

EVALUATION OF CONCUSSION EDUCATION, PREVENTION AND
MANAGEMENT POLICIES IN SCHOOL DISTRICTS OF A RURAL
STATE: IMPLICATIONS FOR PRACTICE AND POLICY CHANGE

by

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ABSTRACT

Concussions have become a national issue in organized youth and adult sports. Estimates indicate there are upwards of 3 million concussions yearly. Concussions are unique in the fact that they can cause serious long-term effects and even death if not managed properly. All 50 states have passed laws mandating school districts implement policies and procedures to educate stakeholders about the nature and risks of concussions and subsequently statutes on the proper management of concussed athletes. Montana passed the Dylan Steiger's Protection of Youth Athletes Act in 2013. It is the purpose of this paper to analyze data from interviews and appraisal of school district concussion policies and procedures in the state of Montana; ultimately describing the current state of implementation. Subsequently, recommendations for policy change, school and clinic practice will be made.

School district superintendents were interviewed from 12 counties in Montana. A tool was created to specifically inquire about superintendent knowledge regarding the current policies and procedures in their respective districts as they pertain to the statutes set forth by the DSPYAA (2013). Subsequently, the policies and procedures in these schools were critically analyzed against the statutes of the DSPYAA (2013).

Superintendents had general knowledge of each districts policies and procedures, though many were unsure or unaware of multiple key aspects that are mandated by the law. Critical analysis of district policies and procedures also showed deficiencies when compared to the mandates of the law. Also many districts denied having adequate health care resources.

Recommendations include amendment of the DSPYAA (2013) by restructuring definitions within the law to provide clarity. Amendment should also include multidisciplinary concussion management teams, preferably including superintendents and licensed health care providers, which conduct concussed student-athletes through a gradual return-to-learn process. Superintendents play an important role in ensuring policies and procedures are appropriately implemented and abide by the DSPYAA. It is also recommended that school staff, officials, and local LHCPs be educated on the most current management recommendations. These recommendations may be facilitated by the nurse practitioner considering they have competency in leadership, quality, policy, and health care delivery systems.

CHAPTER 1

INTRODUCTION

According to the National Athletic Trainer Association [NATA] (2014), sport-related concussions in children (age 8-13) and adolescents (age 14-17) account for 58% and 46%, respectively, of all emergency room visits among each age group. Furthermore, those who suffer a single concussion are 1.5 times more likely to suffer a second concussion, those who have suffered two concussions are three times more likely to suffer a second concussion and those who have suffered three concussions are 3.5 times more likely to experience a fourth concussion (NATA, 2014). Many athletes, both boys and girls of all ages, have been severely affected from sustaining concussions – There are far too many stories that tell of long debilitating recoveries, permanent neurological damage and dysfunction, and even death (Adler & Herring, 2011; Green, 2015).

The Healthy People 2020 initiative has set objectives to increase school health education on the topic of “unintentional injury awareness” of elementary, middle, and senior high school students (Office of Disease Prevention and Health Promotion, 2015). Among unintentional injuries are sports and recreation related injuries (Centers for Disease Control and Prevention [CDC], 2012). Head injuries, specifically concussions, have become more prevalent in high school student-athletes over the last decade (Rosenthal, Foraker, Collins, & Comstock, 2014). There was an estimated 446,788 head injuries due to sport-related events that were evaluated in U.S. emergency departments in 2009 (American Association of Neurological Surgeons [AANS], 2015). Furthermore, it is

estimated that as many as 3.8 million concussions, occur yearly during sporting events and recreational activities and that more than 50% of these go undiagnosed (Harmon et al., 2013). An 11-year study on the incidence of concussions among athletes showed they were present in multiple high school sanctioned sports and that there were similar concussion rates among girls and boys; overall rates increased significantly over the 11-year period (Lincoln et al., 2011). At one point in the last decade, sport-related head injuries in the 15-24-year-old age group were the second highest cause of traumatic brain injuries, second only to motor vehicle crashes (Gessel, Fields, Collins, Dick and Comstock, 2007; Marar, McIlvain, Fields, & Comstock, 2012). Concussions remain highly prevalent in contact sports that have inherent risk involved in the nature of the particular sport (Koh, Cassidy, & Watkinson, 2003). Football is one of the worst offenders in the U.S. and is a sport that is included in most high schools, which have a sports program, in the state of Montana (Lincoln et al., 2011). Marar, McIlvain, Fields & Comstock (2012) found in study that concussions were found in many student athletes from multiple sports. Concussions have been seen to be most prevalent in football, boys and girls soccer, wrestling and boys and girls basketball (Gessel, Fields, Collins, Dick, & Comstock, 2007; Marar, McIlvain, Fields, & Comstock, 2012; Yard & Comstock, 2009).

Specifically in Montana, 6% of all mild traumatic brain injuries (mTBI) treated in emergency departments between 2010 and 2013 were sports-related concussions (Montana Chronic Disease Prevention and Health Promotion Bureau [MCDPHPB], 2015). However, among those ages 10-19, sports related concussion accounted for 20% of all mTBIs treated in the same time period (MCDPHPB, 2015). It was also noted in

study that 43% of sport-related concussions for school-aged youth in Montana occurred in September and October (MCDPHPB, 2015). It does not seem to be coincidence that regular season competition in school sanctioned football and soccer programs begin in late August and conclude in October (MHSA, 2015)

Concussions are significant injuries; Younger people are at increased risk of sustaining long-term effects from TBI when compared with adults (CDC, 2011). Post-concussive syndrome can exist years later in the form of neurocognitive deficits and depression (McCrory, Meeuwisse, Kutcher, Jordan, & Gardner, 2013). It has also been seen, though rare, in those under the age of 18 where the brain is still “immature” return-to-play too early may lead to severe anoxic brain injury and even death (Gusiewicz & Broglio, 2015).

Currently, there is a Montana law in place, The Dylan Steigers Protection of Youth Athletes Act [DSPYAA](2013), that mandates each school district implement a program that informs and educates athletes, parents, and school-based staff who are involved with, or participating within, district sanctioned sports. It also mandates that schools properly remove players suspected of having a concussion from play and keep them out of play until evaluated by a licensed health care provider (LHCP). Finally, that player can only return with written clearance from the LHCP.

This scholarly project seeks to analyze the current state of concussion policies and procedures from a sample of school districts in Montana. From analysis, recommendations for policy change, clinical and school practices will be made to further the safety of student-athletes who participate in sports that put them at risk for

concussions and for those who actually do suffer concussions. Superintendents from each district were interviewed to gather knowledge and perspective considering superintendents are the executive director of the districts school board and, ultimately, the districts policies and procedures. Through data analysis from interviews and critical appraisal of district concussion protocols and procedures, it is this studies aim to describe the current state of the DSPYAA (2013) and provide recommendation for future implementation and study.

CHAPTER 2

REVIEW OF LITERATURE

Definition

Concussions have become a high priority in healthcare and sports organizations nationwide (Harmon et al., 2013; McRory et al., 2013). Concussion and mTBI have been used synonymously in the past, however concussions are recognized as a unique subset of mTBI (Harmon et al., 2013; McRory et al., 2013). This is why the term ‘concussion’ will be used exclusively in this paper. Concussions occur when force is applied directly, or in a rotational manner, to the head, neck or other region of an individual’s body that transmits said force to the head (Harmon et al., 2013; McRory et al. 2013). This triggers biochemical reactions within the brain that cause a transient disturbance in brain functioning, which may or may not be accompanied by loss of consciousness (Broglia et al., 2014; Harmon et al., 2013; McRory et al. 2013).

Prevention, Recognition,
Diagnosis and Management

Due to the quickly evolving nature of concussions in sports and the potential danger it poses to athletes around the country, recognition of such injuries has increased. Though there has been increased awareness, there has been a lack of solid treatment guidelines due to the vague nature of symptoms and uniqueness of each case (Bakhos, Lockhart, Myers, & Linakis, 2010). However, there are common guidelines that have

been presented by leading organizations that are recommended to decrease concussion prevalence as well as long-term effects and repeat injury.

Symptoms of concussions are far ranging and unique to each individual.

However, common signs and symptoms have emerged in four areas which can be seen in Table 1 (CDC, 2015; McRory et al., 2013; Harmon et al., 2013; Halstead & Walter, 2010):

Table 1. Concussion Signs & Symptoms.

Domain	Specific Signs and Symptoms	
Physical signs	o	Dizziness
	o	Nausea
	o	Vomiting
	o	Fatigue
	o	Light sensitivity
	o	Noise sensitivity
	o	Headache
	o	Balance disturbance
	o	Visual disturbance
Cognitive impairment	o	“Foggy or hazy” feeling
	o	Difficulty concentrating
	o	Difficulty remembering
	o	Forgetful
	o	Confusion
	o	Repeats questions
	o	Slow response time
Emotional changes	o	Lability
	o	Irritability
	o	Sadness
	o	Anxiety
Sleep disturbances	o	Drowsy
	o	Sleeps more than normal
	o	Sleeps less than normal
	o	Difficulty falling asleep

These symptoms have been seen to last approximately 7-10 days in youth who have experienced a concussion (Belanger et al., 2005; Graham, Rivara, Ford, & Spicer [Eds.], 2014; McCrory et al., 2013).

When looking at the high school population, it is of note that younger people are at increased risk of sustaining long-term effects from concussions when compared with adults (CDC, 2011; Sim, Terryberry-Spohr, & Wilson, 2008; Kirkwood, Yeates, & Wilson, 2006). It has also been shown that high school athletes have slower recoveries than college athletes (Field, Collins, Lovell, & Maroon, 2003; Covassin, Elbin, Harris, Parker & Kontos, 2012). Children also have been reported to experience a higher incidence of cognitive symptoms one-year post concussion when compared to adults (Daneshvar et al., 2011). Though rare, this long-term symptomology is manifested by a multitude of lingering symptoms, such as fatigue, headache, dizziness, irritability, depression, and difficulty concentrating, which has been termed post-concussive syndrome (PCS). PCS can last months to years after injury (Daneshvar et al., 2011; Ryan & Warden, 2003). Since the brain continues to develop in adolescence, it is thought that concussions, and the possible acquisition of PCS, may also impede the ability of the individual to learn and develop healthily and effectively (Daneshvar et al., 2011; Sim, Terryberry-Spohr, & Wilson, 2008).

As previously mentioned, concussion symptoms are more vague than other common sports-related injuries, and are not easily detected by untrained staff (Lincoln et al., 2011; Meehan & O'Brien, 2015). This makes it extremely difficult to pull concussed athletes out of competition due to the lack of recognition (Lincoln et al., 2011; Meehan &

O'Brien, 2015). Furthermore, student-athletes may not exhibit symptoms for up to 24 hours post-trauma and it has also been noted that players notoriously underreport symptoms (McCrea, Hammeke, Olsen, Leo, & Guskiewicz, 2004; Duhaime et al., 2012; McCrory et al., 2013; Graham, Rivara, Ford, & Spicer [Eds.], 2014). When staff at athletic events are not properly educated and informed, it can lead to mistakes in recognition and student-athletes may subsequently be returned to play too early. It has also been thought that, though rare, if an athlete returns to play too early after sustaining a concussion, that player is at risk of sustaining second impact syndrome (SIS), which refers to severe edema of the brain (Bey & Ostick, 2009; Cobb & Battlin, 2004; Cantu, 1998). However, this is not well understood and more recent research has suggested that SIS is not accurate terminology. Rather it is thought that children and adolescents are at highest risk of suffering "diffuse cerebral edema", due to impact, that is ultimately fatal (McCrory & Berkovic, 1998; Cantu, 1998; Cobb & Battin, 2004; McCrory, Davis, & Markissi, 2012). In either case, both cause swelling of the brain that can lead to severe anoxic brain injuries and even death (Gusiewicz & Broglio, 2015; McCrory, Davis, & Markissi, 2012). In light of the aforementioned information, though rare, student-athletes well-being can be put in significant jeopardy due to missed signs & symptoms and underreporting.

Concussions have recently been recognized further as a debilitating injury due to study of a condition called Chronic Traumatic Encephalopathy (CTE) (Omalu, Bailes, Hammers, & Fitzsimmons, 2010; McKee et al., 2013). CTE has been found in many athletes who have been exposed to repeated head trauma, namely, players from the

National Football League (Omalu, Bailes, Hammers, & Fitzsimmons, 2010; Costanza et al., 2011). CTE is categorized as a dementia-like syndrome that is due to repeated trauma to the head (McKee et al., 2013; Yi, Padalino, Chin, Montenegro, & Cantu, 2013). This is currently a contentious topic in the National Football League (NFL) due to the fact that many former players have experienced severe psychological problems including major depressive disorder and suicidality, which have been linked to CTE (Omalu, Bailes, Hammers, & Fitzsimmons, 2010; McKee et al., 2013). Currently, there has been a lack of study and little evidence empirically linking CTE to many populations, let alone high school athletes, considering symptoms usually do not manifest until years later (Meehan, Mannix, Zafonte, & Pascual-Leone, 2015).

Concussion Prevention

First and foremost, before an athlete is to participate, prevention strategies must be in place to educate parents, athletes, school and sporting staff about the nature and risks of concussions in sports (Broglia et al., 2014; Giza et al., 2013). The American Academy of Neurology recommends that school-based staff be educated by a LHCP, such as a physician, physician's assistant, or nurse practitioner, experienced in the field of treating concussions so that they can properly educate parents and athletes (Giza et al., 2013). It is equally important that athletes and their parents are properly informed of the risks involved with playing their specific sport regarding concussions. Such education should include prevention, symptom recognition, return-to-play (RTP) restrictions, specific treatment, and consequences to improper management (Broglia et al., 2013; Giza et al., 2013).

Evaluating Concussions

When evaluating a downed athlete for a concussion, the athlete should always be evaluated for first-aid issues including airway patency, breathing, and circulation integrity (McCrory et al., 2013; Harmon et al., 2012). If the student-athlete has unconsciousness for longer than one minute, has focal neurological changes, and/or is mentally deteriorating they must be transferred to a facility for emergency care. Cervical-spine injuries must be ruled out as well (McCrory et al., 2013; Harmon et al., 2012). The student-athlete should not be left alone and monitored frequently for altered or deteriorating mental status (Broglia et al., 2013) (Giza et al., 2013; McCrory et al., 2013; Harmon et al., 2012). Players can then be evaluated with standardized sideline tests to help diagnose a concussion. That being said, there are many tools used for the identification of concussions currently. Such tools that are appropriate for immediate evaluation include the Sports Concussion Assessment Tool version 3 (SCAT3) and the Standardized Assessment of Concussions (SAC) tool (McCrory et al., 2013). Both tools are approved for high school athletes (McCrory et al., 2013). Graham, Rivara, Ford, & Spicer [Eds.] (2014) recommend that a multitude of tools such as symptom checklists, balance testing and neuropsychological testing be used in the evaluation and diagnosis of concussions.

