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INJURY RATES, SEVERITY OF INJURY, AND ACCESS TO SPECIALTY HEALTH CARE OF AMERICAN
INDIAN HIGH SCHOOL ATHLETES IN MONTANA

By

Drew A. Babcock

Bachelors of Science, University of Montana, Missoula, MT, 2007

Thesis

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Approved by:

Perry Brown, Associate Provost for Graduate Education

Graduate School

Dr. Valerie Rich, Chair

Health and Human Performance

Dr. Blakely Brown

Health and Human Performance

Tammy Elser

Curriculum and Instruction

Babcock, Drew, MS, July 2009

Major

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Injury Rates, Severity of Injury, and Access to Specialty Health Care of American Indian High School Athletes In Montana

Chairperson: Dr. Valerie Rich

Introduction: Athletics are an integral part of American Indian (AI) life and culture. However, with participation there is a risk of receiving an injury. Sustaining an injury can be devastating to AI athletes that live on or near a reservation due to the rural location and disparities in health care. **Objective:** To determine Montana's AI high school athletes' injury rates, severity of injury, the current level of medical supervision, and type of health care they seek/receive. **Methods:** The procedure for collecting data consisted of sending out surveys to head coaches at 11 high schools that met the inclusion criteria. **Analysis:** Numerical data was analyzed using Microsoft Excel 2007. **Discussion:** Injury rates were fairly low, with most injuries being minor. Medical supervision at practices/competitions was inadequate and the majority of injured athletes sought medical care from Indian Health Service. Access to specialty care was also found to be inadequate.

Keywords: American Indian, Indian Health Service (IHS), specialty medical care, sports related injury

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Chapter 1

1.1

Introduction

Games, sports, and athletics have been an integral part of American Indian (AI) life and culture dating back hundreds of years. For American Indians participation in sports goes beyond playing for sheer pleasure; it was an integral aspect of the culture of all tribes and was a means by which individual and tribal identities were formed. It also served as a means to achieve a sense of pride, self-esteem, and respect (King, 2005). Sports were played and supported by all. Even members of the tribes that were not participating believed it was part of their duty to prepare and cheer for the participants and in doing so, played a part in the success or failure of those who participated. Oxendine (1988) explains the importance placed on athletics and the roles played by all in the tribe by stating, "in addition to the pure joy involved in participation, sport was used as a means by which the Indians communicated with a higher spirit, seeking on their individual community welfare. Such communication was related to healing, climate, celebration, seeking success in upcoming events, and other matters of individual or community importance" (Oxendine, 1988, p. 32-33). Although in today's AI culture much of the ceremonial and spiritual importance is gone, the importance of athletics and athletic achievement remains an important mainstay in AI communities. In AI culture, sports achievement is still greatly valued and one's athletic identity is deeply rooted in the community. However, if AI athletic identity is compromised due to

athletic injury, this could lead to a potentially devastating event to the AI athlete as well as the community.

Currently little literature exists reporting the extent of AI sports participation or the amount of injuries these athletes sustain. There is also scarce literature that mentions what resources are available to AI athletes in the way of health care once they have received an athletic injury. While Indian Health Service is most likely their primary care provider, Indian Health Service does not have the funding or resources in order to pay for specialty medical care (Dixon & Roubideaux, 2001), which would be needed following an athletic injury. The lack of funding and recourses for AI athletes can create significant issues, turning what might be a treatable injury for someone that is non-Indian or has health insurance into a career ending injury for an American Indian athlete.

Nationally sports participation is at an all time high and with the high rates of participation a higher prevalence and incidence rates are being observed. Due to the high rate of injuries received nationally by high school athletes and the high cost of those injuries, there is an increasing importance placed on prevention and adequate medical care for athletes that receive an injury. This study can provide much needed information on AI athletic injury rates in Montana and illustrate AI access to specialty health care. Additionally it is hoped that this study will point out a need for injury prevention and having on site medical coverage for AI high school sport competitions and practices. Subsequent studies can evaluate the effectiveness of certain

interventions intended to reduce the significance of sports injury to AI and increase the standard of care once receiving an injury. Such interventions may include having access to a certified athletic trainer or additional funding other than that provided by IHS in order to obtain specialty health care.

1.2

Problem Statement

Athletic participation is a significant component of American Indian life. Much importance is placed on sports participation. However, along with participation there is an inherent risk of receiving an injury while playing a sport. Sustaining an injury can be devastating to an athlete's career, especially if it is a serious injury. It can be particularly devastating to AI athletes that live on or near a reservation due to the rural location and lack of access to specialty healthcare. Currently little research exists pertaining to the participation levels of AI athletes and the rates at which they receive an injury as a result of participation in school sanctioned athletic events. There is also a lack of research on the severity of injuries sustained and the healthcare injured athletes seek/receive.

1.3

Purpose of Study

The purpose of this study was to determine Montana's American Indian high school athletes' injury rates and severity of injury, as well as, determine the type of health care

they seek/receive and the current level of medical coverage at reservation high schools' sport competitions/practices. By understanding injury rates and severity of injury experienced by Montana's AI athletes, attempts can be made to reduce the extent of athletic injuries. Based on the findings this information can ultimately be used to enhance the quality of health care injured AI athletes receive and be used as a background for further research and investigation. Subsequent studies could include more accurate reporting of injuries using computer based injury tracking software, examining AI high school athletes in other states or perhaps at the national level and analyze the psychological and cultural effect an athletic injury has on AI high school athletes and their communities.

1.4

Research Question

1. What are the injury rates for Montana's American Indian high school athletes that receive an injury while participating in a school sponsored sport?
2. What is the severity of the injuries sustained by Montana's American Indian high school athletes while participating in school sanctioned sporting events?
3. Do Montana's American Indian high school athletes have medical coverage at school sanctioned sporting events/practices?

4. What type of health care do Montana's American Indian high school athletes that receive an injury while participating in school sanctioned sporting events seek/receive?

1.5

Pertinent Questions

1. What are the injury rates and severity of injury among AI high school athletes?
2. What is the current level of medical coverage at reservation high school sporting events (practice and competition)?
3. Do AI athletes on Montana reservations have access to a certified athletic trainer?
4. Who is the primary health care provider for AI high school students on reservations?
5. What form of health care do AI high school athletes seek following an athletic related injury?
6. Do AI athletes have access to radiology/imaging and specialty medical care, i.e. orthopedic surgeon?

1.6

Significance of the Study

This research is of great value to Indian athlete health care and the field of athletic training because very little is known about the rates at which Indian high school athletes are injured and once injured what is their level of access to specialty medical care. Prior to this study the severity of injuries for American Indian athletes has not been well described. (Johnson, 1999) Gaining a better understanding of these issues may lead to a reduction in the amount of injuries sustained and the severity of injuries. There is also the possibility that the barriers faced by injured Indian athletes in regards to access of specialty care will be improved. This study sheds light on an underrepresented population.

1.7

Definitions of Terms

American Indian- Indigenous peoples from North American that belong to a federally recognized tribe (Dixon & Roubideaux, 2001)

Athletic Injury- An injury that resulted from athletic participation and caused cessation of participation in the current competition/practice and prevented the participant's return to participation for one or more days (Borowski, 2008; CDC, 2006; Rauh, 2007)

Contract Health Service (CHS)- A system funded by congress to provide American Indians access to specialty health care (Dixon & Roubideaux, 2001)

Disparity- word in the U.S. to describe inequalities in health status and health care delivery between specific populations, which are defined by income status, geography, race, or ethnicity (Grossman, 2003)

Incidence- The number of new occurrences of disease during a specific period of time.⁷

Indian Health Service (IHS)- A division of the U.S. Public Health Service that provides health care free of charge to qualifying AI through a system of clinics and hospitals on or near reservations (Dixon & Roubideaux, 2001; HIS Fact Sheet, 2008)

Prevalence- The proportion of individuals in a population who have a disease at a particular time. (Knowles, 2006)

Specialty Health Care- Health care that requires a physician with a subspecialty

Tribe- A federally recognized group of Native Americans whose existence pre-dates European discovery and which has continued to remain separate and distinct (Dixon & Roubideaux, p. 32)

1.8

Delimitations

The delimitations for the study are that 11 of the 21 high schools that have American Indian student populations greater than 50% were selected to take part in the study. These high schools span the state and represented all 11 Montana tribes and seven reservations. The instrument used in collecting data on AI high school athletes' injury rates, severity of injury, and access to health care was a field tested survey given to the head coaches at each school. The survey was mailed to the coaches at each school to answer questions and then collected via mail.

1.9

Limitations

There were several potential threats to internal and external validity in this study that need to be addressed. The first threat to internal validity is maturation (Gall, Gall & Borg, 2005). While this study's intent was to take a "snap shot" of sports related injuries over a one year period responses to the survey may differ based on coaches' levels of experience and what sport they coach. Also level of the coaches' education may also affect the accuracy of information obtained, due to a lack of understanding questions and not knowing their teams' injury rates, severity of injury, and what medical care they

sought. Head coaches may have estimated injury rates and severity of injury which would detract from the reliability of the study.

Another threat to internal validity is selection bias (Gall, Gall & Borg, 2005). In not selecting the AI high school athletes themselves to answer the survey may have created inaccuracies in the information obtained. Due to these factors the instrument may not adequately measure injury rates, severity of injury, what medical care was sought, and what the current level of medical care is present at competitions and practices. Since the high schools selected for the sample varied in size and class athletes at each school could not accurately be measured.

Lastly, implementation was another threat to internal validity. According to Onwuegbuzie (2003), a common component of the implementation threat is related to time. This pertains to this study because the instrument used to collect data is a retrospective survey instead of a prospective study. With injuries occurring at different points in the season and the timing of when coaches answer the survey, the time from injury to recollection by the coach may be considerable. The retrospective survey relies solely on memory recall by the coaches and thus can introduce “retrospective contamination” (Kolt & Kirby, 1999).

Several threats to external validity exist. The first threat to external validity was temporal validity, which is described by Onwuegbuzie (2003) as the ability of the results to be generalized across time. Another potential threat includes population validity. Population validity is the degree to which the results of a study can be generalized from

one population or sample to a larger population (Gull, Gull & Borg, 2005). Results from this study may not be applicable to American Indians throughout the U.S.

Chapter 2

2.0

Review of Literature

In recent years there have been many studies examining nation high school sports injury rates and the severity of injury. There is also a significant amount of research examining the level of medical care present at high school practices and competitions. Despite the vast research in this area little to no data has been collected on American Indian high school athletes living on or near reservations. The primary focus of this review was to highlight current national trends in high school athletic participation, injury rates and severity of injuries sustained, and current levels of access to medical care. Once this was established a comparison between the national rates to the current trends among American Indian high school athletes was made. This was accomplished by first, describing the national participation rates, followed by highlighting the national injury rates and severity of injuries sustained during high school sports participation. The national review concluded by examining the level of medical coverage at high school sports practices/competitions.

