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**Evaluation of the Implementation of the New York State (NYS) Concussion
Management and Awareness Act**

By

Elise Wilcocks

A Thesis Submitted in partial fulfillment of the requirements for the degree of
Master of Science in Science, Technology, and Public Policy

Department of Public Policy

College of Liberal Arts

Rochester Institute of Technology

Rochester, NY

May 2018

R·I·T

Evaluation of the Implementation of the New York State (NYS) Concussion Management and Awareness Act

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*Masters of Science, Science, Technology and Public Policy
Thesis Submitted in Partial Fulfillment of the Graduation Requirements for the*

*College of Liberal Arts/Public Policy Program at
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Abstract

Since the 1990s, sports-related concussions have become a public health concern in the youth and adolescent athlete population. After some professional athletes revealed that their retirement was connected to concussions, public awareness of concussions and identifying the need to protect these high school athletes emerged. Between 2009 and 2013, all 50 states in the U.S. passed a state concussion management policy modeled after the Lystedt Act. In July 2012, the New York State (NYS) Concussion Management and Awareness Act went into effect for all students in public and charter schools, with most schools applying their policies to interscholastic sports. This policy - a mixture of requirements and guidelines - is aimed toward raising awareness and providing students a consistent recovery process. However, the guidelines NYS provides school districts leaves room for variation in implementation across districts. This variation in implementation is called policy translation: the creation and modification of the NYS guidelines to fit each schools' needs. While some of the variation might help accommodate differences among schools, other variation may negatively impact policy effectiveness. The focus of this thesis is understanding the degree and cause of variations in implementation across high school boundaries. Additionally, implications for future policy developments will be discussed.

Acknowledgements

I would like to thank my thesis committee members for helping me throughout this process. A special thank you goes out to my faculty advisor, Dr. Sandra Rothenberg. She has helped and supported me from day one when I joined the program 2 years ago. Thank you, Sandy, it has been a great experience working with you and all your support has been much appreciated.

I would also like to thank the RIT Biomedical Engineering department for providing me this opportunity to conduct my own research in a topic I've been passionate about for years.

Lastly, a huge thank you goes out to Caitlin, Dakota, and especially, my mom and dad! Thank you to you all for listening to me at times when I needed you the most. You all helped motivate me throughout this journey.

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List of Abbreviations

Table 1 describes the various abbreviations and acronyms that are used throughout the thesis.

Table 1. List of Abbreviations.

Abbreviation	Meaning
AD	Athletic Director
AT	Athletic Trainer
CDC	Centers for Disease Control
CMT	Concussion Management Team
HIPPA	Health Insurance Portability and Accountability Act “Privacy Rule”
IRB	Institutional Review Board
NCAA	National Collegiate Athletic Association
NCIPC	National Center for Injury Prevention and Control
NFL	National Football League
NHL	National Hockey League
NP	Nurse Practitioner
NYS	New York State
NYSCSH	New York State Center for School Health
NYSPHSAA	New York State Public High School Athletic Association
PCP	Primary Care Physician
PE	Physical Education
RTL	Return to Learn
RTP	Return to Play
SCAT	Sport Concussion Assessment Tool
SES	Socioeconomic Status
SIS	Second-Impact Syndrome
SN	School Nurse
TBI	Traumatic Brain Injury
WNY	Western New York

1. Introduction

1.1 Background: A Public Health Concern

A concussion is defined as a type of traumatic brain injury (TBI) that can be caused by events such as a fall, a motor vehicle accident, or any situation that causes harmful impacts to the head and/or body (The State Education Department, 2012). This "...biomechanically induced neurological injury..." (Kane, 2015, pg. 205) results in a temporary change in the brain's function when a force is transmitted to the head, causing the brain to move rapidly within the skull (The State Education Department, 2012). One population susceptible to sports-related concussions is children and adolescents (The State Education Department, 2012). The youth and adolescent athlete population's brains are vulnerable to this injury because of the neurocognitive development that occurs as their bodies continue to grow (Marar, McIlvain, Fields, & Comstock, 2012). A younger brain will recover at a slower, more irregular rate than an adult brain.

Out of all the causes that lead to TBIs in young individuals ages 15 to 24, sports are ranked second to motor vehicle crashes (Gessel, Fields, Collins, Dick, & Comstock, 2007). Sports could potentially rank number one in the future, as it is predicted that the concussion estimates are expected to increase as the number of participating athletes continues to grow (Cook & King, 2014). Many of the reported statistics vastly underestimate the negative impact of concussions/TBIs on this population because many athletes who suffer a mild head injury rarely seek medical attention (Daneshvar, Nowinski, McKee, & Cantu, 2011) or the TBIs are not recognized by the supervising adult such as the coach or athletic trainer (AT) due to improper use of concussion management guidelines and assessments (Daneshvar et al., 2011).

Prior to the 1990s, attention toward sports-related concussions involving youth athletes was minimal. It was not until the 1990s that national awareness surrounding sports-related concussions emerged, and the push to protect youth and adolescent athletes began. The attention given to sports-related concussions has grown not only because of the new discoveries that were made by the medical community (Powell, 2001), but also due to the media (Cook et al., 2014). Both the media and fans of different sports have helped heighten concussion awareness as both groups learned more about why some professional athletes retired. These professional athletes revealed that post-concussion syndrome, a major side-effect of concussions, was the main factor in their decision to retire (Powell, 2001). These revelations started a change in attitude toward concussions, prompting a growth in research that focuses on the "...identification, management, and long-term effects..." of the injury (Powell, 2001, pg. 308).

The public push to protect youth and adolescent athletes from sports-related concussions also stems from the growth in number of high school students participating in interscholastic sports (Cook et al., 2014). Organized sports can present many benefits to these athletes. Playing sports not only helps youth athletes develop physically, promoting a healthier lifestyle, it also is an outlet to relieve stress, teach social values, improve grades and/or self-esteem, and lead to professional success (e.g., scholarships, future employment) (Kane, 2015; Powell, 2001). At the same time, heightened public awareness of concussions and the need for the injury to be reduced in high school athletes has been identified as a public health concern (Marar et al., 2012). Risk is inherent in any sport, however, and some argue that the responsibility falls on the school's sport program to balance recreation and player safety (Powell, 2001).

1.2 Sports-Related Concussion State Policies

To initially address sports-related concussions, a variety of sport-specific strategies had been created and implemented to reduce TBIs in all levels of sports. These strategies included changes to the sport equipment, the rules of the game, and times and/or location where the sports are played. At the professional level, the National Football League (NFL) and National Hockey League (NHL) have changed the rules of the game to help reduce TBIs. At the collegiate level, the National Collegiate Athletic Association (NCAA) partnered with the Centers for Disease Control (CDC) to help institute best practices and prevention processes for college athletes and athletic staff to follow. These efforts have spilled over into youth-related sports programs, such as the creation of new rules limiting contact in football practices. However, these strategies/prevention mechanisms and other tools used to reduce the frequency and severity of sports-related concussions in the youth population are not consistently effective or even taken seriously (Baugh & Shapiro, 2015; Harvey, 2013).

To ensure that awareness and prevention of sports-related TBIs would be taken seriously by youth sports programs, state-wide efforts have been made toward the creation of concussion management policies for youth athletes (Harvey, 2013). While it is also possible to develop guidelines that eliminate contact elements in sports, resulting in rule changes (Kane, 2015), this is harder to achieve than raising awareness and prevention because of the social pressure from the fans and athletes surrounding preservation of the game. Therefore, public support is in favor of implementation of concussion management policies to mitigate player risk, while preserving the original game rules (Kane, 2015).

The push for implementation of concussion management public policies targeting the high school athlete population began in Washington state in 2006 when a 13-year old football

player named Zackery Lystedt, suffered a concussion during a middle school game. Zack was assessed by the coach on the sidelines, but no medical personnel was present, which was typical for middle school games. He returned to play during the third quarter with symptoms increasing throughout the game. Today, Zack continues to recover, but will struggle with cognitive impairments. Because of this incident, the Lystedt family pushed for a change in concussion management within Washington state. In 2009, Washington state enacted the Lystedt Act that contained components such as stressing the need for athletes, parents/guardians, and coaches to be educated about concussions, the removal of the athlete if suspected of sustaining a concussion, and determination of return to play (RTP) by a licensed healthcare professional specialized in evaluation and management of concussions. The expectation was that the Lystedt Act would continue to raise awareness to all stakeholders involved in student athletics about the dangers of sports-related concussions (Bompadre, Junguji, Yanex, Satchell, Gilbert, Burton, Conrad, & Herring, 2014; Concannon, 2016).

With the NFL, the CDC, and other stakeholders' support of the Washington policy, the Lystedt law became the concussion management policy that all of the other states modeled their policies after containing similar themes (Bell, Master, & Lionbarger, 2016; Cook et al., 2014). By January 2014, all 50 states, as well as the District of Columbia, had created and enacted youth sports concussion laws (Concannon, 2016). The main points of the policies address ways to mitigate the effects post-injury, stress the importance of educating effected stakeholders to recognize and properly manage TBIs (Bell et al., 2016), call for immediate removal of players during practices or games if suspected of sustaining a concussion, and requires medical clearance by a professional for RTP (Lowrey & Morain, 2014). While the Lystedt law initially addressed the three main stakeholders - athletes, parents, and coaches - (Concannon, 2016), other policies

focus on a broader range of stakeholders, such as high school athletic directors (ADs), coaches, primary care physicians (PCPs), athletic trainers (ATs), and school nurses (SNs) (Esquivel, Haque, Keating, Marsh, & Lemos, 2013; Howland, Hackman, Taylor, Brown, Gapinski, Mills, & Thornton, 2017).

Based on a 2013 case study evaluation regarding the RTP Concussion Management policies implementation efforts in two states (Washington and Massachusetts) conducted by the National Center for Injury Prevention and Control (NCIPC), key elements the NCIPC suggested to include in state concussion management policies are as followed (CDC, 2015; Friesen, 2013):

- Identification of stakeholders' roles and responsibilities
- Implementation requirements or guidelines on how to implement the policy, who to collaborate with, etc. as well as a process to monitor compliance
- Guidelines for stakeholder knowledge and awareness (how to increase transfer of knowledge, required training for certain stakeholders, types of resources needed, etc.)
- Medical clearance, which includes documentation during duration of the injury (start to finish with RTP and return to learn (RTL) protocols) and tools/resources needed to ensure appropriate healthcare is given to student athletes

While most of the youth state concussion laws are similar in themes, concussion management protocols vary (Bonds, Edwards, Spradley, & Phillips, 2015) creating issues such as tragic residual symptoms from the injury and premature RTP (Concannon, 2016). For example, all state laws require medical clearance before the athlete can RTP, but only one state requires student athlete baseline testing during this RTP process (Cook et al., 2014). This could be due to many factors such as lack in personnel or financial resources (Cook et al., 2014). The variation

among state policies indicates that the policies are just beginning to evolve and as they progress, the differences between states can result in inconsistent treatment of student athletes.

Along with variation across state policies, there may also be variation across schools within a state that implement programs under the same policy. While some of the variation might help accommodate differences among schools, other variation may lead to differences in player safety. *The focus of this thesis is on these variations in implementation.* I will focus on the following questions:

- How much variation is there in the implementation of a particular state level policy?
- What are the causes of these variation?
- What are the implications for future policy development?

This thesis will evaluate the factors that cause variation in the translation process and impact effective implementation of the New York State (NYS) Concussion Management and Awareness Act across NYS high school district boundaries.

First, I will review existing evaluation studies on state concussion management policies in U.S. high school sports. This literature review will help guide a series of case studies of schools in the NYS region. Data will include interviews with multiple concussion management team (CMT) members from different NYS school districts. These interviews, along with other case study data, will be analyzed to provide insight into the level and nature of implementation variation across schools, as well as factors that impact policy implementation. Lastly, suggestions will be made regarding possible changes that could be made to the NYS Act to help improve and strengthen the NYS and other high school concussion management policies.

2. Literature Review

The articles used in this literature review are summarized in Table 2. There were several criteria used to determine the boundaries of this literature review. First, only articles published since 2009 were included; this date criterion was chosen because widespread enactment of state concussion management policies across the United States occurred between 2009 and 2013 (Kane, 2015). Second, articles included in the review discussed how the state laws impact or effect the mitigation of concussions and evaluations of the overall policy that focused on one or multiple factors that influence policy implementation and compliance. Third, studies must have been conducted within high schools located in the United States. Articles that focused on evaluating the process used to treat concussions (e.g., the rest and return steps, evaluation tests) or discussed the science and signs/symptoms behind concussions were excluded. Additionally, articles that did not focus on high school athletes, discussed ways to create a concussion management policy (e.g., determining the best RTP protocols), or research conducted to improve the policy were excluded.

Table 2. Summary of Papers Reviewed.

	Conducted	Method	Researchers	Participants	Research Focus
Bompadre et al. (2014)	2008-11	Documentation comparison	Medical, Academic	Seattle public high schools	Determined the effect the Lystedt law has on injury and concussion documentation
Rivara et al. (2014)	2012	Interview and survey	Academic	Public high school athletes and coaches	Examined concussion rates in Washington State student athletes, the proportion who play with symptoms, and the effect of coach education on reporting behavior
Chrisman et al. (2014)	2012-13	Interview and survey	Academic	Washington State public high school coaches	Evaluated variation in concussion education and knowledge between coaches (football, soccer) 3 years after the passage of the law, examining the relationship between sports and location (urban VS. rural)
Kajankova et al. (2017)	2013	Documentation comparison	Medical, Academic, Legal	NYS public school districts	Examined the extent to which NYS school districts' policies and procedures complied to the state concussion act, and the relationship between compliance and district demographics
Kasamatsu et al. (2016)	2013-14	Survey	Academic	ATs	Examined ATs' perspectives on RTL, cognitive rest, and communication with other high school staff (public & private)
Faure et al. (2015)	2014	Survey	Academic	ADs	Examined the effectiveness of Idaho's concussion law on public and private high schools in terms of time, resources, and money
Flahery et al. (2016)	2014	Survey	Medical	PCPs	Determined PCP adherence and support of the Massachusetts policy, guidelines followed, and barriers to care
Doucette et al. (2016)	2014-15	Semi-structured interviews	Academic	Coaches, ATs, ADs, nurses, health coordinator	Determined Massachusetts public school districts' implementation process and identified factors that influence this process
Howland et al. (2017)	2015	Focus Groups (no mixture of groups)	Medical, Academic	ATs and SNs	Assessed implementation of the Massachusetts policy in public high schools
Wallace et al. (2017a)	N/A	Survey	Academic	Michigan high school athletes	Evaluated athlete concussion knowledge and reporting behaviors with and without access to ATs
Wallace et al. (2017b)	N/A	Survey	Academic	Michigan high school athletes	Determined relationships in athlete knowledge/reporting behavior and school location with or without access to ATs

As seen in Table 3, across these studies five notable factors were identified that impact the implementation of concussion management protocols. The factors that influence implementation and compliance to concussion management policies most often mentioned were knowledge transfer and the level of stakeholder education, followed by the location of the school and district resources. Only one article, a case study conducted by Doucette, Bulzacchelli, Gillum, & Whitehill (2016), focused on all five factors. These factors are interconnected because having the resources, especially the presence of knowledgeable leaders, has a large impact on awareness of concussions and implementation of the policy. I will now review these factors in the order listed in Table 3, from most to least discussed.

Table 3. Factors Identified in the Studies. The X's indicate the factors that were identified in the articles as those that effect implementation and compliance to the concussion management policy. The articles are listed in order by the year the study was conducted.

	Knowledge and Education	Location and Availability of Resources	Policy Structure	Communication and Coordination	Documentation
Bompadre et al. (2014)	X	X			X
Rivara et al. (2014)	X				
Chrisman et al. (2014)	X	X	X		
Kajankova et al. (2017)	X	X	X		
Kasamatsu et al. (2016)	X	X	X	X	
Faure et al. (2015)	X	X	X		
Flahery et al. (2016)	X	X		X	
Doucette et al. (2016)	X	X	X	X	X
Howland et al. (2017)	X	X	X		X
Wallace et al. (2017a)	X	X			
Wallace et al. (2017b)	X	X			

2.1 Knowledge and Education

Education was most often identified in the articles as one of the key factors in aiding proper diagnosis and management of sports-related concussions (Concannon, 2016). This knowledge can be acquired using various types of educational materials: active and passive. Active learning materials means there is direct stakeholder interaction when stakeholders are being educated such as guest speakers/staff telling their stories that students can relate to or experimental learning exercises/demonstrations, while passive is associated with traditional lecturing or handing out materials (Michel, Cater III, & Varela, 2009).

