

# School Nurses' Perceived Challenges With Concussion Management Procedures in the Secondary School Setting

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## Abstract

School nurses have an integral role in managing student health concerns throughout the school day, yet little is known about their specific role in concussion management. Therefore, the purpose of this study was to explore the challenges encountered by school nurses regarding concussion management in the secondary school setting. Twenty-two school nurses employed in the secondary school setting were interviewed via phone. We analyzed the data via the consensual qualitative research paradigm. Overall, we found school nurses face consistent challenges with their role on the concussion management team, specifically related to education of school personnel, parents, and community health-care providers. Challenging topics included the inconsistency of community health-care provider recommendations and others' perceptions of school nurses' preparation and training to be important members of the concussion management team. Efforts to increase concussion education and improve communication across all stakeholders of the concussion management team should be implemented.

## Keywords

concussion policy, concussion education, traumatic brain injury, mental health, multidisciplinary team

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## Introduction

It has been estimated that 1.1 to 1.9 million sport and recreation-related concussions occur among children and adolescents per year in the United States (Bryan, Rowhani-Rahbar, Comstock, & Riveria, 2016). Furthermore, sport-related concussions among high school athletes occur at a rate of 3.89 per 10,000 athlete-exposures (O'Connor et al., 2017). The high incidence of concussions among children and adolescents are not only of particular concern since the brain is still developing but also brings to attention the need for formal concussion policy that emphasizes best practices for concussion management.

Appropriate concussion management is a balance between rest and activity while the brain recovers (McCroory et al., 2017). The concussion management process should be multifaceted as well as multimodal, highlighting the physiological development, recovery

time and process, and the cognitive activities specific to the care of a student-athlete. Thus, concussion management should incorporate a holistic approach, including identification and diagnosis, symptom monitoring, return-to-learn or academic adjustments, and eventually return-to-play. This process should also be completed with the initiation of proper referrals as necessary (Broglio et al., 2014; McCroory et al., 2017).

To ensure proper concussion management, secondary schools should have a well-defined concussion policy

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outlining all aspects of concussion-related care (Kasamatsu, Cleary, Bennett, Howard, & Valovich McLeod, 2016b). Concussion policies should include (a) outlined concussion background material, management plans including (b) removal from play, (c) school support services, (d) return-to-play and return-to-learn criteria, and (e) team member roles (Bompadre et al., 2014; Kasamatsu et al., 2016b). Many state and inter-scholastic guidelines may be in place to help guide concussion policy development or items to include.

With this foundation, schools can expand upon existing guidelines to more thoroughly address concussion management policies and procedures appropriate for their institution (Bompadre et al., 2014). Without a policy or concussion management plan, the management of concussion may be disorganized and inefficient. Since the primary role of an adolescent is to be a student, this can be detrimental to the student's schoolwork and overall health. While research has primarily focused on concussion education, removal, return-to-play, and more recently academic consequences of concussion (Russell et al., 2016; Wasserman, Bazarian, Mapstone, Block, & van Wijngaarden, 2016; Williams, Welch, Parsons, & Valovich McLeod, 2015), there is still limited evidence available regarding the roles and responsibilities of the members of the concussion management team, particularly in the secondary school setting. The concussion management team should involve the parents, physician, athletic trainer, school nurse, school psychologist or school counselor, school administrators, and teachers (Halstead et al., 2013, Williams & Valovich McLeod, 2015). All members of the concussion management team should work together to ensure the student-athlete is managed appropriately throughout the school day and at home (Halstead et al., 2013; Welch Bacon, Erickson, Kay, Weber, & Valovich McLeod, 2017).

The two primary school-affiliated health-care providers in the secondary school setting are school nurses and athletic trainers. These two health-care professionals, though educated in different areas, are both in a unique position to aid the concussion management team with facilitating a student athlete's safe return to both school and sports (McGrath, 2010; Rains & Robinson, 2010). While the athletic trainer is typically the sole health-care provider during after-school activities, the school nurse is in a position to deal directly with all aspects of concussion management during the school day. However, the school nurse may have an even stronger role in the management of concussed student-athletes in secondary schools who do not employ an athletic trainer (McGrath, 2010; Rains & Robinson, 2010), particularly for implementation of the return-to-learn process (Weber, Welch, Parsons, & Valovich McLeod, 2015; Welch Bacon et al., 2017). Therefore, it is vital that the school nurse is knowledgeable about

concussion management, particularly regarding the safe return of a concussed student-athlete to the classroom (Rains & Robinson, 2010; Zirkel & Brown, 2015).