In order to compare the national rates to the current trends among American Indian high school athletes it is important to first describe the American Indian population and

narrow the population down to the area of study, Montana's American Indian high school athletes. Once Montana's AI population was described, literature on injury rates was discussed. Information about Indian Health Service was provided to understand the final section of this review, which described the disparities in American Indian Health care and access to health care issues face by Montana's injured AI high school athletes.

High School Athletics National Participation Rates

In 2007-08, high school sports participation reached an all time high, which marks the 19th consecutive year the number of students participating in sports has increased (National Federation of State High School Associations, 2008). According to the National Federation of High Schools 2007-08 High School Athletics Participation Survey the total number of students participating in athletics was 7,492,381, including 3,057,266 girls and 4,372,115 boys (National Federation of State High School Associations, 2008). Based on these numbers, it is estimated that 50-55 percent of students enrolled in high school participate in sports (Aukerman, Aukerman & Browning, 2006; CDC, 2006; National Federation of State High School Associations, 2008). While 50-55 percent may seem high other researchers believe the percent of students who participate in athletics is lower. In a study conducted by Johnston, he estimates that only 33 percent of girls and 37 percent of boys participate in varsity sports (Johnston, Delva, & O'Malley, 2007). However Johnston collected data from the YES study and the Monitoring the Future study, which do not deal directly with athletics like the National Federation of High

Schools Participation study. The most popular sports for boys were football with 1,108,286 participants, followed by basketball (552,935) (National Federation of State High School Associations, 2008). Gill also found football to be the most popular sport for boys with an estimated 1.2 million participating each year (Gill & Boden, 2008). The most popular sport for girls is basketball with 449,450 participants. Due to the marked increased of 21 percent over the past 10 years, it is expected that participation will continue to grow (McGuine, 2006). With increased levels of participation in high school athletics the prevalence and incident of injuries sustained will also increase.

National High School Athletic Injury Rates and Severity of Injury

High school students who choose to participate in sports place themselves at risk for sports-related injury (Powel & Barber-Foss, 1999). Knowles (2006) describes prevalence as the proportion of individuals in a population who have a disease/injury at a particular time, whereas incidence is the number of new occurrences of an injury during a period of time (Knowles, Marshal & Guskiewicz, 2006). Much research has been conducted over the past 15 years that studies the prevalence and incident of injury among high school athletics. With the creation and improvements of injury monitoring and tracking online software it is becoming easier and more efficient for researchers to access raw data on injuries. Two of the most widely used online systems are High School Reporting Information Online (RIO) and the National Athletic Trainers Association High School

Database (Rauh, Macera & Wiksten, 2007; Rechel, Yard, & Comstock, 2008). Most studies obtain their information from one or a combination of these two systems.

In a study conducted by the Center for Disease Control (CDC) over the 2005-06 school year examined sports related injuries among high school athletes. The study collected its information from the High School RIO and estimated that 1,442,533 injuries occurred among high school athletes participating in the nine sports studied. The study also found that the overall injury rate in all sports was 2.44 per 1,000 athlete exposures (exposure is defined as one athlete participating in one practice or competition) (Borowski, Yard, Fields & Comstock, 2008; Rechel, Yard, & Comstock, 2008). Football had the highest injury rate with 4.36 injuries per 1,000 athletic exposures followed by wrestling with 2.50 per 1,000. The highest rate of incidence for girls sports were women's soccer (2.36 per 1,000) and basketball (2.01 per 1,000) (CDC, 2006). A similar study conducted by Rechel had similar findings. In Rechel's study she compared the high school sports injury rates and types of injury sustained in practice and competition during the 2005-06 school year. She found that a nationally representative sample of 100 high schools sustained 4,350 injuries occurring during 1,730,764 athlete exposures(AE), resulting in a total injury rate of 2.51 injuries per 1,000 athletic exposures. The rate of injury was higher in competition than in practice with an injury rate for competition of 4.63 injuries per 1,000 AE and 1.69 per 1,000 AE respectively. Again football had the highest rate of injury with 2.54 injuries per 1,000 AE. The 4,350 reported injuries represented an estimated 1,442,533 injuries, which is the same estimate presented by the CDC (Rauh, Macera & Wiksten, 2007; Rechel, Yard, &

Comstock, 2008). Other studies conducted earlier by the National Athletic Trainers Association (NATA) estimated the 1.3 million or 1 out of 5 high school athletes receive an injury each year. While 70% are minor injuries, data collected from 1985-99 suggests the risk for catastrophic injury in high school sports is approximately 1 in 100,000 participants (Lyznick, Riggs & Champion, 1999). It should be noted that these rates are leading to a significant number of emergency room visits, hospitalizations, and, surgeries, which dramatically impacts our health care system (McGuine, 2006). In 2003 it was revealed that high school athletic injuries were estimated to cost \$588 million in direct expenses and \$6.6 billion in indirect expenses (McGuine, 2006). Due to the high rate of injuries received by high school athletes and the high cost of those injuries there is an increasing importance being placed on prevention and adequate medical care for athletes that receive an injury.

National Medical Coverage and Access to Health Care

To enhance safety and reduce the risk of injury sustained through high school athletic participation, some high schools use the services of a certified athletic trainer, who under the supervision of a physician, provide medical care to athletes (Lyznick, Riggs & Champion, 1999). Despite the large push in the past 20 years to place certified athletic trainers in high schools, there has been little literature highlighting the number of high schools across the nation that employ a certified athletic trainer. Since the profession of athletic training is not entirely understood by school administrators and

coaches and the perceptions of those individuals vary greatly, there has been little success introducing certified athletic trainers into high schools (Mensch, Crews & Mitchell, 2005). Another difficulty faced by athletic trainers is that there is a lack of qualified candidates entering the workforce due to a lack of personal and social skills that are needed in order to be a successful athletic trainer (Mensch, Crews & Mitchell, 2005; Mensch & Mitchell, 2008). There is also a lack of literature describing the effectiveness or importance of athletic trainers at the high school level.

The Council on Scientific Affairs of the American Medical Association recently reported the importance for adequate medical coverage and employing a certified athletic trainer (ATC) at the secondary level. The report concluded that having a doctor present at practices and competitions is not practical, however, employing a certified athletic trainer who can recognize and treat a wide range of athletic injuries and medical conditions that occur during high school athletics is feasible. Certified athletic trainers can provide more continuous and comprehensive on-site medical coverage, particularly at practices, and hiring ATCs makes good sense from a risk management perspective (Lyznick, Riggs & Champion, 1999). As stated earlier there is little research looking at the availability of certified athletic trainers in high schools nationally, the only studies to date come from a few states. Lindaman (1992) researched the availability of athletic trainers at the high school level in Michigan. Her study concluded that only 41 percent of the schools that responded had the services of an athletic trainer for at least one sport or at one time during the year, which was considered to be very inadequate. Of

that 41 percent only 25 percent were employed by the schools and the other 16 percent were volunteers (Lindaman, 1992).

In a more recent study conducted in 2005 by Aukerman, medical coverage of high school athletics in North Carolina was slightly better. Aukerman's study not only looked at the availability of certified athletic trainers but availability of physicians as well. In his study he found that only 52 percent (n=71) of the schools had coverage by either nationally or state certified athletic trainers, although 71 percent of the schools had physician coverage at some athletic events, much higher than anticipated. Aukerman also discussed the perceptions of the schools' adequacy of medical coverage and found that only 27 percent of the schools surveyed felt their current medical coverage could be considered adequate (Aukerman, Aukerman & Browning, 2006).

While there is a consistent amount of research on national high school injury rates and levels of event medical coverage, a population that has received little attention is American Indian high school athletes that live on or around reservations. Although, it is a relatively small population, making up only 1.4% on the nations population, it is not less important. Before examining literature describing AI athletic injuries and level of health care it is important to first describe AI population in regard to location and demographic composition and gain an understanding of the importance athletics play on AI culture.

American Indian Population and Geographical Areas of Residence

According to the latest census done in 2008 the American Indian population has increased from 2.0 million in 2000, to 4.5 million in 2008, which makes up 1.4 percent of the nation's population and is the smallest minority. Of the 4.5 million AI/AN, 57% of the Indian population lives in urban areas (population in urbanized areas and in incorporated and census designated places of 2,500 or more outside urban areas) (U.S. Census Bureau, 2008). Currently there are over 550 federally recognized Indian tribes and about 310 reservations within the United States, not counting tribal trust lands.

Geographically most of the U.S. American Indian population resides west of the Mississippi River, where the majority of reservations are located (Korenbrodt, Ehlers & Crouch 2003). In 2004 AI were most likely to live in three states- Arizona, California, and Oklahoma. California's AI represents 14% of the total AI population followed by Oklahoma (10%) and Arizona (8%). While large chunks of the AI population in the nation reside in these states, the percentage of AI population compared to the three states' non-native population is small (Grossman, 2003). According to the U.S. Census Bureau's *American Community Survey Reports* the states that have the largest percent of AI per capita are Alaska with 19.3%, Oklahoma with 12%, New Mexico with 10.2%, and Montana with 7.8%.

Montana is home to 11 federally recognized tribes and one state recognized tribe. These tribes include the Assiniboine, Blackfeet, Chippewa, Cree, Crow, Gros Ventres, Kootenai, Northern Cheyenne, Pend D'Oreille, Salish, Sioux, and Little-Shell. The 11

tribes occupy seven reservations: the Blackfeet Reservation; Crow Reservation; Flathead Reservation, which is home to the Salish, Kootenai, and Pend D'Oreille; Fort Belknap, which is home to the Assiniboine and Gros Ventres tribes; Fort Peck Reservation, home to the Assiniboine and Sioux; Northern Cheyenne; and Rocky Boy's Reservation, home to the Chippewa and Cree tribes. Geographically Montana's reservations are distributed throughout the state and constitute 13,178 of Montana's 145,557 total square miles. According to the 2000 U.S. Census the total AI population in Montana is 56,068, with the Blackfeet Indian Reservation being the largest in the state with 8,507 enrolled members. However, it is not the largest in land area. The populations for the other reservations are: Crow 5,165, Flathead 6,999, Fort Belknap 2,790, Fort Peck 6,391, Northern Cheyenne 4,029, and Rocky Boy's Reservation 2,578. Of the 56,068 AIs in Montana, 42% live in urban areas while the other 58% live in rural areas, which is opposite of the national data (U.S. Census Bureau, 2000). Now that there is an understanding of the American Indian population, an examination of AI sports participation injury rates is needed. However, literature on AI participation rates is nonexistent and studies exploring injury rates are scarce.

American Indian Injury Rates

While there has been much data collected nationally on injury rates and levels of medical coverage in high school athletics there is little data collected on the injury rates sustained by AI athletes and their access to healthcare. Following an extensive

literature search only one study (nationally or locally) related to Indian high school athlete injuries was identified. The study was conducted by Edward Moran from 1986 through 1989 on the Flathead Indian Reservation in western Montana. In his study Moran investigated the effectiveness of an injury prevention program for Indian athletes at five high schools within the borders of the Flathead Reservation during the 1988-1989 school year. Prior to the implementation of a prevention program injury rates among the Flathead Indian population were documented and reviewed for the 1986-1987 academic year. The review revealed that sports injuries were the second leading cause of all injuries requiring hospitalization on the Flathead reservation. The number of injuries reported or the level of participants was not mentioned in the review.