All the articles mentioned that awareness and education of stakeholders can also be transferred through those who are trained and knowledgeable in concussion management. For example, many states require specific stakeholders, such as ATs and coaches, to do annual training (Chrisman, Schiff, Chung, Herring, & Rivara, 2014) in order to increase their knowledge, which can assist in raising awareness among parents, students, and other stakeholders (Chrisman et al., 2014; Faure, Moffit, & Schiess, 2015). In addition to training, some educational tools, such as the CDC Heads up online toolkit, also provides tailored information for each stakeholder to refer to throughout the season and helps guide the stakeholders when educating others (Concannon, 2016).

Most studies focused on the coaches' awareness and education because coaches interact with athletes daily (Chrisman et al., 2014; Rivara, Schiff, Chrisman, Chung, Ellenbogen, & Herring, 2014). A coach's attitude and knowledge can directly impact athlete awareness (Chrisman et al., 2014), especially in the absence of an AT (Faure et al., 2015). Conflicts of interest can arise when coaches must report concussed student athletes. Therefore, incorporation of other high school staff could further awareness and compliance to the policy, which could be

particularly important if the most knowledgeable person leaves the school (Concannon, 2016). A solution to help incorporate additional stakeholders could be training teachers, school counselors, and physicians, which could potentially help the transfer of knowledge among parents and athletes (Howland et al., 2017; Kasamatsu, Cleary, Bennett, & McLeod, 2016).

Increasing the amount of training could also help address the gaps in stakeholder knowledge. However, research by Rivara et al. (2014) found that increasing the amount of training material made available to coaches had no impact on their awareness. Results showed that the coaches' knowledge was not impacted after using various types of education tools (e.g., PowerPoint, video, quiz, etc.) (Rivera et al., 2014). This raises concerns regarding what education tools are the most useful to coaches to catch those athletes who are not reporting their symptoms (Concannon, 2016). Another way to increase the knowledge of stakeholders is to require that parents and students take greater responsibility in reviewing the educational material. Most parents and students are referred to reading materials and must sign an acknowledgement form after they have read the material (Rivara et al., 2014). This is an example of passive education; it's unknown if stakeholders are truly reading and understanding the material. In conclusion, while knowledge of stakeholders is a critical aspect of effective implementation, the knowledge transferred is not necessarily translating to permanent changes in behavior (Rivara et al., 2014). Therefore, the type of materials used to train and given to stakeholders may need to be updated such as the use of interactive learning material.

2.2 Location and Availability of Resources

Implementation can be impacted due to the limited resources (e.g., monetary, human, educational) made available to school districts because of their location (Chrisman et al., 2014; Faure et al., 2015; Wallace, Covassin, Nogle, Gould, & Kovan, 2017a, 2017b). The Lystedt Law

was designed to ensure that there would be no extra cost to Washington state (Concannon, 2016); other states included this aspect in their legislation. However, there are costs associated with achieving successful policy implementation.

One of the most commonly talked about impacts of resources was the ability to hire critical people in the implementation process. For example, half of the studies that discussed location and availability of resources acknowledged that the most valuable stakeholder that should be a part of implementation process are the ATs. They are considered one of the most qualified stakeholders in identification and management of concussions (Doucette et al., 2016; Faure et al., 2015; Kasamatsu et al., 2016; Wallace, Covassin, Nogle, Gould, & Kovan, 2017a, 2017b) who can also educate other stakeholders (Wallace et al., 2017b). The presence of an AT, especially one who is full-time, can improve student athlete reporting behavior; trust can be built in the relationship resulting in student athletes feeling more comfortable in reporting concussions (Doucette et al., 2016; Wallace et al., 2017b). However, some school districts are not as fortunate to have a full-time AT or afford one at all because of location and budget limitations. Urban districts tend to have greater access to ATs than rural areas because they are closer to medical resources (Chrisman et al., 2014; Faure et al., 2015; Kasamatsu et al., 2016; Wallace et al., 2017b), but rural and some urban districts do not have an AT because of budget limitations (Chrisman et al., 2014; Mazerolle, Raso, Pagnotta, Stearns, & Casa, 2015; Wallace et al., 2017a). Budget limitations also impact the types of educational materials the school is available to, effecting awareness (Wallace et al., 2017b). Rural areas lack additional education resources other than the free CDC material due to limited monetary resources (Faure et al., 2015).

Socioeconomic status (SES), which relates to the social environment and community norms, also plays a role in athlete awareness. A low SES, usually found in urban areas, is a

poverty indicator, meaning most students will likely have lower reading and proficiency levels (Wallace et al., 2017b). These athletes have a harder time understanding the given information and do not have a strong support system (parents, ATs) available to help change their attitude toward concussions (Wallace et al., 2017b). Therefore, research has found that athletes in an urban school have less knowledge than those attending a suburban school (Wallace et al., 2017b). There is pushback and low student athlete reporting behaviors (Wallace et al., 2017a) that still exists regardless of access to an AT. Therefore, while access to resources can help raise awareness, it is not permanently changing athlete behavior.

2.3 Policy Structure

Fewer studies have focused on how the concussion management policy structure affects implementation and compliance. Understanding the implementation process and how to attain the goals set by the concussion management policies is an indicator of policy effectiveness (Faure et al., 2015). If there are gaps in understanding the policy, it can directly influence stakeholder compliance and implementation (Kajankova, Oswald, Terranova, Kaplen, Ambrose, Spielman, & Gordon, 2017). The causes stem from two variables: ambiguous language and unclear or undefined roles (Lowrey et al., 2014).

An example of how ambiguous, vague language can compromise implementation of the policy was found in research by Chrisman et al. (2014). As mentioned previously, education is the key to every state policy (Faure et al., 2015). It is up to the states and/or districts, however, to determine how the education process will occur (Concannon, 2016). If the process to administer education to stakeholders is unclear, stakeholders' knowledge level will likely plummet. Yet, as pointed out above, sometimes vagueness is intentional so that the policy can accommodate differences across schools, such as the size of the school budget (Chrisman et al., 2014).

The other variable is unclear or undefined roles for the stakeholders. The lack of role responsibilities can negatively impact the injured athlete. Athletes need to know who they can go to and trust when reporting their concussion. In rural areas where access to medical care can be miles away, it is imperative that roles are clearly defined because of the limited access to medical resources (Faure et al., 2015). However, some laws, such as in Massachusetts, do not specify who is responsible in the RTP and removal from play procedures, leaving it to the local level to define the main point of contact (Doucette et al., 2016). Having one main point of contact can help prevent confusion among stakeholders when they are making decisions regarding the athlete's health. This can also create a positive, trusting environment, increasing student athlete reporting behavior. On the other hand, some state laws do not mention or clarify any roles, for example, the role of physicians, causing tension to build between other stakeholders when medically clearing the athlete (Doucette et al., 2016).

Lastly, there is a lack of policy compliance by stakeholders because enforcement mechanisms are not written into the policy. Very few states have enforcement mechanisms in place to ensure compliance (Faure et al., 2015). For example, in Ohio, the state does not have the authority to enforce the law, cannot certify that the policy goals are met, and cannot impose liability on those who do violate the law. Therefore, minor penalties or rewards could be used to ensure proper stakeholder compliance to the policy (Kane, 2015).

2.4 Communication and Coordination

Studies discussed the importance of communication and coordination as factors that influence awareness and compliance to the policy (Table 3). Without effective communication and coordination between CMT members, it can negatively impact policy implementation (Doucette et al., 2016; Kasamatsu et al., 2016). A lack of education and knowledge can also

impact communication with other individuals. Kasamatsu et al. (2016) found that the primary barrier for teacher, school psychologist, and counselor involvement is lack of awareness. These three stakeholders are important for the RTL protocol; therefore, these staff members need to be trained so they can communicate with the rest of the athletic staff who may not be at the school until the start of the after-school activities (Kasamatsu et al., 2016).

CMT team cohesiveness can also positively impact CMT communication, however, research has also found that training may not affect CMT cohesiveness. A benefit of training means everyone can understand one another, making implementation easier because members are on the same page (Doucette et al., 2016). But, Flaherty, Raybould, Jarnal-Allial, Kaafarani, Lee, Gervasini, Ginsburg, Mandell, Donelan, & Masiakos (2016) discovered that, for example, the amount of training PCPs received neither improved nor decreased the level of communications with other medical/school related personnel. Therefore, it was suggested by Kajankova et al. (2017) that more research is needed to determine how much of an influence the amount of training has on the level of communication between CMT members and compliance to the policy. This could include analyzing the day-to-day activities or procedures that are followed by the concussion management staff to reflect compliance (Kajankova et al., 2017).

2.5 Documentation

Three studies identified documentation as a factor that indicates proper implementation and compliance to the concussion policies (Table 3). Documentation can include technology used to track the athlete's progress such as baseline testing (Faure et al., 2015) or other tools designed for sideline testing during games (Esquivel et al., 2013). Having these documentation tools to collect and report the number of concussion-related injuries can help stakeholders comply to the policy and increase effective interactions between stakeholders (Howland et al.,

2017). Doucette et al. (2016) discovered that schools using an electronic recording system helped keep the staff organized as well as force them to produce, report, and review all documents needed for the process. This type of documentation also ensures that the full protocol from initial injury to RTP is followed, leaving no steps out (Doucette et al., 2016). However, as the concussion rate starts to climb, the data can be misleading. An increase in rate of concussions doesn't necessarily mean that the number of concussions is increasing, only the reported value (Kane, 2015). Therefore, documenting the process is beneficial for schools because it indicates that they are complying with the policy and implementing it correctly based on what their policy states.

2.6 Research Question

As suggested by past research outlined above, there is variation across states in the implementation of concussion management programs. Thus, there is likely to be variation within schools implementing the same state policy, such as those within NYS. Variation in implementation is inevitable and may be desired; it is an outcome of a process called policy translation. Literal translation may be difficult to attain because of cultural interpretation, differences in available resources, or different perspectives of the implementers. However, Freeman (2009) stressed that implementation of a policy is evolutionary, and it's expected not to translate policies exactly. Implementation is an outcome of translators – people, organizations, and networks (Ingold & Monaghan, 2016) – continuously adjusting and modifying their actions to ensure the policy is accurately implemented according to their needs (Freeman, 2009).

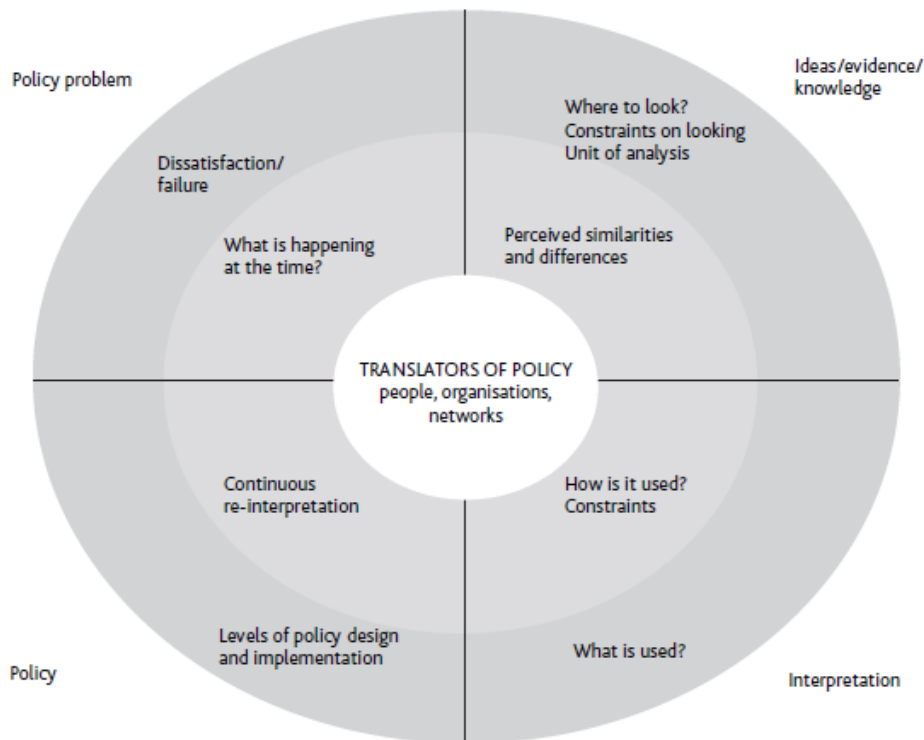


Figure 1. Policy Translation Model (Ingold et al., 2016). The process starts from the upper left-hand corner (Policy problem) and moves clock-wise.

According to Ingold et al. (2016), policy translation occurs in four stages (Figure 1). The cause of policy translation stems from how the policy problem is defined. The broader the policy, the more room for interpretation and variation in implementation to occur. How a policy is formulated by the implementors depends on their knowledge and what has been successfully implemented in other areas. Decisions on how to create an organization’s policy can also be influenced by the implementors’ values and perceptions of the policy. Therefore, depending on how the policy is interpreted in the organization, the results of policy translation is implementation.

While policy translation is a natural part of the policy process, it is important to understand the extent to which translation leads to variation, why this variation occurs, and if this

variation hampers policy effectiveness. This thesis will focus on the translation – the third quadrant in Figure 1 - of the NYS Concussion Management and Awareness Act across high school district boundaries when applied to high risk interscholastic sports. I will be focusing on the following questions:

- How much variation is there in the implementation of a particular state level policy?
- What are the causes of these variations?
- What are the implications for future policy development and practice?

This specific policy was chosen for evaluation because NYS has left the districts responsible to create, implement, and monitor their own concussion management program based on their own local needs and resources they have available for use. NYS provides all the school districts with minimum requirements as well as guidelines that include models to follow, but all the guidelines are not mandated for schools to comply to the Act (NYSCSH, 2017). Because the NYS Act and guidelines are so broad, there is room for interpretation of the guidelines, creating variation as district-specific programs evolve. Thus, there is a need to further investigate how these factors impact translation across all types of schools and what it implies for the actual policy.

2.6.1 Motivation for Thesis

This thesis builds on past research. In the existing literature, only a few studies have been conducted on a handful of states' concussion management policies. Most studies have focused on the impact stakeholder knowledge and education has on successful implementation, but many have not done a full evaluation of a state's concussion management policy. To gain further insight into each district's implementation process, it is important to conduct in-person

interviews with those who are involved in the process, which can provide direct insight into variation in the athlete recovery process. Interviewing a range of stakeholders is needed to understand the implementation process of concussion management programs. In the literature review, most studies incorporating only one or two different stakeholders, mainly interviewing coaches. Very few studies collected data from the AD, AT, or school nurse. These other stakeholders were acknowledged indirectly by the participants in previous studies as ones who do have important roles in the process. Therefore, incorporating these stakeholders can reveal the extent of their role in the process, their actions taken to help implement the policy, and their relationships with the other staff members.

Additionally, previous studies did not compare across all three types of locations (urban, suburban, and rural) as well as include both private and public schools. In the case of the NYS policy, private schools have the option to follow the NYS Concussion Management and Awareness Act (The State Education Department, 2012). Therefore, accounting for type and location of school, can provide further insight of the impact the factors may have on implementation.

3. Methods

A comparative case study was conducted to compare different public high schools that contained certain characteristics related to the size, location, and sports offered at the school. The school must have offered at least one of the top three high contact sports (football, hockey, and soccer) (HeadcaseCompany.com, 2013). Initially, the comparative case study was limited to four different public high schools: small and urban; large and urban; small and suburban; large and suburban. However, due to a high response rate to the participation requests, the scope expanded

to a range of schools (Figure 2). Additionally, private schools were recruited for participation to analyze the differences between public and private school districts since private schools have the option to follow the NYS Act (The State Education Department, 2012). Out of the 10 schools that were interviewed, two were private schools which were small, urban schools (Figure 2). This method of analysis was chosen because it will help reveal similarities, differences, and/or patterns across the different types of school districts that share a common goal: to implement successful concussion management protocols at the local level (Goodrick, 2014).

Small	Large	
*2	1	Urban
1	4	Suburban
2	0	Rural

Figure 2. Comparative Case Matrix Framework. The horizontal axis represented the size of the school while the vertical axis represented the location of the district. Each box represents the case and number of schools interviewed in each case. The asterisk indicates private school districts.

3.1 Description of High Schools

The 10 high schools that were included in the sample for this thesis are described in Table 4. These high schools were in the Western New York (WNY) and Rochester, NY regions. Due to confidentiality, the school names will not be disclosed. Each school was coded based on the school’s size, location, and type (Table 4). To classify a school based on size as small or large, the populations for grades 9-12 were determined based on the 2016-17 enrollment data

from the New York State Education Department (NYSED) (NYSED, 2018). The location was based on the NYS District Locale Classifications map (Schultz, 2018).