When players report or are observed to have the aforementioned signs or symptoms of a concussion, are otherwise cleared of significant first-aid and/or immediately life threatening injuries, and are assessed as having a concussion, then they are to be removed from practice/play until evaluated by a LHCP such as a physician,

physician's assistant, or nurse practitioner experienced in the field of treating concussions (Giza et al., 2013; McCrory et al., 2013; Harmon et al., 2012). Though an LHCP has the ultimate say in when a student-athlete can return, it is also up to parents, coaches, trainers and other staff to help facilitate responsible RTP practices (CDC, 2015).

Management and Return-to-Play (RTP)

No player suspected of having a concussion should be returned to play the same day (Broglia et al., 2013; Giza et al., 2013; McCrory et al., 2013; Harmon et al., 2012). It is recommended by many leading organizations that the student-athlete be returned to play gradually (Giza et al., 2013; Broglia et al., 2013; McCrory et al. 2013). Student-athletes should be returned to play slowly beginning with rest (CDC, 2015; Halstead & Walter, 2010). Rest is a key component to recovery and is a mainstay for treatment (McCrory et al., 2013; CDC, 2015; Halstead & Walter, 2010). McCrory et al. (2013), of the 4th International Conference on Concussion in Sport, go as far to say that physical and cognitive rest are the “cornerstones” of concussion management (p. 557). According to Halstead & Walter (2010) student-athletes will exhibit an increase in symptoms with cognitive over-exertion. Adequate time should be given to these student-athletes away from school, as well as in school, to allow for full recovery (Halstead & Walter, 2010; Broglia et al., 2014). However, there are no evidence-based recommendations on the optimal rest time (McCrory et al., 2013). Screen time also demands a large amount of concentration and attention; therefore it should be discouraged (Halstead & Walter, 2010). Once symptoms resolve, the LHCP should guide the student-athlete through a step-wise progression (CDC, 2015; Giza et al. 2013; Broglia et al., 2013; McCrory et al.,

2013). The steps should start with light activity, then sport specific exercise, non-contact drills and finally back to full-contact practice (McCrory et al., 2013; CDC, 2015).

McCrory et al. (2013) created a graduated return-to-play protocol, which is seen in Table

2. If the student-athlete progressively tolerates each step symptom-free, then they can return to playing in a normal game. However, if symptoms manifest at any time during the step-wise progression, the student-athlete will go to the previous step at which they were asymptomatic (Broglia et al., 2013; Giza et al., 201; McCrory et al., 2013; Harmon et al., 2012). It should be noted that a student-athlete should be returned to school activities before being returned to play in sports (McCrory et al., 2013).

Table 2. Graduated Return-to-Play Protocol,

Rehabilitation Stage	Functional Exercise at Each Stage of Rehabilitation	Objective(s) of Each Stage
1. No activity	Symptom-limited physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming, or stationary cycling, keeping intensity, 70% of maximum permitted heart rate; no resistance training	Increase heart rate
3. Sport specific exercise	Skating drills in ice hockey, running drills in soccer; no head-impact activities	Add movement
4. Noncontact training drills	Progression to more complex training drills, eg, passing drills in football and ice hockey; may start progressive resistance training	Exercise, coordination, and cognitive load
5. Full-contact practice	After medical clearance, participation in normal training activities	Restore confidence and assessment of functional skills by coaching staff
Return to play	Normal game play	

(McCrory et al., 2013 p. 558)

Meehan & O'Brien (2015) state that if a student-athlete who has suffered a concussion is asymptomatic, they may return to school immediately. However, it has also been noted that it may be beneficial to have 24-48 hours of rest regardless if symptoms have ceased to persist (McCrory et al., 2013). Concussed student athletes may have difficulty in school due the multifactorial effects concussions can have on the brain (Sady, Vaughan, & Gioia, 2011; Halstead et al., 2013). Therefore, students may also qualify to have a Response to Intervention Protocol (RIP), 504 plan, or an Individualized Education Plan (IEP) to facilitate their learning needs after a concussion has been sustained (CDC, 2015). There is little evidence or guidelines on the proper time for students to return to school; each case should be carefully evaluated and managed (Harmon et al. 2012). It is the position of this evaluation that "return-to-learn" is far more crucial than returning to play (Halstead et al., 2013).

Neuropsychological Testing

Many schools have also implemented baseline testing into their programs (CDC, 2015). These baseline tests are used to assess cognition as well as concussion symptomology before an athlete begins their season (Randolph, McCrea, Barr & Macciocchi, 2005). Then, if head injury were to occur, the athlete would again do testing to identify lingering symptoms. Computerized neuropsychological testing has been used as a baseline test and subsequently, for evaluation of concussions (Graham, Rivara, & Spicer [Eds.], 2014). There have been many mixed findings with NP testing. In some cases, it has been shown to be effective at capturing the multifactorial effects caused by concussions (Echemendia et al., 2013). Broglio, Macciocchi, & Ferrara (2007) found that

even after subjective symptoms had resolved after 72 hours, the ImPACT test continued to show cognitive deficit in at least one area in 81% of athletes. However, there can be many factors that can affect the outcomes of such testing such as comorbidities and genetics; it should not be used as a sole measure to clear concussed players (Echemendia et al., 2013) (Graham, Rivara, & Spicer [Eds.], 2014). A systematic review of the quality of research on NP testing showed that methodologies were highly variable and lacked “proper scientific rigour” (Comper, Hutchison, Magrys, Mainwaring, & Richards, 2010). Also, it is recommended for proper resulting that trained staff conduct testing and that trained neuropsychologist should evaluate data from the specific neuropsychological test (Giza et al., 2013; Echemendia et al., 2013; Graham, Rivara, & Spicer, 2014). NP testing can be administered after the typical recovery period, though there is no evidence or recommendation as to when exactly it should be utilized (Halstead & Walter, 2010; Graham, Rivara, & Spicer [Eds.], 2014).

Medication and Imaging

Medication and neuroimaging are usually not a significant piece in the management of concussions. Medication such as Tylenol can be used for headaches – aspirin and NSAIDs should be avoided due to their capability to decrease platelet aggregation and mask the severity of signs and symptoms (Broglia et al., 2013). Medications that can cause mental status changes should be avoided as well. Student-athletes with pre-existing conditions such as depression or who are taking medication that may alter mental status, need careful evaluation to distinguish between the signs of concussion and concomitant disease (McCrory et al., 2013).

Neuroimaging is not usually indicated for most student-athletes who suffer concussions (Broglia et al., 2013; Giza et al., 2013; McCrory et al., 2013; Harmon et al., 2012; Halstead, & Walter, 2010). However, CT scans are very useful to rule out other life threatening sequelae, due to traumatic brain injury, such as intracranial hemorrhage (Giza et al., 2013). There is research being conducted on different scans that may provide useful data, however there are no recommendations at this time for any imaging for concussed athletes (Harmon, et al., 2012).

Legislation

According to the Office of Disease Prevention and Health Promotion (2015) “Making changes within existing systems, such as improving school health programs and policies, can effectively improve the health of many in the community”. Our nation has taken great strides in preventing, identifying, and treating concussions in athletes of all ages. According to the National Conference of State Legislatures [NCSL](2014) between 2009 and 2014, all 50 states had implemented laws that address traumatic brain injuries, with a majority of these laws targeted towards sports-related concussions. Three common themes engender the sports-related concussion policies in a large majority of states:

- Education and training for coaches, players and athletes on concussion recognition and response.
- Removing a youth athlete from play or practice if they are suspected of having a concussion.

- Returning a youth athlete to play after evaluation and written clearance from a LHCP at least 24 hours after concussive incident. (National Conference of State Legislatures, 2014; CDC, 2016)

Though strides taken to implement policy have been remarkable in the previous years, the NCSL (2014) and CDC (2013) state that further evaluations of policy implementations are warranted to identify their effectiveness. Adler and Herring (2011) state that as concussion recognition and management evolve, so should the laws that govern each state.

There are policies in every state, however they do tend to vary. For example, LHCPs who can clear players in some states differ from others (Tomei et al., 2012; Harvey, 2013). There were multiple state laws that allow NPs, PAs and even ATCs to clear players to return-to-play while some other states only allow physician clearance (Tomei et al., 2012; Harvey, 2013; Graham, Rivara, & Spicer [Eds.], 2014). Tomei et al., (2012) and Harvey (2013) were unable to add information in their studies from Montana due to the fact the law had not been created yet.

Hence, this particular evaluation comes timely, mid-decade, to assess the state of progress made in the implementation of head injury guidelines as they pertain to high school sports in a rural state; a vital piece to achieving the objectives of Healthy People 2020. The CDC (2013) states: “One example of an implementation evaluation would be an evaluation of the quality of the implementation efforts by examining the content of school level protocol” (p. 11). Furthermore, the CDC (2013) suggests that if policy

evaluation is undertaken that it is appropriate to use instruments that are specific to the policy to extract relevant data (Graham, Rivara, & Spicer [Eds.], 2014).

Considering the CDCs (2013) recommendations, the purpose of this project is to define the current high school sports system in Montana, a rural state with a population of approximately 1 million, and help guide/inform policy to implement a universal system that will help staff identify and implement standard concussion protocols statewide. Also, the aim of this project is not to directly impact primary prevention, but rather help identify possible facilitators to actively approach secondary prevention of head injuries during sporting practices and events.

The Dylan Steiger's Protection of Youth Athletes Act

The DSPYAA (2013), also known as Montana Senate Bill 112, was passed in April of 2013. Many of the DSPYAA's (2013) statutes parallel the CDC's (2016) three identified areas. This law was created to protect youth athletes from serious injury – This is of specific concern of the state (DSPYAA, 2013). The DSPYAA (2013) outlines the inherent risks of school sports and the dangers that concussions pose to the student-athletes who participate in them. The entirety of the law can be seen in the Appendix A.

The Dylan Steiger's Protection of Youth Athletes Act (DSPYAA), also known as Senate Bill 112, was passed in the spring of 2013 for the purpose of:

- Educating parents, athletes, coaches, athletic trainers (ATCs) and other school staff about the nature and risk of concussions in sports

- Mandating school districts put policies and procedures in place that indicate the removal of a player suspected of having a concussion
- Mandating the athlete is not returned to play before being evaluated by a licensed health care professional (LHCP) and having written clearance from that LHCP to return-to-play (DSPYAA, 2013).

Review of the Current State of the DSPYAA

The DSPYAA is broken down into 7 sections, 4 of which are of concern to this review. The seven sections are as follows in Table 3:

Of concern to this evaluation are sections 2-5 of the DSPYAA. Section 2, the purpose and intent of the DSPYAA, declares that the purpose of this act is to mitigate permanent injury and death, due to concussions, in the youth athletes of Montana. The DSPYAA (2013) goes on to say that concussions can be significant injuries and that many youth are at risk who participate in organized and unorganized athletics. The DSPYAA (2013) states that if the athlete continues to play after exhibiting symptoms from a concussion, then they are put at significant risk of damaging injury and even death.

Table 3. Sections of the DSPYAA.

Section	Title	Description
1	Short Title	Provides Title
2	Purpose – Intent	This section reviews the prevalence and dangers of concussions
3	Definitions	Provides definition to “concussion”, “LHCP”, “Organized youth athletic activity”, and “Youth athlete”
4	Youth athletes – concussion education requirements	This section outlines the law’s requirements to educating individuals such as parents, athletes, trainers, officials and coaches on the nature and risks of concussions in sports
5	Youth athletes -- removal from participation following concussion -- medical clearance required before return to participation	This section outlines the need to have a student removed if suspected of sustaining a concussion and that an LHCP evaluate must evaluate that athlete and provide written clearance for return-to-play
6	Codification instruction	Bill coding
7	Effective Date	“Effective on passage and approval” DSPYAA (2013)

Section 3 provides definitions to key terms included in the law. In the law, “concussion” is defined as “an injury to the brain arising from blunt trauma, an acceleration force, or a deceleration force, which may include one of the following observed or self-reported conditions attributable to the injury...” The conditions referred to are symptoms of concussions such as confusion, disorientation, headache, dizziness, fatigue, neurological and/or psychological dysfunction and irritability, to name a few (DSPYAA, 2013). “Licensed Health Care Professionals”(LHCPs) are defined as individuals who are “registered, licensed, certified, or otherwise statutorily recognized health care professional whose training includes the evaluation and management of concussions” (DSPYAA, 2013). “Organized youth athletic activity” is defined as “an

athletic activity sponsored by a school or school district in which the participants are engaged in an athletic game or competition against another team, club, or entity, in practice, tryouts, training exercises, or sports camps, or in preparation for an athletic game or competition against another team, club, or entity” (DSPYAA, 2013). "Youth athlete" is described as an “individual who is an active participant in an organized youth athletic activity” (DSPYAA, 2013).

Section 4 mandates concussion education requirements be met in each school district in Montana. The DSPYAA (2013) states that each school district will implement policies and procedures that educate “athletic trainers, coaches, officials, youth athletes, and parents or guardians of the nature and risk of brain injuries”. This education should include the nature and risk of such injuries within athletics, the signs and symptoms involved, the need to contact a LHCP when signs and symptoms are present, and the importance of following medical advice for returning to play. Also, It is mandated that each school will have parents and youth athletes sign a form stating that they have received the aforementioned education and that the form be turned in before the athlete can participate. This is to be done for each year of participation. Section 4 also includes that all coaches, officials, and athletic trainers must complete “the training program” yearly. The DSPYAA also allows for material in section 4 to be completed in association with “appropriate advocacy groups and appropriate sports governing bodies” (DSPYAA, 2013). According to the law, “The policies, content, and protocols must be consistent with current medical knowledge and guidelines provided by the U.S. Department of

Health and Human Services, Center for Disease Control and Prevention” (DSPYAA, 2013).

Section 5 outlines the statutes for removing a player who is suspected of sustaining a concussion and the subsequent statutes for appropriate medical clearance for RTP. Section 5 states that any ATC, coach, or official may remove a player suspected of having signs or symptoms that are consistent with a concussion. If the player is removed they may not RTP until they are no longer symptomatic of a concussion AND they have been evaluated by an LHCP who provides written clearance. The DSPYAA (2013) also mandates that written clearance must include that the LHCP has evaluated the athlete and it is their medical opinion that the athlete can safely RTP.