The importance of the school nurse's role in concussion management has been established (Halstead et al., 2013; McGrath, 2010; Rains & Robinson, 2010; Weber et al., 2015; Welch Bacon et al., 2017), but the specifics of how they fit in the concussion management team, and how their specific clinical skills are best utilized to provide complete concussion care is still unclear (Mummert et al., 2014; Rains & Robinson, 2010; Weber et al., 2015). Therefore, the purpose of this study was to explore school nurses' perceptions of and experiences with the concussion management process in the secondary school setting.

## Methods

### Design

This study was guided by the consensual qualitative research (CQR) tradition. The target population for data collection was school nurses employed in the secondary school setting. We initially contacted participants for this study if they completed a previous study on school nurses' familiarity, attitudes and beliefs of concussion management, and academic adjustments for student-athletes (Weber et al., 2015). The multianalysis approach that serves as the foundation of the CQR tradition ensures consensus of different insights about the collected data and allows for an in-depth look at the collective experiences of participants (Hill et al., 2005; Hill, Thompson, & Williams, 1997).

### Population or Setting

Participants were randomly recruited from a convenience sample of 315 school nurses who completed a previous investigation and provided their contact information (Weber et al., 2015). Individuals were included if they met the following predetermined criteria: (a) completion of the previous study, (b) had at least 5 years of experience as a school nurse in a secondary school setting, and (c) managed at least one concussion case at the secondary school in the past year. The CQR method relies on reaching saturation of the data (typically after 10–15 participants), meaning that no new information is being attained (Hill et al., 2005). For this study, we deemed data saturated after the completion of 22 participant interviews (females = 22; mean age = 53.0 ± 6.2 years). We assigned each participant a pseudonym to maintain anonymity (Table 1). This study was approved by the university institutional review board. Both written and verbal consent were obtained prior to each interview.

**Table 1.** Participant Demographics ( $n = 22$ ).

Participant pseudonym	State	Years experience as a school nurse	Type of secondary school
Betsy	Minnesota	7	Public school
Ellie	Colorado	7	Public school
Breanne	Nebraska	8	Public school
Brittney	North Carolina	8	Public school
Megan	Pennsylvania	9	Private charter school
Jessica	Colorado	9.5	Public school
Allison	Ohio	10	Public school
Angie	Massachusetts	10	Public school
Chelsea	Pennsylvania	10	Public school
Corey	Minnesota	11	Public school
Audra	Illinois	12	Public school
Taylor	Kansas	15	Parochial school
Elaine	Texas	17	Public school
Lisa	Oregon	17	Public school
Annette	Pennsylvania	18	Public school
Stacy	Montana	18	Public school
Erica	California	19	Public school
Tracy	North Carolina	19	Public school
Ashley	Hawaii	20	Parochial school
Carly	Texas	20	Public school
Abby	California	23	Public school
Kelsey	Kansas	30	Public school

### Instrumentation

This study used a semistructured interview protocol (Table 2), which included nine open-ended questions and probing questions allowing the investigator to dive deeper into the specific subject matter, if needed. After the interview protocol was developed, the principal investigator conducted two pilot interviews with school nurses who met the predetermined criteria but were not participants of the study. The pilot interviews allowed the research team to restructure the questions for clarity or specificity as needed. Based on feedback following the pilot interviews, no changes were made to the interview protocol.

### Procedures

The principal investigator sent an initial e-mail to potential participants which included the purpose of the study, contact information, and a request to participate in the study. A phone interview was scheduled after the participant identified interest in participating in the study and consent was obtained. Phone interviews were used as the primary data collection method due to the geographical

diversity of the participants. In addition, all participants were asked to complete a brief demographic questionnaire prior to the interview. The investigation began in August of 2014 and stopped upon saturation of the data, or when no new information was gained from participants (December 2014).