Table 4. Summary of High Schools. Each school is coded by its size, location, and type. The numbers differentiate between schools with the same characteristics. All schools are public schools unless noted with “PR” at the end of the school’s coded name indicating a private school. School budget (NYSED, 2018) and spending per student (Buckshot, 2017) for the 2017-18 school year was also listed.

School (size, location, type)	School Budget (2017-18)	Spending per Student (2017-18)	Contact Sports Offered
LS1	\$78,847,223	\$24,358	Football, Hockey, Soccer
LS2	\$73,491,613	\$21,489	Football, Hockey, Soccer
LS3	\$124,717,502	\$22,981	Football, Hockey, Soccer
LS4	\$116,804,058	\$18,429	Football, Hockey, Soccer
LU	\$140,921,509	\$19,484	Football, Hockey, Soccer
SMR1	\$17,415,783	\$24,774	Soccer
SMR2	\$36,358,538	\$23,640	Football, Soccer
SMS	\$20,154,146	\$22,620	Football, Soccer
SMUPR1	N/A	N/A	Hockey, Soccer
SMUPR2	N/A	N/A	Hockey, Soccer

Size: L = large; SM = small
 Location: U = urban; S = suburban; R = rural
 Type: PR = private

As shown in Table 4, all schools offered soccer. The schools that offered all three of the sports with the highest concussion rates were the large public schools that were located in an urban or suburban area. The private schools do not have football because they are all-girls schools, however, they do have lacrosse which has the fourth highest concussion rate (HeadcaseCompany.com, 2013).

3.2 Data Acquisition

Recruitment for high school and stakeholder participation was conducted through emails. The information disclosed in the emails was regarding background of the research being conducted, the choice of an in-person or phone interview that would be recorded, and discussion

about all information remaining anonymous and confidential. Initial emails were sent out in October 2017 to the AD, AT, Superintendent, PE teachers, and/or coaches. Not all school staff were emailed based on the availability of email addresses that were listed on the schools' websites. The staff members that were interviewed for the thesis is summarized in Table 5.

Table 5. Summary of Participants.

School	AT	AD	School Nurse	Other Leadership
LS1	X			
LS2	X			
LS3	X	X		
LS4	X			
LU	X			
SMR1		X	X	
SMR2	X			
SMS	X	X	X	X
SMUPR1		X		
SMUPR2	X			
TOTAL	8	4	2	1

A contact person at each school chose who would be interviewed for the study. Apart from one interview, all interviews were conducted in-person between November and December 2017. The interviews were semi-structured (see Appendix: Interview Details for the interview protocol). All participants were provided the general list of questions and a copy of informed consent form to look over prior to the interview. The informed consent form was signed prior to conducting the interview. Questions asked were related to the factors that were identified in the literature review, including discussion of challenges the districts have faced or currently face. All interviews were recorded using a voice recorder and digitally saved. Each file was given a letter and number to ensure confidentiality and anonymity. The letter represented the school and the number represented the staff member's position. Most of the interviews were transcribed using a transcription company. Those that had poor quality were transcribed by the interviewer.

3.3 Data Processing

The first step of data processing was reading through the all the interviews to conduct the first cycle coding (Miles, Huberman & Saldaña, 2014). Coding the interviews helped identify information and cluster themes that the participants discussed. The informal coding process used a combination of four methods of coding: in vivo, process, emotion, and holistic coding (Miles et al., 2014). Phrases and/or large portions of data were tagged according to factors that were directly or indirectly identified as ones that impact implementation. Interesting quotes were also highlighted.

The second step was the creation of flow diagrams that visually showed each school's implementation process. Each diagram was created based on what the schools' documents stated as well as what the participants said in the interviews regarding their process. From these diagrams, we found that the process could be broken up and described in three main stages for the thesis: pre-season activities, before RTP, and RTP and RTL protocols.

The last step was the creation of multiple matrices to conduct cross-case analyses (Miles et al., 2014). A matrix was created comparing the documents each school had, what components were included in each schools' policy/program, and who was included in the CMT. A second matrix was designed comparing differences in implementation based on each school's flow diagram. The last matrices were role-ordered matrices (Miles et al., 2014), conducting a comparison across different staff members, for example, one matrix was a comparison between only ATs. The role-ordered matrices categorized information by factors that participants acknowledged as ones that positively or negatively impact their implementation process. All the matrices that were created helped identify trends in factors that impact implementation across similar types of schools and staff members. This also helped identify other factors that were not

identified in the literature review as ones that impact implementation of concussion management programs.

4. Results

4.1 Background: NYS Concussion Management and Awareness Act

In June 2011, the NYS Senate passed the Concussion Management and Awareness Act that went into effect July 2012. The goal of the NYS policy is "...to adopt rules and regulations for the treatment and monitoring of students with mild traumatic brain injuries" (The New York State Senate, 2011) in the school setting. This included the creation of minimum guidelines to be followed regarding student removal from play, physician clearance, and creation of RTP protocols. Having these guidelines would help the appropriate stakeholders readily identify concussions and provide the student support during recovery, as well as encourage all stakeholders to take preventative actions to help students avoid injury in the school environment. (The New York State Senate, 2011)

4.1.1 The Policy Audience

The NYS Concussion Management and Awareness Act applies to all charter and public schools (NYSCSH, 2017). Private schools do have the option of adopting similar concussion management policies, but they must verify with their league to confirm if complying with the Act is required (The State Education Department, 2012). The Act also applies to all students in any grade, athlete or non-athlete, who suffer or believes to suffer a concussion during high risk school activities such as recess, physical education (PE) class, or participation in interscholastic sports (The State Education Department, 2012, pp. 3). However, for this thesis, the focus is only on policy pertaining to student athletes who participate in modified to varsity level

interscholastic sports (middle and high school aged students). Because the risk of sustaining a concussion associated with the high contact sports (HeadcaseCompany.com, 2013) is immense, the policy is applied more toward student athletes, which is the case with the high schools that were interviewed for this thesis.

4.1.2 Elements of the Act

Prior to 2012, a few schools described the general process that most NYS schools followed when a student athlete sustained a concussion can be seen in Figure 3.

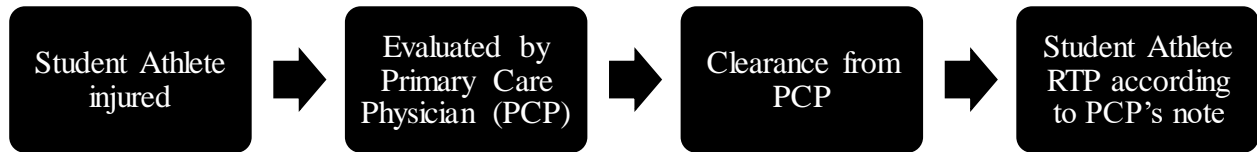


Figure 3. General Process Prior to the NYS Act.

Some schools were proactive and prepared, implementing their own concussion management process that contained additional steps, knowing that future passage of a concussion management policy was eminent. However, most school districts did not have a process in place prior to 2012 and had to follow the PCP's directions which were very vague. The PCP's notes were too subjective and did not explicitly say that the student athlete suffered a concussion. Some schools said that these subjective PCP notes caused staff confusion in how to best treat the athlete, especially if the athlete needed more recovery time than what the PCP was prescribing. When the NYS Concussion Management and Awareness Act went into effect in 2012, the process changed according to the minimum requirements (Figure 4) (NYSCSH, 2017; NYSPHSAA, 2012).

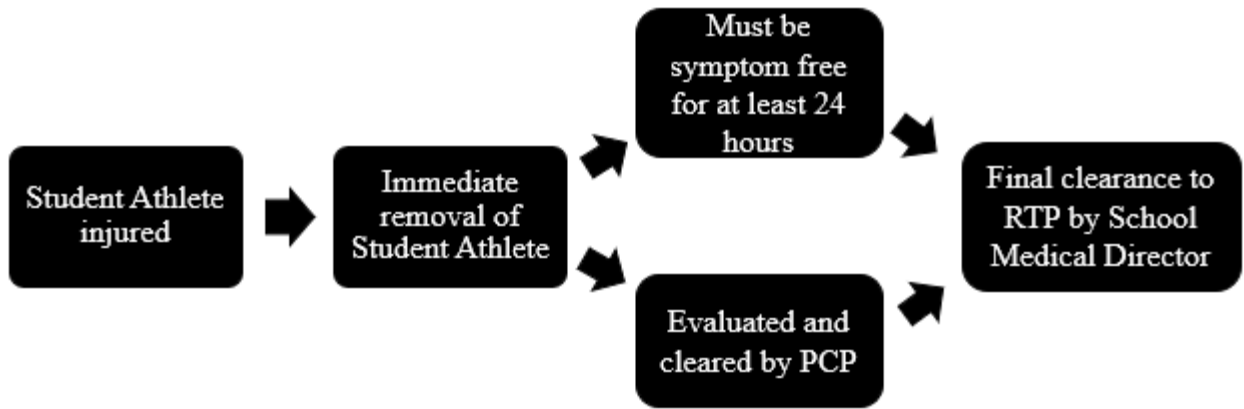


Figure 4. General Process After the NYS Act (NYSCSH, 2017; NYSPHSAA, 2012).

According to the summary sheet created by the New York State Public High School Athletic Association (NYSPHSAA), the school districts are required to do the following to be in compliance with the policy (NYSCSH, 2017; NYSPHSAA, 2012):

- **Require biennial training to educate** the school coaches, PE teachers, school nurses, and ATs.
- **Provide concussion management information** to stakeholders, which must be posted on the school’s website if the school has one, and parental sign off required prior to student athlete participation.
- **The student athlete must be removed immediately** from athletic activity if believed to or has sustained a concussion. The athlete cannot return to athletic activities until being symptom free for at least 24 hours in addition to being **evaluated and written clearance is received from a licensed physician** before beginning the RTP process. Student athletes must also have received clearance from the **school medical director** (Figure 4).

These requirements provide basic awareness to those stakeholders who did not have previous exposure to concussion knowledge and ensures removal of the athlete regardless if the athlete has suffered a concussion. Additionally, the document, *Guidelines for Concussion Management in the School Setting*, was created to provide information, recommendations, and examples for districts to refer to when making their own concussion management program (The State Education Department, 2012).

As described by the NYSPHSAA and the New York State Center for School Health (NYSCSH), schools are encouraged, but are not required to develop their own written concussion management policy as part of their concussion program. The policy should incorporate procedures that address the treatment of the athlete, the required education for the appropriate stakeholders, and communication and coordination pathways between appropriate staff members as well as periodic review of the program.

The district is also encouraged to address the post-concussion steps of athlete cognitive and physical rest along with return to play/school activities. These guidelines can be addressed using RTP and RTL protocols. RTP protocols involve gradual re-introduction of physical activities to the injured athlete. NYS recommends school districts to follow the model based on the Zurich Progressive Exertion Protocol (The State Education Department, 2012). The purpose of the RTL protocol is to help transition concussed athletes back to classroom activities, making accommodations for the athlete as needed to ensure symptoms do not occur throughout the school day (The State Education Department, 2012). Another recommendation mentioned to the districts is the use of neurocognitive computerized tests (e.g., ImPACT) and sideline evaluation tools (e.g., Sport Concussion Assessment Tool (SCAT)) to assist the appropriate medical

providers in determining the severity of the athlete’s injury throughout the recovery process (The State Education Department, 2012).

Lastly, at their discretion, school districts can form a CMT, which is not limited to certain staff members, that would be responsible for implementing the program (The State Education Department, 2012). While the first three requirements are simple for the districts to follow, the remaining guidelines are highly recommended for the districts to follow. This indicates that school district implementation and translation of the policy guidelines will vary and are unavoidable because of the varying characteristics that make up each district. It is left to the districts to create, implement, and monitor their own concussion management program based on their own local needs and what resources that are made available to them (NYSCSH, 2017; NYSPHSAA, 2012).

4.2 Written Policy

Table 6. The Schools’ Documents.

Documents	Schools									
	LS1	LS2	LS3	LS4	LU	SMR1	SMR2	SMS	SMUPR1	SMUPR2
*Educational material	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
*Parental sign-off	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Concussion policy	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Sideline evaluation	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
ImPACT testing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
RTP forms	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
PCP evaluation form	No	No	Yes	No	No	Yes	Yes	Yes	No	No
Paper or electronic recording	Electronic	Paperwork	Paperwork	Both	Both	Paperwork	Both	Paperwork	Paperwork	Both

* = NYS Requirement

Table 6 shows a comparison of the written documents each school has as a part of their concussion management program. Overall, most schools do have a written concussion policy, a document that contains the school’s mission, goals, a list of the CMT members, procedures/protocols, etc., which is encouraged by NYS to have (NYSCSH, 2017). Both private

schools do not have a written policy as private schools are not required to have a written policy to participate in their league.

The first two rows of Table 6 are NYS requirements that all public-school districts must follow. All schools must provide informational material to stakeholders to be referenced to throughout the season. While NYS does not directly explain how the material should be taught to stakeholders or what the material should contain, most schools use passive methods. The material is either handed out on paper or can be accessed online by various stakeholders to reference to throughout the season.

Almost all schools have a parental permission form that must be signed prior to athlete participation, apart from two schools. Both schools may be outliers because a parent/guardian signature is usually required for athlete participation in all sports even before the Act went into effect. However, private schools are not required to have a parental permission form.

There are many ways in which the signature can be obtained. One way is the health history form that is filled out during registration for athletics indicating if the student has suffered a concussion in the past. The parent/guardian may also sign the school's Code of Conduct or the Athletic Handbook. Additionally, NYS does not specify if a separate consent form stating that the concussion management material has been reviewed by parents, but a handful of schools have this form in addition to participation forms. Based on the parents' signature, they are stating that they agree with and are aware of the school's concussion management materials. However, parent pushback is still present indicating that the parental permission form may not be effective in promoting and encouraging parents to understand the policy and injury.

Some variation is seen in the documents (Sideline Evaluation, ImPACT testing, and RTP forms) that relate to the athlete evaluation process. Most schools do utilize a paper sideline evaluation tool which allows trained staff members to evaluate the athlete (The State Education Department, 2012) during a game or practice to measure the athlete's symptoms. Not all schools utilize ImPACT testing, a neurocognitive computerized test, which also assists the district in measuring the athlete's brain activity pre- and post-injury (The State Education Department, 2012). Lastly, most schools do utilize RTP forms that describe what to do in each step of the protocol and requires dated signatures by the appropriate staff members.

The greatest variation is the is of a PCP evaluation form and how each school records their information. Only three schools have a PCP evaluation form, a form that is not included in the *Guidelines for Concussion Management in the School Setting*. The form is to be filled out during all athlete visits to the PCP, ensuring that the doctor's note is less subjective, a problem that occurred in the process prior to 2012. Additionally, about half of the schools have an electronic system (e.g., SportsWare or Microsoft Excel), in addition to the traditional paper system, that captures each athlete's information and/or recovery process. Both recording systems function the same way, however, some schools prefer paperwork over an electronic system, while others do not have a choice because they lack the capability and/or cannot afford to buy an electronic system.

4.3 Written Policy Components

Table 7. The Written Components in Each Schools' Concussion Management Policy.

Written Policy Components	Schools									
	LS1	LS2	LS3	LS4	LU	SMR1	SMR2	SMS	SMUPR1	SMUPR2
*Staff training	DIP	Yes	DIP	Yes	Yes	Yes	DIP	DIP	DIP	DIP
*24-hour symptom free with PCP clearance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
*School Medical Director clearance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Signs/symptoms in educational information	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Safety practices	Yes	No	No	No	No	Yes	No	No	No	No
CMT roles/communication plan	Yes	Yes	Yes	Yes	Yes	Yes	DIP	Yes	No	DIP
RIP protocol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RTL protocol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Periodic review of program	DIP	Yes	DIP	Yes	DIP	Yes	DIP	DIP	DIP	DIP
Review material seasonally	DIP	DIP	DIP	DIP	DIP	Yes	DIP	DIP	DIP	DIP

*=NYS requirement; DIP = done in practice

Table 7 shows the components that are included in each districts' policy. The first three rows are NYS requirements, while the rest of the components are suggestions NYS provides in their guidelines for districts to include in their programs. This table is based off what is explicitly written and mentioned in the school's concussion policy document; Table 7 does not reflect the district's actions. For example, all schools train the appropriate staff according to the NYS requirement and review the material seasonally with athletes, however, these tasks are not written down in the school's documentation. It is important that the concussion management program is reinforced with all stakeholders seasonally because it serves as a quick reminder for everyone to be aware of the injury.

