building is that multiple people are involved so more people can fall at once. It takes multiple people to spot a pyramid in a safe manner, and sometimes there are problems spotting because multiple people are falling while another group of people is moving to catch each person. In order to protect fliers and spotter, the NCA safety guidelines prohibit any person from front flipping off a pyramid; however UCA does allow this in competition. Rules and safety committees have recognized the dangers involved with pyramiding, but as with any sport, they also maintain that one can not change the essence of the sport. NCA has set several rules to limit pyramiding such as limit of height and spotter requirements (Safety guide, 2004) Building pyramids is a foundation of cheerleading and most committees and organizations in cheerleading are willing to accept the inherent risks associated with pyramid building.

Basket tosses can create an even greater risk of head and neck injury than pyramids and stunting. The heights reached during a co-ed basket toss can be very dangerous. In some basket tosses, fliers reach heights greater than 30 feet in the air. In speaking to one cheerleader who cheered for an All-Star level competition squad this past year, he stated that they threw the girl higher than the hanging row of lights that was lighting the stage. It is also not just the heights that create risk of injury. These females are performing acrobatic skills while at these heights. If anything goes wrong in the air and they fall in the wrong position, it is very difficult to avoid injury not only to the females, but the males catching her as well. Highly skilled females can perform up to four tricks while in the air during a basket toss. During practices at Oklahoma State University, it was reported that two different cheerleaders, one male and one female,

were placed on a spine board and taken to an emergency medical facility by EMS due to basket toss mishaps. In both cases, the female landed the basket toss wrong. As with pyramiding, rules have changed over the years to limit the risk of injury. Basket tosses are no longer allowed to “travel.” This means that a flier may not be caught by a completely different tossing group in a different location. The girl must be thrown straight up and land in the same group that threw her (Safety guide, 2004).

Also for the upcoming year, a few coaches and participants who work for NCA and UCA, state that there have been rumors and speculation that NCA and UCA will limit girls in basket tosses to performing only two specific skills in the air. As was stated earlier, some girls have performed up to four. According to the speculation, the insurance companies that cover many of these schools are complaining that too many cheerleaders are getting injured. These insurance companies have supposedly stated that they will not cover cheerleading injuries unless rule changes were made in order to reduce injuries. Rumor also has it, that tumbling passes will also be limited as to what passes are allowed. At this time, no official announcements have been made as to the validity of these rumors, but this researcher has spoken to several coaches in the business, who state that these changes are just a matter of time.

All of these risks of head and neck injuries alone should validate athletic training departments to cover cheerleading. One problem is, however, that the risk is so high that it could prevent people from taking on that responsibility. Most of the emergencies reported in the current study were related to injuries of the head, neck, or spine. This is consistent with the head and neck injury data of the current study and all of the literature

Once athletic trainers encounter an injury to a member of their team, time loss becomes an immediate concern. Cheerleading has been shown in other studies to have a very high rate of time loss per injury. The current study further supports previous findings, in that eight injury sites averaged over ten days lost per injury, and the knee averaging 94.2 days lost per injury. As was stated in the results, the knee was the fifth most common site of injury for both males and females. This would indicate that most knee injuries are more severe or that there have been serious injuries, such as ACL tears, that require an athlete to be out six months to one year. Numbers like this can drive a statistic such as days lost per injury to a very high level. It also demonstrates even more, that cheerleaders are at a high risk for severe injury. After the knee, the foot and ankle show the second highest rate of days lost per injury with a rate of 46.38 days. Likely, ankle injuries are very slow to return in cheerleading due to the tumbling aspect of the sport. The forces and movement placed on the ankle prohibit the ligaments in the ankle to heal properly if tumbling is started too early. After the foot and ankle, the shoulder is third in days lost followed by the head and neck with 38.3 and 25.0 days lost per injury respectively. This study shows that 8 of the body parts show days lost per injury over 10 days (see Fig. 5, p. 37). In other sports, 10 days lost is a very significant amount of time. That could mean up to 3 games missed in basketball or 1 game and a week of practice in football.