For the study two interconnected programs were started at the five high schools on the reservation. The first program was conducted by the Missoula Orthopedic Clinic, which provided orthopedic and conditioning screenings for athletes prior to participation. The second program ran by the Western Montana Sports Medicine Center, employed certified athletic trainers to identify, treat, and rehab athletic injuries that occurred over the course of the study. Sports included in the study were football, wrestling, girls' volleyball, girl's and boy's track, and girl's and boy's track.

Following completion of the study a total of 113 athletes were injured during the 1988-1989 fall season. Of the 113 injuries, 44 were first degree, 50 were second degree, 10 were third degree, and the remaining nine were diagnosed as having chronic

problems. Football, track and wrestling accounted for 72 percent of all reported injuries with the ankle and knee being the most common injury site. Consistent with the national data, strains were the most common type of injury followed by sprains (Moran, 1989; Rauh, Macera, & Wiksten, 2007; Rechel, Yard, & Comstock, 2008). While this study does provide some information on type and prevalence of injuries that Indian high school athletes sustain, it does not state how many athletes were included in the study and what proportion were AI. It is important to note since this study is 20 years old, currently injury trends may be different.

Indian Health Service (IHS)

American Indian healthcare has been around since the 1800's when the U.S. Army took steps to stop infectious diseases from spreading among tribes living around military posts, in order to protect its soldiers and non-Indians from contracting the diseases (Dixon & Roubideaux, 2001). As stated, much of the early healthcare provided to Indians was provided by the military. It wasn't until 1849 when Indian health care was passed over to Bureau of Indian Affairs (BIA), which fell under the newly created Department of the Interior. Although health care was passed from the military to the BIA, Indian health care was very unstable until 1921 when congress passed the Snyder Act, providing legislative authorization for the expenditure of funds for Indian health care. Funding for the BIA's medical division received boosts in funding throughout the next years 30 years; however, AI healthcare was still inadequate (Dixon & Roubideaux,

2001). In 1954, the responsibility of Indian health care was transferred to the U.S. Public Health Service under the Department of Health, Education, and Welfare, which is now the Department of Health and Human Services, and the Indian Health Service (IHS) was created (Dixon & Roubideaux, 2001).

Presently IHS provides health care services to approximately 1.9 million American Indians and Alaska Natives who belong to more than 557 federally recognized tribes in 35 states residing on or near reservations and 600,000 AIs in urban clinics. Nationally the IHS's annual patient services includes 58,281 inpatient admissions and over 10,173,500 outpatient visits. In order to fund these services and pay for staffing and facilities, congress appropriated \$3.35 billion for fiscal year (FY) 2008, which is a \$166 million increase from FY 2007. While the \$166 million increase was direly needed, a serious lack of funding still exists. Presently, there are over 700 IHS and tribal health care facilities scattered throughout 36 states, most of which are located in rural and isolated areas. In addition, IHS also operates over 2,200 clinics (HIS Fact Sheet, 2008). These health care facilities are monitored by IHS headquarters which is located in Rockville, MD and 12 service areas which are broken up geographically. The service areas include Nashville, Bemidji, Aberdeen, Oklahoma City, Billings, Navaho, Albuquerque, Tucson, California, Portland, and Alaska.

In Montana, responsibility for the health care of its 12 tribes falls solely on the IHS Billings Area office. Billings Area provides health care services for more than 70,000 AIs in the states of Montana and Wyoming. The Billings Area consists of three IHS hospitals,

located on the Blackfeet, Crow, and Fort Belknap reservations, nine health centers, and six health stations (IHS Billings Area Homepage, 2008). While all these facilities fall under the IHS system and Billings's area office it is the responsibility of each tribe/reservation to decide what form of health care delivery system will be utilized.

Indian Health Service is a very unique and different system from traditional forms of health care in the U.S. It is a very complicated system and to try and fully explain it is inappropriate for this literature review. However, a basic knowledge is needed in order to understand the disparities and complications that exist in accessing some forms of health care in the IHS system. IHS clinics and hospitals provide services free of charge to AI who are members or decedents of one, or a combination, of the 557 federally recognized tribes. To accomplish this, programs and facilities are jointly administered by the IHS, tribes, and urban programs (Dixon & Roubideaux, 2001). Ultimately, tribes determine the health care that will be provided to their members. Tribes primarily have three options in order to meet the needs of their members: 1) they can receive health care directly through IHS; 2) they can receive funding from IHS to run their own facilities and programs; or 3) a combination of both (Dixon & Roubideaux, 2001). It is important to note that funding not only varies between area offices but from tribe to tribe as well. As stated earlier, IHS relies solely on appropriations from congress which are unbelievably limited. This reduces the scope of services that can be provided by IHS. One way IHS tries to compensate for the limited scope of their services is by contracting specialty health services from the private sector. This program is called Contract Health Service (CHS).

The Contract Health Service program provides primary and specialty care services that may not be available through normal IHS channels. Some of these services include outpatient procedures, physician services, radiology, etc. A particularly important specialty service that the CHS provides, especially for athletes, is orthopedic specialists which are not accessible in the primary care portion of IHS. According to Baldwin, 2008 the most common referral from the primary care portion of IHS for specialty services in Montana and Arizona were orthopedists.² CHS is also funded by the federal government with a budget of \$579.3 million for FY 2008 (IHS Fact Sheet, 2008), and like other IHS funds the \$579.3 million is dispersed differently between area offices and between tribes. Again individual tribes have control over the CHS funds they receive; however, once the funds are exhausted services can no longer be rendered. For this reason CHS has different rules for gaining access to care than the primary care portion of IHS, these rules often hinder access to specialty care (Dixon & Roubideaux, 2001). Based on the limited funds and strict rules governing CHS, its services are limited to individuals with the greatest need.

While IHS provides much needed health care to 1.9 million AI free of charge it is not without its limitations created by a lack of funding. As Dixon and Roubideaux (2001) state, "congress has never funded Indian health care at a level that would provide health services comparable to that which other Americans receive. As a result, the Indian health care system is struggling to meet the needs of the growing AI population."(p.xix) IHS is so underfunded that in 2003 it spent just \$1,914 per AI. In contrast, the per person expenditures for people on Medicaid was \$3,897, Medicare

was \$5,915, and \$3,803 for federal inmates (Warne, 2007; Sarche & Spicer, 2008).

While appropriations from Congress are improving the lack of funding continues to create some of the disparities experienced by AIs.

Disparities in American Indian Health care and Access Associated with the Disparities

A disparity is a word in the U.S. to describe inequalities in health status and health care delivery between specific populations, which are defined by income status, geography, race, or ethnicity (Grossman, 2003). Disparities in health have existed among American Indians and Alaskan Natives since the time of first contact with Europeans, and they continue to occur across a broad spectrum of disease categories and for all ages (Sarche & Spicer, 2008). It has been well documented that morbidity and mortality rates are significantly higher for AIs than other races (Johnson, Sullivan & Grossman, 1999). While the causes of disparities in health care faced by AI is only partially understood, the recurring elements in the literature points to geographic location, poverty and education, more commonly called socioeconomic status (SES) (Dixon & Roubideaux, 2001, Grossman, 2003). Of these recurring elements geographic location may be the most understandable.

Due to rural locations that 42% of the AI population resides, access to medical facilities is limited. In these rural areas population density is low and few businesses exist, making it hard for medical providers to live. However, as stated previously most

of the Indian Health Service and Tribal run hospitals and clinics are located on or near reservations, which tend to be in rural areas. Travel in order to receive medical care is common in these rural areas. Access to primary care does exist and has been fairly good. However, this does not mean AIs utilize it. AIs are less likely than Whites to use medical care (Zuckerman, Haley & Roubideaux, 2004). Reasons for this are not entirely understood but factors that are most agreed upon is a lack of confidence in their access and problems with communication between themselves and health care professionals (Zuckerman, Haley & Roubideaux, 2004). Conversely, access to nonemergency specialty health care, like that would be sought by injured athletes, is limited. AI populations are too small and health care facilities are too spread out to support medical specialists and because of the lack of IHS funding, salaries are too low to recruit physicians in subspecialties (Dixon & Roubideaux, 2001). That is why IHS created Contract Health Service which was discussed previously. One study of particular importance to the level of access to specialty health care was conducted by Baldwin in 2008. Baldwin found that, AIs in Montana and New Mexico have very poor access to specialty care (e.g. orthopedic specialists). This poor access is most likely due to isolated geographic location and insufficient contract funding (Baldwin, et al, 2008). Baldwin also reported that in Montana, the median distance from reservation clinics to the five top specialists ranged from 51 to 143 miles. This may be considered a significant distance to travel for health care if one does not have the financial means.

According to the U.S. Census Bureau over one-quarter of AIs in 2005 lived below the poverty level. This is more than double of the general American population.

Contributing to the high prevalence of poverty within the AI population is two circular factors, unemployment and education. They are circular in nature because one can lead to the other. Low education rates leads to not having the education needed to maintain a job, and in not maintaining a consistent job, limits the capacity for making money and supporting basic needs. Nationally the average unemployment rate for AIs is double the rate for Whites, 14% compared to 7%, but AI unemployment can be as high as 35% in some reservation communities (Sarche & Spicer, 2008). Along with unemployment AIs also exhibit lower education rates. The AI population has fewer high school graduates with only 71% of AIs 25 and older having at least a high school diploma Sarche & Spicer, 2008). Based on the high levels of unemployment and educational discrepancies AIs are confronted with some significant problems related to health care.

High unemployment rates and low education levels can directly contribute to some of the problems AIs face in regards to health care. As Warne stated in 2007, "health status and health outcomes are highly correlated to education and income, making these socioeconomic markers significant factors in AI public health"(Warne, 2007). One of the largest problems these two issues create is access to health insurance.

Zuckerman found in 2004, that over 35% of all AI were uninsured, which is over three times the rate for Whites (12%) (Zuckerman, Haley, & Roubideaux, 2004). In not having/maintaining a steady job, health insurance cannot be afforded by the person or provide through the employer. Another problem is the lack of knowledge needed to make basic health care decisions. With the high dropout rate exhibited by the AI

population some AIs have not had the schooling required to make informed health decisions.

Conclusion

The above review of the literature has provided a knowledge base on national injury rates and levels of medical coverage in high school athletics however, literature studying American Indian injury rates and adequacy of medical coverage is extremely limited. Due to the lack of literature this study will contribute to the limited published literature in the area. This study will also provide a background for further research. The following section will outline the methodology, subjects, instrument use, variables, procedures and statistical analysis this study will use.