Additionally, the NYS policy does not state how often a review of the program should be conducted. Most participants said that they do periodically review the program, but this task is not written in their schools' documentation; some schools said that reviewing the program is sometimes forgotten. Reviews are beneficial because they can help identify strengths and weaknesses of the documents, see what is not being implemented properly by staff, and update the policy according to new research.

All the public and private schools that were interviewed comply to the NYS requirement of having the athlete be at least 24 hours symptom free and receive RTP clearance from a PCP. However, both private schools do not require final clearance to RTP by the school medical director. While not required, all schools have similar step-wise RTP protocols describing in detail what activities must be completed in each step, but not all schools have detailed RTL protocols. Some schools have step-by-step RTL protocols, while others state who oversees student academic accommodations. However, in the NYS guidelines, RTL protocols are not outlined in detail like the example RTP protocol, which is included in the guidelines. It is not necessary to have a step-wise RTL protocol as accommodations will vary among athletes. Yet, the schools that do not have a detailed RTL protocol said that they need to update it, making it more in depth regarding what classroom activities will be accommodated, because there has been less focus on returning athletes to the classroom than returning them to play.

In addition to raising concussion awareness, it is mentioned in the guidelines that district programs should also emphasize on safety practices such as preventative techniques, reviewing the rules of play, and proper use of equipment (The State Education Department, 2012). However, while a couple schools did mention that they try to incorporate safety techniques, football specifically, many districts do not explicitly list this in the policy as a task for staff to emphasize on in all sports in addition to providing general concussion management education.

4.4 CMT Members

Table 8. The Schools' Concussion Management Team (CMT) Members.

Stakeholder	Schools									
	LS1	LS2	LS3	LS4	LU	SMR1	SMR2	SMS	SMUPR1	SMUPR2
*Medical Director	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A
Private Medical Provider (PCP)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Nurse	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Student	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Parent/Guardian	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
School Admin	No	No	No	Yes	Yes	Yes	No	Yes	No	No
AD/Director of PE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AT	Yes	Yes	Yes	Yes	Yes	N/A	Yes	Indirectly	Indirectly	Yes
PE Teacher/Coach	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Teacher	Yes	Indirectly	Yes	Indirectly	Yes	Yes	No	No	No	No
Guidance Counselor	Yes	Indirectly	Yes	Indirectly	Yes	No	No	Yes	No	No
Formal or Informal Team	Formal	Formal	Formal	Formal	Formal	Formal	Informal	Formal	Informal	Informal

*=NYS requirement

Table 7, while it is not required to document CMT roles and responsibilities, most of the schools list the roles and responsibilities of the CMT members. Additionally, a formal team is not mandated by NYS (The State Education Department, 2012). The schools that do describe the CMT in detail have formal teams (Table 8). Those that have a larger, formal team are found mainly in the large public-school districts that have the top three high risk sports. Some teams indirectly list team members as a part of the CMT such as either mentioning the members in a protocol step or not noting them in the documents, yet they are involved in the process.

The student athlete, parent/guardian, and school administrator (e.g., the Superintendent, Principal) are sometimes not directly included in the CMT for two reasons. The first reason for exclusion is that it's assumed these three stakeholders are already involved. For the CMT to uphold their duties, the process must begin with an athlete recognizing and reporting their own concussion or another teammate's injury (The State Education Department, 2012). The parent/guardian is also automatically involved because they must monitor and discuss the status of the athlete with medical personal throughout the entire process (The State Education Department, 2012), while the school administration is always informed of the program's and

athlete's status. The second reason for no direct inclusion of these three stakeholders is the district's scope when creating the CMT. The scope of the CMT is determined by the leader of the CMT. The focus could be on the stakeholders involved in the athlete's life or focus on the pertinent staff who understand the medical aspects and the recovery process.

All districts incorporate the AD, school nurse, and PCP in the CMT. The AD is the formal leader of the program and CMT (The State Education Department, 2012). The AD looks to the AT and/or the school nurse to implement the program. The school nurse is relied upon if the school does not have an AT. Additionally, the School Medical Director (e.g., school doctor or nurse practitioner (NP)) is incorporated in the public schools' CMT. This is because NYS requires the School Medical Director to give the athlete the final clearance prior to starting the RTP protocol. Because private schools do not require final clearance for RTP from a School Medical Director, this stakeholder is not included in their CMT.

Lastly, there is large district variation regarding inclusion of teachers and guidance counselors. Many districts either do not or indirectly include these two stakeholders. However, some schools mentioned that there is a strong need for them to be a part of the team to the athletes' transition back into the learning environment. There has been too much emphasis on athletes returning to athletic activities, but not enough emphasis on returning to learn, which is why there is a lack of teacher and counselor involvement. Having these two stakeholders involved in the process could help create detailed RTL protocols as well as support monitoring of athletes throughout the school day since ATs normally arrive at the school in the afternoon for the after-school activities.

4.5 Implementation

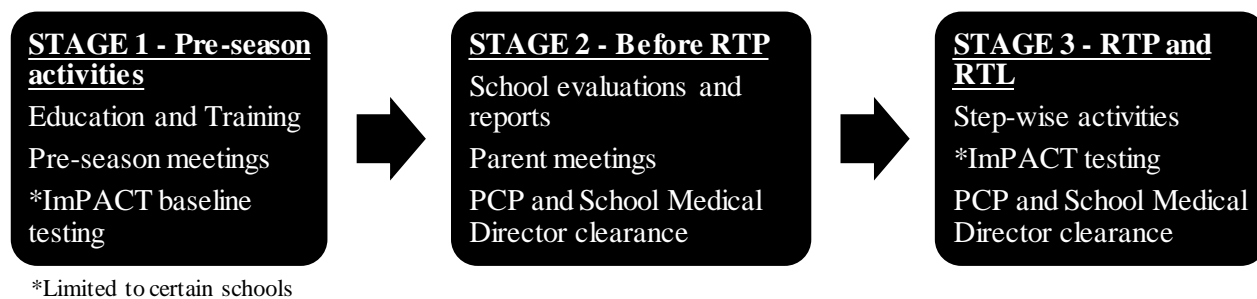


Figure 5. The Three Stages of the Concussion Management Process.

The general concussion management process can be described in three stages: pre-season activities prior to participation, steps related to an injured student receiving RTP clearance, and ending with the athlete undergoing the RTP and RTL protocols (Figure 5). Even when the written components of the policy are the same, who is involved, what activities occur, and the materials that are used in each stage varies between schools. This results in many different processes occurring across NYS school districts, with variation between school districts decreasing from stages 1 to 3. In this section, I will look at implementation in practice, and point out where important differences were observed in each of the three stages.

4.5.1 Stage 1: Pre-season Activities

The goal of stage 1 activities is to ensure all stakeholders understand the concussion management program/policy prior to the start of the sports season (Figure 5). These activities include ensuring that the appropriate CMT staff are trained, pre-season meetings take place, students are properly educated, and depending on the school, baseline ImPACT testing is conducted. Table 9 describes how coaches are educated prior to the start of the sports season. In addition to the required online NYS training, most schools' ADs or ATs host coach pre-season

meetings to review the school's policy and remind coaches the athlete recovery process that the school follows.

Table 9. Coach Education During the Pre-Season.

Coach Education	Schools									
	LS1	LS2	LS3	LS4	LU	SMR1	SMR2	SMS	SMUPR1	SMUPR2
*Online training	X	X	X	X	X	X	X	X	X	X
Pre-season meetings with AD and/or AT		X	X	X		X	X	X		X

* = NYS requirement

Prior to the start of the sports season, most schools host pre-season meetings. The differences in pre-season meetings across the 10 school districts is summarized in Table 10.

Table 10. Differences in School Districts' Pre-Season Meetings.

Pre-season meetings	Schools									
	LS1	LS2	LS3	LS4	LU	SMR1	SMR2	SMS	SMUPR1	SMUPR2
*Online material	X	X	X	X	X	X	X	X		
PowerPoint						X	X	X		
Meetings administered by AD	X	X	X			X		X	X	
Meetings administered by AT		X		X	X					
Meetings administered by Coach	X	X	X		X	X		X	X	X
Meetings administered by School Doctor							X			

* = NYS requirement

The purpose of the pre-season meetings is for the athletic staff to meet and speak with the parents and students, starting a relationship prior to athlete participation. Additionally, the meetings reinforce the online material regarding concussions and the school's policy. Both private schools do not post information online as they are not required to do so.

Only three schools said that a PowerPoint is used at the pre-season meetings to highlight the key points of the online material. The other schools, however, did not clearly state if paper materials are handed out to parents and students. These schools mentioned that the online information is reviewed, for example, telling the parents what documents to read more in depth and refer to about concussions throughout the season, but, the schools did not state if physical copies are provided. Sometimes the physical copies were left at the meeting by the parents and/or students.

The differences in who administers the pre-season meetings is also summarized in Table 10. Many schools noted that coaches are responsible in hosting pre-season meetings with the parents and students. In a couple schools, the AD kicked-off the school year by hosting the first pre-season meeting in the fall, with the coaches taking responsibility for the winter and spring seasons. ATs rarely ran the meetings, nor were they present for the entire meeting because they were trying to make as many pre-season meetings as possible, which could all be occurring at the same time. They did, however, usually introduce themselves to the parents at the meeting so parents would know who their child would be seeing when injured.

In addition to the pre-season meetings and reading the online material, other student athlete educational tactics used to increase concussion awareness varies immensely across districts (Table 11).

Table 11. Additional Student Education Tactics.

Additional student education tactics	Schools									
	LS1	LS2	LS3	LS4	LU	SMR1	SMR2	SMS	SMUPR1	SMUPR2
In the classroom		X	X	X					X	
Pre-season TV show					X					
ImPACT testing	X	X	X	X	X	X	X	X		
First practice with coach								X		X

In most schools, student athletes are taught concussion management material at the start and throughout the season. Only a couple of schools have coaches go over the concussion management material directly with the athletes during the first practice. Additionally, athletes learned more about concussion management through the ImPACT testing. The AT, who is responsible for administering the ImPACT testing, explained the reason behind the testing, what are the signs and symptoms of a concussion, and what the results mean when the athletes do their baseline testing. However, some schools continuously educate their athletes as well as the rest of the student body.

Almost half of the schools teach all students about concussions in the classroom. The material is taught in either high school health classes or PE classes; only one school teaches students about concussions starting as early as the PE elementary class level. Lastly, only one school promoted awareness through a pre-season TV show run by students and a coach, making the whole student body aware of the injury. This is an example of active education material, teaching students through hands-on learning exercises (Michel et al., 2009).

4.5.2 Stage 2: Before RTP



Figure 6. Stage 2 Process.

The goal of stage 2 is to ensure the student athlete is removed from play and evaluated, the parents are informed of the injury, and clearance from the PCP and School Medical Director is received prior to the start of the RTP protocol (Figures 5 and 6). All schools immediately conduct a sideline evaluation on the athlete to numerically measure concussion symptoms. These are conducted mainly by ATs or a coach if the school does not have an AT. The choice of sideline evaluation tool can vary from using any version of the SCAT (e.g., SCAT3 or SCAT5) to using the school's own checklist. One participant mentioned the benefit of having a sideline evaluation form:

“...it's a good guideline and the coaches use that to help them ask the right questions and to go through some symptoms with the athlete.”

This shows why it is important for coaches to be made aware of and take the concussion training seriously. If the AT is busy with other injuries or is not present because it is an away game, it allows the coach to act and evaluate the athlete immediately.

For schools that utilize ImPACT testing, ImPACT testing is another tool to help measure the severity of the concussion prior to PCP evaluation. ImPACT testing can gain insight into an athlete's brain activity and provide more data to the PCP in addition to SCAT results. Also, ImPACT testing helps with the timeliness and efficiency of the process because athletes' baseline scores can be accessed on a smartphone at any time. Additionally, this tool helps ensure consistency when symptoms are being measured because it can be difficult recording all information on pen and paper as one AT described:

“[The] computer's a lot smarter than a human being doing some test.” [School LS1]

When ImPACT post-injury testing is administered can vary between schools. Some schools have the athlete take the post-injury test 24 to 48 hours after the injury. The other schools who utilize ImPACT testing wait to administer the post-injury test until the student is cleared for RTP. Ultimately, the data from the sideline evaluation form and ImPACT testing results helps PCPs conduct their evaluation.

As the sideline evaluations are being conducted, the parent/guardian is notified, and a time is scheduled to talk with the CMT staff member in charge of the process. For those schools that have access to an AT, the AT sets up a parent meeting and reviews the educational material a second time. Paperwork may also be given to the parent/guardian. For example, the three schools that have a PCP evaluation form provide the form to the parents to take to the PCP visit.

For those schools who have a part-time AT or no AT on their CMT, the coaches were responsible to administer the parent meetings. The school that has the part-time AT relied more on the coaches to meet with the parents because it is listed in policy under the coach's role, not the AT, and the AT is available only three days a week. After the parents meeting, the process at the public schools in my sample was the same. The CMT must wait until the athlete is at least 24 hours symptom free and receives clearance by the PCP and School Medical Director to begin the RTP protocol. For private schools, clearance from only the PCP is required to start the RTP protocol.

4.5.3 Stage 3: RTP and RTL

The goal of stage 3 is administration of the RTP and/or RTL protocols by the AT or coach in absence of an AT and teachers or guidance counselors for the RTL protocol. These protocols ensure proper recovery of the athlete in the school setting once the school has received PCP and School Medical Director clearance. Any notes and reports that were received from the PCP as well as written directly by CMT members were kept in the school's documentation system. Streamlined communication and coordination efforts between CMT members is the key to success in this stage.

The least amount of variation occurs in stage 3 of the process because all schools (public and private) follow the step-wise RTP example protocol provided by NYS. Among districts, the duration of the protocols ranged from five to six days. Additionally, the types of exercises the athlete must complete and/or the duration between each step differed a little. If symptoms showed up at any point in the RTP process, some schools made the athlete wait 24 hours and repeat the previous step, while others re-started the process from step 1.

To monitor where the athletes were in the RTP protocol, the use of either an electronic spreadsheet or a paper RTP form was used. The RTP forms required dated signatures from appropriate staff as the student completes each step, ensuring that the student checks in with the CMT daily. Any type of RTP documentation ensures that the student is following up daily with staff to properly recover and staff can keep track of where the student is in the protocol, especially when other injuries in addition to concussions occur. One AT described the benefit of having a documentation process:

“...I just have a running Excel spreadsheet of that six-step process... ‘Cause sometimes, we’ll have 10 people going through this process, and to know where they are amongst 30 other kids coming down here with different injuries.” [School LS1]

An additional evaluation conducted by school staff may occur. Those schools that do not administer the ImPACT post-injury tests right after injury administer the tests near the last step when the athlete is ready for full RTP (contact activities). In place of ImPACT, a SCAT evaluation may be conducted to measure the athlete’s symptoms prior to full RTP. Lastly, who gives the final clearance when the athlete is finishing the RTP protocol differs across public schools. For most districts the School Medical Director gives the final clearance, but the PCP or the AT can also provide final clearance.

4.6 Summary

Translation of the broad NYS guidelines at the district level allows for interpretation and variation in implementation to occur across NYS school districts’ concussion management programs. This results in differences across school districts in their written documents and how their policies are implemented.

Some of the variation between school districts stems from what is written in the districts' policies and additional documents schools include in their program (Tables 5 and 6). These differences in policy is a large issue because having a written document is beneficial. If a responsibility is not written down or clearly explained, tasks may be incomplete, steps may be skipped, and the process may not be consistent each time. In most schools, some policies do not state when the program is reviewed, if the material is reviewed with athletes every season, and/or the training appropriate staff must do prior to the start of the season. These three components are done in practice even though they are not physically listed in the policy. Schools remember to review the material seasonally with students and ensure staff are trained, however, participants mentioned that reviews of the policy are sometimes forgotten.

The inclusion of a PCP evaluation form is one difference among school districts. Only three schools have a PCP form; these schools have found the form to be beneficial when students are diagnosed at the PCP's office. The form ensures that the student is diagnosed with a concussion or not, decreasing the chance of subjective PCP notes. Another difference in the written policy components is that most schools do not stress preventative techniques as part of their written policy. Inclusion of preventative techniques was also a topic that was not mentioned in literature. The focus of most concussion management policies in both NYS and the policies studied in literature is on raising awareness/education of concussions, not the mitigation of concussions using safety/preventative techniques in addition to raising awareness.