A professional transcription company ([www.dictate2us.com](http://www.dictate2us.com); London, UK) was used to transcribe the recorded audio file of each participant interview. All identifying information was redacted to maintain participant confidentiality. After the transcription was complete, a copy was sent back to the participant for *member-checks*. The member-check process allows the participant to read the transcript and provide any further commentary deemed necessary to communicate their ideas (Hill et al., 1997, 2005). We instructed participants to not make changes to the transcript, but they were allowed to provide additional clarifying information if they felt it necessary.

### Data Analysis

The CQR process utilizes a team approach to analyzing data, which consists of several members. The team approach and model are essential for reducing research bias, as each member brings a different perspective and opinions, which become apparent during the data analysis process (Hill et al., 1997, 2005). The research team included five athletic trainers with varying levels of CQR experience (Table 3). One of the athletic trainers served as an auditor. The auditor plays a critical role in data analysis process checking the work of the other team members and ensuring all viewpoints have been considered as the data are analyzed.

The CQR data analysis process was divided into four stages (Hill et al., 1997, 2005). Once data were collected, researchers read the transcriptions and individually identify key words which are then merged into corresponding themes and categories. At the end of Stage 1, researchers met to create an initial consensus codebook. During Stage 2, research team members individually coded transcripts using the initial consensus codebook created in Stage 1. At the end of Stage 2, the researchers had another meeting to discuss the coded transcripts where any necessary changes could be made to the codebook. Stage 3 involved creating and implementing the final consensus codebook which was used to code all remaining transcripts. During Stage 4, the frequency of participant responses for each category was determined and gathered into one combined document (Hill et al., 1997, 2005).

### Results

Four themes emerged from the interviews analyzed for this study: (a) communication or collaboration,

**Table 2.** Interview Protocol.

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1. Please discuss what, if any, concussion policies and procedures you have in place at your secondary school.
    - a. How do the policies and procedures you have in place at your secondary school reflect your current state law?
  2. After a student–athlete sustains a sport-related concussion, describe a typical scenario of your involvement in the concussion management process from the initial incident to full participation clearance or return-to-play.
    - a. Who do you communicate with when a sport-related concussion occurs?
    - b. What postconcussion education, if any, do you provide for patients?
    - c. What postconcussion education, if any, do you provide for the parents?
  3. Is baseline concussion assessment testing conducted at your secondary school?
    - a. [If “yes”] Could you please explain the process at your secondary school?
      - i. What is your involvement in the process?
      - b. [If “no”] What, if any, are the primary challenges that prevent you from conducting baseline concussion assessment testing at your site.
  4. Please explain any postconcussion assessment testing processes at your secondary school.
    - a. What is your involvement in the process?
  5. Please discuss your level of satisfaction with your involvement in the concussion management procedures and assessment tools that are used at your secondary school?
    - a. What changes, if any, would you make to the current procedures?
    - b. Are there any assessment tools you would like to incorporate but do not have access to? [Note: If yes, assess why they do not have access]
  6. After a student–athlete sustains a concussion, what other health-care providers do you collaborate with in terms of concussion management?
    - a. Are there any particular factors or symptoms that a patient may present that would lead you to refer to this individual?
    - b. What do you think their role should be in concussion management?
  7. After a student–athlete sustains a concussion, what other school personnel do you collaborate with in terms of concussion management?
    - a. What leads you to involve this individual?
    - b. What do you think their role should be in concussion management?
  8. Please discuss the challenges, if any, you have had with the concussion management procedures at your secondary school.
  9. What resources do you feel are or would be useful for enhancing concussion management and referral in the field of nursing?
    - a. Are there any educational techniques you think would be useful to help educate or reinforce the importance of concussion management to school nurses?
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(b) policies and procedures, (c) perceptions and satisfaction, and (d) challenges. This study focuses on the theme of challenges perceived by school nurses in their concussion management role, which was broken down into five corresponding categories including: (a) knowledge levels, (b) support, (c) policy, (d) resources, and (e) community health-care providers. The participant frequency counts for each category are displayed in Table 4.