CHAPTER 3

3.0

Methodology

The significance of sports related injury for Montana's American Indian high school athletes is poorly understood and inadequately studied. The purpose of this study was to describe Montana's American Indian high school athletes' injury rates and severity of injury, as well as, determine the type of health care they seek/receive. Also examined was the level of medical coverage present during practices/competitions at Montana high schools that have an AI student population greater than 50%. Subjects and instrumentation are discussed in the following sections.

3.1

Subjects

The population for this study consisted of eleven of the twenty-one Montana high schools who met the following inclusion criteria: 1) the high school is geographically located on one of Montana's seven Indian reservations; 2) the AI student population in each school must be greater than 50%; and 3) high schools not located on a reservation but have an AI student population great than 50%. Information used in selecting the

sample was taken from the Montana Office of Public Instruction 2005-06, Fall Enrollment by Race/Ethnicity statistics (Montana OPI, 2007). Of the 171 high schools in Montana 21 met the inclusion criteria for the study, from those 11 were randomly selected. The 11 high school selected represents 11 tribes and over 2,900 AI high school students. Geographically the schools span the state and represented all classification (size) of high schools except class AA. Four high schools are class A, seven are class B, and 11 are class C.

Each head coach at the high schools were sent a survey and signed a mandatory informed consent document prior to completing the survey. The consent form was approved for ethical treatment of subjects and overall safety of data collection by The University of Montana Institutional Review Board. The participation of the head coaches was completely voluntary and no personal information was be obtained or included in the survey.

3.2

Survey

One survey was developed for this study, the American Indian High School Athlete Injury Survey; a standard form for this study does not exist. The mail survey designed for this study was intended to collect information regarding 1) rate and severity of AI athletes injured while participating in high school athletics in the state of Montana; 2) extent of medical coverage present at practices and games; and 3) level of access to specialty medical care following injury. The development of the quantitative survey was

guided by Turocy. According to Turocy, the first part of the development process should include a Table of Specifications (ToS). The ToS outlines the topics of the survey and should be directly related to the research questions (Turocy, 2002). Following the creation of the ToS questions were developed that would adequately answer the research and pertinent questions. As the questions were created they were then placed into the ToS under the topic headings that were most appropriate. All questions were closed-ended and qualitative in nature. While writing the questions attention was paid to assuring no questions were threatening and easy to comprehend.

Following development, the survey was evaluated by a panel of experts who work in the field of athletic training and Indian health in order to assure validity. A panel of eight professionals examined the survey in order to assure its ability to evaluate injury rates, severity of injury, extent of medical coverage, and access to specialty health care, as well as assuring questions were non-threatening. The survey was then field tested at three local high schools. Field testing assured clarity of questions, questions were nonthreatening, and estimated the time it took to complete the survey. Corrections to the survey were made as suggested by the pilot subjects. This evaluation established face validity which is explained by Turocy (2002) as the evaluation by both experts and sample participants to determine if the instrument measures what it is intended to measure. Being evaluated by an expert panel also established content and construct validity (Turocy, 2002). Criterion-related validity was established with the ToS. This was done by assuring that all questions in the survey can be related to the specific topics set forth in the ToS.

3.3

Ethical Nature of Data Collection

Prior to collection of data, the researcher received Institutional Review Board approval. By filling out and returning the survey consent for the study was implied. All information collected from the participants was kept confidential. Records will be kept for five years.

3.4

Procedure

The procedure for collecting data in this study consisted of sending out a mailed packet to each head administrator at the 11 schools that met inclusion criteria for this study. Names and addresses of administrators was attained through a Montana high school address book published by the Montana High School Association. Prior to sending the packet an introductory phone call was made to the high school administrators explaining who the researcher is and the purpose of the study. The phone call asked the individuals if they were interested in participating. Prior to sending out the packets the survey used as the research instrument, the survey was piloted to coaches at three local high schools that were not included in the target population (n=8).

The packet included a letter, a survey, and a self-addressed and stamped envelope. The letter described the purpose of the study and provides the coaches' with instructions for completing the survey accurately. After completing the survey the coaches mailed the survey back to the researcher. The letter and survey was sent via mail on April 27, 2009, with two follow up phone calls to administrators at three and five weeks. Following data collection data analysis was conducted.

3.5

Data Analysis

Descriptive statistics, including ordinal and nominal level data was analyzed. Ordinal data consisted of measures of central tendency, standard deviations, skewness, and kurtosis. Nominal level data consisted of frequencies and percentages. Graphs were used to interpret the data gathered by the survey. The numerical data collected by the survey was analyzed using Microsoft Excel 2007, software.

Injury rates, severity of injury, and access to specialty medical care of American Indian
high school athletes in Montana

Dr. Valerie Rich, Dr. Blakely Brown, Tammy Elser

Address for Correspondence

Valerie Rich

University of Montana Athletic Training Education Program

University of Montana

Department of Health and Human Performance

Missoula, MT 59812

Tel: (406) 243-2703

Email: valerie.rich@mso.umt.edu

Introduction: Athletics are an integral part of American Indian (AI) life and culture. However, with participation there is a risk of receiving an injury. Sustaining an injury can be devastating to AI athletes that live on or near a reservation due to the rural location and disparities in health care. **Objective:** To determine Montana's AI high school athletes' injury rates, severity of injury, the current level of medical supervision, and type of health care they seek/receive. **Methods:** The procedure for collecting data consisted of sending out surveys to head coaches at 11 high schools that met the inclusion criteria. **Analysis:** Numerical data was analyzed using Microsoft Excel 2007. **Discussion:** Injury rates were fairly low, with most injuries being minor. Medical supervision at practices/competitions was inadequate and the majority of injured athletes sought medical care from Indian Health Service. Access to specialty care was also found to be inadequate.

Keywords: American Indian, Indian Health Service (IHS), specialty medical care, sports related injury

Introduction

Games, sports, and athletics have been an integral part of American Indian (AI) life and culture dating back hundreds of years. For American Indians participation in sports goes beyond playing for sheer pleasure; it was an integral aspect of the culture of all tribes and was a means by which individual and tribal identities were formed. It also served as a means to achieve a sense of pride, self-esteem, and respect (King, 2005). In AI culture, sports achievement is still greatly valued and one's athletic identity is deeply rooted in the community. However, along with participation there is an inherent risk of receiving an injury while playing a sport (Powel & Barber-Foss, 1999). Sustaining an injury can be devastating to an athlete's career, especially if it is a serious injury. It can be particularly devastating to AI athletes that live on or near a reservation due to the rural location and disparities in health care. While the causes of disparities in health care faced by AI is only partially understood, complex, and beyond the scope of this study, the recurring elements in the literature points to geographic location (42% of the AI population living in rural areas), poverty and education (over one quarter living under the poverty level and only 65% having health insurance), more commonly called socioeconomic status (SES) (Baldwin, et al, 2008; Zuckerman, Haley & Roubideaux, 2004; Dixon & Roubideaux, 2001). Currently little research exists pertaining to the participation levels of AI athletes and the rates at which they receive an injury as a result of participation in school sanctioned athletic events. There is also a lack of research on the severity of injuries sustained and the healthcare injured AI athletes seek/receive (Johnson, 1999).

Nationally, sports participation is at an all time high, and with the high rates of participation, higher prevalence and incidence rates are observed (National Federation of State High School Associations, 2008). Due to the high rate of injuries received by high school athletes and the high cost of those injuries, there is an increasing importance being placed on prevention and adequate medical care for these athletes (McGuine, 2006). In recent years many studies examined national high school sports injury rates and the severity of injury. These studies reported overall injury rates in all sports was between 2.44 and 2.51 per 1,000 athletes with football exhibiting the highest rate at 4.36 injuries per 1,000 athletes. The highest rate of incidence for girls sports were women's soccer (2.36 per 1,000) and basketball (2.01 per 1,000 athletes) (CDC, 2006; Rechel, 2008). There is also a significant amount of research examining the level of medical care present at high school practices and competitions. For example Aukerman, found in 2005 that 52% of the high schools in North Carolina had a certified athletic trainer on staff and 71% of the schools had physician coverage at some athletic events (Aukerman, Aukerman & Browning, 2006).

As previously mentioned little literature currently exists that reports the extent of AI sports participation or to what level they sustain sports related injuries. There is also scarce literature that mentions what resources are available to AI athletes in the way of health care once they have received an athletic injury. While Indian Health Service (IHS) is most likely their primary care provider, IHS does not have the funding or resources in order to pay for specialty medical care (Dixon & Roubideaux, 2001), which would be needed following an athletic injury. The lack of funding and resources for AI athletes

can create significant issues, turning what might be a treatable injury for someone that is non-Indian or has health insurance into a career ending injury for an American Indian athlete. While high importance may be placed on serious athletic injury and the problems they create, minor injuries should not be overlooked. Due to the rural location of reservation high schools access to health care professionals such as certified athletic trainers (ATCs) many AI high school athletes that sustain a minor injury look to IHS for care, which may place even more strain on a strained system.

The purpose of this study was to determine Montana's American Indian high school athletes' injury rates and severity of injury, as well as, determine the type of health care they seek/receive and the current level of medical coverage at reservation high schools' sport competitions and practices. By understanding injury rates and severity of injury experienced by Montana's AI athletes, attempts can be made to reduce the extent of athletic injuries. Based on the findings this information can ultimately be used to enhance the quality of health care injured AI athletes receive and be used as a background for further research and investigation.

Materials and Methods

Population

Montana is home to 11 federally recognized tribes and one state recognized tribe. These tribes include the Assiniboine, Blackfeet, Chippewa, Cree, Crow, Gros Ventres,

Kootenai, Northern Cheyenne, Pend D'Oreille, Salish, Sioux, and Little-Shell. The 11 tribes occupy seven reservations: the Blackfeet Reservation; Crow Reservation; Flathead Reservation, which is home to the Salish, Kootenai, and Pend D'Oreille; Fort Belknap, which is home to the Assiniboine and Gros Ventres tribes; Fort Peck Reservation, home to the Assiniboine and Sioux; Northern Cheyenne; and Rocky Boy's Reservation, home to the Chippewa and Cree tribes. Geographically Montana's reservations are distributed throughout the state and constitute 13,178 of Montana's 145,557 total square miles. According to the 2000 U.S. Census the total AI population in Montana is 56,068, with the Blackfeet Indian Reservation being the largest in the state with 8,507 enrolled members. However, it is not the largest in land area. The populations for the other reservations are: Crow 5,165, Flathead 6,999, Fort Belknap 2,790, Fort Peck 6,391, Northern Cheyenne 4,029, and Rocky Boy's Reservation 2,578. Of the 56,068 AIs in Montana, 42% live in urban areas while the other 58% live in rural areas, which is opposite of the national data (U.S. Census Bureau, 2000). While this describes the entire AI population it is very important to understand the AI student population enrolled in Montana's public schools.