The data from this study has shown that cheerleaders do get injured and in some instances, in a very serious manner, yet some universities continue to ignore cheerleaders as athletes and will not acknowledge cheerleading as a sport. When this researcher spoke to one athletic trainer over the phone, he was asked if they covered cheerleading, he said,

“No, we don’t have anything to do with them, thank God,” (Personal Conversation, 2004). This stance may need to be reexamined when one looks at the injury data, especially head and neck injuries. According to the literature cited in this study (Cantu, 1999) cheerleading has led all female sports in catastrophic injury. This is usually due to females falling from heights up to and possibly over 15 feet. Gymnastics, diving, and equestrian are the only sports that could conceivably place an athlete at a similar risk for catastrophic injury due to falling from great heights. Gymnasts could fall from any apparatus such as the high bar or uneven bars, divers could land in the water wrong or hit their head on the board or platform, and equestrian riders could be thrown from their horse. However, the NCAA recognizes all of those sports as legitimate NCAA sports or emerging sports in the case of equestrian.

Emerging sports are sports that the NCAA will recognize for female athletes only in order to comply with Title IX regulations and financial aid awards. Other sports listed under the emerging sports category include: archery, badminton, bowling, rugby, squash, synchronized swimming, and team handball. All of these sports qualify as emerging sports because they fit under the definition of a sport under NCAA guidelines. The definition is as follows, “An institutional activity involving physical exertion with the purpose of competition versus other teams or individuals within a collegiate competition structure. Furthermore, a sport includes regularly scheduled team, and/or head-to-head competition (at least five) within a defined competitive season(s); and standardized rules with rating/scoring systems ratified by official regulatory agencies and governing bodies ([www.ncaa.org](http://www.ncaa.org)).”

If one looks at the list of emerging sports and then the definition of sport as stated by the NCAA, different opinions and emotions can be formed. Cheerleading does not meet all of the requirements as stated in the definition of sport, but it does come quite close. There is definitely physical exertion as anyone can see and is backed up injury data. There is competition, but currently there is no more than one per year and there is no defined season. Changing the competition format would take a lot of work due to contracts, sport seasons, and money, but it could be done if universities were serious about adding cheerleading as a NCAA sport. In regards to the rules and scoring system, there are two different sets of rules and regulations as they relate to UCA and NCA competition, which are the two major companies involved with Division I universities. The owners of these companies actually merged in 2004 but kept the two competitions and rules separate. Changing the way cheerleading is governed would take a major effort on the part of the universities and NCAA in order to break away from the contracts and money involved in cheerleading competitions, but the activity could greatly benefit in having a consistent governing body and competitions in order to gain recognition as an emerging sport.

One other way for cheerleading to validate itself against the emerging sport is participation. Almost every school in the country at any level has a cheerleading squad. Of all of the emerging sports, at Division I, II, and III, the highest number of schools sponsoring a sport is 27. That sport is squash. Equestrian is second with 17. Team Handball is also listed as an emerging sport with zero schools fielding a team. If the NCAA and universities would look strictly at schools participating in a sport, cheerleading makes more sense to add as an emerging sport than any of the other

emerging sports. From this point of view, cheerleading would also make much more sense in terms of participation of female athletes and the creation of new sports and removal of existing sports due to gender equity. One problem that may arise is that both males and females participate in cheerleading. However, several schools do field “All-Girl” squads and they compete as All-Girl squads.

Regarding female participation in cheerleading, it is clear that they do account for the vast majority of the catastrophic injuries which occur in cheerleading. As was shown in the results of this study, females had a significantly higher rate of injury to the head and neck. However, the data for every other body part surveyed was found to be similar. As Hutchinson stated in his work (Hutchinson, 1997), cheerleading can lead to a great number of days lost because the entire body is used in almost every aspect of the sport. This seemed to hold true with the data from this survey. One would also hypothesize that the great number of days lost is due to the severity of injury. Head and neck injuries can and should prevent athletes from any participation until they have been evaluated and cleared for participation by a physician or allied health professional, such as a certified athletic trainer.