There was also variation among schools regarding participation of guidance counselors and teachers in the CMT (Table 7). The benefits of including these two stakeholders was mentioned in previous literature, little discussion was regarding RTL protocols. Based on school documentation, most schools do not have an in-depth RTL protocol, therefore, making it harder

to incorporate these two stakeholders in the process because they don't know their roles. Most schools acknowledged that RTL protocols need to be further developed by the CMT to bring these two stakeholders on board with the policy. As mentioned earlier in chapter 4, there has not been enough focus on returning students to the classroom. Having a general RTL protocol can help teachers and other classroom staff monitor and accommodate students as needed.

Variation in practice was also evident and was discovered through the interviews, which is not reflected in Tables 5-7. One area of difference was in how student athletes are educated versus parent and school staff education. NYS requires schools to provide educational materials, but there are no specifics in how this should be accomplished or how much material needs to be taught. As literature has pointed out, there are two different types of educational techniques (Michel et al., 2009). Active learning involves leader engagement with students, applying the material in hands-on exercises and having students input their thoughts into the discussion. Passive learning is traditional lecturing of material with little to no student discussion.

Based on the interviews, most schools incorporate more active learning for students such as discussions prior to ImPACT testing and in-class discussions in PE or health class (Table 11). Only one school goes above and beyond how most schools educate students by creating a pre-season TV show through athlete and coach collaboration. Not only does the TV show provide hands-on learning for both stakeholders, it also promotes awareness to the rest of the student body. In comparison to student education methods, parents and school staff are taught in passive ways (e.g., parents are lectured by CMT members at pre-season meetings, online required staff training). From the literature and the interviews, active learning is preferred because it allows for interaction among people as they learn the material.

Additionally, how much and the way the information is conveyed can cause both under and over reporting in students to occur. Now that students are more aware of what recovery process the school follows when they get concussed, students will either report every bump to the head or symptom they feel and thinking it's a concussion, take advantage of the system by reporting a symptom so they don't have to play, or students will not report the injury and continue to play symptomatic because they want to stay in the game. Therefore, caution needs to be taken when presenting the information to stakeholders to induce behavioral change. Rather than lecturing the material to stakeholders, the use of active learning can help convey the education in a positive light showing stakeholders that this is a good policy to have in place through interactive discussions.

There is also variation in the use of technology across districts (Table 5), however, this variation does not significantly impact implementation. Using a paper trail or electronic system reaches the same goal: ensures all steps are followed throughout the recovery of an athlete. Additionally, there are benefits and drawbacks to using a paper sideline evaluation tool versus ImPACT testing. ImPACT scores can be accessed anytime using a phone app, however, the scores can be skewed. Athletes can find ways to lie during ImPACT testing and sometimes false positives are produced by accident. Also, athletes can lie about their symptoms when a SCAT evaluation is conducted. Therefore, the use of both tools can be useful, although schools should not heavily rely on them when evaluating athletes.

Lastly, there was a large amount of variation because the public and private schools because the private schools do not have to comply to the NYS Act. While the private schools meet the NYS minimum requirements, as shown in Tables 5 and 6, they lack some of the documents and components found in public schools. Additionally, their CMT is smaller than

public schools. This could relate to the elements they chose to include in their program as well as the size of the school and sports that are offered.

5. Analysis

As discussed in the literature review, there are numerous factors that may impact how school districts implement a concussion management policy. Drawing from the interviews, this section discusses the factors that were identified to impact and cause variation in implementation. While some of these factors were identified in the literature and the cases provide further insight on them, others were new and not mentioned in the literature reviewed.

5.1 Resources

Resources are one of the most problematic aspects of implementing unfunded mandates (Faure et al., 2015). Thus, it is not surprising that most districts acknowledged that resources have a large impact on implementation of concussion management programs. The types of resources can be monetary, staff availability, and materials. Availability of these materials can cause variation in implementation across school districts. Balancing available resources with organizational needs is a fundamental aspect of policy design and implementation (Mazerolle, 2015). In schools, prioritizing needs in the face of a given set of resources is often done in the budgeting process (Poston, Jr., 2011). A key aspect of this process is the identification and weighting of needs (Sutton, 1996). Thus, it is important to keep in mind the limits of this process. First, the assumption is that all resources are being utilized. However, this may not be the case, especially if the schools' organizational effectiveness is low. Second, determining needs is a subjective process. In the case of the NYS concussion management policy, school districts are given discretion regarding what resources to incorporate into their program based on

the guidelines NYS provides. While resources are cited as a limitation, they are done so within a larger context of need prioritization. While student health is important, it may not be the primary focus of educational institutions, particularly in the face of ever increasing pressures for academic performance (Zirkel & Brown, 2015).

Money was brought up as a critical issue in nine schools. Lack of financial support impacts the availability of other critical resources. The resource that most schools identified as restricted by budgets was available staff. Without enough manpower, it makes it difficult to take care of all sports injuries. For example, one AT explained the difficulties in implementing the RTP protocol while tending to other injuries:

“...and it basically comes down to manpower. [I’m the] only person, again, [at our school] that does the testing, that’s between me and taking care of injuries and working games, and there’s only so much I can do.”

Another AT commented:

“It is being one person... it’s hard to be in all places...”

These two quotes show that there is a need for more staff to be on hand to help appropriately implement the program, ensuring that the entire process is followed. It is a double-edged sword relying on one person throughout the whole process. Based on the literature review, schools rely on ATs because of their knowledge and relationships formed with the athletes. ATs are on the field and can form a strong relationship with the student athletes, causing a positive impact on reporting behavior. The importance of these relationships was reflected in the interviews:

“One you have that relationship with the high school student, they’re going to tell you every little thing that’s bothering them.”

“...the kids feel like they are able to have that one person that they can talk to about [their injury and concerns related to concussions]...”

If schools only rely on the AT to implement the concussion management process in addition to taking care of other athlete injuries, improper recovery of athletes may be a result of an overworked AT. Staff member stress level rises and makes it hard for the AT to manage multiple concussed athletes who are at different stages of the RTP protocol. If a school does not have an AT, or has limited access to one, implementation is impacted even more. An AT who only works part time at one school commented:

“...financially there’s limitations... [coaches] work independently because they kind of have to because I’m not here every day.”

Not having an AT present can also impact critical relationships within the school. In School SMUPR1’s case, for example, they cannot afford a full-time AT; they hire a part-time AT when one is available, but it is not the same person each time. Several interviewees noted that it is harder to formulate trusting relationships between the coach and AT when the AT is not present every day. This can result in coaches not reporting injuries on time or coaches deviating or delaying the start of RTP protocols.

Financial restrictions also impacted the schools’ ability to provide adequate training and education. Overall, most of the schools could benefit by providing more training to staff. This is, however, limited by their budget. While most schools can afford printed educational material, more in-depth training may not be affordable. As reflected by on person,

“Training-wise, I think if districts had money, it would be great to send your concussion management team to a conference...”

A tight budget can also impact purchasing evaluation tools to assist in improving the school’s recovery process. ImPACT testing is another source of data to help school staff understand where the athlete is in the recovery process. However, purchasing ImPACT testing is expensive, especially when the costs exceed the benefits. That is the reason School SMUPR1 does not purchase the software because they are a small school that doesn’t offer football nor has the budget. As explained by an individual from School SMUPR1,

“...we don’t have the funds...for something we probably might not ever use.”

Therefore, lack of resources has a large impact on implementation of the concussion management process. It is harder on districts when they do not have a choice on how to create their program because of budget limitations.

5.2 Stakeholder Involvement, Knowledge, Education, and Attitude

All 10 schools acknowledged that education is important to the success of their concussion management program. The extent to which schools have gone to raise awareness (e.g., pre-season meetings, online material, training) among stakeholders impacts proper identification of concussions, adherence to policies, and pushback. Table 12 outlines the stakeholders mentioned in the interviews and describes each stakeholder’s role in the process and how each one helps and/or hinders implementation of the policies.

Table 12. How Stakeholder Involvement Helps or Hinders Implementation.

Stakeholder	Role	Help	Hinder
Student	Student reports injury to school staff.	Education increases awareness, causing an increase in reporting behavior.	Underreporting still occurs in those who want to play and overreporting in students who believe every hit to the head is a concussion.
Parents	Parents monitor the athlete.	Overall, more receptive and taking the policy seriously.	Pushback is still present with parents. Also, parents who work in the medical field can interfere with the recovery process.
Coaches	Coaches administer sideline evaluation and/or RTP protocol in the absence of an AT.	They're more proactive in reporting concussions.	Pushback and tension is still present, especially when coaches must sit injured players out. Some coaches minimally administer the RTP protocols in the absence of an AT.
AT	AT administers RTP protocol.	AT builds trust with students and CMT staff, leader of process.	
AD	AD leadership impacts attitude toward becoming more aware.	Leadership pulls school community and CMT staff together.	
Teachers and Guidance Counselors	Both administer RTL protocol.	They strengthen RTL protocol by taking responsibility from AT and can monitor in the classroom.	They can be resistant toward involvement in RTL protocols because they believe it creates more work.

5.2.1 Coaches

Other than the AT, one of the most mentioned stakeholders is the coaches. Coaches need to be educated because in the absence of an AT, coaches are relied upon to report athlete concussions. Based on the interviews, raising coaches' awareness has positively impacted student athletes. While there are still some coaches who minimally administer the RTP protocols,

most coaches are catching athletes who do not want to get caught playing while concussed. As mentioned by an individual from School LS2:

“...some kids are shying away and have been until I catch them and evaluate or the coach says something. If they don’t do a good job hiding, we can get to them.” [School LS2]

An AT from School SMUPR2 also emphasized how educating the coaches has made a difference when the AT is busy:

“I think it’s good for coaches to know the basics and to look out for certain signs and symptoms. I don’t have the luxury of going out to every sport here and watching them at practices...”

However, while coaches are catching symptomatic students, there is still hesitation when coaches need to take players out who have or believed to have suffered a concussion especially in the smaller schools. A participant from School SMR2 described the challenge that small schools face when injuries pile up in a season:

“...[small schools’ sports teams] have limited [number of players] to begin with and once an athlete has been diagnosed [with a concussion, the sports team’s] number [of players] drops even more, for at minimum one week. Some seasons that could potentially be 3 or 4 games.”

Therefore, coaches do understand the recovery process that schools have in place and the importance of the policy, but still pushback because of how devastating injuries can be, especially to a small school. Coaches may have a harder time taking out their star players to be assessed as well as having to administer all the steps listed in the RTP protocols in the absence of an AT that can further delay a student athlete’s return.

5.2.2 Parents

Regardless of the educational material, schools have seen mixed pushback with parents. Most parents have changed their attitude over time toward the policy as discussed by School SMS:

“Parents are pretty receptive and just grateful to have it in place ‘cause they do realize now that concussions are dangerous if not treated appropriately.” [School SMS]

Based on the literature review, parents need to be supportive throughout the process to ensure proper recovery measures are taken for their children. However, there are still parents who do not want to listen to the schools’ information. When parents work in the medical field, school staff find it particularly difficult to do their job properly because the parents try to interfere with the school’s process by determining the best recovery procedure for their child:

“...[what] I find is hard, is if I have a student whose parent is a nurse.” [School SMS]

“...being at a private school you have a lot of parents that are doctors, and they know everything.” [School SMUPR2]

Continuous education of the community is needed to help decrease pushback. The pushback can be associated with how the education material is presented and conveyed. In the literature review, the differences in presenting education material using passive and active educational tactics were discussed. The interviews showed how each method can have a different effect on stakeholders. For example, School LS1 experienced an issue in the past with passive learning during their pre-season meetings when paper materials were handed out to parents and students:

“We used to [hand out paper copies of the educational material], and when [parents and students] would leave the meeting, [the physical paper copies would] end up in the garbage. They’d be in the lobby...”

This shows that passive methods may not reinforce behavioral changes. Handing out educational materials and expecting parents to read over the information is not easy to achieve, especially if the CMT members do not stress the importance during the meeting of why parents need to know this information. An example of an active form of learning was the parent workshops School LS3 held when the NYS Act first went into effect allowing for feedback and discussions to occur between the school and parents. Another example of active education is bringing the parents into the school and watching the athletic staff conduct the initial evaluation on the student. Because there is still parent pushback regarding the NYS policy, bringing the parents in to watch and understand the process as well as discuss with the athletic staff what is going on can help raise parent awareness.

5.2.3 Students

The impact of educating student athletes on athlete reporting behavior has mixed results. Most student athletes are reporting their own injury or teammates’ injuries when they suspect something is wrong with their head. However, while student awareness has increased, there is still both under and overreporting of concussions. Under and overreporting concussions may stem from how the educational material is conveyed to the students.

Most schools teach students the dangers of sports-related concussions during pre-season meetings where the material is discussed and/or handed out to them. However, as discussed in the literature review, this passive form of education is not the most effective in causing

behavioral and mental changes. Some schools go a step further and discuss concussions in the classroom, with one school teaching students at the elementary level. Teaching the material in the classroom is another opportunity for schools to raise awareness besides relying on school athletic staff members to teach students. To encourage behavioral change, some schools have implemented active methods of education. For example, staff members at School LU has seen positivity surrounding the active educational material that involves the students and staff directly:

“...I do a pre-season TV show at the school... the kids run it, and then there’s a teacher that oversees it and he’s a coach... you really don’t get much push back as long as you’re telling people that this is a positive thing to help, then we really don’t have any issues.”

Therefore, it is important that students understand what concussions are, but presenting material in a positive light and having open discussions can help decrease the negative stigma that has surrounded reporting concussions. This helps create a comfortable, trusting environment for students to report their injuries in and ask questions to further understand the injury, as well the school’s policy.

5.2.4 Guidance Counselors and Teachers

Involvement of other staff at schools varied. Some schools noted that while not all staff are needed in the process, others thought it is important to include teachers and guidance counselors for the RTL protocols. In most schools, the focus is on the RTP protocols, which are more in depth than schools’ RTL protocols (Table 6). Involvement of teachers, however, are critical in RTL. In fact, an AT reflected a lack of comfort dealing with RTL:

“I’ve placed so much emphasis on athletics, ‘cause I’m the athletic trainer, but [students are] here for school...” [School LS2]

Another AT found it difficult to manage multiple protocols:

“I’m more involved in [the RTL process] more than I’d like to be, ‘cause I’d like to be more [focused on] the return to play, on the athletic side...” [School LS1]

The RTL protocols addressing classroom accommodations is just as critical as a RTP protocol because a normal school day workload could potentially trigger or worsen concussion symptoms (The State Education Department, 2012). Having guidance counselor and teacher involvement could help strengthen the RTL protocol, allowing the athletic staff to focus on RTP. However, teachers are hesitant to be onboard with the process, pushing back from the idea of being a part of the program. As described by an AT from School SMR2:

“These teachers’ responses are usually a negative connotation to the athlete, as [the teachers] do not understand. They cannot “see” an actual injury and they get frustrated as they think the athlete does not want to be in their class... I find that even the teachers who know of the policy don’t like to follow the return to learn aspect of it, as it created extra work for themselves which in turn creates a negative relationship with the athlete [and] causes a negative view [of] the protocol...”

Therefore, it is up to the current leaders to educate these stakeholders, communicating in a positive manner to the teachers. By changing the teachers’ attitudes toward their involvement in the process can help evolve and strengthen the RTL protocols. As a person from School SMR1 mentioned, a good plan is in place “...so long as you have all willing parties.” Some

schools have seen positive reactions from all stakeholders, such as guidance counselors wanting to get involved and students coming forward with their injuries.

5.2.5 Athletic Trainers and Other Team Leaders

Ultimately, education has raised awareness, but there is need for continuous, active learning to occur to see behavioral changes. Thus, to ensure a successful program, a school needs a program champion (Stevenson, 2018): a person dedicated to promoting the program in persuading others to join the team. This person is most often the Athletic Trainer or Athletic Director. One example of this is School SMS' CMT leader, whose colleagues describe as proactive and critical to program success:

“And it’s nice to have him because he is the athletic director. Sometimes there’s a lag in getting incident reports to me or something like that, so he can be a resource for me to call...”