American Indian students make up roughly 11% of the total student population in the state of Montana with just 16,700 students (primary and secondary) (Montana OPI, 2007). The population for this study consisted of the twenty-one Montana high schools who met the inclusion criteria: 1) the high school is geographically located on one of Montana's seven Indian reservations; 2) the AI student population in each school must be greater than 50%; and 3) high schools not located on a reservation but have an AI

student population great than 50%. Information used in selecting the sample was taken from the Montana Office of Public Instruction 2005-06, Fall Enrollment by Race/Ethnicity statistics (Montana OPI, 2007). Of the 171 high schools in Montana 21 met the inclusion criteria for the study. The total population of high school AI students for this study is 2,881. Table 1 shows the 21 schools, which reservation they are on/close to, total student enrollment, AI enrollment, percent of AIs students enrolled, number of sports at the school, and school size.

Subjects

The sample for this study consisted of eleven Montana high schools who met the inclusion criteria: Of the 21 high schools which met the inclusion criteria 11 were randomly selected, which makes this a random sample strategy (Gull, Gull, & Borg, 2005). Eleven high schools were selected based on the target 50% of the whole population. The 11 high schools selected represent all of Montana's 11 tribes and geographically span the state, as well as represent all classifications (size) of high schools except class AA. The 11 schools represent 2,295 (80%) of the 2,865 total AI students in the population. Of the 11 high schools three are class A, six are class B, and two are class C (Table 2).

Each head coach at the randomly selected high schools was sent the American Indian High School Athlete Injury Survey (AIHSAIS). Consent was obtained by the coaches' participation in filling out the survey and returning it to the researcher. The AIHSAIS was approved for ethical treatment of subjects and overall safety of data

collection by The University of Montana Institutional Review Board. The participation of the head coaches was completely voluntary and no personal information was obtained or included in the survey.

Survey

One survey was developed for this study, the American Indian High School Athlete Injury Survey (AIHSAIS); a standard form for this study does not exist. The mail survey designed for this study was intended to collect information regarding 1) rate and severity of AI athletes injured while participating in high school athletics in the state of Montana; 2) extent of medical coverage present at practices and games; and 3) level of access to specialty medical care following injury. The development of the quantitative survey was guided by Turocy. The first step of the development process included creating a Table of Specifications (ToS). The ToS outlines the topics of the survey and should be directly related to the research questions. Following the creation of the ToS questions were developed that would adequately answer the research and pertinent questions. As the questions were created they were then placed into the ToS under the topic headings that were most appropriate (Turocy, 2002). All questions were closed-ended to limit inconsistent reporting and quantitative in nature. While writing the questions attention was paid to assure questions were nonthreatening and easy to comprehend which was based off of feedback from the pilot surveys.

Following development, the survey was evaluated by a panel of experts who work in the field of athletic training and Indian health in order to assure validity. A panel of eight professionals examined the survey in order to assure its ability to evaluate injury

rates, severity of injury, extent of medical coverage, and access to specialty health care, as well as assuring questions were non-threatening. The survey was then field tested by eight coaches at three local high schools that were not included in the target population. The fields testing assured the questions were clear, non-threatening, and estimated the time it would take to complete the survey. Corrections to the survey were made as suggested by the pilot subjects. This evaluation established face validity (Turocy, 2002). Being evaluated by an expert panel established content and construct validity (Turocy, 2002). Criterion-related validity was established with the ToS (Turocy, 2002).

Procedures

The procedure for collecting data in this study consisted of sending out a mailed packet to the administrators at each of the 11 high schools that met the inclusion criteria for this study and were randomly selected. Prior to sending the packet an introductory phone call was made to the high school Athletic Directors/Principals explaining purpose of collecting information on injury rates, severity of injury, and access to specialty medical care of AI high school athletes. The phone call was also used to gain permission to survey their coaches.

The packet included a letter, a survey, and a self-addressed and stamped envelope. The letter described the purpose of the study and provided the coaches' with instructions for completing the survey accurately. After completing the survey the coaches mailed the survey back to the researcher. Two follow-up phone calls were made three and five weeks after the initial mailing to have administrators remind their

coaches to fill out the surveys if they hadn't already and to assure they did not need more surveys. Following data collection, data analysis was conducted.

Data Analysis

Descriptive statistics, including ordinal and nominal level data were analyzed. Ordinal data consisted of measures of central tendency, standard deviations, skewness, and kurtosis. Nominal level data consisted of frequencies and percentages. Graphs were used to interpret the data gathered by the survey. The numerical data collected by the survey was analyzed using Microsoft Excel 2007, software.

Results

A total of 11 Montana high schools that met the inclusion criteria were randomly selected for the study representing approximately 116 coaches. Initial consent was obtained from all 11 high schools prior the study; however only nine high schools returned surveys. Of the 165 surveys sent 21% (n=35) percent were returned with 26 being filled out completely and correctly. Only the 26 surveys that were completely and correctly filled out were used for the results. Eighteen were returned by class A schools, 14 by class B schools, and 2 by class C schools. Examining the surveys correctly answered by sport, football had the most responses with five, followed by girls' volleyball, girls' basketball, and girls' track and field all with three responses. The rest of the responses by sport are as follows: boys' basketball with two, wrestling with two, boys' track and field with two, softball with two, cheerleading with two, and boys' cross country and boys' golf with one. Calculating the correctly completed surveys by sports

gender 13 coaches of female sports and 13 coaches of male sports returned the survey completed correctly. Sports with no responses included girls' cross country, boys' and girls' swimming, girls' golf, and boys' and girls' tennis.

The results are organized in the following sections and include the coaches' level of experience, number of American Indian (AI) athletes that participate in sports, current level of medical coverage/supervision at competitions and practices, injury rates and severity of injury, and access to medical care. Access to medical care included how many AI athletes sought care, what type of care was sought, how many received imaging tests (x-ray and MRI), how many were referred to a specialist (e.g. orthopedic surgeon), how long did it take for athletes to receive care, how many required surgery, and how many required physical therapy.

Coaches' Level of Experience

Coaches were asked to record how many years they have held their current position and how many total years they have been coaching. Of the coaches who accurately completed the survey 38% (n=10) have held their current position for 5 or less years, while 23% (n=6) have held their position for 11-15 years. There were five (19%) responses to having held their coaching position between 6 and 10 years and five (19%) for more than 15 years, respectively. When asked to record the total years they have been coaching 46% (n=12) of the coaches reported they have been coaching for more than 15 years while 31% have been coaching between 11 and 15 years, 15% between 6 and 10 years, and 8% between 0 and 5 years.

Number of American Indian (AI) athletes that participate in each sport

Thirty percent (n=8) of the coaches reported having between 16 and 20 athletes that participated on their team while 23% (n=6) reported having 11 to 15, 23% having 21 to 25, 12% (n=3) having 26 to 30, 4% (n=1) having 6 to 10, and 4% having more than 46. These responses represent between 486 and 576 total high school athletes. This was calculated by multiplying the ranges by the number of responses by the coaches. The ranges were then added to come up with a total range (ex. 8 coaches reported having 16-20 athletes, 16-20 would be multiplied by 8 and equal 128-160, then the other totals would be added). Comparing the results for the number of AI athletes that participated 30% (n=8) of the coaches reported having between 11 and 15, 27% (n=7) between 16 and 20, 19% (n=5) between 21 and 25, 12% (n=3) between 6-10, 4% (n=1) between 1 and 5, 4% between 26 and 30, and 4% that more than 46 AI athletes that participated. This equates to between 396 and 469 AI athletes that participated on the responding coaches' teams (this was calculated by multiplying the ranges by the number of responses and then adding them together).

Current level of medical coverage/supervision at competitions and practices

Comparing the current levels of medical supervision present at practices and competitions it was found that medical supervision is lacking considerably. While coaches reported having little medical supervision at practices, medical supervision increased for competitions. The most common medical supervision present at practices and competitions were EMTs (Figure 1). When asked if the coaches' athletes had access to a licensed athletic trainer (LAT) 54% (n=14) of the coaches reported having access to

an LAT. However, results may be skewed because only one school employs an LAT and coaches from another school reported having access to an LAT when in fact they do not.

Injury rates and severity of injury

Injury rates recorded by the coaches were fairly low with 92% (n=24) of the coaches reporting between 1 and 5 AI athletes receiving an injury that excluded them from one or more practices/competitions during the season. The remaining 8% (n=2) of the coaches reported between 11 and 15 athletes were injured and one coach reported there were no injuries. These 26 responses account for approximately 35-135 AI athletes injured during the 2008-2009 school year. This was calculated by multiplying each range by the number of responses by the coaches. Injury rates broken down by sport is shown in Table 1.

Determining severity and time missed following injury 88% (n=23) of the coaches reported between 1 and 5 of their athletes sustained an injury that precluded them from participation for one to seven days and 4% (n=1) reported between 6 and 10 athletes. The remaining 8% (n=2) reported not knowing how many athletes were injured from one to seven days or they had zero athletes injured from one to seven days. Injury rates decreased even more when coaches were asked to report the number of their athletes that sustained an injury that held them out of practices and competitions for two to six weeks with 65% (n=17) of the coaches reporting between 1 and 5 injuries with the remaining 35% (n=6) of coaches reporting none of their athletes were injured two to six weeks or they were not sure. When ask two record how many

injuries were season ending 15 or 58% of the coaches reported their athletes did not sustain any season ending injuries; however, 35% (n=9) of the coaches reported 1 to 5 season ending injuries. The remaining 8% (n=2) of the coaches reported not knowing. Of the 26 coaches that correctly answered the survey 96% (n=25) reported their athletes did not receive any career ending injuries while one coach reported between 1 and 5 of his/her athletes sustained a career ending injury.

In order to examine specific body parts injured coaches were asked to record the number of athletes that injured their head/neck, chest, shoulder/arm, wrist/hand, pelvis/thigh, knee, and ankle/foot. The body part that exhibited the highest rate of injury by the coaches was the foot and ankle. Following ankle and foot the most common site of injury was the knee and shoulder (Figure 2).

Access to medical care

Prior to identifying types of medical care sought by injured AI athletes and how long it took to receive medical care coaches were first asked to report how many of their athletes sought medical care. See Figure 3 for types of medical care sought by AI athletes following injury. It is important to note that coaches were allowed to report more than one type of medical care that their athletes sought.

On average it took athletes less than seven days to receive medical care from one of the previously mentioned providers with 77% (n=20) of the coaches reporting it took between 1 and 7 days. However, this may not be accurate because 19% reported they

were not sure how long it took their athletes to receive care. One (4%) coach did report it took his/her athletes 3 to 4 weeks to receive medical care.