Since cheerleading does present a definite risk of catastrophic injury as stated in the literature, in this data, and through my own personal experience, it is critical that trained medical personnel should be readily available for cheerleaders at all times. The schools that responded to this survey showed that only 7 out of 22 schools provided a high level of medical coverage, which was defined in Chapter 1. These schools are taking the appropriate actions to protect themselves against any legal matters and are treating the cheerleading squads at their respective universities like all other athletes

There were some limitations for the current study. The first limitation was that a low response rate was achieved. Combined with the response rate, some responders did not have records for cheerleading, which in turn, limited the ability to do statistical analysis. The low response rate could have been due to any number of factors. Generally speaking, some people may not have taken the time to read what the study was about, and simply discarded the e-mail containing the link to the survey. One other possible explanation could have been that the schools which did not or do not cover cheerleading, simply did not feel that had the data available to answer the survey, even though they could have answered the first two questions.

Another limitation was only using athletic trainers for this study. Since schools may not keep injury records on their cheerleaders, it may have been plausible to survey the cheerleaders themselves to gain some basic injury data.

### Recommendations

The first recommendation this researcher would make, would be to repeat this study with a larger number of schools. All colleges and universities can and should be studied in regards to cheerleading injuries. In making changes to this survey, it would be interesting and possibly beneficial to separate the days lost per injury category into male and female categories to go along with the male and female categories in the other aspects of the survey.

The second recommendation is that a central tracking system for cheerleading injuries needs to be implemented. The committees and people making safety regulations need to have a database to draw information from every year. The NCAA tracking



system does not currently track cheerleading injuries; however I feel it would do a great justice to everyone involved to track cheerleading injuries. This could also force more schools to place ATC's with cheerleading to help prevent injury and care properly for the injuries that do occur. When consistent yearly data is collected, appropriate safety guidelines can be implemented to help increase the safety of the sport. Another way a tracking system and ATC placement could help is the prevention of excessive insurance claims. Medical personnel, such as ATC's could handle many injuries and conditions within their respective athletic departments without having to file an insurance claim. As of now, the only data the insurance companies can be looking at is their claims filed list. A claims list should not be considered a good source of information because there are several unknown factors going into their claim list. Some cheerleaders without the proper access to athletic trainers, may be filing claims from emergency room and doctor visits that could easily be evaluated and treated by athletic trainers. Therefore, it could be hypothesized that access to athletic trainers could lower the number of insurance claims made by cheerleaders.

The third recommendation is that the NCAA gives serious thought to revising its emerging sport definition so cheerleading can be included as an emerging sport. In this study alone, averages of 26.5 females were involved at each school. There were a total of 318 female participants reported in this survey from only 12 schools. Males averaged 14 athletes per team. This is a difference of over 12 female athletes per team that could help schools comply with Title IX guidelines for gender ratio. Also, the number of schools already fielding some type of cheerleading team outranks any number of schools participating in any of the listed emerging sports by a wide margin. The biggest aspect

holding cheerleading back is the competition aspect of the NCAA definition for an emerging sport. Cheerleading competitions could be increased throughout the year, but this has not yet happened due to all sorts of different companies running different competitions.

The recommendation is that athletic training departments, sports medicine departments, and athletic departments recognize cheerleaders as the athletes that they show themselves to be and treat them accordingly. Cheerleading needs to be provided appropriate medical coverage for the risks involved with the sport. Not only does it help the cheerleading teams, but it gives athletic trainers great exposure and experience in a unique setting and in dealing with serious injuries.

Cheerleading is not what it used to be. It has evolved into a highly athletic and competitive sport. The athletes involved in cheerleading at the collegiate level have trained for years to perfect highly technical skills that can not be duplicated by an average person. Cheerleading has an inherent risk of serious injury and it is time that the athletic world recognizes this.