The program champion in the schools interviewed was most often the AT. Having the ATs to encourage athlete and staff reporting in a positive light can largely impact the smoothness of implementation of the schools' concussion management programs. As stated previously from literature and the interviews, the ATs have been described as the most knowledgeable, trusting staff members that are important to have a successful program. The AT can help align stakeholder interests within the school community, decreasing stakeholder pushback and increasing buy-in to the school's policy. One school member described the importance of their AT:

“...a lot of it has to do with [the AT] and his leadership in all of this as our athletic trainer, being able to talk to phys-ed staff, being able to talk to school administrators, and he works closely with the nurses as well.” [School LS3]

Another AT explained the extent to which staff relied on them:

“That’s big for the coaches to be able to trust me and the parents to be able to trust me to evaluate and diagnose...” [School LS4]

These two quotes show how the ATs are relied upon for leadership in properly implementing the concussion management policy. The ATs are knowledgeable and are looked to when other staff need assistance. The staff trust the ATs judgement, as School LS3 refers to their AT as their “Google”.

5.3 Stakeholder Communication and Coordination

As stated in the literature review, communication and coordination are important, both which can affect the management process and relationships among staff. Because of past issues with subjective PCP notes, some schools have created PCP forms that ensure a clear diagnosis is given and both parties are on the same page. This has helped decrease the adverse relationship between PCPs and the school. Additionally, requiring the School Medical Director have the final say in clearance prior to the start of the RTP protocol has helped ease the disagreements between the school and PCP:

“...physicians kind of expect to know that the school [has the final say] as far as when they return to play.” [School SMS]

The AT often plays a key role in facilitating communication among the CMT members. For example, some CMT members stated that the policy’s language can create confusion. Having the AT on the CMT can help clarify confusion. Additionally, most of the ATs that were interviewed for this thesis were veterans in their field and have witnessed the evolution of the treatment of sports-related concussions over the years. It is important to have an implementing

agent or main coordinator that has prior knowledge and experience with concussions who can monitor the CMT relationships between members, ensuring that the members are following the correct procedure and assist others in learning how and what to do when an athlete is concussed (Spillane, Reiser, & Reimer, 2002). It is beneficial for the school to have an AT because the process remains consistent as well as timely by having that main point of contact on the team. The AT has a better sense of how to conduct the recovery process (Spillane et al., 2002). As the AD at School SMS further explained about the importance of having an AT at the school:

“I really relied more on our trainers. And staff can use their expertise and their knowledge to really evaluate it... [ATs are] pretty knowledgeable and have that great communication and stuff with the management plan.”

However, for those schools who have limited to no access to ATs, the reliance is on the coaches to report injuries, especially when the AT is busy with other injuries. School staff at School SMR1 that do not have an AT must maintain steady communication and must rely on all members actively participating in the process:

“...the system I think is in a much better place than it was five years ago because the school nurse is so active and on top of things.”

Lastly, the growth in technology has made a difference in how schools are able to implement their management programs. Athlete statuses are sent by email or text to all appropriate CMT members, making it more efficient in how information travels between staff. Therefore, it is important to have ATs as a resource to maintain communication because of the level of involvement they have in the athlete's life. They ensure that the process is completed correctly and timely as School SMS explained:

“Students are getting through it in a timely process to make sure if there is issues or concerns, that we’re seeing those, and making sure that we’re addressing them.”

5.4 Framing of the Issue

Numerous lawsuits by retired NFL players have been filed against the NFL, costing the NFL millions of dollars in settlements (Bonds, Edwards, Spradley, & Phillips, 2015). The players accused the NFL of dishonesty, withholding knowledge about the dangers of concussions, and not attempting to protect players through rule changes (Bonds et al., 2015). Watching what the NFL has gone through, school districts have implemented concussion management programs and policies to help protect students and avoid litigation, providing them with the appropriate care (The New York State Senate, 2011). However, there is a constant struggle in balancing protection of the athlete’s health with protecting the school from litigation.

Parents have put their trust in the district to protect their kids when they participate in interscholastic sports. It is the district’s job to uphold their promise and provide the athletes with support when they get concussed:

“...I feel our job as the school district is to protect the kids, to record what’s happened, administer first aid... our job is to fill in, step in, write down, record what we see and get those kids to a doctor.” [School SMR1]

While concussion injuries are not something new to sports, past court cases surrounding student athletes who were mismanaged by school staff (Underwood, 2016) have now led to the schools “...err on the side of caution” [School SMR1] all the time when a student hits their head. Districts see how much the NFL is being sued and know they cannot financially afford it. One person from School LS1 described the situation most schools are in:

“Number one, I gotta protect [the athlete]. Number two, I’m here to protect the school, and I gotta protect myself... everything trickles down, but we wouldn’t be here if [NFL] didn’t get sued for that amount of money.”

Schools understand the danger they are in if they do not properly implement their concussion management programs or are following the best practices. While all the NYS guidelines are optional and can be implemented however the school district chooses, the creation of the RTP protocols has been identified as an important procedure to have in all schools (Zirkel & Brown, 2015). It has been stressed that if other methods are used to formulate a RTP protocol, the method must be “...scientifically sound” (NYSCSH, 2017) or the district could be in trouble with the courts. An example of the consequences when protocols are not followed was at the end of the NFL’s 2017-18 season. The NFL had to make additional changes to their concussions protocol in response a team failing to follow all protocol steps, which resulted in a \$100,000 franchise fine (France-Press, 2017). An athletic staff member stressed why all the paperwork – the documentation, the protocols, the required School Medical Director clearance – is needed:

“It’s for the safety, which is why we do it, but it is a lot of red tape because of the fear of litigation.” [School LS4]

A staff member at a private school district also emphasized on the need to follow the policy exactly as its stated:

“They try to follow it to the T, since we don’t want anything coming back on us.” [School SMUPR2]

The hardest part for school districts is making the decision when to remove athletes from play and enter them into the RTP protocol. At this age, these athletes' bodies are changing at a rapid pace that it makes it harder to differentiate between concussion-like symptoms:

“Sometimes the kid is, all of a sudden, at that age where he needs glasses and doesn't realize it. So now, his headache started at football practice. Well, of course, they're tackling, you're playing football. And it lasted the whole next day, and now they're in the protocol... And you can't just go back and say, “Yeah, it was just the glasses.”” [School LS1]

This has led to some staff going to the extreme of reporting every bump to the head because of the fear of missing a concussed player that could result in a lawsuit (Key, 2014). There is anxiety in assuming athletes are fine and not giving them the necessary care immediately:

“But I always am really, just, “This is the rule.” ‘Cause I don't wanna miss one. And if we're wrong, and it's not, then so be it. At least we did the process and we followed the rule, and we're safe.” [School SMS]

The concussion management programs ensure that athletes are taken out of the game until relevant school staff members are confident that the athlete is healthy to return within the school setting and all staff are aware of the injury so that they can act as needed. Therefore, because of the constant fear of litigation, the amount of paperwork that districts put in place is to protect the district itself in addition to the athlete. The actions taken by the school are to catch the injury before it causes more serious damage to the athlete, but also to mitigate the likeliness of a lawsuit by showing dedication in concussion management techniques. As one staff member describes the current attitude surrounding the program:

“I think that people just have finally accepted it and are kinda like, it is what it is now, it’s serious and school districts and medical professionals have to make sure that they’re doing what’s right.” [School SMS]

5.5 Documentation

Most school staff acknowledged that having a documentation system helps keep everything organized and ensures that the process is followed and implemented correctly, regardless if it’s a paper or electronic system:

“The paper trail helps, though. Everything is printed. I just scan and implement...” [School LS4]

“...we use SportsWare system for our documentation at the school. And that allows us to really stay on top of the kid that we’re treating or evaluating or putting through a certain protocol.” [School SMR2]

“When a student is concussed they go into a... folder. It’s a nice way to keep track of it for me ‘cause otherwise it would be everywhere.” [School SMR1]

As discussed above, every school has a different documentation system. Having specific documents that need to be handled and one spot to access them helps manage multiple concussed athletes at one time. The use of an electronic system like SportsWare has its benefits in that all information isn’t scattered among papers and notes from PCPs can be kept on file easier [Schools F, J]. However, some schools choose not to utilize an electronic system because of monetary reasons and/or personal preference. As described by an AT:

“[SportsWare is] expensive. It’s not a one-time fee either... It would make my system in here a little bit better. But I do a lot of things on paper still. ‘Cause it’s so hectic in here...”

[School LS3]

In conclusion, the inclusion of documentation forms and a process ensures that the program is successfully and properly implemented. Having an electronic system makes it easier regarding organization, but as long as the school has a consistent system in place, the process should be implemented smoothly. Additionally, including paperwork in the program helps keep everyone on track and is something that can be referenced to weeks or months later. Ultimately, while the concussion management program has added more stress to high school staff in collecting and filing more data, it has been easily integrated into their daily workload:

“...our job is documentation is through and through no matter what... I mean personally for me it doesn’t really affect my job. I’m always documenting everything.” [School SMR2]

5.6 Type of School

The literature review suggested that rural districts would have less access to resources, making it harder for them to implement a successful program. However, based on the discussion with the rural schools in my sample, this may not be the case. For example, all schools are charged per student for both baseline and post-injury ImPACT testing. This expense can quickly add up. While the small, urban private school I talked to could not afford to purchase ImPACT testing, both small rural schools do ImPACT testing on the whole student body:

“...I pay for the ImPACT testing to make sure that we got a good baseline for everybody.”

[School SMR1]

A similar pattern was seen with the use of athletic trainers. One small rural school explained that while they had the money to pay for the AT's service, the school wasn't providing enough business for the AT to be needed at their athletic events. As an individual at School SMR1 explained:

“We don't have a trainer any more... They dropped us, mostly because they weren't getting the referrals to the office because we're such a small district...”

School SMS, a small, rural school, had similar issues, but were able to have part-time AT on staff, in part because the school has two out of the three high contact sports (Table 4).

The size of the school also has an impact on the size of the CMT. While the large CMTs are found in the large, public schools located in urban and suburban areas, the size of smaller Schools SMS and SMR1 almost have about the same sized CMTs as these large schools (Table 7). These schools expanded their scope to include staff outside of those who are athletic-related. What helps these schools form CMTs that include more stakeholders is that specific staff members can represent two different stakeholder positions. As explained by one individual:

“And they all coach too, teachers coach [the students], so they have it both ways...” [School SMS]

“Most of our PE teachers are coaches anyways.” [School SMR1]

This makes it easier for smaller districts to have a more diverse CMT because classroom teachers are easily involved in the concussion management process such as RTL protocols. These teachers can monitor the student in school and after school activities.

Lastly, communication and coordination were often easier in smaller schools. Even without an AT on staff, staff can easily check-in on each other on a consistent basis:

“...we’re small enough that I can get to all of my coaching staff.” [School SMR1]

6. Discussion

The first finding from my research is that school districts are following the NYS policy. Based on my interviews with the 10 schools, the school staff has helped raise awareness in stakeholders and have created a consistent recovery process to be followed when introducing student athletes back to play. Additionally, based on the schools’ documents, the public schools are including a lot of the components that are not required by NYS into their policy, which can relate to how the school defines the scope of their policy. Some schools incorporate all the guidelines into their policy because of the fear of litigation, while others choose which components to incorporate based on what is best for them and what fits their school culture to best protect the student athlete.

The second finding is that there is variation between what is documented and recorded on paper versus what actions occur throughout the process. Therefore, in-person interviews were needed because the differences between what’s written down as the process versus what the actual process is cannot be determined through analyzation of just documents. One example is that some schools’ documents do not accurately reflect the extent of a CMT member’s role such as the AT. Based on the interviews, the AT was found to be the most critical player in successful implementation of a school’s concussion management policy. However, the written documents did not state how involved the AT is in ensuring the recovery process is consistent as well as being the main person whom the CMT trusts and relies upon in understanding what a concussion

is. Another example is the documents not listing when the policy is reviewed but was a topic of discussion by the participants during their interviews (Table 7). Therefore, this shows a disconnect between what is written down in the schools' documents versus what the CMT staff members do when implementing the policy.

Stakeholders also need to be educated on concussions as well as support the district's concussion management policy. It is important for all stakeholders to be educated or trained because concussions are not easily diagnosed. To ensure all stakeholders support the concussion management program, the stakeholders need to actively participate and take the educational material seriously. While most schools provide educational material to stakeholders either electronically or on paper, knowledge needs to be continually transferred through active methods to reduce policy pushback. The use of active methods can help achieve successful transfer of knowledge to stakeholders.

Additionally, while they may think they do not need to be a part of the process, teachers and guidance counselors are critical to helping students return to the classroom. In the literature review, most studies did not discuss the importance of RTL protocols. However, from my research, this was a topic of discussion by some schools mentioning that there is a need for in depth RTL protocols to promote inclusion of teachers and guidance counselors. Because the AT is already so busy with tending to all athlete injuries in addition to concussion management documentation, having the teachers and guidance counselors be a part of the process will take some of the workload off ATs. But, these two stakeholders need to be less resistant regarding being a part of the process, focusing on how it will add to their workload. Stakeholder alignment can start with CMT leadership as well as overall school community attitudes to change, ensuring that everyone is willing to learn more about and accept the importance of the policy.

I also found that resources do impact implementation, as predicted by literature. Based on past research, I expected that the schools in rural school districts would not have the resources to properly implement their schools' concussion management policy. However, the rural schools from my sample contradicted the assumption, suggesting that lack of resources is not location dependent. In the case of these rural schools from my research, they do have the money to provide evaluation tools, try to hire staff, and create detailed written policies for the CMT staff members to follow.

As discussed above, perceptions of need are critical in understanding resource allocation. In my sample, one school indicated that the need was not sufficient to justify the expense of ImPACT testing. At this school, the student athletes were all women and football was not offered at the school. Other studies have found that when focus on sports-related concussions, men's football and hockey receive the most attention (Covassin, Swanik, & Sachs, 2003), as both have a higher risk of concussions (Hoxworth, 2018). It is also assumed that male athletes have a greater risk of suffering a concussion because they are more aggressive in nature than women athletes and men's sports are played at a faster pace than women's (Covassin et al., 2003). Because of this assumption, schools and the CMT may be biased in providing certain resources to the men's teams and see less need to provide the same resources (e.g., ImPACT testing) to women's teams. However, this perception may be leading to inappropriate resource allocation decisions. In fact, research has shown that women have a higher risk of suffering a concussion (Hoxworth, 2018) for a given sport. Thus, when resource allocation is not mandated by policy, biases and assumptions about the risks to students may play a role in resource allocation decisions. In fact, having resources such as ImPACT testing could help monitor and mitigate overreporting that is more common with female athletes (Hoxworth, 2018), as well as help

women athletes recover properly, especially when the symptoms they suffer may not pertain to the concussion.

Lastly, the importance of having an AT was overlooked in literature. While it was mentioned in some of the studies from the literature that an AT is important to have on the CMT, not all studies interviewed ATs directly. However, after interviewing a range of stakeholders, I found that the AT is a critical part of the CMT. In those schools who do not have an AT on their staff, they must rely on coaches who do not have the extensive medical background in concussions as ATs. It is harder for coaches to evaluate an injured athlete because they may be uncertain if it is a concussion. In those schools that do have ATs, the district heavily relies on the AT throughout the concussion management process. Additionally, from my interviews with the school participants, ATs were main leader of the CMT. While the AD is the formal CMT leader, the AT is there to help align stakeholders' interests, promoting stakeholder buy-in to the school policy. If everyone in the school community is not on board with the policy, the risk of failed success may rise.

The schools' documents do not accurately reflect the AT's role in the CMT. They oversee initial evaluation of the athlete, updating the CMT on the status of students, documenting each step of the process, and administering the RTP protocol. The ATs are given the most responsibility in implementing the policy because of their medical background and contact with the athlete. ATs can form a strong, trusting relationship with student athletes because the AT is the point of contact for athletes throughout the process. They can also help create new ideas on how to implement certain steps of the school's policy or incorporate creative ways in educating stakeholders (e.g., pre-season TV show).

Being at the core of the CMT, ATs also streamline communication and coordination with all the CMT members regarding updates on student athletes to submitting reports (e.g., RTP forms, injury reports, ImPACT results). Additionally, because ATs are in constant communication with most stakeholders, they can formulate strong relationships and help raise awareness among the rest of the stakeholders, especially among student athletes. Student athletes feel more comfortable and trust the AT because of how pro-active the AT is during recovery, especially when the AT can relate to what the athlete is feeling.

6.1 Implications

6.1.1 Policy Implications

Based on this study, there are several implications for future updates to the NYS Concussion Management and Awareness Act. The implications suggested in this section are based on the literature review, as well as analysis of the interviews and school documents.