The Montana High School Association (MHSA) is the regulating body that oversees the policies and procedures that are in place for each school district regarding concussion education, identification, evaluation and treatment amongst student-athletes, coaches, parents, and trainers. However, there is no universal system in place and it is up to the individual school district to formulate a program that meets the criteria set forth by the law. There are guidelines available to each district from the MHSA, though the problem lies with the unknown nature of each system (especially those which are rural), it’s resources, and it’s ability to accurately interpret the guidelines to educate staff and implement protocol to increase safety of sporting events.

The DSPYAA (2013) parallels many aspects of recommendations set forth by governing bodies such as the Center of Disease Control and Prevention, American Medical Society for Sports Medicine, the American Academy of Neurology, The

American Academy of Pediatrics and The 4th International Conference on Concussion in Sport, and the National Athletic Trainers Association. However, the law does not require that parents, student-athletes, coaches, and other school based staff be educated by a LHCP experienced in managing concussions, which is a thematic recommendation (Giza et al., 2013; Broglio et al., 2014). It is also of note that the DSPYAA (2013) only covers school-sanctioned sports; there is no regard to youth and recreation leagues, which the CDC (2013) recommends be part of each states law.

DSPYAA in Context of Current Recommendations

Section 2 provides the purpose and intent of the DSPYAA (2013). As described above, this section outlines the dangers of concussions and the risk of concussions associated with competing in sports. This information is clearly accurate as evidence by the literature. Being a leading organization in public health, the Centers for Disease Control and Prevention has been at the forefront of the campaign to mitigate concussions and serious injuries associated with them. They have created the “Heads-up” initiative that aims at not only educating parents and athletes but also coaches, officials, school districts and health care providers (CDC, 2015). Many organizations assessment of the signs and symptoms of concussions are congruent with those present in the DSPYAA (CDC, 2015; McRory et al. 2013; Harmon et al., 201; Halstead & Walter, 2010). The CDC also verifies that concussions, though categorized as “mild” traumatic brain injuries, have serious implications as discussed previously.

As described previously, Section 3 provides definitions to a few key terms important to the management of concussions. As stated above a concussion is accurately described (McCrory et al., 2013; Harmon et al., 2013; Broglio et al., 2014). However, the definition of LHCP is quite vague in the DSPYAA (2013). The law states an LHCP is a professional “whose training includes the evaluation and management of concussions”. Though there is no actual statement, this would ultimately include an ATC who is a trained professional who can evaluate and manage concussions (Broglio et al., 2014). However, there is mention in the DSPYAA (2013) of the need for ATCs to have yearly training along with coaches, which may suggest otherwise. There is no mention that ATCs cannot be the evaluator to return an athlete to play, since their scope of practice lies within the laws mandate (Moody & Tosoni, 2016; MCDPHPB, 2015; Broglio et al., 2014). Another glaring finding is the definition of “organized youth athletic activity”. The law states that this is defined as a sporting activity sponsored by the school or school district (DSPYAA, 2013). However, it is of note that there has been study showing inadequate concussion knowledge in many youth coaches (McLeod, Schwartz, & Bay, 2007; Covassin, Elbin, & Sarmiento, 2012). Many other sports programs take place outside of school districts across the nation and in Montana (Moody & Tosoni, 2016; Montana Department of Health and Human Services [MDHHS], 2015). Therefore, the law does not cover a large number of young children in Montana, ultimately limiting the target population (Moody & Tosoni, 2016).

Section 4 outlines the need to educate individuals involved in school-sanctioned sports. Many organizations agree that education is an essential part of alleviating long-

term sequelae post-concussion as well as preventing concussions through restricting contact in practice and with proper training/techniques (Harmon et al., 2013; McCrory et al., 2013). It is one current recommendation that parents, student-athletes, and school personnel be educated by a LHCP who is educated and experienced in the identification and management of concussions (Giza et al., 2013). Also, Broglio et al. (2014) states that a player should not be returned to play after a concussion until cleared by a “physician, or designate (eg AT), specifically trained and experienced in concussion evaluation and management” (p. 247). However, with the rural nature of Montana, it has been seen that almost half of all school districts have neither an ATC or school nurse therefore have little access to a health care professional trained and experienced in evaluating and managing concussions (Moody & Tosoni, 2016). Regarding the DSPYAA (2013) mandate to have parent/athlete sign-off on the understanding of their education, it has been found that many school districts in Montana are failing to collect parent/athlete sign-off sheets and, if they are collected, failing to record they were returned (Moody & Tosoni, 2016).

Finally, Section 5 states that a LHCP should evaluate and provide written clearance for RTP. This is aligned with many recommendations (Broglio et al., 2014; Giza et al., 2013; McCrory et al., 2013; Harmon et al., 2013; CDC, 2015). In contrast to the recommendations of having experienced LHCPs evaluate concussed athletes, as stated previously, it is has been seen in study that many health care providers, including physicians, are not properly trained in the management of concussions (Zonfrillo et al., 2012; (Graham, Rivara, Ford, & Spicer [Eds.], 2014). It is also recommended that the

athlete be reintroduced to activity in a stepwise manner (CDC, 2016; Broglio et al., 2016; Harmon et al., 2013). Though not mentioned in the DSPYAA, current recommendations state that RTP will not take place in the first 24 hours post-concussion and until an athlete returns to their cognitive baseline where they are otherwise symptom free (Harmon et al., 2013; McCrory et al., 2013; Broglio et al., 2014; Giza et al., 2013; CDC, 2016). It is interesting to note that Yard & Comstock (2009) found in study that half of athletes who sustained concussions did not RTP appropriately. Marar, McIlvain, Fields & Comstock (2012) also found that many students were being RTP the same day of injury, despite current recommendations. If appropriate RTP is not addressed in the law, then full compliance is less than the recommendations of leading organizations.

New Concussion Legislation in Montana

Newly passed, HJ 26 (2015), requests that further study and evaluation is done on the implementation of the DSPYAA (2013). This joint resolution recognizes the quickly evolving nature of concussions and the vast differences in resources (health care, geographical and financial to name a few) of the school districts within the state of Montana. It is the intent of this evaluation to provide a piece of this suggested research as well as recommendations to improve implementation and continual compliance. HJ 26 (2015) states this resolution's purpose is to examine how, and if, policies and procedures are being implemented and determine the content of these policies and procedures. If it is determined that these policies and procedures are not aligned with current medical knowledge and scientific information, then it may be warranted that statutory changes be made to the DSPYAA (2013) that mandate specific protocols and also seek resources for

districts that may have difficulty in implementing their policies and procedures (HJ 26, 2015).

Other Study in Montana

The Montana Department of Public Health and Human Services [MDPHHS](2014) published a study in December 2014 that analyzed aspects of the current state of the law through electronic surveys with athletic directors, athletic trainers, school nurses, principals, coaches, and superintendents. 12 Superintendents responded to this study, however, all responses were undifferentiated from other persons included in the study. It was reported that among the respondents, 81% had policies and procedures in place and at least 92% of schools had implemented key components mandated by the DSPYAA (2013). Also, it was found that schools with ATCs were more likely to have concussion protocols in place. Other intriguing findings were that only 65% of schools documented the required parent/student-athlete sign-off sheet. Also, only 58% of respondents said they have a system to keep track of the training hours that coaches and athletic trainers are mandated to accomplish. Finally, schools in the study were found to have more full-time school nurses than full-time athletic trainers. Many other schools did not have part-time coverage from either.

Another, more recent study by Moody and Tosoni (2016), further described the state of concussion policy and procedure implementation across the state. Again, this study was done across multiple professional fields whose scope of practice lie within the context of school-based health, sports, and activities (Coaches, ATCs, ADs,

Superintendents, etc.). Again, all responses were undifferentiated from other professionals. One of the biggest findings was that over half of the schools included in the study did not have direct access to an ATC or school nurse. It was also found in this study that only 84% of schools that responded had a concussion policy and procedure in place and that most of them do not contain the components required by the DSPYAA (2013). One more finding that is pertinent to this study is that though parents and student-athletes are receiving education on concussions, schools are failing to collect sign-off sheets and document that they done-so.

The School Superintendent and Concussion Legislation

Hodgkinson & Montenegro (1999) state: “Our nation’s future is inextricably tied to the success of children in the public schools. The individual ultimately responsible for the teaching and learning process and student outcomes is the local school superintendent” (p. 5). Considering that one of the most important issues surrounding concussed athletes is returning them to the classroom, the superintendent is a central figure in the concussion arena (Halstead et al., 2013). Copeland (2013) examined the many roles of superintendents in a small study and found that superintendents have many different roles in their position which includes that of a planner, communicator and being actively involved in the community, to name only a few. Copeland (2013) also found that the superintendent’s role in rural communities could be quite broad. However, forming curriculum policy is a key role of the superintendent (Björk, Kowalski, & Browne-Ferrigno, 2014; Andero, 2000). Therefore, concussion legislation and subsequent school

policies and procedures mandated by legislation, fall directly under the supervision of the school superintendent. For this reason, school superintendents are the key focus of this evaluation.

Advanced Practice Registered Nurse's Role in Concussion Management

When referring to APRNs and PAs, The term “midlevel” will not be used in this scholarly project due to the inability of the term to accurately describe these individual clinician’s skills and abilities and for the negative connotation that it poses. They will be referred to by their professional title and/or as a licensed health care provider.

Nurse Practitioners are a vital piece of the health care culture in Montana. According to the Health Resources and Services Administration (2016) Currently, 51 of Montana’s 56 counties qualify as Health Professional Shortage Areas (HPSA). This means that there is a ratio of 1 physician to 3500 people in an area. This, however, does not include nurse practitioners or physician assistants in such areas.

As of 2010, there were 471 nurse practitioners practicing in 41 of Montana’s 52 counties (Montana Healthcare Workforce Advisory Committee, 2011). In the area of concussions, Meehan, d’Hemecourt, Collins, & Comstock (2011) found in study that the 4 professionals who had highest incidence of concussion assessment were: ATCs (94%), general physician (58%), Orthopedic physician (4.7%), and NPs (2.4%). It is interesting that NPs, though having a low percentage of concussion assessments, were more likely to assess concussions than neurologists, sports medicine physicians, PAs, and emergency medicine physicians. This was a nationwide study that only targeted high schools with an

ATC, which does not represent a significant number of schools in Montana and may implicate a higher percentage of assessments. Hing & Hsao (2014) found that there were approximately 41.6 primary care physicians per 100,000 people in the state of Montana. This was similar to the national average of 46.1. Of these primary care physicians, it was found that 89.1% of them work with a NP or PA in the state of Montana. These findings are significantly more than the national average of 53%. Furthermore, there were increased primary care physician numbers and decreased PA and NP numbers with the increase in population. Inversely, primary care physician numbers decreased and the likelihood of a NP or PA being in practice with a primary care physician was significantly greater with decreased population numbers and in rural areas. The Agency for Healthcare Research and Quality (2014), reported that in 2010, there were almost two times as many NPs as PAs in primary care and that NPs and PAs are much more likely to be primary care providers in rural areas than physicians (16% vs. 11%). It was found in the study by Moodi & Tesoni (2016) that the health care provider most responsible for making return-to-play decisions post-concussion was the primary care physician (82%). However there is no mention of PA or NP involvement possibly due to the lack of knowledge of the distinction between primary health care providers.

This data is key to describing the Montana primary care workforce accurately and it seems that NPs in Montana are highly likely to be the initial LHCP to assess athletes with concussions, especially in rural areas.

Theoretical Underpinning

Florence Nightingale's theory of environment is the primary basis of this project. The meta-paradigm of "environment", and its role within Nightingale's theory, appeals to many aspects of current nursing. Selanders (2010) states "nursing is achieved through environmental alteration" (p. 83). This is in accordance with a quote by Nightingale (1969) "if a patient is cold, if a patient is feverish, if a patient is faint, if he is sick after taking food, if he has a bed-sore, it is generally the fault of not the disease, but of the nursing" (p. 8). This is a great example of the essence of nursing and demonstrates the applicability of this theory to this evaluation and concussion care. We must provide an environment that is conducive to appropriate care of the student-athlete. Nightingale's "environment" philosophy will provide the backbone for the ideology of care in conjunction with current evidence-based guidelines to fulfill nursing outcomes.

Also, within the realm of environment, Nightingale's desire for nursing to not only focus on the ill, but also on well persons to maintain health, is an important piece of her theory: "the same laws of health or of nursing, for they are in reality the same, obtain among the well as among the sick" (Nightingale, 1969 p. 9). According to Dossey, Selanders, Beck, & Attewell (2005): "she (Nightingale) explained that, although similar to 'sick-nursing,' 'health-nursing' is far more comprehensive" (p. 155). This component is an important piece of holistic nursing care.

Nightingale's environmental philosophy is applied by defining the current system of concussion policy and procedures and subsequently providing recommendations based on evidence. In theory, this will create a safer environment. Nightingale's philosophy on

health promotion is also applicable to identify the needs of the system so that athletes are immersed in an environment that fosters safety. Modification, or even creation, of a program that emphasizes positive effects on the student-athletes environment to decrease head injuries, is the goal. Creating a strong educational backbone and fostering a more informed high school system will achieve this goal as well as proper management of student-athletes who sustain concussions.

CHAPTER 3

METHODS

Sample

High school superintendents were the population chosen for this evaluation. The sample was comprised by the selection of superintendents within all counties that are considered urban (population > 50,000) (n=6) and the selection of superintendents from an equal number of counties considered rural (population < 50,000) (n=6) is based on geography for rural counties. A geographical sample was taken to capture the most populated counties; those that are rural yet geographically close to largely populated counties; and areas that are extremely rural in population and geography. The total number of counties selected was n=12, where rural counties, again, were chosen by geographical sampling. Since school superintendents act as executive director to their respective school boards, this makes them a vital part of the creation and implementation of policies and procedures set forth by the Dylan Steiger's Protection of Youth Athletes Act. Furthermore, It is their duty to disseminate vital information to stakeholders and lead change in policy within their districts. A tool was created to address each aspect of the DSPYAA in question form to identify the subject's knowledge of the law's mandates. This tool can be found in the appendix of this evaluation.

This study was approved and monitored through Montana State University's Institutional Review Board.