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APPENDIX I

Oklahoma State University  
Institutional Review Board

Protocol Expires: 7/512005

Date: Tuesday, July 06, 2004

IRB Application No ED04116

Proposal Title: Injury Rates and Time Loss In NCAA Division I Cheerleading Compared to  
the Level of Medical Coverage

Principal  
Investigator(s):

Jeffrey M. Mattis  
400 S. Squires #02  
Stillwater, OK 74074

Bert Jacobson  
204 Willard  
Stillwater, OK 74078

Reviewed and  
Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

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Dear PI

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date Indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone: 405-744-5700, [coison6okstate.edu](mailto:coison6okstate.edu)).

Sincerely,

Lit -c. O-l (~  
Carol Olson, Chair  
Institutional Review Board

## APPENDIX II

*By volunteering to complete this questionnaire I am voluntarily participating in this research conducted by Jeff Mattis, ATC/L and Dr. Bert Jacobson of Oklahoma State University. Confidentiality will be maintained in that no individual or institution will be identified by name in any of the research materials generated from this survey. All data will be reported in aggregate. You may stop at any time without penalty.*

Jeff Mattis, ATC/L	Carol Olsen	Dr. Bert Jacobson
Primary Investigator	IRB Chairperson	Professor/Advisor
(405)-377-3218	(405)-744-5700	(405)-744-6632

# Cheerleading Injury Questionnaire

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NOTE: All questions are to be answered using data between 08-01-02 and 05-01-04.

Please mark all questions. For the purpose of the study, the following terms are defined as the following:

- **Injury:** Any condition that is treated by a Certified Athletic Trainer (ATC) or allied Health Care Professional, which results in limited or altered practice or loss of time.
- **Direct Medical Coverage:** An ATC and/or Athletic Training Student (ATS) is present at cheerleading practice(s) or game(s), in which cheerleaders are cheering, and providing athletic training services along with full access to team physicians and athletic training facilities.
- **Indirect Medical Coverage:** There is no ATC or ATS present at cheerleading practice(s) or game(s), in which cheerleaders are cheering. However, cheerleading does have access to athletic training services, team physicians, and athletic training facilities if needed.

1: Which conference are you a member of? Please check one.

- ACC     Conference USA  
 Big 10     Pac 10  
 Big XII     SEC

2: Does your cheerleading squad receive either Direct or Indirect Medical Coverage as defined above? Please check one.

- Yes
- No

*If yes, continue the questionnaire. If you answered NO and have no medical records or injury data for cheerleading, you may cease completing the questionnaire and return this portion. If medical records and/or injury data for cheerleading are available, please continue with the questionnaire.*

3: What type of medical coverage does your cheerleading squad receive? Please check one.

- Direct Medical Coverage
- Indirect Coverage

4: What level of medical coverage does your university provide to cheerleading? Please check one.

- High Level: *Providing direct medical coverage to cheerleading in which an ATC is present and providing athletic training services at no less than some cheerleading practices and some games in which cheerleaders are participating.*
- Moderate Level: *Providing direct medical coverage to cheerleading in which an ATS is present and providing athletic training services at no less than some cheerleading practices and some games in which cheerleaders are participating.*
- Low: *Providing indirect medical coverage to cheerleading.*

5: How many cheerleaders are on the current squad? (include co-ed and all female squads if applicable. Also include both Varsity and Junior Varsity squads)

Total number of males.  Total number of females.

6: During the school year, how many days does the cheerleading squad practice per week on average? Please check one.

- 1
- 2
- 3
- 4
- 5
- more than 5
- unknown

7: During the school year, how many hours does each practice last on average? Please check one.

- 0-1    1-2    2-3  
 3-4    more than 4    unknown

8: Does your cheerleading squad compete at a national competition? Please check one.

- Yes  
 No

9: What sports does your cheerleading squad cheer for (Varsity or Junior Varsity)? Check all that apply.