Aside from reporting type of care sought/received coaches were also asked to report how many injured AI athletes received imaging tests, were referred to a specialist (e.g. orthopedic surgeon), how many required surgery and how long it took for the athletes to receive surgery, and how many received physical therapy. Results for the number of athletes that received imaging tests were inconsistent with 69% (n=18) of the coaches reporting between 1 and 5 of their athletes received an X-Ray and 31% (n=8) responded they were not sure or had no athletes that received an X-Ray. Responses to whether AI athletes received an MRI were more inconsistent than X-ray with 23% (n=6) reporting between 1 and 5 of their athletes received an MRI and 69% (n=18) reporting zero. However, 8% (n=2) of the coaches did not respond to the question so it was assumed no athletes received an MRI or the coaches were not sure. Interestingly only 31% (n=8) of the coaches reported between 1 and 5 of their athletes were referred to a specialist while 58% (n=15) reported none of their AI athletes were referred and 12% (n=3) were not sure whether they were referred. From those athletes that saw a specialist only 4 (15%) coaches reported between 1 and 5 of their athletes required surgery with 15% (n=4) reporting it took athletes between 2 to 3 weeks to receive surgery, 4% (n=1) took less than 1 week, and 4% (n=1) took longer than 9 weeks.

The researcher did not ask how many athletes received physical therapy following surgery but simply how many AI athletes saw a PT at some point during their injury. 50% (n=13) of the coaches indicated that between 1 and 5 of their athletes received PT

at some point during the athletes' injury while 4% (n=1) of the coaches reported between 6 and 10 of their athletes received PT. The remaining 46% (n=12) reported that none of their athletes received PT or they were not sure if they did.

DISCUSSION

The primary intent of this study was to evaluate injury rates, severity of injury, and access to specialty medical care of American Indian high school athletes in Montana. To the researchers knowledge this was the first study that examined AI high school athletes' injuries and access to medical care. The intent of this study was not to compare injury rates and access to medical care to other ethnicities, but rather to establish a base for which subsequent studies can evolve. Based on the information obtained from the high school coaches, their answers yielded numerous findings. The importance of the results and their relation to existing literature are discussed in the following paragraphs.

Injury Rates

Our injury rates for AI high school athletes in Montana were 35 to 135 injuries per 396 to 469 which are lower than the national injury rates described in previous studies (CDC in 2006, Borowski in 2008, Rechel in 2006, and Rauh in 2007). AI girls' injury rates were found to be slightly higher than AI boys with between 22 and 70 girls and 13 and 65 boys being injured during the 2008-2009 school year. Again, the injury rates for AI girls and boys are lower than the national rates but similar to results found by Borowski (2008) and others prior. Football had the highest injury rates for boys with 5 to 25 AIs

receiving an injury while track and field had the highest rates for girls ranging between 13 and 25 injuries, as supported in previous studies (Rechel, 2008; CDC, 2006; Moran, 1889); however it is not practical to compare specific sports because of the differing response rates between the sports. While AI athletes' injury rates are lower than national rates, one cannot assume AI athletes are less likely to receive an injury compared to their non-Indian counterparts for several reasons. First, due to the relatively small sample size and the low response rate to the survey, injury rates for AI athletes may be higher than reported. Second, this study uses injury ranges rather than hard numbers, and third, does not examine athlete injury exposures but rather how many athletes sustained an injury.

Based on the present data the most common location of injury was the foot and ankle which is consistent with previous studies, that found 27%-39% of all athletic injuries occurred to the foot and ankle (Borowski, 2008; Rechel, 2008,) and is an important finding when considering prevention and treatment strategies. The knee was the second most common site for injury with half of the coaches reporting their athletes received a knee injury. Injury patterns were similar for both boys and girls with the exception boys injured their shoulders more often than the girls.

Time Lost Due to Athletic Related Injury

Examining the severity of injuries sustained by AI high school athletes in Montana it was found that the majority of injuries sustained were minor, excluding athletes from competition and practices for a week or less. Close to 90% of the coaches reported

their athletes sustained an injury that precluded them from participation for one to seven days. While the percent found in this study is much higher than those found by Borowski (2008) it is consistent with her findings that girls and boys returned to activity most frequently within a week (47.7% and 55.3% respectively). As expected the responses to the amount of their athletes that were injured decreased based on time with 65% of the coaches reported 1 to 5 of their athletes sustained an injury that held them out of practices and competitions for two to six weeks. Surprisingly 35% of the coaches reported 1 to 5 of their athletes sustained season ending injuries. This represents between 9 and 45 athletes that sustained a season ending injury; however the number is most likely closer to 9 athletes. It is important to note that one coach reported one of his/her athletes sustained a career ending injury. Due to the small size of the sample and response rate it is difficult to compare our findings on career ending injuries to the national average; however the national rate is approximately 3% (Darrow, Collins, Yard, & Comstock, 2009). Understanding the significance of the severity of injuries is highly important when examining forms of medical care are present at competitions and practices and what forms of medical care are available to AI athletes following athletic injury.

Access to Health Care Providers

Examining the current levels of medical supervision at high schools with AI athletes was better than initially thought with 81% of the coaches reporting some form of supervision at competitions and 35% at practices. The most common type of

supervision was EMTs (mostly at competitions). Almost half of the coaches reported having access to a licensed athletic trainer (LAT) with 41% stating an LAT was present at competitions and 31% at practices. These percentages may be deceiving because only one school has an LAT on campus, which accounted for 7 of the responses, and one has an LAT that travels to their school. The remaining 4 responses were for the same school and interestingly did not employ or have access to an LAT, but rather had a non-licensed person acting as an athletic trainer. Not only was this finding concerning to the researcher because it violates the state of Montana's licensure law regulating the practice of licensed athletic trainers, but also contributed to the skewed results on this particular question. In order to get a more accurate picture on access to LATs we recalculated the responses to those with confirmed access to an LAT. Following the recalculation 30% reported having access. This is well below averages presented in earlier studies in different states conducted by Lindaman and Aukerman. Lindaman (1992) found that 41% of high schools in Michigan had access to athletic trainers while Aukerman (2006) found that 52% of the high schools in North Carolina had access to LATs. Aukerman (2006) also found that 71% had some form of physician coverage at competitions. Coaches that responded to our survey reported having no physician coverage at practices or competitions. This is concerning, while most schools have EMTs on hand at competitions, where most injuries occur (Rechel, 2006), there is a considerable gap in medical supervision during practices. It is positive that schools have EMTs at competitions; however EMTs are not trained to assess, recognize, and treat athletic

injuries like LATs. So the questions posed are where do they seek care and how many injured AI athletes seek care?

Our study found that following an athletic related injury AI athletes sought care primarily from IHS with 85% of the coaches reporting their athletes were treated at IHS. Other common forms of medical care that AI sought included the ER, family physician, PT, and LAT. Again athletes that saw an LAT were from one school. As stated previously the majority of injuries reported were minor, signifying AI athletes are seeking treatment from IHS for minor injuries which may be due to a lack of access to other health care professionals (Dixon & Roubideaux , 2001) such as LATs who are more appropriate for treating athletic injuries (Lyznicki, 1999). Based on the information provided on how many athletes sought medical care it was calculated that between 39 and 135 AI athletes sought care, which is interesting because the injury rate is between 35 and 135. This could signify three things or a combination of the three: 1) coaches were inaccurate in their reporting injuries how many of their AI athletes sought care, 2) AI athletes that received an injury at the one high school with an athletic trainer skewed the results, or 3) injured AI athletes are seeking care from IHS for almost all injuries, no matter the severity. If the third finding is true, this is of great concern due to the cost of receiving such care. Again it brings up the question of access to more appropriate medical care and unfortunately this study does not elicit enough data to fully understand the complexities of healthcare access. However, this is an area that warrants further investigation. Surprisingly, the amount of time it took athletes to seek/receive care was fairly short with 77% of the coaches reporting it took their

athletes between 1 and 7 days. However, this may not be accurate because 19% reported they were not sure how long it took their athletes to receive care. One coach did report it took his/her athletes 3 to 4 weeks to receive medical care.

Where athletes seek medical care following an athletic injury is important but as health care professionals it is important to look beyond acute care, especially if the injury is moderate to severe. Aside from reporting type of care sought/received coaches were also asked to report how many injured AI athletes received imaging tests, were referred to a specialist (e.g. orthopedic surgeon), how many required surgery and how long it took for the athletes to receive surgery, and how many received physical therapy. Results for the number of athletes that received imaging tests were inconsistent with 69% of the coaches reporting between 1 and 5 of their athletes received an X-Ray and 23% reporting between 1 and 5 of their athletes received an MRI. Interestingly only 31% of the coaches reported between 1 and 5 (represents 8 to 40 of the 35 to 135 total injured AI athletes) of their athletes were referred to a specialist and of those athletes that saw a specialist only 15% of the coaches reported between 1 and 5 of their athletes required surgery. 15% of the coaches reported it took their athletes between 2 to 3 weeks to receive surgery, 4% took less than 1 week, and 4% took longer than 9 weeks.

While one of the main focuses of this study was to determine access to specialty medical care, based on the findings it is clear AI athletes have decent access to primary care but limited access to nonemergency specialty care, which would be sought by injured athletes. This is understandable considering IHS does not have the capabilities to staff medical specialists like orthopedic surgeons. Instead IHS depends on Contract

Health Service (CHS), a sub unit within IHS, to provide specialty care for AIs. The CHS program provides primary and specialty care services that may not be available through normal IHS channels. Some of these services include outpatient procedures, physician services, radiology, etc. A particularly important specialty service that the CHS provides, especially for athletes, is orthopedic specialists which are not accessible in the primary care portion of IHS. CHS allows for access to specialty care, however the process is flawed. Based on the limited funds and strict rules governing CHS, its services are limited to individuals with the greatest need, most of the time excluding nonemergent patients such as athletes (Dixon & Roubideaux, 2001). Another flaw is the distance AIs may need to travel in order to obtain specialty care. The median distance from reservation clinics to the five top specialists ranged from 51 to 143 miles (Baldwin, et al, 2008). This may be considered a significant distance to travel for health care if one does not have the financial means. AI populations are too small and health care facilities are too spread out to support medical specialists and because of the lack of IHS funding, salaries are too low to recruit physicians in subspecialties (Dixon & Roubideaux, 2001). Although IHS provides health care free of charge to AIs something most AIs don't realize is that their care is not free, IHS picks up the bill and given that over 35% of all AIs are uninsured (three times the rate for Whites (12%)) (Zuckerman, Haley, & Roubideaux, 2004) this is a significant impact. For instance if an AI high school athlete receives an injury and requires imaging tests like X-Rays and MRIs, IHS pays. These costs can add up quickly, especially if IHS facilities don't have imaging tests on site and AIs have to travel. This creates a need for more direct access to health care providers, such as licensed

athletic trainers (LATs) that can effectively evaluate injured AI athletes to determine the extent and severity of their injury. This would increase quality of care and limit costs that can be incurred from unnecessary diagnostic tests and referrals and possibly lessen the burden on an already fiscally strained system.