### Knowledge Levels

Several participants described an overall lack of knowledge among stakeholders in their school systems, communities, and even with parents as a challenge in the concussion management process. Lisa noted the lack of knowledge from the parents at her site, rather than school staff, as more challenging. She commented,

Parents I think are the ones that I probably struggle the most with because they’re concerned about playing time and someone taking their kid’s spot and whether their kid gets their spot back once they’re back. And I get that more from parents than coaches. I don’t really get that

from coaches too much. A lot of our parents for that generation think that it’s “just a ding” on the head and they got to just push through it and they don’t really understand or buy in yet with resting.

The lack of knowledge can also become a problem when the school nurse is trying to implement concussion management procedures in the secondary school. Audra shared her struggle with educating school staff by discussing,

I’ve called the BrainSTEPS program managers and it would be nice if they would provide maybe like a summer staff development program for teachers to make them, you know, have a little bit better understanding of how a concussion will affect a student’s academics. I think sometimes the teachers don’t quite understand that.

Elaine has also experienced this challenge. While she felt it has improved, the lack of concussion knowledge is still a concern. She noted,

The concussion education has gotten so much better. There can be some teachers that maybe don’t still quite

**Table 3.** Roles and Experiences of the Research Team.

	Researcher no. 1	Researcher no. 2	Researcher no. 3	Researcher no. 4	Researcher no. 5
Study role	Principal investigator, research team member	Research team member	Research team member	Research team member	Research team member, internal auditor
Qualitative experience	Experienced qualitative researcher with an extensive background in CQR	Experienced researcher with previous experience in CQR	Novice qualitative researcher new to the CQR approach	Experienced researcher with previous experience in CQR	Experienced researcher with previous experience in CQR
Concussion experience	Research experience on the topic of concussion	Research experience on the topic of concussion	Moderately familiar with the concepts of concussion	Research experience on the topic of concussion	Research expertise on the topic of concussion

Note. CQR = consensual qualitative research.

**Table 4.** Participant Cases by Category.

Category	Frequency	Number of participant cases
Knowledge levels	Typical	17
Support	Typical	19
Policy	Typical	13
Resources	Typical	19
Community health-care providers	Typical	14

get it, even though that has come a long way in these 3 or 4 years since the concussion law.

### Support

The second primary challenge reported by school nurses was in regard to the concussion management team. A lack of support, from both school staff and parents, was identified as a significant challenge in regard to managing students with concussion. In some school settings, the lack of support stemmed from an absence of understanding skills and roles of the school nurse in the concussion management process which Ellie identified as her biggest challenge. She felt she must prove that she is a valid resource and feels a policy dictating a specific role for school nurses would be helpful.

I have been trying to prove myself as a resource for the coaches, administrators, athletic trainers, and physicians. Unfortunately, unless a policy and procedure is developed demanding the involvement of the credentialed school nurse, I believe that being invited to be involved will be determined by the individual coaches having the belief that their specific nurse is a valid resource to them.

Audra also noted the high levels of support necessary for successful implementation of academic adjustments. These two processes require significant support from teachers and school staff but as Audra states, not every teacher is supportive.

We've sometimes had difficulty with teachers understanding that, you know, yeah you need to honor accommodations and you need to understand that if it says a student must not do homework, cannot take tests, that that is real. So sometimes the principal has had to step in. I mean it's not been anything major, it's just that's an administrative thing that they can discuss with the teachers

### Policy

Participants often perceived difficulty regarding policy at the school and state (law) level, which they believed impact the school nurses' ability to provide care. Breanne shared how the law within her state delineates care for those with a sport-related concussion, however neglects those with injury outside of sport. She stated,

That only goes for sport sponsor or athletics or school sponsored activities. If it happens like they were in a car accident or skateboarding or snowboarding, then there is no state law that states that they have to—they cannot go back to school or anything like that.

Lisa identified similar challenges with inconsistencies of concussion management with sport-related and non-sport-related concussion management stating,

I think I would like just one track—there's an athlete track and there's a non-athlete track. I wish there was just one track. I'm not sure why there is except that the athletic trainers wrote the guideline because some

students, they may have their concussion in the fall, when they're not in a sport but in the spring they are an athlete.