- Football    M Volleyball    W Volleyball  
 M Basketball    W Basketball    Wrestling  
 LaCrosse    M Soccer    W Soccer

9a. List any other sports that your cheerleading squads cheer for that were not listed above.

10. How are injuries tracked for cheerleading? Please check one.

- Manually  
 Electronically  
 Manually and Electronically  
 Injuries are not tracked

10a. List any other method of how injuries are tracked.



*\*Reminder: Answer the following questions using data occurring between 08-01-02 and 05-01-04.*

*\*Injury is defined for this study as any condition that is treated by a Certified Athletic Trainer (ATC) or allied Health Care Professional, which results in limited or altered participation or loss of time.*

**11:** List the total number of injuries occurring for the listed body parts, and time loss.

NOTE: Please list injury numbers according to males (M) and females (F) and time loss with males and females combined.

<b>a.</b> Foot/Ankle/Lower Leg Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>b.</b> Knee Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>c.</b> Thigh Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>d.</b> Hip/Pelvis Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>e.</b> Low Back Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>f.</b> Abdomen Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>g.</b> Chest Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>h.</b> Upper Back Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>i.</b> Shoulder Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>j.</b> Elbow Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>k.</b> Wrist/Hand Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>
<b>l.</b> Head/Neck Injuries	M	<input type="text"/>	F	<input type="text"/>	Total Days Lost	<input type="text"/>

**12:** What is the total number of participants injured?

**13:** Have there been any injuries that were considered emergencies and required immediate transportation to a medical facility? Please check one.

Yes

No

Unknown

**14a.** If Yes to the previous question, how many?

**14b.** Please list the injuries that were considered emergencies.

*\*Reminder: Answer the following questions using data occurring between 08-01-02 and 05-01-04.*

**15:** List the total number of injuries that occurred by type for males and females.

*NOTE: Musculo-Skeletal includes impingement injuries, tendonitis, etc.*

**a. Sprains** M  F

**b. Strains** M  F

**c. Fractures** M  F

**d. Neurological** M  F

**e. Musculo-Skeletal** M  F

**f. General Trauma/Stress** M  F

**g. Other Injuries**

M

F

VITA

Jeffrey Michael Mattis

Candidate for the Degree of

Master of Science

Thesis: INJURY RATES, FREQUENCY, AND TIME LOSS IN NCAA DIVISION I  
CHEERLEADING

Major Field: Health and Human Performance

Biographical:

Personal Data: Born January 7<sup>th</sup>, 1980 in Clinton, IA. Graduated from Northeast Community High School in 1998 and proceeded to attend the University of Northern Iowa. After graduation I became a Certified Athletic Trainer. I accepted a Graduate Assistantship at Oklahoma State University in 2002 and began working and pursuing a Master's Degree.

Education: Bachelor of Arts: Athletic Training, University of Northern Iowa, 2002

Experience: 2 years of undergraduate athletic training experience at the University of Northern Iowa.

3 year of experience as a Certified Athletic Trainer at Oklahoma State University

Professional Memberships: National Athletic Trainer's Association

Name: Jeffrey Michael Mattis

Date of Degree: December 2005

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: INJURY RATES, FREQUENCY AND TIME LOSS IN NCAA  
DIVISION I CHEERLEADING

Pages in Study: 60

Candidate for Master of Science

Major Field: Health and Human Performance

Scope and Method of Study: This study looked at the injury rates and time loss for collegiate cheerleaders specifically. This study examined injury rates by injury site and type and compared differences between males and females. This study also examined average time loss per injury site. This data was reported by an on-line questionnaire which was developed and validated by this researcher specifically for this study.

Findings and Conclusions: It was found that the only significant difference between male and female rates was at the head and neck. Females had a significantly higher injury rate at the head and neck. It was found that the shoulder was the most frequently injured body part in males and the ankle was the most frequently injured body part in females. Injuries to the knee caused the most time loss. Muscle strains were found to be the most common type of injury in both males and females

ADVISOR'S APPROVAL: Dr. Bert Jacobson \_\_\_\_\_