6.1.1.1 Clarify and Broaden the Policy Goals

The goal of the NYS Concussion Management and Awareness Act was to mandate NYS school districts in implementing procedures that would assist students, especially student athletes, in recovering from a concussion. Additionally, appropriate school staff must complete concussion management training and schools must provide the school community educational material related to concussions to help raise awareness among stakeholders (The State Education Department, 2012). However, based on the interviews, most schools have mainly focused on the need to create a recovery process to return the athletes back to the game, while raising awareness in stakeholders.

The Act does not clearly emphasize that educating stakeholders is just as important as providing a recovery process. Providing educational material is a NYS requirement, but the importance of it is not clearly conveyed to the school districts. Therefore, it is recommended that the goals be re-worded and clearly defined (Ingram & Schneider, 1990) stating that districts are required to implement recovery procedures and stress the importance of raising awareness and education of concussion management across all stakeholders. Broadening the policy will help school districts clearly understand what is being asked of them by NYS.

6.1.1.2 Make the NYS Act a Funded Mandate

Changing the NYS Act from an unfunded mandate to a funded mandate could help school districts acquire resources that they lack such as evaluation tools or staff members, specifically ATs. An unfunded mandate can limit schools in what they can include in their policy, which is the reason why the NYS policy is not standardized across all school districts. By providing funding, the policy may be standardized to ensure that students across the state are receiving the same treatment. The standardized policy could include similar injury forms for ATs to fill out, requiring certain staff members to be on the CMT, or mandating ImPACT testing in addition to having a sideline evaluation tool. Therefore, if the NYS policy is not funded, it makes it more challenging for school districts to achieve a standardized policy's goals due to lack in resources.

6.1.1.3 Require a Written Policy

If the NYS policy cannot be changed from an unfunded mandate to a funded mandate, some of the guidelines should be mandatory. A recommendation is requiring the schools to have a written policy. I found from my interviews with the schools that having a written policy, or

team charter, helps keep the CMT members organized and gives the team something to continuously refer to throughout the school year. Thus, there is a benefit in having a written policy or team charter. A team charter is developed by a group that defines the team's direction, establishing their boundaries, and encouraging stakeholder alignment (Meredith, Mantel, Jr., & Shafer, 2015). In the case of the CMT, the team charter or written policy defines the school/CMT's mission or purpose, accountability of the CMT members and their roles, the required training staff members must do, and the process that will be followed. The document serves as a reference for the CMT, and especially the CMT leader, to ensure that the process remains constant and the goals are met. The schools should also be required to list the CMT members and their roles as well as a network diagram that shows how the members interact throughout the process.

6.1.1.4 Expand the First NYS Requirement

The first NYS requirement regarding required training for certain staff members should also be expanded upon. While coaches, ATs, and nurses are reminded by the CMT leader to recertify two years, there is no requirement that states the schools should keep a certificate of proof on file documenting that the training was completed. The schools could also include keeping their quiz scores on file if there are any quizzes included in the training. Additionally, the state could require mid-year quizzes to ensure that the staff has retained the concussion management knowledge. Furthermore, the first NYS requirement could be further expanded to include other school staff members to be trained such as PE teachers, ADs, and other faculty members that are on the CMT.

6.1.1.5 Require RTP and RTL protocols

Based on the interviews and literature, having both RTP and RTL protocols are important and serve as a guide in an athlete's recovery. Step-by-step detailed protocols provide a consistent process that can be followed by the CMT staff and adjusted for each student as needed. While most schools follow the Zurich Guidelines regarding RTP (NYSPHSAA, 2012), NYS needs to provide the school districts a sample step-wise RTL protocol or clear examples of accommodations staff should consider when an athlete returns to the classroom. NYS does list cognitive and physical rest measures that a student should take, however, does not directly mention RTL protocols (The State Education Department, 2012).

6.1.1.6 Clarify how to Accommodate Sports Team Mergers

In my interviews, it was mentioned by a couple participants that they find it confusing to know which schools' concussion management policy to follow when two sports teams merge because of team size. For example, a smaller school's team merges with a larger school's team, meaning practices will be held at the larger school. If an athlete from the smaller school is injured, it is not addressed by the NYS Guidelines if the athletic staff follows the larger or smaller school's policy. Therefore, this issue should be clarified in the Act using a network diagram or clearly stating the steps to take, so the school staff knows what process to follow.

6.1.1.7 Provide More Details on Administering Education to Stakeholders

As described in earlier sections, pre-season education varies immensely across school districts. All the schools from my sample conduct pre-season meetings, which helps start a relationship between the athletic staff, parents, and students. Therefore, NYS should make this a requirement for schools to host pre-season meetings before each season to review concussion

management material. NYS could include examples of best practices for teaching stakeholders about concussions. The best practices could include differences between passive and active learning methods and provide examples of each such as including the topic in PE and/or health class or hosting pre-season workshops that promote a safe environment with staff where students could get their questions answered.

6.1.2 Implications for Schools

6.1.2.1 Include Preventative Techniques in Education

Very few schools mentioned that their education also includes preventative methods such as reviewing sportsmanship/rules and proper use of equipment (The State Education Department, 2012). Some schools stated that their policies have raised awareness among stakeholders, improving the student reporting behavior and increasing trust among athletes. However, schools need to emphasize preventative tactics to help mitigate concussions from occurring. Connected to mitigating concussion occurrences, schools should also incorporate more education on the dangers of the second concussion called second-impact syndrome (SIS) (The State Education Department, 2012).

6.1.2.2 Have a Sideline Evaluation Tool(s)

It is strongly recommended by NYS that schools should incorporate either neurocognitive computerized tests and/or sideline evaluation tools to assist staff in identification and evaluation of the athlete (The State Education Department, 2012). Using computerized testing can be pricy, however, a paper sideline evaluation tool for CMT staff to use can be obtained at little cost. Based on the schools' documents, those that have a sideline evaluation tool use any version of the SCAT. It is used to assess an athlete immediately after impact. Example SCAT tools can be

found online for staff to use or reference to. If schools choose not to follow the SCAT, they can also create their own sideline evaluation check-list based on the SCAT at no cost. Additionally, having a paper sideline evaluation tool is beneficial for staff to evaluate athletes prior to sending them to their PCP and can be administered by any medical professional.

6.1.2.3 Educate Students in the Classroom

Schools should also incorporate concussion management information into their PE and/or health classes to expose the topic to the whole student body, not just athletes. Inclusion of concussions into classroom curriculums can promote continuous education throughout the school year. Districts should also consider starting to teach the material at the elementary level because a concussion can be more detrimental to a youth athlete's brain than a teenager. Also, exposure to this informational material can also educate parents earlier prior to their kids' involvement in high school sports.

6.1.2.4 Use Active Learning Methods to Enforce Stakeholder Education

If NYS chooses not to provide guidance in how to administer educational material to stakeholders, schools should take on this responsibility. The school districts should utilize active learning methods such as having a pre-season forum for athletes as well as parents. These forums would be like the pre-season meetings but would promote small group discussions between staff members and the parents and students as well as hands-on demonstrations of the, for example, evaluation and recovery processes. While the goal would be to promote active learning with students, the staff's knowledge would be reinforced when hosting these forums.

Additionally, the schools should strengthen or enforce parent education. Based on the interviews, there is still parent pushback in the schools' policies. Having parents read over

material themselves or listen during pre-season meetings followed by signing off on a participation form is not enough proof that the parents have fully absorbed the material. A suggestion for the school districts is enforce parent education by providing a small quiz for parents to take prior to signing off on the permission forms.

6.1.2.5 Create Detailed RTL Protocols

As most participants discussed, their schools' RTL protocols need to be updated to accurately describe what kinds of accommodations the staff should provide athletes when they are returning to the classroom. The CMT staff should align the RTL protocol with the teachers' and guidance counselors' interests to help lighten the AT's workload since some ATs are accidentally involved in RTL as well as RTP processes. The RTL protocol should clearly list where and how both teachers and counselors will be involved when the athlete is re-exposed post-injury to homework and exams.

6.1.2.6 Be More Creative when Forming the School Policy

Spillane & Callahan (1999) discussed how ideas in formatting policy start from the leaders analyzing other schools' policies and understanding how some or all those ideas can be translated to their school. Referring to Figure 1, policy translation focuses on what actions and decisions the school leaders take to implement their management programs. These decisions are impacted by Stages 2 (Ideas/evidence/knowledge) and 3 (Interpretation) where the leaders perceive and interpret the meaning of the policy.

The process of understanding the policy by obtaining ideas and knowledge from others, however, tends to be conservative as people gravitate to ideas that they know. People ignore those ideas that are too abstract or different that do not fit their beliefs (Spillane & Callahan,

1999). They lean toward applying what ideas have been successful in the past to their organization than come up with new ideas that fit better with the organization's culture.

Based on my observations of the documents and interviews with the participants, most of the schools were very similar, with a couple schools doing creative things such as making a student-coach run pre-season TV show or integrating education into the classroom starting at the elementary level. To help school staff be more receptive to more creative ideas and making the policy accurately fit the schools' culture, it is recommended that districts across the state in different sports sections are in constant discussions, which could be consistent discussions throughout the year or only meeting twice (beginning and end of the school year). This could also be an online forum that school districts could post what has worked or what hasn't worked in their concussion management programs. The schools could also provide guidance in how to implement the successful ideas or could ask for feedback on how to implement ideas that the school thinks are impossible, but others see as possible.

6.2 Limitations and Implications for Future Research

6.2.1 Limitations

There were a few limitations associated with the methodology used to gather the data. One limitation was that schools had full discretion on who would be interviewed. Thus, I was limited to certain people that I was able to talk to. On average, two people were interviewed from each school district for my research (Table 5). Thus, could have caused bias in the data. Those participants that were selected may have explained what the school does differently than what occurs, leaving some details out of their answers, as well as not accurately framing the schools' concussion management process and what the CMT members do throughout the process.

Additionally, students and parents were not interviewed for my thesis because of the lengthy process that is involved to receive permission to interview both stakeholders.

I was also constrained in what schools I interviewed for my research. Only schools in the WNY and Rochester, NY regions – Sections V and VI – were contacted to be participants because these schools were within driving distance as in-person interviews was the preferred method in gathering data. However, it is unknown if the data collected from these two regions can be generalized for schools in the same location (urban, suburban, rural) and other NYS high school sports sections.

Lastly, there may have been self-selection bias from school staff. The schools that agreed to participate in my research may have inaccurately described how successful they have been in management of sports-related concussions.

6.2.2 Implications for Future Research

6.2.2.1 Who is Interviewed

For future research, it is recommended to widen the scope of participants to interview. These participants would include the following: coaches, School Medical Directors (e.g., NP or school doctor), PCPs, teachers, guidance counselors, and other school leadership members. Since most of these stakeholders were discussed indirectly by the ADs, ATs, and/or school nurses in my interviews, interviewing these additional stakeholders would gain further insight about their direct perspectives of the policy, challenges they have faced, as well as what the extent of their role is when managing concussed athletes. Additionally, it would be valuable to interview PCPs because this stakeholder could expand on their relationship with school staff before and after the

Act went into effect from their point of view. The PCPs could also comment on their thoughts about the some of the schools' PCP evaluation forms.

It is also recommended to talk to teachers and guidance counselors to understand their perspectives on the policy and the RTL protocols. These two stakeholders are needed to help administer and evolve the RTL protocols. As some schools mentioned, teachers are hesitant to be a part of the process because they are worried of the time commitment and are unwilling to learn more about the injury. Therefore, interviewing teachers in addition to guidance counselors can help gain direct insight regarding, for example, the best ways to incorporate them into the policy.

Interviewing student athletes and their parents should be considered for future research because both stakeholders were indirectly discussed by other stakeholders in most studies. Additionally, in most studies, student athletes and their parents were not included as participants. However, if student athletes and parents are to be included in future research, the process is very involved since it would be more challenging to get IRB approval. There will be a lot of waiting time prior to interviewing both stakeholders.

First, there is waiting time in hearing back from schools confirming participation. Once participation is confirmed, school district approval may be required prior to participation of the school community in the research must be considered (Blom-Hoffman, Leff, Franko, Weinstein, Beakley, & Power, 2014). Research that is conducted in schools may require school district approval regardless if parents and students are involved in the research to further understand, for example, what is involved, who would be involved, and where in the school it would be conducted. Not all schools require pre-approval by the district staff but waiting for an additional approval before the parents are contacted about participation would further increase the delay in conduction of interviews that must be considered.

Once given school district approval, a list of students who have suffered or are suffering from a concussion must be acquired from schools. This requires wait time in hearing back from the schools' nursing and athletic staff regarding which parents must be contacted. However, these discussions with the school staff could cause a potential breach in the Health Insurance Portability and Accountability (HIPPA) "Privacy Rule" Act, disclosing private health information without receiving authorization from the athletes and their parents (Galvez, Rose, Hagemann, & Aburto, 2017).

Lastly, once a list of parents and students from the school is obtained, you must obtain permission from the parents prior to student consent. Based on the IRB standards, it is required that children under the age of 18 obtain assent and permission from their parents before allowing the child the choice to accept or decline participation (Office of Human Subjects Research, 2018).

6.2.2.2 The Sample Size of the Participants

Future research should also utilize a larger sample of ADs, ATs, school nurses, and school leadership members. This is because the sample size for each of these stakeholders in my research was small and may not accurately represent each stakeholder population. It is suggested that the initial participation requests include a question, asking the schools if each of these members can be interviewed.

A larger sample size of public and private schools that are interviewed is also recommended for future research. Because it was unclear if the type of school effects variation in implementation of a schools' concussion management policy, it is recommended that a larger sample of public and private schools that vary in size and sports offered at the school is

interviewed. Regarding private schools, it is suggested that all-boys and mixed gender schools are interviewed since the sample size used for the thesis was two all-girls schools that did not offer football (Table 4). Additionally, it is suggested that public and private schools in different geographical areas of NYS be interviewed. It is unknown if the conclusions drawn from my research that included schools in only the WNY and Rochester, NY regions can be generalized to the rest of NYS.

6.2.2.3 Additional Studies of Focus

For further research, it is suggested that studies analyze the perceptions of men and women's sports versus available resources, determining if there is a bias in how schools' available resources are distributed among men's and women's sports. It is assumed that men's sports are more concussion prone, therefore, if the school is limited in resources, the resources would be applied to men's sports over the women's sports. However, women athletes are just as susceptible to concussions as men, and having resources to monitor their recovery system could help measure their symptoms throughout the process. Therefore, it is recommended that studies analyze if there is a bias in the school and/or the CMT in how resources are distributed to both genders. If a bias is present, research should analyze if the bias is detrimental to athlete safety.

Another area of focus could be analyzing the extent to which technology helps or hinders schools' policies. Some of the schools that I interviewed mentioned that the use of technology has affected their concussion management processes in positive and negative ways. Participants acknowledged that technology has helped with the evaluation of athletes throughout the recovery process, while others stated that technology has led to students lying about how they are feeling through the evaluation. Additionally, participants mentioned that new technology is in the pipeline that can be used by coaches and/or ATs to monitor hits to the head on their smartphones.

The hit is measured by a sensor located in the athlete's helmet, and the status of the hit is sent to the coach's or AT's smartphone real time to help determine if an athlete needs to be immediately evaluated for a concussion. However, this could be a conflict of interest with coaches: immediately remove an athlete and risk losing the game or don't report the hit, keeping a potentially injured player in the game, and risk litigation because it was not reported. Therefore, it is recommended that the affects upcoming concussion management technology has on the reporting behaviors of staff and students be evaluated in the future.

Lastly, to determine if the schools' policies do improve students' health long term after they have suffered and recovered from a concussion, it is recommended to conduct longitudinal studies. Longitudinal studies could be more useful than looking at statistics on concussion rates per sport in each season because the concussion rates could be misleading and do not provide enough information regarding the effect of the policy on student health (Mannix, Meehan III, & Pascual-Leone, 2016). An increase in a sport's concussion rate could indicate that preventative techniques are not being taught, athletes are overreporting, or the season was just tough and unfortunate that injuries plagued the team. The rates do not indicate if the students' health has improved, only if the policy has improved staff and athlete awareness in recognizing a concussion.

The longitudinal studies would follow the students starting from the initial diagnosis of a concussion, through the recovery process, and years after they have graduated high school. However, this may be challenging because, as stated earlier, the process to conduct research on students is involved and requires a lot of waiting time before the student can be interviewed. Additionally, it would be hard to determine if the schools' policies had a positive effect on a student's health if the student continues to play sports in college, suffers more concussions, and

follows a different recovery process when in college. The longitudinal studies may also produce different results for each student that is studied because the side-effects from concussions are individualized. No two concussions are alike, and how a person recovers from the injury differs between every person, especially if people suffer multiple concussions (CDC, 2010). Therefore, the longitudinal studies may not be useful in determining overall if the schools' policies produce long term positive effects on students' health but can determine the policies' effect on individual student athletes.