Procedure

Superintendents were contacted via telephone and asked to participate in a brief (15 minute) interview about school concussion policies and procedures. The interviewer identified himself and briefly informed each subject on the nature of the interview and that their participation was voluntary. They were also informed that the results would be presented in aggregate form to ensure anonymity. After introduction, basic demographic information was gathered regarding superintendents and their corresponding high school(s). Superintendents were identified before phone call as being male or female and were asked how many years of service they had been in the current district as superintendent to satisfy the demographic data. Subjects were then asked about the number of high schools they were responsible for, the estimated enrollment in each high school, the number of contact sports in the high school(s), and the number of students participating in contact sports within each high school to satisfy the school demographics. Contact sports in this study were considered to be boys and girls soccer and basketball as well as football and wrestling. Only school sanctioned sports were analyzed due to the scope of the law. Sports such as ice hockey, field hockey, and lacrosse were excluded from this study due to the lack of existence in high schools in Montana.

After demographics were gathered, superintendents were asked to answer questions to the best of their ability. Frequency variables were produced from all of the questions that involved a “Yes/No/I Don’t Know” response

The second part included gathering and analyzing school board policies and procedures from each school. These were then critically analyzed against the statutes set

forth by the Dylan Steigers Youth Protection Act to identify congruency with the act.

Below are the key elements of the DSPYAA (2013) that must be included in each school districts policies and procedures:

- Policies and procedures that inform parents or guardians, athletes, coaches, athletic trainers, and officials about the nature and risk of concussions and the potential effects related to continuing to play with such an injury. They must also be based on current medical knowledge and consistent with the recommendations from the CDC that include:
 - o “The nature and risk of brain injuries associated with athletic activity
 - o The signs, symptoms, and behaviors consistent with a brain injury;
 - o The need to alert a licensed health care professional for urgent recognition and treatment when a youth athlete exhibits signs, symptoms, or behaviors consistent with a concussion; and
 - o The need to follow proper medical direction and protocols for treatment and returning to play after a youth athlete sustains a concussion. ” (Dylan Steigers Protection of Youth Athletes Act, S. 112, 63rd Legislature, 2013)
- A sheet that is signed by the parent and athlete prior to play, that is returned to a designated official at the school acknowledging they have received the aforementioned education
- The school district provides for each coach, athletic trainer, and official to complete annual training regarding concussions

- The state and MHSA require these individuals to take the course through the National Federation of State High Schools (NFHS) online program
- The school district may also may elicit the help of an appropriate entity to implement and assist with their program
- Athletes will be removed from play if suspected of having a concussion and not returned unless they are:
 - Free of symptoms consistent with concussions
 - There is written clearance from a LHCP that states the athlete was evaluated by an LHCP and is deemed fit to return-to-play

CHAPTER 4

RESULTS

The purpose of this evaluation is to critically evaluate school board concussion and return-to-play policies as well as analyze the perspective of superintendents on their district's policies to inform future policy change and clinical improvement.

Superintendent Interview

A total sample of 44 superintendents resulted in successful contacts of 41 (93% response) at the end of the study period. Of the 41 superintendents 78% were male and 22% were female. Superintendent experience, in their current district, ranged from being in their first year to 13 years. Of the subjects, 9 (22%) superintendents were new to their district. The mean number of years as superintendent in the current district was 3.17 years (sd= 3.19).

Superintendents, in this study, were responsible for overseeing as little as one high school and as many as 4 high schools. A majority of the superintendents (90%) were responsible for one high school. The estimated enrollment from the previous year for these schools varied widely from 4 total students to 1925 students. The mean number of students enrolled from the sample was 345 (sd=474) indicating that the size of schools varied considerably. All but one high school had at least one contact sport. The remaining schools ranged from 1 contact sport to 4 contact sports considered being of highest concern for concussion incidence, as indicated previously by this study. At least 95% of

the schools had 2 or more contact sports. The number of students who participated in contact sports ranged from 1 student to 343 students. The mean number of students participating in contact sports from the sample was 98 (sd=91). Also, the mean percentage of the total estimated enrollment that make up athletes in contact sports was 43% (sd=22%). The percentage of the estimated enrollment that athletes in contact sports made up was as low as 5% and as high as 100%.

After demographic information was gathered, the remainder of questions asked were categorized as quantitative, which responses “yes/no/I don’t know” were analyzed using frequencies, and qualitative. Table 4 shows the results of items designed to understand the current state of concussion policies in each school. The entirety of the interview tool can be seen in Appendix B.

Table 4. Superintendent Interview Quantitative Data (n=41).

Interview Item	Yes (%)	No (%)	I Don't Know (%)
2. Have you ever heard of Montana Senate Bill 112, the Dylan Steiger's Protection of Youth Athletes Act?	40 (98%)	1 (2%)	n/a
3. Has the school district adopted policies and procedures to educate coaches, athletic trainers (ATs), officials, parents and athletes about the nature and risk of concussions with athletics?	40 (98%)	0	1 (2%)
4. Do you require parents AND athletes to sign an educational form regarding the nature and risks of concussion?	36 (88%)	1 (2%)	4 (10%)
4a. If 'Yes' Is there a standardized form used?	32 (81%)	1 (2%)	6 (17%)
5. Do all coaches and ATs take the online training course through National Federation of State High School Associations (NFHS)?	36 (88%)	0	5 (12%)
6. Do you have any association with entities other than the MHSA to help implement such a program?	30 (73%)	11 (27%)	0
8. Do you feel there are sufficient healthcare resources to address the needs of students who suffer concussions?	33 (81%)	7 (17%)	1 (2%)
9. Do you have written policies or procedures in place that outlines how students return to play?	37 (90%)	2 (5%)	2 (5%)
11. Do you have a policy requiring written clearance from a health care provider to return to play?	37 (90%)	0	4 (10%)

The qualitative portions, though correlated to the quantitative data, will be presented next. As expected, 98% of subjects had heard about the DSPYAA (2013) and had adopted policies and procedures to educate stakeholders on the nature and risks of concussions. However, it was unexpected to find that were 36 (88%) superintendents who knew the school district was mandated to have parents and athletes sign an educational form stating they understood the nature and risks of concussions. Others did not know if this was required (10%) and 1 (2%) said they did not require it. Also, of those who had knowledge of this mandate, 17% stated they did not know if the form was standardized and one (2%) stated the district did not use a standardized form.

Though expected, a large percentage (27%) of subjects also denied having any association with entities other than the MHSA to help implement the district's concussion program. All of the districts that did not have assistance from an outside entity was either geographically distanced or had one high school and an enrollment of less than 250. Likewise, 17% of subjects did not feel there were sufficient healthcare resources to address the needs of students who suffer concussions in their district. Again, this information came from school districts with one high school and an enrollment of less than 250.

Subjects also answered questions pertaining to RTP protocols within their district. When asked if there were RTP policies and procedures in place, 5% stated they did not have such policies and procedures and 5% stated they did not know. Similarly, 10% of subjects did not know if there was a policy requiring written clearance from a LHCP for the student-athlete to RTP.

Qualitative data gathered from the interview started with item 3, “Has the school district adopted policies and procedures to educate coaches, athletic trainers (ATs), officials, parents and athletes about the nature and risk of concussions with athletics?” If “yes” was the response, superintendents were asked “can you describe what has been done to educate these individuals?”. Various answers encumbered this question. Common themes emerged such as “Parent/Student-Athlete preseason meetings”, “Coach training”, and “dissemination of information packets to parents/student-athletes”. Some isolated and less common responses included “school nurse training”, “school nurse inclusion in preseason meeting with parents/athletes and coaches” and “school teacher concussion education”. There were 3 superintendents who did not know what was being done to educate the individuals identified. Though not a direct answer to this question, more than half of the subjects replied that they had implemented “imPACT testing”, which is a computerized neuropsychological test.

In item number 4, “Do you require parents AND athletes to sign an educational form regarding the nature and risks of concussion?” If subjects answered “yes” and subsequently answered “yes” to the question “is there a standardized form used?”, then they were finally asked “Where did you get this information?”. A majority of subjects (53%) answered they received their form from the Montana High School Association (MHSA). One subject (2%) stated they received their form from the Montana School Board Association (MTSBA), one (2%) received theirs from the CDC, and one (2%) had made their own. However, 12 (29%) others were unsure where they received this information.

For item number 6, “Do you have any association with entities other than the MHSA to help implement such a program?” if the subjects responded “yes”, they were subsequently asked “which entities are you involved with?”. Responses will not be specifically reported to ensure confidentiality, however many responses included medical clinics, a physical therapy clinic, hospitals, and of note a program that is dedicated to sports medicine in one county.

Item number 7 asked subjects “In your school district, who makes the decision to remove a player suspected of having a concussion?”. Responses to this question varied from multiple persons, to a single person. All of the responses included at least one of the following people who makes the decision to remove a player from play if suspected of having a concussion: Athletic Trainer, Athletic/Activities Director, physician, school nurse, parent, principal, coach, student, referee, emergency medical technician (EMT), and the superintendent. Another answer was “when in doubt, sit them out”, which is in reference to if there is any sign of concussion and any person is concerned, they have reasonable doubt to pull that player out of practice/play. The coach was cited as being an individual in the school district who makes the decision most often; 35 superintendents stated that the coach was at least one of the individuals making the decision. Also, athletic trainers were cited 16 times and athletic/activities directors were cited 14 times as being the next most prevalent individuals making the decision to pull players out who are suspected of having a concussion. It is also of note that the referee/official was cited 6 times, parents once, EMT twice, principal twice, superintendent 4 times, physician once,

school nurse once, and student-athlete 3 times as being individuals capable of making the call.

Item number 10, “Who is responsible for overseeing that students are reintroduced to play correctly, in your district?”, was also similar to item number 7 in that there could have been multiple persons cited as the person(s) who introduce players back to play. The list of persons cited included: Athletic Trainer (AT), Athletic/Activities Director (AD), physician, physical therapist, school nurse, parent, principal, coach, and student. One superintendent stated that they had no high school sports so that individual was not sure about the pertinence of this question to his high school. The most often cited person responsible for reintroducing athletes back to play was the athletic/activities director, cited 19 times followed by athletic trainers (14) and coaches (13). Other persons cited were physicians (7), parents (2), students (3), principals (2), a physical therapist (1) and superintendents (2). Also, 3 (7%) subjects stated they did not know who in their district was responsible for student athlete RTP, however one school did not have any sanctioned sports. It was found that the AD was cited by 11 superintendents (27%) and that the AT was cited by 6 (15%) superintendents as being the sole person responsible for overseeing students are RTP appropriately in their district. It was also found that 18 (43%) superintendents stated that more than 1 person in the district was part of returning youth athletes to play. The LHCP/Physician was cited as the sole subject to return student athletes to play twice (5%). Of the superintendents that cited the AD was solely in charge of student athlete RTP, all had a total enrollment of 300 or less.

Item number 8, “Do you feel there are sufficient healthcare resources to address the needs of students who suffer concussions?” also had many subjective comments attached to it. The comments included: “they do the best that they can; I cannot say yes or no”, “knowledge deficits in providers”, “we feel like we know more [about concussions] than the providers do”, “I feel the PA-C did not evaluate a student correctly”, “the PCPs here are not competent [in concussion treatment]”, “Students have to travel 78 miles to be evaluated”, “There is a high poverty level in our area so parents and athletes do not travel to get proper treatment”, “teachers do not understand how unique concussions are and the treatment behind them”, “I don’t believe we educate teachers enough in Montana”, “chiropractors are evaluating some of our students and clearing them to play”.

For many of the questions the interviewer was referred to the athletic director or the athletic trainer for the answer to the question.

Policy and Procedure Analysis

The second part of data collection included critically appraising each school’s policies and procedures, regarding concussions, and identifying if they contained all of the elements required by the DSPYAA. Of the initial 44 schools in the sample, all but one (n=43) school’s policies and procedures were available for analysis. These policies were analyzed to against the DSPYAA (2013) requirements as stated above.

All of the policies and procedures evaluated must have been written to be valid and qualify for this study. Many of these policies and procedures were physically included in each districts policies and procedures handbook. It was also valid if policies

and procedures existed in a student handbook, coaches handbook, or on the school districts website. Attempts were made to obtain hard copies of each school districts policy through calling other school staff and requesting the information if necessary. Table 5 represents the results of the policy and procedure analysis.

Table 5. Policy and Procedure Analysis Data.

Policy and Procedure Item	Yes (%)	No mention /unavailable (%)
Have a written policy and procedure regarding concussions	39 (91%)	4 (9%)
Athletic trainer, coach, official, parent and athlete education and information	38 (88%)	5 (12%)
Parent and athlete sign off sheet	42 (98%)	1 (2%)
Requires NFHS training mandated through the MHSA	38 (88%)	5 (12%)
Require Athlete to be removed if suspected of concussion	39 (91%)	4 (9%)
Must be evaluated by LHCP	37 (86%)	6 (14%)
Athlete must have written clearance for RTP from LHCP	37 (86%)	6 (14%)

Of the 43 policies and procedures, 39 (91%) school districts have some form of written policy regarding at least one of the requirements mentioned by the law. The other 4 (9%) schools either had no policies and procedures, they were not on file, or were unavailable to this study. Of the school district policies and procedures analyzed, 36 (84%) currently have documented rules that address all of the aforementioned regulations set forth by the law. A substantial number (27 [62%]) of these policies and procedures evaluated were identical. In contrast, 7 (16%) district policies and procedures had at least one missing item required by the DSPYAA (2013). A majority of school districts (98%) required the parent and student-athlete to sign a sheet that acknowledged their

understanding of the nature and risk of concussion. Alternatively, 1 (2%) school had no mention of the use of the sign-off sheet. Of the school districts, 38 (88%) had either requirement of mandated NFHS online training OR deferred to the requirement set forth by the MHSA for coach and ATC education. In regards to RTP, 39 (91%) school districts had a policy and procedure requiring the student-athletes to be removed from play if suspected of having a concussion. The remaining 4 (9%) school districts' policies and procedures did not include this or were otherwise unavailable. It was also found that 37 (86%) school district policies addressed that student-athletes must be evaluated by a LHCP and must have written clearance to RTP by a LHCP. The remaining 6 (14%) district policies did not include either.

CHAPTER 5

DISCUSSION

This scholarly project aims to analyze the current state of concussion policies and procedures from a sample of school districts in Montana. It is the intent of this evaluation to inform policy and provide school and clinical recommendations, from the collected data, to further the safety of student athletes who participate in sports that put them at risk for concussions and for those who actually do suffer concussions.