Limitations

This study had several limitations that need to be addressed and include response rate, size of sample, retrospective study, and location of school. Of the 116 coaches that were sent the survey only 26 returned it completed correctly. Higher response rates may have increased the strength of the results. While this study's intent was to take a "snap shot" of sports related injuries over a one year period responses to the survey may differed based on coaches' levels of experience, what sport they coach, and awareness/perception of who is AI on their team. Additionally, the level of the coaches' education may also affect the accuracy of information obtained, due to a lack of understanding questions and not knowing their teams' injury rates, severity of injury, and what medical care they sought. Head coaches may have estimated injury rates and severity of injury which may have detracted from the reliability of the study. Depending on the timing of the injury in relation to the end of the season severity of injury may have seemed worse. For instance, a coach might report an injury as season ending even if the injury occurred on the last day of participation. In not selecting the AI high school athletes themselves to answer the survey may have created inaccuracies in the information obtained. With injuries occurring at different points in the season and the

timing of when coaches answer the survey, the time from injury to recollection by the coach may be considerable. Due to these factors the instrument may not adequately measure injury rates, severity of injury, what medical care was sought, and what the current level of medical care is present at competitions and practices. Since the instrument was a retrospective survey instead of a prospective study “retrospective contamination” may have been introduced. That is, coaches may exaggerate or under report actual rates based on past circumstance or not being able to accurately recall (Kolt & Kirby, 1999). Due to the small sample size, variability in school and sports sizes, and geographic location results from this study may not be applicable to American Indians high school athletes throughout the U.S. Finally, given we were not able to gain actual participation numbers of AIs represented in this study it may not be representative of the population.

Conclusion

Based on this study, we cannot conclude American Indian high school athletes in Montana have high or lower injury rates or sustain more severe injuries. The majority of the injuries that were reported by coaches were minor, stressing the need for injury prevention programs. Medical supervision at reservation high school competitions and practices was better than anticipated; however, the majority of the medical supervision consisted of EMTs not trained to recognize or treat athletic injuries. While access to primary care was determined to be adequate, access to specialty care is lacking considerably. This creates a need for more direct access to health care providers trained to prevent, recognize, and treat athletic related injuries. One such group of

medical providers are licensed athletic trainers who can provide continues on site medical care at practices and competitions.

Future Research Recommendation

Given that this study was the first to examine Montana's AI high school athletes' injury rates, severity of injury, and access to specialty medical care, further research is warranted. Subsequent studies could include larger samples, a more appropriate recording instrument, and possibly track injury rates and type of medical care sought over the year prospectively rather than retrospectively. Other recommendations for future studies include comparing injury rates and access to medical care between different tribes, comparing injury rates of AIs athletes to rural non-AIs athletes, and AI high school athletes' perceived adequacy of medical care received.

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Figure1. Current levels of medical supervision at practice and competition

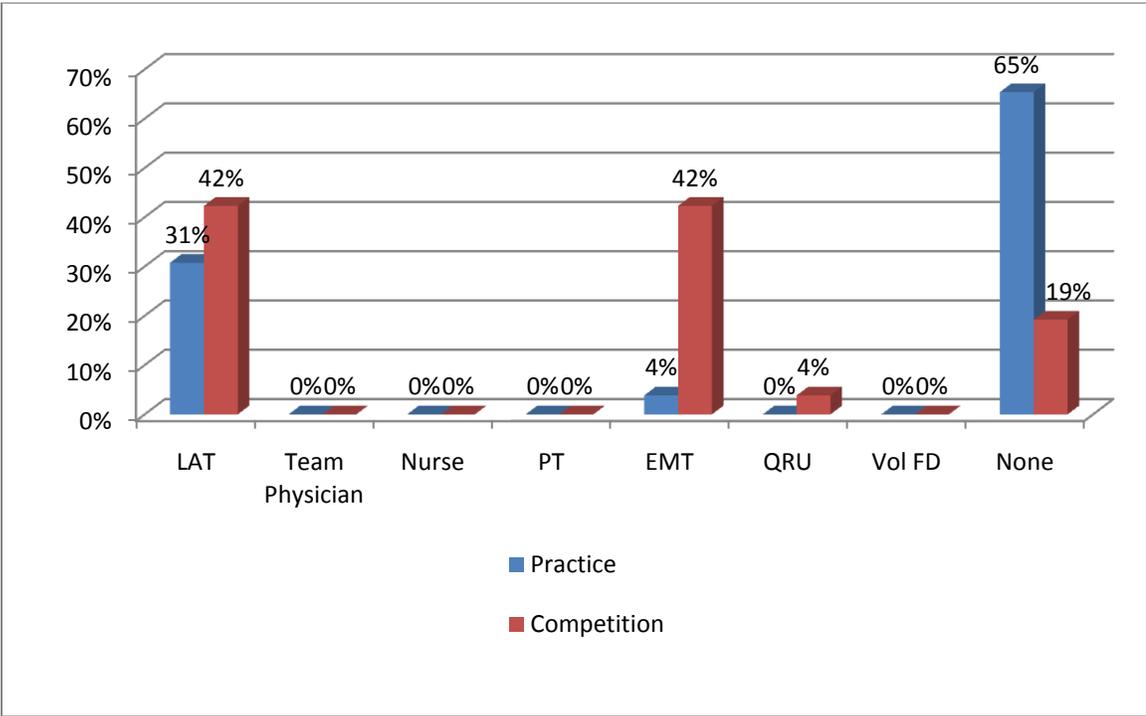


Figure2. Injuries received by AI athletes 2008-2009 AY according to body site reported by coaches

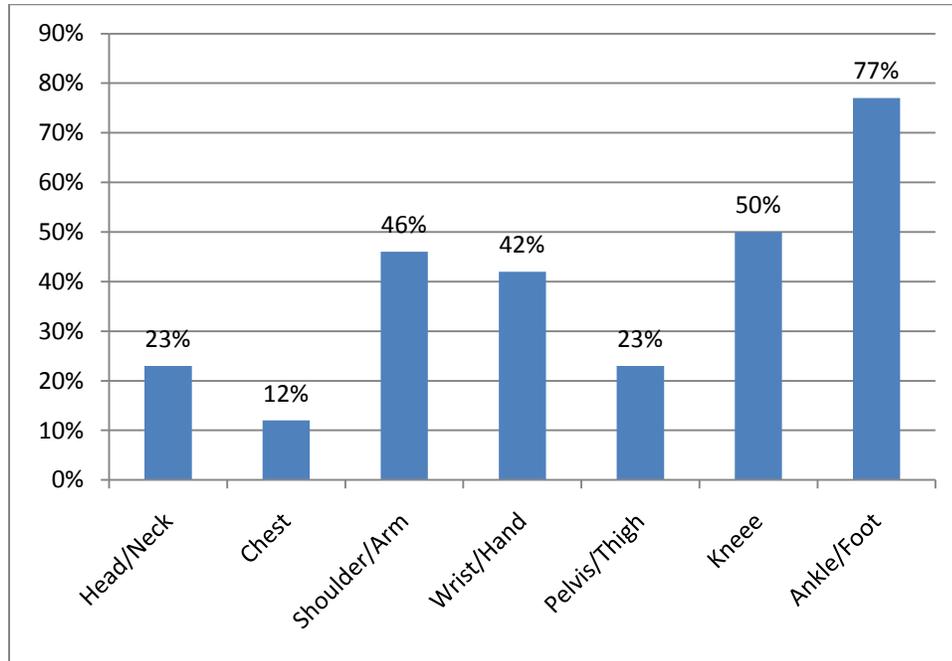


Figure 3. Type of medical care AI athletes 2008-2009 AY sought following injury reported by coaches

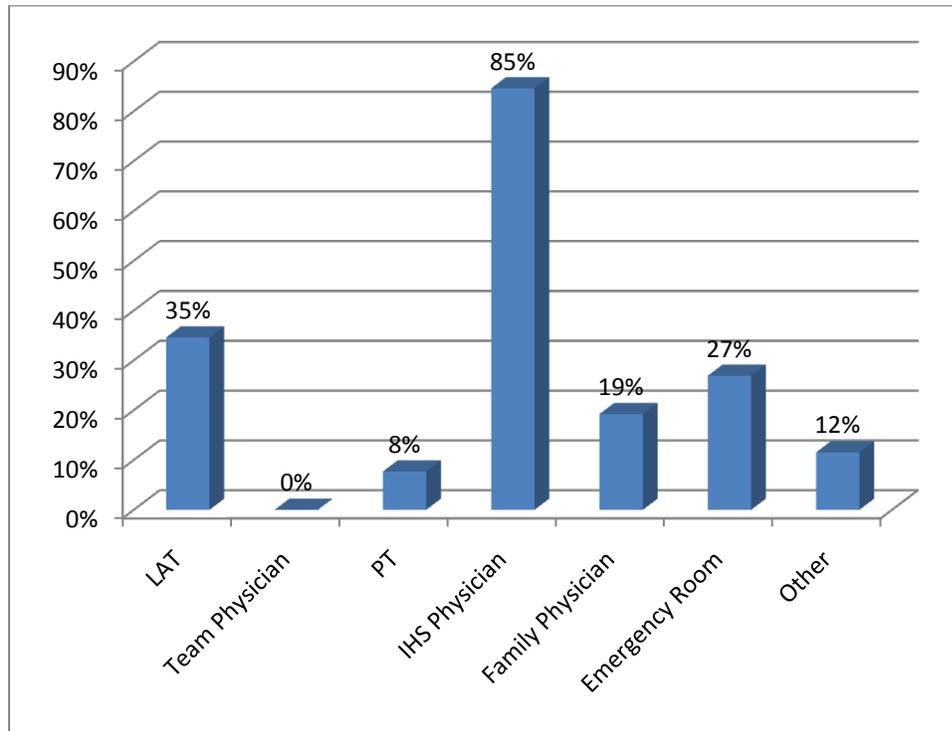


Figure 4. Amount of time it took AI athletes 2008-2009 AY to receive medical care following injury reported by coaches

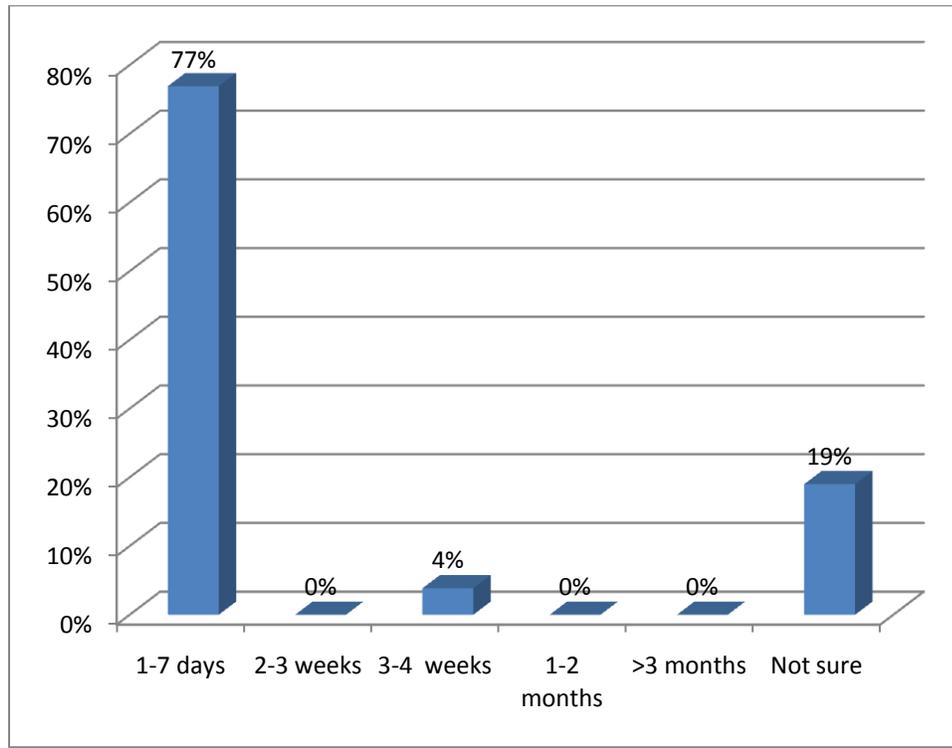


Table 1. Schools that met the inclusion criteria showing which reservation they are on/close to, total student enrolment, AI enrolment, percent of AIs students enrolled, number of sports at the school, and school size.