6.3 Conclusions

From watching retired NFL and NHL players' brains deteriorate from concussion side effects, the reality of how devastating this injury can be and the need for protection of all athletes has trickled down to all sports levels. The passage of the NYS Concussion Management and Awareness Act has helped the schools formulate a concrete policy to follow. However, school districts differ in characteristics, culture, leadership, and available resources, making it challenging to meet all the guidelines NYS provided. The variation in school districts' policies is inevitable because of these differences in school districts. How the district creates their policy is determined on how it is interpreted by the school. School districts must tailor and modify their policy accordingly to match their needs, while also meeting the policy goals.

Variation in school districts' policies can also be attributed to the NYS Act being an unfunded mandate. Some school districts are limited in resources, making it more challenging to create their policy to match other school districts' who have, for example, more staff on hand or can buy ImPACT testing software. From my research, it was discovered that having an AT on the CMT is critical in stakeholder alignment and ensuring that the athlete recovery process is consistent through communication and coordination. However, some schools can find creative

ways to make their policy strong without resources, for example, having CMT leadership improve stakeholder alignment within the school community or focusing on continuous stakeholder education.

This is only the beginning for these concussion management policies. As medical research continues to develop regarding concussions, the policies will have to be updated. For example, it was mentioned by a couple schools that the recommended rest duration has changed. Based on the last revision in 2013, the NYS guidelines list waiting 24 hours prior to re-admission to play, but new research has recommended that rest may not be the best action, faster return to play is better.

In conclusion, staff management of concussions in student athletes has improved overall. The school districts are meeting the Act's goals in whatever ways they can, using the resources they have. While the policy has created additional paperwork and requirements that need to be followed, it ensures that all head injuries are managed equally, even if a hit to the head doesn't result in a concussion. As an AD reflected:

“It's definitely more work, that's good work though... The worse thing that comes out of it is a kid that has a head injury that doesn't rise to the level of concussion, they get a couple more days of relaxation and rest beforehand.” [School SMR1]

7. References

- Baugh, C. M., & Shapiro, Z. E. (2015). Concussions and youth football: using a public health law framework to head off a potential public health crisis. *Journal of Law and the Biosciences*, 2(2), 449–458. <https://doi.org/10.1093/jlb/lsv023>
- Bell, J. M., Master, C. L., & Lionbarger, M. R. (2016). The Clinical Implications of Youth Sports Concussion Laws: A Review. *American Journal of Lifestyle Medicine*, 1–10. <https://doi.org/10.1177/1559827616688883>
- Blom-Hoffman, J., Leff, S. S., Franko, D. L., Weinstein, E., Beakley, K., & Power, T. J. (2014). Consent Procedures and Participation Rates in School-Based Intervention and Prevention Research: Using a Multi-Component, Partnership-Based Approach to Recruit Participants. *School Mental Health*, 1(1), 3–15. <https://doi.org/10.1007/s12310-008-9000-7>
- Bompadre, V., Jinguji, T. M., Yanez, N. D., Satchell, E. K., Gilbert, K., Burton, M., ... Herring, S. A. (2014). Washington State's Lystedt Law in Concussion Documentation in Seattle Public High Schools. *Journal of Athletic Training*, 49(4), 486–492. <https://doi.org/10.4085/1062-6050-49.3.30>
- Bonds, G. B., Edwards, W. W., Spradley, B. D., & Phillips, T. (2015, March 23). The Impact of Litigation, Regulation, and Legislation on Sport Concussion Management. Retrieved October 18, 2017, from <http://thesportjournal.org/article/the-impact-of-litigation-regulation-and-legislation-on-sport-concussion-management/>
- Buckshot, S. M. (2017, May 15). NYS school votes 2017: Compare how much your district wants to spend vs. others. Retrieved from http://www.syracuse.com/schools/index.ssf/2017/05/nys_school_budet_votes_2017_does_your_district_want_to_spend_more_or_less_than_o.html?appSession=283RR4M8J3M8C32

[3SE4C0P552TR958DI3KY3886S6VK61S2EG57E8SOPG3J699T5WSFICU8N4NIM4C7
A538VHRV4IUD1VEUA9EW401Z8DV1H2B78W61Z6H5K074Q8532](#)

- Callahan, K. A., & Spillane, J. P. (1999). Implementing State Standards for Science, Education: What District Policy Makers Make of the Hoopla. *Journal of Research in Science Teaching*, 37(5), 401–425.
- CDC. (2010). Facts about Concussion and Brain Injury - Where to Get Help. CDC. Retrieved from https://www.cdc.gov/headsup/pdfs/providers/facts_about_concussion_tbi-a.pdf
- CDC. (2015). Sports Concussion Policies and Laws. Retrieved December 9, 2017, from <https://www.cdc.gov/headsup/policy/index.html>
- Chrisman, S. P., Schiff, M. A., Chung, S. K., Herring, S. A., & Rivara, F. P. (2014). Implementation of Concussion Legislation and Extent of Concussion Education for Athletes, Parents, and Coaches in Washington State. *The American Journal of Sports Medicine*, 42(5), 1190–1196. <https://doi.org/10.1177/0363546513519073>
- Concannon, L. G. (2016). Effects of Legislation on Sports-Related Concussion. *Phys Med Rehabil Clin*, 513–527. <http://dx.doi.org/10.1016/j.pmr.2015.12.006>
- Cook, A., King, H., & Polikandriotis, J. A. (2014). Where Do We Go from Here? An Inside Look into the Development of Georgia’s Youth Concussion Law. *Journal of Law, Medicine & Ethics*, 284–289.
- Covassin, T., Swanik, C. B., & Sachs, M. L. (2003). Sex Differences and the Incidence of Concussions Among Collegiate Athletes. *Journal of Athletic Training*, 38(3), 238–244.
- Daneshvar, D. H., Nowinski, C. J., McKee, A., & Cantu, R. C. (2011). The Epidemiology of Sport-Related Concussion. *Clinics in Sports Medicine*, 30(1), 1–17. <https://doi.org/10.1016/j.csm.2010.08.006>

- Doucette, M. L., Bulzacchelli, M. T., Gillum, T. L., & Whitehill, J. M. (2016). The Massachusetts School Sports Concussions Law: A Qualitative Study of Local Implementation Experiences. *The Journal of Law, Medicine & Ethics*, 44(3), 503–513.
<https://doi.org/10.1177/1073110516667946>
- Esquivel, A., Haque, S., Keating, P., Marsh, S., & Lemos, S. (2013). Concussion Management, Education, and Return-to-Play Policies in High Schools: A Survey of Athletic Directors, Athletic Trainers, and Coaches. *Sports Health*, 5(3), 258–262.
<https://doi.org/10.1177/1941738113476850>
- Faure, C. E., Moffit, D. M., & Schiess, K. (2015). Concussion Law Compliance: The Allocation of Time, Resources, and Money in a Rural Western State. *American Secondary Education; Bowling Green*, 44(1), 4–27.
- Flaherty, M. R., Raybould, T., Jarnal-Allial, A., Kaafarani, H. M. A., Lee, J., Gervasini, A., ... Masiakos, P. (2016). Impact of a State Law on Physician Practice in Sports-Related Concussions. *The Journal of Pediatrics*, 178, 268–274.
- France-Press, A. (2017, December 24). N.F.L. Changes Concussion Protocol. *The New York Times*. Retrieved from <https://www.nytimes.com/2017/12/24/sports/football/nfl-concussion-protocol.html>
- Freeman, R. (2009). What is “translation”? *Evidence & Policy*, 5(4), 429–447.
<https://doi.org/10.1332/174426409X478770>
- Friesen, S. (2013, June). *Implementing Return to Play; Learning from the Experiences of Early Implementers*. Electronic presented at the Safe States Alliance/SAVIR Annual Meeting (Baltimore, MD). Retrieved from <https://c.ymcdn.com/sites/safestates.site-ym.com/resource/resmgr/imported/Friesen.pdf>

- Galvez, J., Rose, S. L., Hagemann, J., & Aburto, M. (2017, January). Students in Research - IRB module.
- Gessel, L. M., Fields, S. K., Collins, C. L., Dick, R. W., & Comstock, R. D. (2007). Concussions Among United States High School and Collegiate Athletes. *Journal of Athletic Training*, 42(4), 495–503.
- Goodrick, D. (2014, September). Comparative Case Studies. United Nations Children’s Fund (UNICEF).
- 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. <https://doi.org/10.2105/AJPH.2012.301107>
- HeadcaseCompany.com. (2013). Sports Concussion Statistics. Retrieved from http://www.headcasecompany.com/concussion_info/stats_on_concussions_sports
- Howland, J., Hackman, H., Taylor, A., Brown, L., Gapinski, M. A., Mills, J. K., & Thornton, K. (2017). Evaluation of Implementation of Massachusetts Sports Concussion Regulations: Results of Focus Groups With School Nurses and Athletic Trainers. *The Journal of School Nursing*, 1059840517702697. <https://doi.org/10.1177/1059840517702697>
- Hoxworth, L. (2018, February 6). Women More Likely to Suffer Sports-Related Concussions, Studies Suggest. *UVA Today*. Retrieved from <https://news.virginia.edu/content/women-more-likely-suffer-sports-related-concussions-studies-suggest>
- Ingold, J., & Monaghan, M. (2016). Evidence translation: an exploration of policy makers’ use of evidence. *Policy & Politics*, 44(2), 171–190. <http://dx.doi.org/10.1332/147084414X13988707323088>

- Ingram, H., & Schneider, A. (1990). Improving Implementation through Framing smarter Statutes. *Journal of Public Policy*, 10(1), 67–88.
- Kajankova, M., Oswald, J. M., Terranova, L. M., Kaplen, M. V., Ambrose, A. F., Spielman, L. A., & Gordon, W. A. (2017). Response of School Districts to the New York State Concussion Awareness and Management Act: Review of Policies and Procedures. *Journal of School Health*, 87(6), 409–415.
- Kane, A. J. (2015). An Incomplete Pass: Inadequacies in Ohio’s Youth Concussion Legislation and the Ongoing Risk for Players. *Journal of Law and Health*, 28(201), 202–246.
- Kasamatsu, T., Cleary, M., Bennett, J., Howard, K., & McLeod, V. (2016). Examining Academic Support After Concussion for the Adolescent Student-Athlete: Perspectives of the Athletic Trainer. *Journal of Athletic Training*, 51(2), 153–161. <https://doi.org/10.4085/1062-6050-51.4.02>
- Key, J. (2014). Sports Law-Requiring High School Coaches to Attend Courses for the Prevention, Care, and Management of Concussions and Brain-related Injuries - Mann v. Palmerton Area School District. *American Journal of Trial Advocacy*, 38(2), 443–447.
- Lowrey, K. M., & Morain, S. R. (2014). State Experiences Implementing Youth Sports Concussion Laws: Challenges, Successes, and Lessons for Evaluating Impact. *Journal of Law, Medicine & Ethics*, 42(3), 290–296. <https://doi.org/10.1111/jlme.12146>
- Mannix, R., Meehan III, W. P., & Pascual-Leone, A. (2016). Sports-related concussions - media, science and policy. *Nat Rev Neurol*, 12(8), 486–490. <https://doi.org/10.1038/nrneuro1.2016.99>

- Marar, M., McIlvain, N. M., Fields, S. K., & Comstock, R. D. (2012). Epidemiology of Concussions Among United States High School Athletes in 20 Sports. *The American Journal of Sports Medicine*, 40(4), 747–755. <https://doi.org/10.1177/0363546511435626>
- Mazerolle, S. M., Raso, S. R., Pagnotta, K. D., Stearns, R. L., & Casa, D. J. (2015). Athletic Directors' Barriers to Hiring Athletic Trainers in High Schools. *Journal of Athletic Training*, 50(10), 1059–1068. <https://doi.org/10.4085/1062-6050-50.10.01>
- Meredith, J. R., Mantel, Jr., S. J., & Shafer, S. M. (2015). *Project Management*. John Wiley & Sons, Inc.
- Michel, N., Cater III, J. J., & Varela, O. (2009). Active Versus Passive Teaching Styles: An Empirical Study of Student Learning Outcomes. *Human Resource Development Quarterly*, 20(4), 397–418.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis* (3rd ed.). SAGE Publications Ltd.
- NYSCSH. (2017). Concussion FAQs. Retrieved from <https://www.schoolhealthny.com/Page/245>
- NYSED. (2018). New York State Education. Retrieved from <https://data.nysed.gov/>
- NYSED. (2018). New York State Property Tax Report Card. Retrieved from <http://www.p12.nysed.gov/mgtserv/propertytax/>
- NYSPPHSAA. (2012). Summary to Concussion Management. Retrieved from <http://www.nyspphsaa.org/Portals/0/PDF/Safety/Summary%20Concussion%20Management%20and%20Awareness%20Act.pdf>
- Office of Human Subjects Research. (2018). Informed Consent Process Toolkit. Retrieved from https://www.rit.edu/research/hsro/informed_consent_process_children

- Poston, Jr., W. K. (2011). *School Budgeting for Hard Times: Confronting Cutbacks and Critics*. Corwin.
- Powell, J. W. (2001). Cerebral Concussion: Causes, Effects, and Risks in Sports. *Journal of Athletic Training*, 36(3), 307–311.
- Rivara, F. P., Schiff, M. A., Chrisman, S. P., Chung, S. K., Ellenbogen, R. G., & Herring, S. A. (2014). The Effect of Coach Education on Reporting of Concussions Among High School Athletes After Passage of a Concussion Law. *The American Journal of Sports Medicine*, 42(5), 1197–1203. <https://doi.org/10.1177/0363546514521774>
- Schultz, E. (2018). NYS District Locale Classifications. Retrieved from <http://www.nyruralschools.org/w/about/rural-schools-nys/>
- Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy Implementation and Cognition: Reframing and Refocusing Implementation Research. *Review of Educational Research*, 72(3), 387–431.
- Stevenson, W. J. (2018). *Operations Management* (13th ed.). McGraw-Hill Education.
- Sutton, M. (1996). Spending on Educational Resources in Schools: Who Should Decide? *Management in Education*, 10(5), 6–9.
- The New York State Senate. (2011, June 11). Senate Passes Concussion Management Awareness Act. Retrieved from <https://www.nysenate.gov/newsroom/press-releases/senate-passes-concussion-management-awareness-act>
- The State Education Department, T. U. of the S. of N. Y. (2012, June). Guidelines for Concussion Management in the School Setting. The University of the State of New York: The State Education Department. Retrieved from

<http://www.p12.nysed.gov/sss/schoolhealth/schoolhealthservices/ConcussionManagementGuidelines.pdf>

Underwood, J. (2016). Schools should heed concerns over sports' brain injuries. *Kappan Magazine*, 97(6), 74-75.

Wallace, J., Covassin, T., Nogle, S., Gould, D., & Kovan, J. (2017a). Concussion Knowledge and Reporting Behavior Differences Between High School Athletes at Urban and Suburban High Schools, 87(9), 665–674.

Wallace, J., Covassin, T., Nogle, S., Gould, D., & Kovan, J. (2017b). Knowledge of Concussion and Reporting Behaviors in High School Athletes With or Without Access to an Athletic Trainer. *Journal of Athletic Training*, 52(3), 228–235.

Zirkel, P. A., & Brown, B. E. (2015). K-12 Students With Concussions: A Legal Perspective. *The Journal of School Nursing*, 31(2), 99–109. <https://doi.org/10.1177/105984051452146>

8. Appendix: Interview Details

INTERVIEW PROTOCOL

1. Tell me about yourself and your involvement with concussion management within school athletics.
 - a. Explain your role and involvement in the Concussion Management Awareness team at the school.
 - b. Explain your knowledge of concussions (e.g., training, experience a concussion, etc.).
2. Who is on the concussion management team? (e.g., roles, duties, etc.)
3. Was there a concussion management policy in place prior to the NYS policy? If so, how did you manage student athlete concussions?
4. What is the concussion protocol that the concussion management team members follow and how has it changed since 2012?
5. Discuss some of the challenges you faced in implementation of the NYS policy.
6. What are the strengths and weaknesses/limitations of the concussion management policy?
7. How much concussion knowledge-related training does the whole concussion team receive as well as individually?
8. Do the concussion management team members annually educate all district personnel and student athletes?
9. Has this policy help promote awareness throughout all district personnel or are only select groups aware of the policy? Explain.
10. Who else do you suggest I talk to?