Findings

The data collected overall shows that the sample of superintendents has basic knowledge on their school districts concussion policies and procedures – 98% had heard of the DSPYAA and state they have implemented policies and procedures. Also, there was at least an 80% response rate indicating superintendents were knowledgeable in each area of requirement set forth by the DSPYAA (2013). However, there were significant findings:

- There is lack of knowledge about the policies and procedures involved with the educational form parents/student-athletes must sign
- Lack of knowledge on mandated coach and athletic trainer education
- A large percentage of school districts do not have help from outside entities in implementing their policies and procedures

- Many superintendents do not believe they have adequate healthcare resources in their district
- Policies and procedures have not been implemented in all school districts
- Policies and procedures are not adequate in all school districts

Some of the more significant findings from this evaluation were the varying policies and procedures as well as numerous members of the school district and communities that take part in the prevention, recognition and management of concussions. It was seen that many individuals take part in the in the duties required by the schools concussion policies and procedures, often times multiple in the district. This included multiple health care providers, superintendents, principals, athletic directors, ATCs, nurses, coaches, parents, student-athletes and teachers. However, it is unclear exactly who is ultimately supervising athletes and their RTP.

It is intriguing to note differences among school districts in our state and how they operate under the law. Though many policies and procedures were similar, there were also many policies and procedures that had variations or were completely unique to the school district. Though they were variable in the way the information was presented, many of the policies and procedures satisfied the statutes of the law.

Interview Findings.

When asked about item 4 in the superintendent survey, 88% subjects said they did require parents and student athletes to sign a concussion form. One subject said they did not have this as a policy. However, this school did not have any high school sanctioned sports and had only one student in a co-operative with another district to play sports. The

other 4 (10%) subjects that did not know had either referred the interviewer to the athletic director or athletic trainer for their district. Of those who answered 'yes', 8 (19%) subjects either did not use (1 [2%]) or did not know (7 [17%]) if the form was standardized. Also, 12 subjects who answered that they had a standardized form did not know where they acquired the material. All of the knowledge deficits in the parent/student-athlete section of the survey transcended multiple school districts of various populations. The expectation was that subjects may not know all of the information from this line of questioning, however since the parent/student-athlete sign-off is required by the law, it is significant that many of the subjects were unaware of certain aspects of this piece of implementation. In any case, it is the recommendation of many leading organizations that education on prevention be a part of any concussion program (Giza et al., 2013; Broglio et al., 2014; CDC, 2016). If these areas of policy are incomplete, parents and athletes may not be well informed, be at risk for improper care, and possible litigation may ensue due to the lack of adherence to the law and proper documentation. Moodi & Tesoni (2016) reported that many schools in Montana have a sign-off policy, however many school districts lack proper record keeping or even have the students return the form back to a school official. It is of note that the investigator did find that 43 school districts (98%) did have some mention of parent/student-athlete sign-off on some form of policy and procedure, handbook, or on the school districts website identifying the perceived use of these tools. However, it was not asked if forms were collected and/or if record was kept of that collection.

This evaluation also found 5 (12%) subjects were unsure if their coaches or athletic trainers participated in mandatory concussion training required by the law. If coaches and trainers are not properly educated, they could miss common signs and symptoms leading to decreased recognition and improper management (Broglio et al., 2014).

Another key finding was that 11 (27%) subjects did not have an association with an entity other than the MHSA to implement their concussion program. All schools without associations were either geographically distanced or had a total enrollment of 250 or less. This was an expected finding due to Montana's rural population. Along with this, 7 (17%) subjects stated they thought, in their district, there were insufficient health care resources to address concussions. 1 (2%) subject did not know if this was true for their district. Again, those subjects who stated there were insufficient health care resources or who did not know, had a total enrollment of 250 or less. Most schools with an estimated enrollment of less than 250 had no association with an entity to implement their program except for one school, whose district had a medical center. This was again expected, however, rural health care professionals may not be knowledgeable about concussion care due to the subjective comments collected. One subject stated about the LHCPs in his district: "they do the best that they can; I cannot say yes or no (regarding if healthcare resources are sufficient)". Another subject stated in interview they thought there were sufficient resources in the district but that there were "knowledge deficits in providers" and stated "we feel like we [school officials] know more [about concussions] than the providers do". Again a subject stated, "I feel the PA-C did not evaluate a student

correctly” and “the primary care providers here are not competent [in concussion treatment]”. One subject stated that their students have to drive 78 miles to have treatment and be cleared. Yet another subject was concerned about the poverty level in their district and because of that, parents are not taking their son or daughter to be properly evaluated due to the travel required. These findings were expected, however the question becomes: “how can we better serve our rural populations?”. Moodi & Tosoni (2016) again suggest that expansion of the LHCPs able to clear students to return-to-play should include ATCs and school nurses. However, it is difficult when these professionals are not present in many of the rural districts.

Finally, it was also an interesting finding that superintendents cited a gamut of people within the district that are responsible for returning athletes to play. It was expected that there would be a myriad of individuals identified for RTP considering the diverse population landscape of Montana. However, this information identifies there may be disconnect in superintendent knowledge and lack of standard procedures throughout Montana. It was interesting to note that the AD was cited as being the sole individual to return athletes to play in 27% of the districts. In the districts that cited ADs were the sole individuals ensuring RTP, all had a total enrollment of 300 or less. Also, other superintendents stated that the sole individuals in their district that ensured RTP were LHCPs (5%) was the sole individual in their district to return students to play. There were 3 (7%) superintendents who did not know who returned players to play in their district. Though one superintendent’s school did not have any sanctioned sports, they did have one student who participated in a co-operative with another district. Though there is no

school sanctioned sports in this district, it is equally important to return players to learn, therefore the knowledge of concussions is important (Halstead et al., 2013).

Policy and Procedure Findings

There were a total of 36 (84%) schools that had no inequities in the critical evaluation of their policies and procedures against the mandates of the DSPYAA (2013). However, it was also of concern that many of the policies and procedures were missing from 7 (16%) school districts. 6 (14%) of the schools had no mention of LHCP evaluation or written clearance for RTP. However, 4 districts had no policies and procedures other than parent/student-athlete sign-off information. This was an unexpected finding and it seems that our state has yet to successfully implement the law statewide, two (almost three) years after inception. There are major safety and litigious implications due to this fact though it is the main goal of this evaluation to focus on the safety of student-athletes.

There were instances where subjects were new to the district. Considering that this study took place in the fall, 9 (22%) had only been there for a few months, some as little as 2 months. This did create a circumstance where a few subjects were unfamiliar with many, if not all, of the districts policies and procedures. 7 of the 9 new superintendents had answered, “I don’t know” to at least one aspect of the interview. One of these subjects had no knowledge of the new districts concussion policies.

It is of interest to note that not all of the subjects’ answers were aligned with what was actually available in their respective policies and procedures (when applicable). One subject had answered that there were concussion policies and procedures in place and

after calling to acquire about a copy of those policies and procedures there were none available.

Recommendations

From critical evaluation of the DSPYAA (2013), the policies and procedures mandated by them, and the knowledge of the superintendents that oversee them, recommendations are implicated. Recommendations are as follows:

Recommendations for amendment of the DSPYAA (2013)

- o Clarify definitions
- o Addition of concussion management teams
- o Addition of a standardized RTP progression
- Recommendations for district superintendents
 - o Ensure implementation of appropriate policies and procedures
 - o Participate in concussion management teams
 - o Assist in the implementation of a concussion action plan that includes managing parent/student-athlete sign-off sheets and RTP protocol
 - o Require staff to participate in annual concussion education/training
- Recommendations for nurse practitioners
 - o Complete 1 CEU yearly on concussion prevention and management
 - o Become an active member with school districts in the implementation of concussion policies and procedures

After reviewing the findings from this evaluation, there are a multitude of discrepancies in the current law, current school board concussion policies, stakeholder knowledge and possibly even LHCP knowledge. The recommendations of this evaluation are to assist in the advancement of the current model, or lack thereof, for concussion education, recognition, and management. That being said, the approach to solving the concussion issues involved with sports is multifactorial. Legislation and rule making is only one area of this complex and dynamic issue and cannot solely solve all of the problems that face our communities and country. However, taking steps and ensuring that the laws are followed will bring about recognition and proper treatment. The effort cannot be placed on one individual or entity; all stakeholders in the matter must put forth the effort. In previous studies, there is mention of professionals such as ATCs and school nurses needing further power and involvement in the care of athletes who sustain concussions (Moodi and Tosoni, 2016; MDPHHS, 2014). The literature indicates favorable outcomes increase with ATC and school nurse presence throughout the state, however with the rural nature of Montana this may not be achievable (Moodi and Tosoni, 2016; MDPHHS, 2014). It is recommended that other individuals in the state of Montana step-up and be involved. This evaluation has focused on two entities that have immense purpose in the concussion conversation: school superintendents and nurse practitioners in the state of Montana.

Recommendation for
Amendment of the DSPYAA (2013)

It has been indicated through the data to not only recommend change for practice, but also address policy. It is a goal that recommendations create changes that enact safe and appropriate measures to alleviate current issues within the existing system. The CDC (2011) recommends that primary and secondary prevention strategies be in place to mitigate concussions, or further harm, after a concussion has been sustained. The CDC (2011) also states that it is imperative to respond “quickly and appropriately to suspected TBI”. Tomei, Doe, Prestigiacomo, & Gandhi (2012) state “historical precedent exists for injury prevention legislation, and past efforts demonstrate both improvements in patient outcome and decreased costs of health care associated with preventable injuries”.

Definitions. Regarding section 2, the rather ambiguous definitions of the “LHCP” and “organized youth athletic activity” need to be changed to provide clarity. As seen in this study, a chiropractor was cited as being a LHCP that was clearing student-athletes for RTP. Other study in Montana have indicated that ‘LHCP’ be defined as including specific disciplines such as physicians, physician assistants, advanced practice registered nurses, neuropsychologists and/or ATCs (Moody & Tesoni, 2016; MDHHS, 2016). These are individuals who could possibly be listed, however, not limited to them specifically. This should be done to minimize confusion and inconsistency (CDC, 2013). Also, the definition of “organized youth athletic activities” should be expanded to include all organized youth sports in and outside of the school district. As previously mentioned, not only are many youth coaches not properly educated about concussions, but also cover

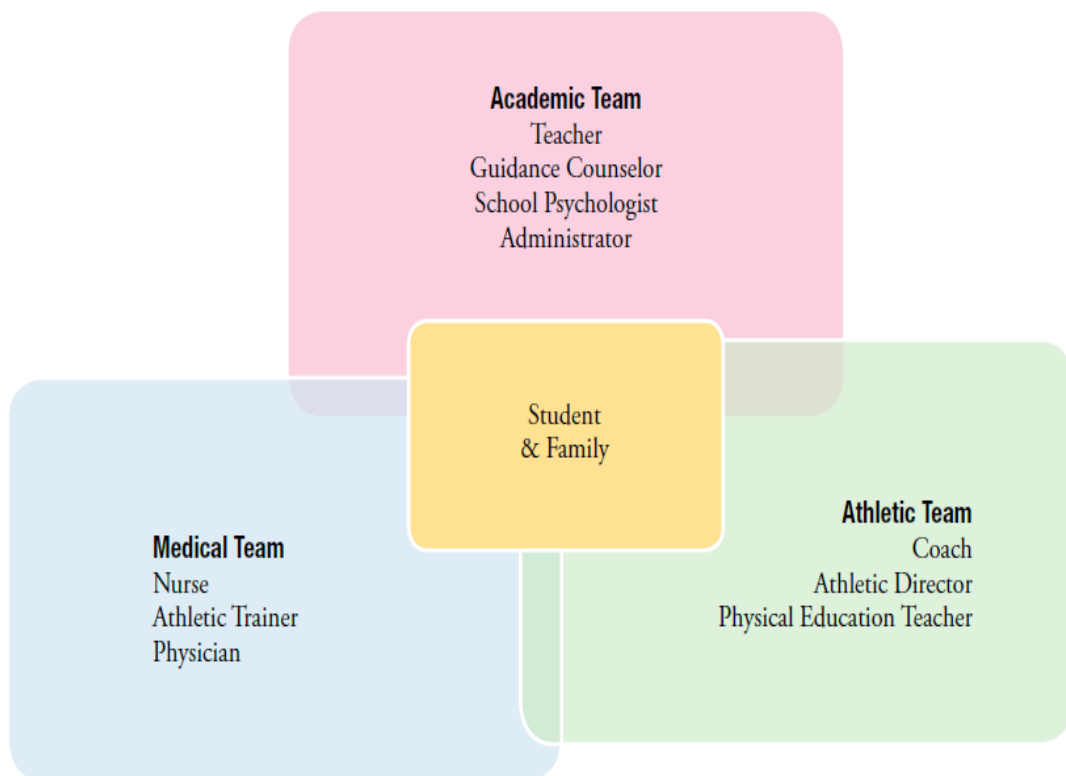
a larger number of youth athletes who have higher risk factors due to the lack of protections of the law (Broglia et al., 2014). The CDC (2013) also recommends the inclusion of recreational sports that are currently not covered by the law. The evidence has shown that children and adolescents are more likely to have more severe concussions with longer recovery times than adults (CDC, 2011; McCrory et al., 2012; Halstead & Walter, 2010). Though it has been shown that youth have had increased knowledge with education it does not correlate with reporting of symptoms (Graham, Rivara, Ford, & Spicer [Eds.], 2014). There is also significant data that has been gathered that demonstrates a lack of concussion knowledge among youth coaches (McLeod, Schwartz, & Bay, 2007; Covassin, Elbin, & Sarmiento, 2012). If education and prevention is enacted in younger generations, this will not only help catch concussions in such a vulnerable population, but also foster a culture that encourages safety for the following years in the young athlete and young parent's life.