Often a lack of policy at the secondary school setting provided challenges as Taylor identified.

The [school] nurses at my school would assess the child and then they send a note home with the kid saying, you know, Johnny was hurt in school today, please watch for these things tonight and so I (as the head nurse) wasn't satisfied with that. And so I created a new policy/procedure to ensure that we were all checking for the same things. So now I would say I'm very satisfied now but be—but I did make these changes.

## Resources

The challenges identified regarding resources in the concussion management process concerned a lack of tools such as computerized neurocognitive assessment testing or educational resources. Taylor identified a lack of concussion assessments specifically geared toward school nurses as a challenge in her initial concussion evaluation process.

Well, more appropriate check lists for the school nurse. Like I said, right now it's like the focus is mostly on—if it happens on the field. I'd like to see more tools for head injuries that occur during the school day, like in the gym for instance. So—so a tool to help you diagnose, do I send this kid home, do I just watch him for two hours, that kind of thing.

Carly noted a challenge with the lack of resources pertaining to her school's lack of personnel and the gap in coverage and care it presented.

You have an athletic trainer often on site, at least for 9th through 12th. Middle school, I think, it's a little trickier, because we don't have an athletic trainer. We're not a huge school system, so we do not have that—the services of an athletic trainer on site for those games and practices.

The lack of resources does not always pertain to the school, Lisa noticed a lack of resources with her families and the effect it was having on the students.

If—if they come back to school maybe for too long during the day or maybe they come back too soon, sometimes it's a parent issue as being that work, the parents, you know, it's like I've had a day off, I got to go back to work so he has to go to school. Where in the ideal world,

they might have stayed home in a couple extra days or come back two hours a day for the first week or something that sometimes with parent schedules, you know, they're just like, well, he's going to have to come to school because I got to go to work.

## Community Health-Care Providers

School nurses identified a general lack of knowledge regarding concussion and inconsistency in recommended treatments within their community health-care providers. Angie noticed a significant gap regarding concussion management procedures.

I think some of them are more knowledgeable about concussion management than others and we've had—we don't have any uniformity among the providers—the healthcare providers in the community. I mean we have one family-care practice that's got five or six doctors at it, some of them are DO, some are MD, and nurse practitioners, but there's no uniformity among how they handle it. Some of them have just sent a note saying stay out for a week, one has said well keep him out so his ImPACT test improves. So that makes it difficult for the school and when that happens all I can do is share. I—I keep doing the testing, but sometimes it doesn't make any difference if the—if their physician isn't following up with them.

Similarly, Carly noticed significant inconsistencies in the treatment plans and medical advice of different health-care providers in her community.

So I think that, and I think maybe I would really like to see that post—that release come from a doctor that's—or healthcare provider, nurse practitioner, PA—that has some certification or class—some—some kind of licensure where they've done a course on concussions. So it's not just the family doc that's been into practice 30 years or 15 years or—I just feel like the need to be uniformity in their educational background and understanding of what the newer concussion guidelines are telling us what we need to do for our kids, to save those brain cells. So that's a frustration.

Participants also noted a possible connection between concussion management approaches among health-care providers in their communities and their lack of contemporary knowledge regarding concussion management best practices. Breanne said, “So, I think some of our more seasoned doctors just don't understand the new knowledge, and they're kind of old school and it kind of makes it frustrating sometimes.” Allison noticed a similar situation in her community but noted some

success with mid-level providers such as nurse practitioners and physician assistants,

it's just people, if they—when they get stuck—they've always done it this way, it's just the way—you know, those sort of things, but I find that the mid-levels, we seem to have a little bit more responsiveness with them.

## Discussion

Participants in our study identified several challenges that interfere with their ability to function in their role as a member of the concussion management team. Specifically, school nurses identified educational deficits, a lack of support, policy, and resources, and a lack of community resources for referral. While each of their specific experiences was different, participants generally identified the same challenges, showing that these are consistent across concussion management in the secondary school setting.