	School	Reservation	Total Students	AI Students	% of Total	# Sports	Class
1+		Flathead	128	80	62.5	10	B
2		Rocky Boy	108	102	94.4	6	C
3		Fort Peck	58	56	96.6	9	C
4+		Blackfeet	636	622	97.8	12	A
5		Fort Peck	20	17	85	4	C
6		Fort Peck	38	38	100	5	C
7+		Crow	485	294	60.6	16	A
8+		Rocky Boy	195	170	87.2	11	B
9+		Fort Belknap	110	110	100	8	C
10		Blackfeet	58	57	98.3	9	C
11+		Northern Cheyenne	157	157	100	7	B
12+		Crow	162	162	100	9	B
13		Northern Cheyenne	0	0	0	7	C
14		Crow	65	65	100	6	C
15+		Fort Peck	236	220	93.2	11	B
16+		Rocky Boy	128	128	100	7	C
17+		Flathead	378	195	51.6	14	A
18		Flathead	166	85	51.2	9	B
19		Crow	174	166	95.4	9	B
20		Flathead	0	0	0	8	C
21+		Fort Peck	250	157	62.8	11	B
totals			3552	2881		188	

*+ indicates school included in the study

Table 2. The 11 randomly selected high schools used for study showing which reservation they are on/close to, total student enrolment, AI enrolment, percent of AIs students enrolled, number of sports at the school, and school size.

	School	Reservation	Total Students	AI Students	% of Total	# Sports	Class
1		Flathead	128	80	62.5	10	B
4		Blackfeet	636	622	97.8	12	A
7		Crow	485	294	60.6	16	A
8		Rocky Boy	195	170	87.2	11	B
9		Fort Belknap	110	110	100	8	C
11		Northern Cheyenne	157	157	100	7	B
12		Crow	162	162	100	9	B
15		Fort Peck	236	220	93.2	11	B
16		Rocky Boy	128	128	100	7	C
17		Flathead	378	195	51.6	14	A
21		Fort Peck	250	157	62.8	11	B
Total			2865	2295		188	

Table 3. Injury (caused cessation of participation in the current competition/practice and prevented the participant's return to participation for one or more days) rates of American Indian Athletes 2008-2009 AY reported by coaches by sport.

Injuries	FB	VB	B CC	B BB	G BB	WR
1-5	5	2	1	2	3	2
6-10	0	0	0	0	0	0
11-15	0	0	0	0	0	0
16-20	0	0	0	0	0	0
21-25	0	0	0	0	0	0
26-30	0	0	0	0	0	0
>31	0	0	0	0	0	0

Injuries	B T&F	G T&F	B Golf	SB	Cheer	Total
1-5	2	2	1	2	2	24
6-10	0	0	0	0	0	0
11-15	0	1	0	0	0	1
16-20	0	0	0	0	0	0
21-25	0	0	0	0	0	0
26-30	0	0	0	0	0	0
>31	0	0	0	0	0	0

*FB= Football, VB= Volleyball, B CC= Boys' Cross Country, B BB= Boys' Basketball, G BB= Girls' Basketball, WR= Wrestling, B T&F= Boys' Track & Field, G T&F= Girls' Track and Field, SB= Softball, Cheer= Cheerleading

American Indian High School Athlete Injury Survey

Please answer the following questions as accurately and truthfully as possible. Only provide answers for the questions that you know the answers to. Please don't guess. **If you are a head coach for more than two sports complete a survey for each sport.** Answer the following questions based on the **2008-2009 school year**. If you coach a spring sport that has not concluded please provide information from the previous year. Following completion of this survey please return it using the envelope provided as soon as possible. If you have any questions feel free to contact the researcher.

Background/Demographics

1. At what school do you coach? _____

2. What sport are you the **head coach** for and at what level (freshman, junior varsity, varsity, please identify next to sport, **answer for only one sport/team**)?

- | | |
|--|--|
| <input type="checkbox"/> Football_____ | <input type="checkbox"/> Girl's swimming_____ |
| <input type="checkbox"/> Volleyball_____ | <input type="checkbox"/> Boy's Track & Field_____ |
| <input type="checkbox"/> Boy's cross country_____ | <input type="checkbox"/> Girl's Track & Field_____ |
| <input type="checkbox"/> Girl's Cross country_____ | <input type="checkbox"/> Boy's Golf_____ |
| <input type="checkbox"/> Boy's basketball_____ | <input type="checkbox"/> Girl's Golf_____ |
| <input type="checkbox"/> Girl's basketball_____ | <input type="checkbox"/> Softball_____ |
| <input type="checkbox"/> Wrestling_____ | <input type="checkbox"/> Boy's tennis_____ |
| <input type="checkbox"/> Boy's swimming_____ | <input type="checkbox"/> Girl's tennis_____ |

3. How many years have you held this position?

- | | |
|-------------------------------|--------------------------------|
| <input type="checkbox"/> 0-5 | <input type="checkbox"/> 11-15 |
| <input type="checkbox"/> 6-10 | <input type="checkbox"/> >15 |

4. How many years have you been coaching (any level)?

- | | |
|--------------------------------|------------------------------|
| <input type="checkbox"/> 0-5 | <input type="checkbox"/> >15 |
| <input type="checkbox"/> 6-10 | |
| <input type="checkbox"/> 11-15 | |

5. How many athletes participate on your team?

- | | |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> 1-5 | <input type="checkbox"/> 26-30 |
| <input type="checkbox"/> 6-10 | <input type="checkbox"/> 31-35 |
| <input type="checkbox"/> 11-15 | <input type="checkbox"/> 36-40 |
| <input type="checkbox"/> 16-20 | <input type="checkbox"/> 41-45 |
| <input type="checkbox"/> 21-25 | <input type="checkbox"/> >46 |

6. How many **American Indian** athletes participate on your team?

- | | |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> 1-5 | <input type="checkbox"/> 26-30 |
| <input type="checkbox"/> 6-10 | <input type="checkbox"/> 31-35 |
| <input type="checkbox"/> 11-15 | <input type="checkbox"/> 36-40 |
| <input type="checkbox"/> 16-20 | <input type="checkbox"/> 41-45 |
| <input type="checkbox"/> 21-25 | <input type="checkbox"/> >46 |

Current Level of Medical Coverage

7. Do you have medical support/supervision at your **practices**? (check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Licensed Athletic Trainer | <input type="checkbox"/> EMT |
| <input type="checkbox"/> Team Physician | <input type="checkbox"/> Quick Response Unit |
| <input type="checkbox"/> Nurse | <input type="checkbox"/> Volunteer Fire Department |
| <input type="checkbox"/> Physical therapist | <input type="checkbox"/> None |

8. Do you have medical support/supervision at your **home competitions**? (check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Licensed Athletic Trainer | <input type="checkbox"/> EMT |
| <input type="checkbox"/> Team Physician | <input type="checkbox"/> Quick Response Unit |
| <input type="checkbox"/> Nurse | <input type="checkbox"/> Volunteer Fire Department |
| <input type="checkbox"/> Physical therapist | <input type="checkbox"/> None |

9. Do your Athletes have access to a Licensed Athletic Trainer? (check one of the following)

Yes

No

10. Who is the primary medical care provider for your athletes? (check one of the following)

IHS

Private Physician

other

Not sure

Injury rates and severity (The following section relates to American Indian athletes only)

11. How many **American Indian** athletes received an injury that excluded them from one or more practices/competitions during the season? (check the box that applies)

1-5

16-20

6-10

21-25

11-15

26-30

>31

12. How many injuries were sustained to the following body parts that excluded them from one or more practices/competitions during the season?

Head/Neck

0

11-15

1-5

>16

6-10

Not sure

Chest

0

11-15

1-5

>16

6-10

Not sure

Shoulder/Arm

- 0
- 1-5
- 6-10

- 11-15
- >16
- Not sure

Wrist/Hand

- 0
- 1-5
- 6-10

- 11-15
- >16
- Not sure

Pelvis/Thigh

- 0
- 1-5
- 6-10

- 11-15
- >16
- Not sure

Knee

- 0
- 1-5
- 6-10

- 11-15
- >16
- Not sure

Ankle/Foot

- 0
- 1-5
- 6-10

- 11-15
- >16
- Not sure

13. How many injuries were **season ending**?

- 0
- 1-5

- 6-10
- Not sure

14. How many injuries were **career ending**?

- 0
- 1-5

- 6-10
- Not sure

15. How many injuries excluded the athlete from practices/competitions for **two to six weeks?**

- 1-5
- 6-10
- 11-15
- >16
- Not sure

16. How many injuries excluded the athlete from practices/competitions for **one to seven days?**

- 1-5
- 6-10
- 11-15
- >16
- Not sure

17. How many of your Indian athletes that received an injury during the season sought medical attention?

- 1-5
- 6-10
- 11-15
- >16
- Not sure

18. What type of medical care did they seek? (check all that apply)

- Licensed Athletic Trainer
- Team Physician
- Physical therapist
- IHS Physician
- Family Physician
- Other
- Emergency Room

19. How many received the following imaging tests?

- X-Ray
- 1-5
- 6-10
- 11-15
- >16
- Not sure

MRI

1-5

6-10

11-15

>16

Not sure

20. How many were referred to a specialist? (e.g. Orthopedic surgeon, etc.)

0

1-5

6-10

11-15

>16

Not sure

21. On average how long did it take for injured athletes to receive medical care?

1 -7 days

2-3 weeks

3-4 weeks

1-2 months

>3 months

Not sure

22. How many injured athletes required surgery?

0

1-5

6-10

11-15

>16

Not sure

23. On average how long did it take for injured athletes to receive surgery?

1 week

2-3 weeks

4-5 weeks

6-8 weeks

>9 weeks

Not sure

24. How many injured athletes received physical therapy?

0

1-5

6-10

11-15

>16

Not sure

25. Of those that sustained a career ending injury, how many athletes dropped out of school?

For that year

0

1-3

Did not return at all

0

1-3

4-5

>5

4-5

>5

Thank you. Your participation is greatly appreciated and the information you provided is highly valuable.