Concussion Management Teams. To create an environment that fosters appropriate education, prevention and management, addendum of the current law to mandate a “concussion team and action plan” within each district is warranted. It has been seen in the data that there is disconnect in many areas of superintendents knowledge and in the concussion policies they oversee. A few superintendents indicated that they followed the requirements of the law, however when analyzing the district, policies and procedures were not appropriately aligned with the statutes of the DSPYAA (2013) It has also been shown that there are inadequate health care resources in multiple areas of the state as indicated by the 17% of superintendents who do not believe there are sufficient

healthcare resources in their districts. To foster an environment that embraces the seriousness that concussions pose, a collaborative effort should be undertaken to create positive outcomes (CDC, 2014). Stolp, Wilkins, & Raine (2015) conducted a qualitative study evaluating the essential elements for healthy students within schools and they recommended that teams be created within the school that include a broad range of stakeholders to maintain a healthy school environment. The Connecticut State Department of Education [CSDE] (2015) set up statewide concussion guidelines that state: “School concussion management teams may be formed to create and implement a concussion management plan with sound procedures that support a concussed student” and as part of that team, school “administrator support is needed to change the culture surrounding sports concussions, put systems in place to manage concussions effectively, and provide the programs necessary to return students to full activity (athletics and academics) safely” (p. 21). Their guidelines are based on guidelines they borrowed from Oregon public schools (CSDE, 2015). Nationwide Children’s Hospital (2016) also endorses the use of an academic concussion management team. Figure 1 depicts those who may be involved in the care of the student-athlete and parent at any given time. It would be ideal to have a professional(s) from each discipline (academic, medical and athletic) to cover every aspect of the student-athlete’s needs for recovery (Nationwide Children’s Hospital, 2016; Halstead et al., 2013). It is important to know that the family should also be considered part of the team (Halstead et al., 2013). Halstead et al. (2013) state that a multidisciplinary approach to return concussed student-athletes back to school can maximize benefit (Rocky Mountain Hospital for Children, 2016). This would include

local LHCPs, sporting staff and other school-based staff that work together to create an action-plan, based on the district's policies and procedures, which addresses all of the aspects of concussion prevention and management.

It is appropriate that school districts work closely with LHCPs in their area to establish the concussion management team. However, this may not be possible due to the lack of such professionals in rural areas. Halstead et al. (2013) states that accessibility to some professionals, such as physicians, is limited making team management that much more important. Resources are not the same in each area of Montana, and scarce at some times. However, efforts to ensure an action plan is in place with the available resources will streamline concussion management.



Nationwide Children's Hospital (2016)

Figure 1. Concussion Management Team

Another recommendation is to addend the law to include a gradual, step-wise approach to returning-to-play and “returning-to-learn” as well (Broglia et al., 2014; Giza et al., 2013; Halstead et al., 2010; Halstead & Walter, 2010; (McCrorry et al., 2013; CDC, 2013). This is a key component of an action plan, which must include a stepwise progression to return the student-athlete to activity, and is a recommendation of many leading entities in the field of concussion (CDC, 2015; Giza et al. 2013; Broglia et al., 2013; McCrorry et al., 2013). The progression (as identified in the review of literature) should include the following table:

Table 6. Return-to-Play Progression.

Stage	Physical Activity
1	No activity
2	Light exercise: <70% age-predicted maximal heart rate
3	Sport-specific activities without the threat of contact from others
4	Noncontact training involving others, resistance training
5	Unrestricted training
6	Return to play

Stages should be separated by at least 24 hours (McCrorry et al., 2013).

(Broglia et al., 2014; McCrorry et al., 2013)

Recommendations for the School Superintendent and Concussion Legislation

As quoted before, Hodgkinson & Montenegro (1999) state: “Our nation's future is inextricably tied to the success of children in the public schools. The individual ultimately responsible for the teaching and learning process and student outcomes is the local school superintendent. ” (p. 5). According to the data gathered in this evaluation, a large percentage (mean of 43%) of high schools total enrollments are at significant health

risk due to the nature of sport and concussions. School superintendents play a vital role in the implementation of concussion legislation, specifically, with board policies and procedures that address this legislation. Björk, Kowalski, & Browne-Ferrigno (2014) state “the nature of their (superintendent) work is intertwined with the economic, social and political shift occurring in the nation, states and local communities” (p. 2). With the increase in concussions in high school sports, it is not only a school issue, but also a community and national issue that require attention. Superintendent involvement is extremely important in the implementation of the DSPYAA (2013). Björk, Kowalski, & Browne-Ferrigno (2014) again state: “As the CEO of the school district, the superintendent is responsible for ensuring that legislated mandates, policies and regulations are implemented properly and for providing oversight and support to local schools” (p. 7). Each school districts policies and procedures, by law, must include the components of the DSPYAA (2013).

First, it is recommended that superintendents review the current law and ensure their district has implemented, or is in the process of implementing, policies and procedures that adhere to the DSPYAA (2013). This evaluation shows that though 91% of the school districts have some form of concussion policies and procedures, other districts have not implemented policies and procedures that are appropriate. Of the districts that had policies and procedures, 3 districts’ policies and procedures were not to the standard of the law. It is imperative that this step be taken immediately to decrease the likelihood of poor outcomes.

Second, the CDC (2013) recommends the inclusion of a wide array of stakeholders to address the barriers and facilitators to properly implement the district's policies and procedures. It is recommended that the superintendent be part of the concussion management team. Being the head official and administrator of the school board policies and procedures, it is the duty of the district superintendent to disseminate, and delegate, such information to the appropriate parties. Nationwide Children's Hospital (2016) names the school administrator, as an important piece of the concussion management team and that it is their duty to "help create a change in the culture of the school regarding the implementation of programs and policies." Therefore, it is recommended that school district superintendents work with activity/athletic directors, coaches, ATCs and other school staff in concussion management teams to ensure that policies and procedures are in place that encompass the current statutes set forth by the DSPYAA (2013).

Third, it is recommended that superintendents help implement an action plan that includes a system of tracking student-parent sign-off and RTP protocol. Superintendent knowledge on the requirement of parents and athletes to sign an educational form is a glaring inconsistency in the findings of this evaluation. The data shows that 29% of superintendents were unaware of where the form came from, 17% did not know if their form was standardized and 10% were not aware of the requirement of parents and athletes to sign an educational form. This has also been found to be a problem among districts in other study in Montana (Moody & Tesoni, 2016; MDHHS, 2014). Moody and Tesoni (2016) state that though parents and student-athletes are receiving educational

forms in Montana, school districts are failing to collect and record them. The MDHHS (2014) also reported that only 65% of schools required the student to return signed educational forms and that only 58% had a system to track that the forms were returned. The action plan will also assist school and athletic staff in appropriately managing concussions by instituting a protocol that can be easily followed (CDC, 2015). This action plan basically encompasses all aspects of RTP including removal of an athlete and that appropriate school staff ensures the student-athlete's parents are notified as well the LHCP (CDC, 2015). Furthermore it should be included that the student-athlete be kept out of play that day and until there is written clearance for RTP by the LHCP (CDC, 2015). It is important that stakeholders be prepared to manage concussions in multiple settings.

Finally, The CDC (2016) suggests the inclusion of regular training of multiple stakeholders and a concussion management team as strategies for the successful implementation of concussion policies. Hence, it is also a recommendation to expand the scope of concussion education from sport-related staff and parents/student-athletes exclusively, to teachers, school based health staff, local LHCPs and ultimately for anyone in the public requesting resources. Data from this evaluation have shown that there may be lack of education amongst teachers and other school staff. One superintendent stated, "I don't believe we educate teachers enough in Montana". Another superintendent stated, "teachers do not understand how unique concussions are and the treatment behind them". Also, as evidenced by the data, superintendents may benefit from annual training considering the knowledge deficits across the board on concussion policy and that 22%

of superintendents were new to the district in this study. McGrath (2010) states that it is important that other school personnel be educated about concussions so they understand the disease process and assist in supporting students' recovery. Harmon et al. (2013) and Broglio et al. (2014) also recommend the inclusion and collaboration with school administrators to assist in more thorough concussion management. It may be of benefit to include concussion education in the school districts yearly staff training as part of universal precautions. According to the Montana Office of Public Instruction (2005) it is recommended that training should include "serving students with health care needs" and student-athletes who suffer concussions have specific health care needs (McCrory et al., 2013; Broglio et al., 2014). The CDC (2013) recommends that not only do school districts educate within the school, but that they also open up training to the public. Considering that many school districts are in rural areas of Montana, It may be appropriate for the school superintendent to lead (or at least be a large contributor to) the concussion management team.

Recommendations for Nurse Practitioners and Concussion Legislation.

It is recommended that LHCPs, who are capable of evaluating pediatric patients, complete at least 1 CEU on concussion prevention and management annually. The Montana Nurse Practitioner has a large role in the health of people in their communities. Nurse practitioners and physician assistants are often more available than physicians in rural areas (Hing & Hsao, 2014; AHRQ, 2014). The CDC (2013) found in a qualitative evaluation of concussion law implementation in Washington and Massachusetts, that

rural and low-income areas face difficulties in accessing providers knowledgeable in concussion management (Graham, Rivara, Ford, & Spicer [Eds.], 2014). This can also be seen in the data from this evaluation, as 17% of school superintendents believe their district lacks sufficient healthcare resources. Also, other than physicians, the APRN is the only other autonomous professional to provide primary care services in Montana. This increases the likelihood that an APRN will see the concussed student-athlete and be the only LHCP to diagnose and treat them. However, Harvey (2013) suggests that in the states that allow nonphysician providers to return athletes to play, there is a higher risk of inappropriate management of RTP. Also, Harvey (2013) found that only 26, of the then 45, states implemented a statute mandating clearance by a health care provider trained in concussion identification and management. It is suggested in some studies, however, that even physicians are under prepared to manage concussions (Zanfrillo et al., 2012) (Graham, Rivara, Ford, & Spicer [Eds.], 2014). For this reason, APRNs and PAs (and other LHCPs) need to be further educated on the correct course of action when diagnosing and treating concussions (Graham, Rivara, Ford, & Spicer [Eds.], 2014).

Harmon et al. (2013) of the American Medical Society for Sports Medicine, States “greater efforts are needed to educate involved parties including athletes, parents, coaches, officials, school administrators, and healthcare providers to improve concussion recognition, management, and prevention” (p. 2). It is therefore recommended that local APRNs and PAs participate within the community and in conjunction with the school district to ensure that student-athletes are given the best chance of being safe when playing the sports. Specifically, APRNs could be a great asset to a school district’s

concussion management team, acting as the representative to the healthcare portion of the team. The nurse practitioner's core competencies include leadership, quality, policy and healthcare system delivery competencies and add a great depth of knowledge and experience to the public health issue of concussions. Thomas et al. (2012) states that the nurse practitioners are prepared to be a leaders in complex roles and "participate in professional organizations and activities that influence advanced practice nursing and/or health outcomes of a population focus" (p. 2). This plays a vital role in influencing change and implementation, which is imperative within the concussion phenomenon. Furthermore, the nurse practitioner uses the best available evidence to improve quality of clinical practice on a continual basis (Thomas et al., 2012). Pertaining to concussions, the nurse practitioner has the tools and training to use the latest recommendations and implement them into practice, considering the concussion landscape is ever changing. As the concussion issue is also in part legislative, the nurse practitioner has expertise in advocating for appropriate health policy and contributing to such policy. Mund (2014) states, even though the word "politics" has come with a negative connotation it "should also have positive undertones as the decision-making process whereby APRNs can influence the development of legislation and the allocation of resources" (p. 180). Finally, when looking at healthcare delivery systems, the NP "applies knowledge of organizational practices and complex systems to improve health care delivery". Therefore, the NP could play a key role in the creation of a districts action plan to streamline not only RTP processes, but also staff education. For these reasons, NPs are strongly encouraged to be active participants within the school district to help enrich the

concussion program by educating parents, school staff and student-athletes as well as working closely with school officials to ensure policies and procedures are appropriate and that an action plan is in place. Interprofessional collaboration within the public realm has been a key part of public health and the APRN can take many positions in such collaborative efforts (Ash & Miller, 2014).

Limitations

One key limitation to this project is that superintendents were the only subjects that were interviewed and this cannot represent the whole school districts perspective on the status of their policies and procedures. However, this limitation was balanced with an objective evaluation of actual policies that reside at each school. It is important to remember that this evaluation included only a sample of schools in Montana, thus conclusions about implementation of the state policy across Montana cannot be made. Because this study was based in part on self-report data, some answers given by superintendents may be in error due to social acceptability.

Conclusion

This evaluation has brought to light some of the obstacles facing concussion education, recognition and management in the state of Montana's rich sporting culture. As discussed, there are many factors and individuals involved in the care of the concussed-student athlete. On top of that, each student who suffers a concussion has his or her own unique experience making management all the more difficult.

Currently, legislation has been passed in all 50 states. However, it has been difficult to identify if these laws have helped prevent and manage concussions. If anything, concussions have been more prevalent due to increased awareness and diagnosis. In the state of Montana, Senate Bill 112, also known as the Dylan Steigers Protection of Youth Athletes Act (2013), was passed in the spring of 2013. This law was created to educate multiple individuals, within school districts as well as outside, on the dangers of concussions and how to mitigate and manage them.

School superintendents, as well as local health care providers such as APRNs, play an important role in successful implementation of concussion policies and procedures. The APRN has an appropriate skill set as well as a unique presence in rural Montana, where resources for appropriate concussion programs may be scarce. It is also important to recognize the presence of PAs in these areas as well. School superintendents, though not directly in the athletic or health care realm, play an important role impart of their duties as the executive director of the school board and thus the school board policies.

Study in this evaluation recognized many key findings from interviews of superintendents from 41 school districts across the state of Montana. It was found that there were multiple subjects who believe that there were insufficient health care resources in their area. Subjects also were found to have variable levels of knowledge on their concussion programs that are mandated by law. Subjects were found to be unaware of if they had parents and student-athletes sign an educational form informing and subsequently confirming their agreement/understanding of the nature and risks of

concussions inherent to sport. This is critical in concussion programs to not only inform and educate parents and student-athletes but to legally bind them in contract.

Critical analysis of 44 school district concussion policies and procedures also showed inequities in a number of the policy components from 7 school districts. There were 4 school districts that had no mention of any policies or procedures other than a parent/student sign-off sheet. One school district had no components mandated by the law. Though this study included only 12 Montana counties, findings suggest improvements are needed in policy implementation to provide for maximum student protections.

Through research and an extensive review of the current literature, this evaluation recommends addendum to the DSPYAA (2013) as well as increased training for LHCP and school staff. Addendum to the DSPYAA (2013) includes mandating each school district have a concussion management team consisting of multiple disciplines, inside and outside of the district, that monitors the reintroduction of a concussed student-athlete back to school activities. It is also recommended that this concussion management team use a stepwise, graduated return to school, since it is more important to have a student-athlete return-to-learn than it is to return-to-play.

The school superintendent plays an important role in the concussion management team. It is their duty to ensure that school board policies are implemented appropriately and that all parties involved are informed on the proper protocols involved with said policies. It is mandated by the DSPYAA (2013) that all policies and procedures include

the mandated components of the law. Therefore it is of direct responsibility of the school superintendent to ensure the implementation of the law.

APRNs and other LHCPs, though not directly involved within the district, will likely care for concussed student-athletes. Being that much of Montana's health care is done in rural areas and minimal resources, it is recommended that APRNs not only be educated in the management of concussions, but also collaborate with school staff and school officials to ensure that student-athletes are properly managed within school as well. APRNs and LHCPs are encouraged to be part of the concussion management team to ensure holistic care. Also, it would be of great benefit, and therefore a recommendation, for APRNs and LHCPs to have at least one continuing education credit on concussion management.