### *Challenges With Levels of Education*

Our findings indicate that while concussion education has made significant strides in the last few years, improvements are still needed. Efforts should be focused on educating student-athletes, parents, school staff, and personnel, particularly in areas with less access to community resources (Welch Bacon, Cohen, Kay, Tierney, & Valovich McLeod, 2018). In a recent study, Welch Bacon et al. (2018) found that athletic trainers reported similar challenges with a lack of education from coaches and parents, which hindered their ability to properly manage concussions at the secondary school level. Educational materials should be improved for student-athletes and created specifically for students who are not athletes but may be suffering from a concussion. The incorporation of nonathlete specific education and other clinical resources (i.e., symptom checklists and evaluation tools) that can be used both on and off the sidelines would allow school nurses to make use of these resources and provide better care for all students throughout the school day (Sleight, Valovich McLeod, Kay, Erickson, & Welch, 2015).

A large focus on concussion education should also be directed toward those in the medical community, specifically in regard to standardization of care (Feddermann-Demont, Straumann, & Dvorak, 2014; Valovich McLeod, Houston, & Welch, 2015). Previous research suggests that not all pediatric providers are using the guidelines and statements put forth by national organizations, such as the National Athletic Trainers' Association and the American Academy of Neurology, to guide their practice and management of concussion

(Welch Bacon et al., 2018). If consistent recommendations are not provided by community providers, it may lead to confusion for student-athletes, parents, and other members of the concussion management team. In addition, it may also lead to negative outcomes associated with returning to play prior to full recovery (Welch Bacon et al., 2018). Welch Bacon et al. (2018) reported that athletic trainers also had significant challenges with the education levels of community health-care providers. While several studies have focused on concussion knowledge among various stakeholder groups (Carl & Kinselle, 2014; Gourley, Valovich McLeod, & Bay, 2010; Mrazik, Bawani, & Krol, 2011; Pleacher & Dexter, 2006; Register-Mihalik et al., 2013; Stoller et al., 2014; White et al., 2014; Zonfrillo et al., 2012), misconceptions about concussion still exist. The lack of education from parents and coaches combined with a lack of education from the community health-care provider prove difficult to create a common understanding of the concussion management plan across all members of the concussion management team (Welch Bacon et al., 2018).

Results from our study indicate the need for consistent and continual concussion education across all members of the concussion management team including all health-care providers such as physicians, school nurses, and athletic trainers. As new research emerges, these individuals should remain up-to-date on current recommendations and best practice guidelines as well as ensure their school policies reflect the updates (Welch Bacon et al., 2018).

### *Challenges With Support and Policy*

A very important aspect of concussion management at the secondary school level is support which is heavily influenced by the presence of a concussion management policy (Bompadre et al., 2014; Valovich McLeod et al., 2015). In a study by Kasamatsu et al. (2016b), it was found that 87% of athletic trainers had a written concussion management policy, and at least 91% of those with a written concussion management policy indicated the plan included concussion background information, initial treatment, and return to play guidelines. Although athletic trainers indicated a large portion of recommended topics were included in their concussion policy, it is not all inclusive. Kasamatsu, Cleary, Bennett, Howard, and Valovich McLeod (2016a) also outlined that athletic trainers who were paid directly by the school or district, hired as full time, and had evaluated concussions annually were strong predictors if a concussion policy was present at their site. Among school nurses, Mummert et al. (2014) reported that 54% of school nurses indicated their school had a concussion policy in place, but only 36% had an actual role in the

policy. A strong, well-defined policy will help frame individual roles and responsibilities for concussion management team members, as well outline how resources should be allocated (Bompadre et al., 2014). Furthermore, a concussion policy should outline specific roles and responsibilities for the school nurse as part of the concussion management team as well as care for both students and student-athletes (McGrath, 2010; Rains & Robinson, 2010).