The use of the immediate resources in each district is advantageous for every district, rural or urban. By getting more stakeholders directly involved in concussion programs, awareness will be increased. Local providers and school staff must work together to create effective action plans that are appropriate within their districts. Education on concussion recognition, prevention and management needs to be improved at all levels. Dissemination of education through appropriate collaboration will only strengthen Montana athletics by creating a culture of safety within sports.

REFERENCES

- Adler, R. H., & Herring, S. A. (2011). Changing the culture of concussion: education meets legislation. *PM&R*, 3(10), S468-S470.
- Agency for Healthcare Research and Quality (2014). Primary Care Workforce Facts and Stats No. 3. *Agency for Healthcare Research and Quality*, Rockville, MD. Retrieved from <http://www.ahrq.gov/research/findings/factsheets/primary/pcwork3/index.html>
- American Association of Neurological Surgeons (AANS)(2015). Patient information.
- Andero, A. (2000). The changing role of school superintendent with regard to curriculum policy and decision making. *Education*, 121(2), 276.
- Ash, L. & Miller, C. (2014). Interprofessional collaboration for improving patient and population health. In Zaccagnini, M. E. & White, K. W. (Eds.). *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed.) (p. 217-250). Burlington, MA: Jones & Bartlett Learning.
- Bakhos, L. L., Lockhart, G. R., Myers, R., & Linakis, J. G. (2010). Emergency department visits for concussion in young child athletes. *Pediatrics*, 126(3), e550-e556.
- Belanger, H. G., & Vanderploeg, R. D. (2005). The neuropsychological impact of sports-related concussion: a meta-analysis. *Journal of the International Neuropsychological Society*, 11(04), 345-357.
- Bey, T., & Ostick, B. (2009). Second impact syndrome. *Western Journal of Emergency Medicine*, 10(1).
- Björk, L. G., Kowalski, T. J., & Browne-Ferrigno, T. (2014). The school district superintendent in the United States of America. Retrieved from http://ecommons.udayton.edu/cgi/viewcontent.cgi?article=1011&context=eda_fac_pub
- Broglia, S. P., Cantu, R. C., Gioia, G. A., Guskiewicz, K. M., Kutcher, J., Palm, M., & McLeod, T. C. V. (2014). National Athletic Trainers' Association position statement: management of sport concussion. *Journal of athletic training*, 49(2), 245.
- Broglia, S. P., Macciocchi, S. N., & Ferrara, M. S. (2007). Neurocognitive performance of concussed athletes when symptom free. *Journal of athletic training*, 42(4), 504.
- Cantu, R. (1998). Second-impact syndrome. *Clinics In Sports Medicine*, 17(1), 37-44 8p.

- Centers for Disease Control and Prevention (2015). Heads up: Concussion signs and symptoms. Retrieved from http://www.cdc.gov/headsup/basics/concussion_symptoms.html
- Centers for Disease Control and Prevention (2015). Heads up: recovery from concussion. Retrieved from http://www.cdc.gov/headsup/basics/concussion_recovery.html
- _____. (2015). Heads up: Responding to a concussion and action plan for coaches. Retrieved from http://www.cdc.gov/headsup/basics/concussion_respondingto.html
- _____. (2015). Heads up: Return to school. Retrieved from http://www.cdc.gov/headsup/basics/return_to_school.html
- _____. (2015). Heads up: Returning to sporting activities. Retrieved from http://www.cdc.gov/headsup/basics/return_to_sports.html
- _____. (2016). Get heads up on concussion in sports policies: Information for parents, coaches, and school & sports professionals. Retrieved from <http://www.cdc.gov/headsup/pdfs/policy/headsuponconcussioninsportspolicies-a.pdf>
- _____. (2013). Implementing return to play: Learning from the experiences of early implementers. http://www.cdc.gov/headsup/pdfs/policy/rtp_implementation-a.pdf
- _____. (2014). Injury Prevention & Control: Traumatic Brain Injury. Retrieved from <http://www.cdc.gov/concussion/policies.html>
- _____. (2012). Protect the ones you love: Child injuries are preventable. Retrieved from <http://www.cdc.gov/safekid/NAP/background.html#unint>
- _____. (2011). Nonfatal traumatic brain injuries related to sports and recreation activities among persons aged ≤ 19 years --- United States, 2001—2009. *MMWR: Morbidity & Mortality Weekly Report*, 601337-1342.
- Collie, A., Darby, D., & Maruff, P. (2001). Computerised cognitive assessment of athletes with sports related head injury. *British journal of sports medicine*, 35(5), 297-302.
- Comper, P., Hutchison, M., Magrys, S., Mainwaring, L., & Richards, D. (2010). Evaluating the methodological quality of sports neuropsychology concussion research: A systematic review. *Brain injury*, 24(11), 1257-1271.
- Costanza, A., Weber, K., Gandy, S., Bouras, C., Hof, P. R., Giannakopoulos, P., & Canuto, A. (2011). Review: Contact sport-related chronic traumatic

encephalopathy in the elderly: clinical expression and structural substrates. *Neuropathology and applied neurobiology*, 37(6), 570-584.

- Covassin, T., Elbin, R. J., Harris, W., Parker, T., & Kontos, A. (2012). The role of age and sex in symptoms, neurocognitive performance, and postural stability in athletes after concussion. *The American journal of sports medicine*, 40(6), 1303-1312.
- Covassin, T., Elbin, R. J., & Sarmiento, K. (2012). Educating Coaches About Concussion in Sports: Evaluation of the CDC's 'Heads Up: Concussion in Youth Sports' Initiative. *Journal Of School Health*, 82(5), 233-238 6p. doi:10.1111/j.1746-1561.2012.00692.
- Daneshvar, D. H., Riley, D. O., Nowinski, C. J., McKee, A. C., Stern, R. A., & Cantu, R. C. (2011). Long-term consequences: effects on normal development profile after concussion. *Physical medicine and rehabilitation clinics of North America*, 22(4), 683-700.
- Dossey, B. M., Selanders, L. C., Beck, D. M., & Attewell, A. (2005). Florence Nightingale today: Healing, leadership, global action
- Duhaime, A. C., Beckwith, J. G., Maerlender, A. C., McAllister, T. W., Crisco, J. J., Duma, S. M., Bronlinson, P. G., Rowson, S., Flashman, L. A., Chu, J. J., & Greenwald, R. M. (2012). Spectrum of acute clinical characteristics of diagnosed concussions in college athletes wearing instrumented helmets. *Journal of neurosurgery*, 117(6), 1092.
- Dylan Steigers Protection of Youth Athletes Act, S. 112, Montana 63rd Legislature. (2013)
- Echemendia, R. J., Iverson, G. L., McCrea, M., Macciocchi, S. N., Gioia, G. A., Putukian, M., & Comper, P. (2013). Advances in neuropsychological assessment of sport-related concussion. *British journal of sports medicine*, 47(5), 294-298.
- Field, M., Collins, M. W., Lovell, M. R., & Maroon, J. (2003). Does age play a role in recovery from sports-related concussion? A comparison of high school and collegiate athletes. *The Journal of pediatrics*, 142(5), 546-553.
- Giza, C. C., Kutcher, J. S., Ashwal, S., Barth, J., Getchius, T. S., Gioia, G. A., ... Zafonte, R. (2013). Summary of evidence-based guideline update: Evaluation and management of concussion in sports Report of the Guideline Development Subcommittee of the American Academy of Neurology. *Neurology*, 80(24), 2250-2257.

- Gessel, L., Fields, S., Collins, C., Dick, R., & Comstock, R. (2007). Concussions among United States high school and collegiate athletes. *Journal Of Athletic Training (National Athletic Trainers' Association)*, 42(4), 495-503.
- Graham, R., Rivara, F. P., Ford, M. A., & Spicer, C. M. (Eds.). (2014). Sports-Related Concussions in Youth: Improving the Science, Changing the Culture. National Academies Press.
- Graves, J. A., Mishra, P., Dittus, R. S., Parikh, R., Perloff, J., & Buerhaus, P. I. (2016). Role of Geography and Nurse Practitioner Scope-of-Practice in Efforts to Expand Primary Care System Capacity: Health Reform and the Primary Care Workforce. *Medical care*, 54(1), 81-89.
- Green, J. D. (2015). 2014 sports-law in review. *National Federation of State High School Associations*. Retrieved from <https://www.nfhs.org/articles/2014-sports-law-year-in-review>
- Guskiewicz, K. M., & Broglio, S. P. (2011). Sport-related concussion: on-field and sideline assessment. *Physical medicine and rehabilitation clinics of North America*, 22(4), 603-617.
- Halstead, M. E., McAvoy, K., Devore, C. D., Carl, R., Lee, M., Logan, K., ... & LaBella, C. R. (2013). Returning to learning following a concussion. *Pediatrics*, 132(5), 948-957.
- Halstead, M. E., & Walter, K. D. (2010). Sport-related concussion in children and adolescents. *Pediatrics*, 126(3), 597-615.
- Harmon, K., Drezner, J., Gammons, M., Guskiewicz, K., Halstead, M., Herring, S., Kutcher, J. S., Pana, A., Putukian, M. & Roberts, W. (2013). American Medical Society for Sports Medicine position statement: concussion in sport. *British Journal Of Sports Medicine*, 47(1), 15-26. doi:10.1136/bjsports-2012-091941
- Harvey, H. H. (2013). Reducing traumatic brain injuries in youth sports: youth sports traumatic brain injury state laws, January 2009–December 2012. *American journal of public health*, 103(7), 1249-1254.
- Hing, E., & Hsiao, C. (2014). State variability in supply of office-based primary care providers: United States, 2012. *NCHS data brief*, (151), 1-8.
- HJ 26, Montana 65th Legislature (2015)
- Hodgkinson, H. L., & Montenegro, X. (1999). The US School Superintendent: The Invisible CEO. *Institute for Educational Leadership, Inc.*, 1001 Connecticut Avenue, NW, Suite 310, Washington, DC 20036.

- Kirkwood, M. W., Yeates, K. O., & Wilson, P. E. (2006). Pediatric sport-related concussion: a review of the clinical management of an oft-neglected population. *Pediatrics*, 117(4), 1359-1371.
- Koh, J. O., Cassidy, J. D., & Watkinson, E. J. (2003). Incidence of concussion in contact sports: a systematic review of the evidence. *Brain Injury*, 17(10), 901-917.
- Leddy, J. J., Sandhu, H., Sodhi, V., Baker, J. G., & Willer, B. (2012). Rehabilitation of concussion and post-concussion syndrome. *Sports Health: A Multidisciplinary Approach*, 4(2), 147-154.
- Lincoln, A. E., Caswell, S. V., Almquist, J. L., Dunn, R. E., Norris, J. B., & Hinton, R. Y. (2011). Trends in Concussion Incidence in High School Sports: A Prospective 11-Year Study. *American Journal Of Sports Medicine*, 39(5), 958-963. doi:10.1177/0363546510392326
- Marar, M., McIlvain, N. M., Fields, S. K., & Comstock, R. D. (2012). Epidemiology of Concussions Among United States High School Athletes in 20 Sports. *American Journal Of Sports Medicine*, 40(4), 747-755. doi:10.1177/0363546511435626
- McLeod, T., Schwartz, C., & Bay, R. (2007). Sport-related concussion misunderstanding among youth coaches. *Clinical Journal Of Sport Medicine*, 17(2), 140-141 2p.
- McCrea, M., Hammeke, T., Olsen, G., Leo, P., & Guskiewicz, K. (2004). Unreported concussion in high school football players: implications for prevention. *Clinical Journal of Sport Medicine*, 14(1), 13-17.
- McDonald, L. (2014). Florence Nightingale and Mary Seacole on nursing and health care. *Journal Of Advanced Nursing*, 70(6), 1436-1444. doi:10.1111/jan.12291
- Meehan, W. P., d'Hemecourt, P., Collins, C. L., & Comstock, R. D. (2011). Assessment and management of sport-related concussions in United States high schools. *The American journal of sports medicine*, 39(11), 2304-2310.
- Meehan, W., Mannix, R., Zafonte, R., & Pascual-Leone, A. (2015). Chronic traumatic encephalopathy and athletes. *Neurology*, 85(17), 1504-1511.
- Meehan, W. P. & O'Brien, M. J. (2015). Sport-related concussion in children and adolescents: Management. In A. Hergenroeder & R. Bachur (eds.) *Uptodate*. Available from <http://www.uptodate.com>
- Meehan, W. P. & O'Brien, M. J. (2015). Sport-related concussion in children and adolescents: Clinical manifestations and diagnosis. In A. Hergenroeder & R. Bachur (eds.) *Uptodate*. Available from <http://www.uptodate.com>

- McGrath, N. (2010). Supporting the student-athlete's return to the classroom after a sport-related concussion. *Journal of Athletic Training*, 45(5), 492-498.
- McKee, A. C., Stein, T. D., Nowinski, C. J., Stern, R. A., Daneshvar, D. H., Alvarez, & Cantu, R. C. (2013). The spectrum of disease in chronic traumatic encephalopathy. *Brain*, 136(1), 43-64.
- Montana Chronic Disease Prevention and Health Promotion Bureau (2015). *Mild traumatic brain injuries, 2010-2013. Montana Department of Health and Human Services*. Retrieved from <https://dphhs.mt.gov/Portals/85/publichealth/documents/EMSTS/prevention/mtbirreportaccessible6-15.pdf>
- Montana Department of Health and Human Services (2015). Dylan Steigers protection of youth athletes act evaluation summary report. Retrieved from <https://dphhs.mt.gov/Portals/85/publichealth/documents/NutritionAndPhysicalActivity/ConcussionEvaluationSummaryReport2014.pdf>
- Montana Healthcare Workforce Advisory Committee (2011). Montana healthcare workforce statewide strategic plan. *Montana Office of Rural Health*. Retrieved from <http://www.opi.mt.gov/Pdf/HOSA/MTHHealthcareWorkforceStrategicPlan.pdf>
- Montana High School Association (2015). Soccer. Retrieved from <http://www.mhsa.org>
- Montana Office of Public Instruction (2005). Serving students with health care needs in public schools: A technical assistance manual. Retrieved from <http://opi.mt.gov/pdf/SpecED/guides/HealthCareNeeds.pdf>
- Moody, V., & Tosoni, E. (2016). Assessment of implementation of the dylan steigers protection of youth athletes act: a descriptive study. *University of Montana*. Retrieved from [http://leg.mt.gov/content/Committees/Interim/2015-2016/Education-and-Local-Government/Meetings/Jan-2016/Executive%20Summary%20Report%20HJ%2026%20\(4\).pdf](http://leg.mt.gov/content/Committees/Interim/2015-2016/Education-and-Local-Government/Meetings/Jan-2016/Executive%20Summary%20Report%20HJ%2026%20(4).pdf)
- Mund, A. (2014). Healthcare policy for advocacy in health care. In Zaccagnini, M. E. & White, K. W. (Eds.). *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed.) (p. 177-218). Burlington, MA: Jones & Bartlett Learning.
- National Association of School Nurses (2013). NASN position statement: Concussions—The role of the school nurse. *NASN School Nurse*, 28(2), 110-111 2p. doi:10.1177/1942602X12473949
- National Athletic Trainer Association (2014). NATA issues new position statement on the management of sport concussion. Retrieved from

<http://www.nata.org/news%20release/nata-issues-new-position-statement-management-sport-concussion>

National Collegiate Athletic Association. (2015). Concussion guidelines: diagnosis and management of sport-related concussion guidelines.

National Conference of State Legislatures (2014). Traumatic brain injury legislation. Retrieved from <http://www.ncsl.org/research/health/traumatic-brain-injury-legislation.aspx>

_____. (2014). Traumatic brain injuries among youth athletes. Retrieved from <http://www.ncsl.org/research/health/traumatic-brain-injuries-among-youth-athletes.aspx>

Nationwide Children's Hospital (2016). A school administrator's guide to academic concussion management. *Nationwide Children's Hospital*. Retrieved from <http://www.nationwidechildrens.org/academic-concussion-management>

Nightingale, F. (1969). *Notes on nursing: What it is and what it is not*. New York, NY: Dover Publications. (Original work published 1860)

Office of Disease Prevention and Health Promotion (2015). Educational and community-based programs. Retrieved from <http://www.healthypeople.gov/2020/topics-objectives/topic/educational-and-community-based-programs>

Omalu, B. I., Bailes, J., Hammers, J. L., & Fitzsimmons, R. P. (2010). Chronic traumatic encephalopathy, suicides and parasuicides in professional American athletes: the role of the forensic pathologist. *The American journal of forensic medicine and pathology*, 31(2), 130-132.

Randolph, C., McCrea, M., Barr, W. B., & Macciocchi, S. N. (2005). Is Neuropsychological Testing Useful in the Management of Sport-Related Concussion?/COMMENTARY/AUTHORS'RESPONSE. *Journal of athletic training*, 40(3), 139.

Rocky Mountain Hospital for Children (2016). Concussion management/REAP. Rocky Mountain Hospital for Children. Retrieved from <http://rockymountainhospitalforchildren.com/service/concussion-management-reap-guidelines>

Rosenthal, J. A., Foraker, R. E., Collins, C. L., & Comstock, R. D. (2014). National high school athlete concussion rates from 2005-2006 to 2011-2012. *The American journal of sports medicine*, 0363546514530091.

Ryan, L. M., & Warden, D. L. (2003). Post concussion syndrome. *International Review Of Psychiatry*, 15(4), 310-316.

- Sady, M. D., Vaughan, C. G., & Gioia, G. A. (2011). School and the concussed youth: recommendations for concussion education and management. *Physical medicine and rehabilitation clinics of North America*, 22(4), 701-719.
- Selanders, L. (2010). The power of environmental adaptation: Florence Nightingale's original theory for nursing practice. *Journal Of Holistic Nursing*, 28(1), 81-88. doi:10.1177/089801010936025
- Sim, A., Terryberry-Spohr, L., & Wilson, K. R. (2008). Prolonged recovery of memory functioning after mild traumatic brain injury in adolescent athletes.
- Stolp, S., Wilkins, E., & Raine, K. D. (2015). Developing and sustaining a healthy school community: Essential elements identified by school health champions. *Health Education Journal*, 74(3), 299-311.
- Thomas, A. C., Dumas, M. A., Kleinpell, R., Logsdon, M. C., Crabtree, M. K., Delaney, K. R., ... & Nativio, G. D. (2012). Nurse practitioner core competencies April 2011, amended 2012. *The National Organization of Nurse Practitioner Faculties*. Retrieved from <http://c.ymcdn.com/sites/www.nonpf.org/resource/resmgr/competencies/npcorecompetenciesfinal2012.pdf>
- Tourville, C., & Ingalls, K. (2003). The Living Tree of Nursing Theories. *Nursing Forum*, 38(3), 21. doi:10.1111/j.0029-6473.2003.t01-1-00021.
- Tomei, K. L., Doe, C., Prestigiacomo, C. J., & Gandhi, C. D. (2012). Comparative analysis of state-level concussion legislation and review of current practices in concussion. *Neurosurgical focus*, 33(6), E11.
- Yard, E. E., & Comstock, R. D. (2009). Compliance with return to play guidelines following concussion in US high school athletes, 2005–2008. *Brain injury*, 23(11), 888-898.
- Yi, J., Padalino, D. J., Chin, L. S., Montenegro, P., & Cantu, R. C. (2013). Chronic traumatic encephalopathy. *Current sports medicine reports*, 12(1), 28-32.
- Zonfrillo, M. R., Master, C. L., Grady, M. F., Winston, F. K., Callahan, J. M., & Arbogast, K. B. (2012). Pediatric providers' self-reported knowledge, practices, and attitudes about concussion. *Pediatrics*, 130(6), 1120-112

APPENDICES

APPENDIX A

DYLAN STEIGER'S PROTECTION OF YOUTH ATHLETE ACT

AN ACT CREATING THE DYLAN STEIGERS PROTECTION OF YOUTH ATHLETES ACT; PROMOTING SAFETY FOR YOUTH ATHLETES; PROVIDING DEFINITIONS; REQUIRING EACH SCHOOL DISTRICT TO ADOPT A POLICY ADDRESSING THE DANGERS OF CONCUSSIONS; PROVIDING MINIMUM REQUIREMENTS FOR THE CONTENTS OF A SCHOOL DISTRICT POLICY; REQUIRING THAT A YOUTH ATHLETE WHO EXHIBITS SIGNS, SYMPTOMS, OR BEHAVIORS CONSISTENT WITH A CONCUSSION BE REMOVED FROM PARTICIPATION AND THAT MEDICAL CLEARANCE BE OBTAINED PRIOR TO RETURNING TO PARTICIPATION; CLARIFYING THAT THE ACT DOES NOT CREATE A NEW CAUSE OF ACTION; AND PROVIDING AN IMMEDIATE EFFECTIVE DATE.

WHEREAS, the Centers for Disease Control and Prevention estimates that as many as 3.9 million sports-related and recreation-related concussions occur in the United States each year; and

WHEREAS, youth athletics are commonplace throughout the state and it is in the best interest of participating youth that uniform concussion policies and procedures apply across the state; and

WHEREAS, the Centers for Disease Control and Prevention has created uniform policies and procedures regarding the nature and risk of concussions, including the effects of continuing to play after sustaining a concussion, that are consistent with current medical knowledge.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Short title. [Sections 1 through 5] may be cited as the "Dylan Steigers Protection of Youth Athletes Act".

Section 2. Purpose -- intent. (1) The legislature finds that protecting youth athletes from serious injury is a compelling state interest. The purpose of [sections 2 through 5] is to prevent permanent injury and death to youth athletes in the state of Montana. To further this interest, the legislature finds:

(a) concussions are one of the most commonly reported injuries in children and adolescents who

participate in sports and recreational activities; (b) a concussion is caused by a blow or motion to the head or body that causes the brain to move

rapidly

inside the skull; (c) the risks of catastrophic injuries or death are significant when a concussion or brain injury is not

properly evaluated and managed; (d) concussions are a type of brain injury that can range from mild to severe and can disrupt the way the

brain normally works; (e) concussions can occur in any organized or unorganized sport or recreational activity and can result

from a fall or from players colliding with each other, with the ground, or with obstacles; (f) concussions occur with or without loss of consciousness; and (g) continuing to play with a concussion or symptoms of brain injury leaves the youth athlete especially

vulnerable to greater injury and even death. (2) [Sections 2 through 5] do not create a new cause of action.

Section 3. Definitions. As used in [sections 2 through 5], the following definitions apply:

(1) "Concussion" means an injury to the brain arising from blunt trauma, an acceleration force, or a deceleration force, which may include one of the following observed or self-reported conditions attributable to the injury:

(a) transient confusion, disorientation, or impaired consciousness; (b) dysfunction of memory; (c) loss of consciousness; or (d) signs of other neurological or neuropsychological dysfunction, including: (i) increased irritability;

(ii) lethargy; (iii) vomiting; (iv) headache; (v) dizziness; (vi) fatigue; (vii) decreased balance; and

(viii) seizures.

(2) "Licensed health care professional" means a registered, licensed, certified, or otherwise statutorily recognized health care professional whose training includes the evaluation and management of concussions.

(3) "Organized youth athletic activity" means an athletic activity sponsored by a school or school district in which the participants are engaged in an athletic game or competition against another team, club, or entity, in

practice, tryouts, training exercises, or sports camps, or in preparation for an athletic game or competition against another team, club, or entity.

(4) "Youth athlete" means an individual who is an active participant in an organized youth athletic activity.

Section 4. Youth athletes -- concussion education requirements. (1)

Each school district in this state offering organized youth athletic activities shall adopt policies and procedures to inform athletic trainers, coaches, officials, youth athletes, and parents or guardians of the nature and risk of brain injuries, including the effects of continuing to play after a concussion. The policies, content, and protocols must be consistent with current medical knowledge and guidelines provided by the U.S. department of health and human services, centers for disease control and prevention, as to:

(a) the nature and risk of brain injuries associated with athletic activity; (b) the signs, symptoms, and behaviors consistent with a brain injury; (c) the need to alert a licensed health care professional for urgent recognition and treatment when a

youth athlete exhibits signs, symptoms, or behaviors consistent with a concussion; and (d) the need to follow proper medical direction and protocols for treatment and returning to play after a

youth athlete sustains a concussion. (2) A form documenting that educational materials referred to in subsection (1) have been provided to

and viewed by each youth athlete and the youth athlete's parent or guardian must be signed by each youth athlete and the youth athlete's parent or guardian and returned to an official designated by the school or school district prior to the youth athlete's participation in organized youth athletic activities for the subsequent school year.

(3) School districts shall ensure access to a training program consistent with subsection (1). Each coach, athletic trainer, and official participating in organized youth athletic activities shall complete the training program at least once each school year.

(4) School districts may invite the participation of appropriate advocacy groups and appropriate sports governing bodies to facilitate the requirements of subsections (1) through (3).

Section 5. Youth athletes -- removal from participation following concussion -- medical clearance required before return to participation.

(1) An athletic trainer, coach, or official shall remove a youth athlete from participation in any organized youth athletic activity at the time the youth athlete exhibits signs, symptoms, or behaviors consistent with a concussion.

(2) A youth athlete who has been removed from participation in an organized youth athletic activity after exhibiting signs, symptoms, or behaviors consistent with a concussion may not return to organized youth athletic activities until the youth athlete:

(a) no longer exhibits signs, symptoms, or behaviors consistent with a concussion; and

(b) receives an evaluation by a licensed health care professional and receives written clearance to return to play from the licensed health care professional. The written clearance must state:

(i) that the licensed health care professional has evaluated the youth athlete; and

(ii) that in the licensed health care professional's opinion, the youth athlete is capable of safely resuming participation in organized youth athletic activities.

Section 6. Codification instruction. [Sections 2 through 5] are intended to be codified as an integral part of Title 20, and the provisions of Title 20 apply to [sections 2 through 5].

Section 7. Effective date. [This act] is effective on passage and approval.

APPENDIX B

SUPERINTENDENT INTERVIEW GUIDE REGARDING
CURRENT ADHERENCE TO MONTANA SENATE BILL 112

“Hello my name is Cole Whitmoyer and I am a graduate student in the Doctor of Nursing program at Montana State University. I am evaluating the current state of concussion policies and procedures in High Schools around the state of Montana.

Would you be willing to spend 10-15 minutes to answer 10 questions that will help us understand how much progress school districts have made in implementing safety guidelines to address head injuries for high school students that participate in contact sports?

As part of this study your participation is completely voluntary. All results will be presented in aggregate. No individual school's responses will be published.”

7. School demographic
 - a. How many high schools are you responsible for overseeing?
 - b. Can you give me an estimated enrollment for the previous year in each school
 - i. .
 - ii. .
 - iii. .
 - iv. .
 - c. How many contact sports do you have in each high school?
 - i. .
 - ii. .
 - iii. .
 - iv. .
 - d. How many students participate in contact sports at each high school under your direction?
 - i. .
 - ii. .
 - iii. .
 - iv. .
 - e. How long have you been superintendent in the district?

8. Have you ever heard of Montana Senate Bill 112, the Dylan Steiger's Protection of Youth Athletes Act?

- a. Yes
- b. No

If "No", the interviewer will give brief description of Montana Senate Bill 112.

9. Has the school district adopted policies and procedures to educate coaches, athletic trainers (ATs), officials, parents and athletes about the nature and risk of concussions with athletics?

- a. Yes
- b. No

If 'yes', can you describe what has been done to educate these individuals?

Would you be willing to share these policies and procedures with me?

Details:

10. Do you require parents AND athletes to sign an educational form regarding the nature and risks of concussion?

- a. Yes
- b. No

If 'Yes' Is there a standardized form used?

- a. Yes
- b. No

If 'Yes' where did you get this information?

11. Do all coaches and ATs take the online training course through National Federation of State High School Associations (NFHS)?

- a. Yes
- b. No

12. Do you have any association with entities other than the MHSA to help implement such a program?

- a. Yes
- b. No

If 'yes' which entities are you involved with?

- i. .
- ii. .

13. In your school district, who makes the decision to remove a player suspected of having a concussion?

14. Do you feel there are sufficient healthcare resources to address the needs of students who suffer concussions?

- a. Yes
- b. No

15. Do you have written policies or procedures in place that outlines how students return to play?

- a. Yes
- b. No

16. Who is responsible for overseeing that students are reintroduced to play correctly, in your district?

17. Do you have a policy requiring written clearance from a health care provider to return to play?

- a. Yes
- b. No

If 'yes', would you be willing to share your policy with me?

Details:

“This concludes our interview. Thank you for your time and participation.

Do you have any questions for me?

Would you be interested in receiving the aggregated results from this study?”