Recent research has found that despite having a school policy, the school nurse often had minimal to no role (Heyer, Weber, Rose, Perkins, & Schmittauer, 2015; Mummert et al., 2014). In one study, principals noted school nurses were involved in 37% of sports-related concussion cases; however, this number increased for school nurse involvement to 43% of the time in non-sport-related concussions cases (Heyer et al., 2015). In some cases, school nurse involvement may be limited due to the fact that secondary schools only have a return-to-play policy and do not have any type of return-to-learn plan or policy. Kasamatsu et al. (2016a) reported only 44% of athletic trainers surveyed had a return-to-learn policy; in another sample, Lyons et al. (2017) reported only 12% of schools had a return-to-learn policy. This suggests a potential void for the school nurse to fill as previous research has found athletic trainers experience challenges, specifically with communication, with implementing a return-to-learn program in the secondary school setting (Sleight et al., 2015). Often in the secondary school settings, the athletic trainer does not arrive on campus until the afternoon, making communication with school personnel during the school day difficult. School nurses are often on campus during the school day, which puts them in a position to more effectively communicate with school personnel on a regular basis (Rains & Robinson, 2010). Providing clearly defined roles and responsibilities for all concussion management team members can help foster, facilitate, and support this vital relationship, improving the concussion management process for all involved (Rains & Robinson, 2010).

Gioia, Glang, Hooper, and Brown (2016) outline five components to build effective mechanisms for student support, which should be incorporated throughout concussion policies and procedures. The first component recommended is that of an interdisciplinary team, which should be comprised of both school and medical personnel along with the patient's family. Within the interdisciplinary team, roles of individuals should be outlined (Gioia, 2016; Halstead et al., 2013; Welch Bacon et al., 2017). The second component outlined is professional development (Gioia et al., 2016). Professional development should be administered to help educate individuals surrounding the injury, including but not limited to, both the school and medical communities. Incorporating a professional development plan into the concussion

management policy may help reduce challenges that have been previously reported (Welch Bacon et al., 2018).

In addition to an interdisciplinary concussion management team and a professional development plan, secondary school concussion policies should also outline identification, assessment, and monitoring processes for concussed students within the school (Gioia et al., 2016). Within this process, various potential *triggers* or symptom exacerbations should be noted (Gioia, 2016). Furthermore, the use of standardized forms should be implemented to ease communication between the management team and teachers. These forms can help identify potential symptoms that may be exacerbated within the classroom, and ways teachers can help mitigate them (Gioia, 2016). The fourth component compasses creating "academic, physical, and emotional interventions" (Gioia et al., 2016, p. 402). This portion of a return-to-learn is essential to best manage those with deficiencies in these areas following a concussion. Lastly, the fifth component includes coordinated medical-to-school communication (Gioia, 2016; Gioia et al., 2016). Regular communication between the interdisciplinary team can ensure all members are making a coordinated effort for the patient (Welch Bacon et al., 2017).

### *Challenges With Resources*

Lack of resources and support at the secondary school level can be a byproduct of knowledge, education, or policies. A lack of concussion education may prevent an administrator or school staff member from seeing a need for a particular resource, whereas a lack of policy may hinder a school from utilizing all of its potential resources. Participants identified the lack of personnel, specifically an athletic trainer, as a challenge and hindrance in the concussion management process. It has been reported that only 41.6% of school nurses have an established relationship with an athletic trainer (Mummert et al., 2014). While the knowledge and expertise of these two health-care professionals overlaps in some respects, the school nurse can use their position within the school to coordinate the students' return-to-learn process, while the athletic trainer may collaborate with the school nurse in managing the return-to-play process after full return-to-learn has occurred (Rains & Robinson, 2010).

Participants also noted a lack of education and understanding with their specific role as a school nurse. Previous research has identified that each health-care professional has a separate and specific role that when combined, provide a complete concussion management process for patients (Williams & Valovich McLeod, 2015). Some participants stated that they were not a part of their concussion management process because



the personnel at their school failed to realize their skills and potential significant role in the concussion management team. This indicates a lack of health-care provider education on the respective expertise of their concussion management team members. Recent research on the school nurses' role in concussion management outlines strategies specific to school nurses, and can provide education from a nursing perspective on academic accommodations, and working with the concussion management team (McGrath, 2010; Melander & Ceynar Moen, 2014; Rains & Robinson, 2010; Weber et al., 2015; Wing, Amanullah, Jacobs, Clark, & Merritt, 2016).

In regard to educational resources for their parents and students, participants expressed the desire for more information specifically outlining the concussion process; however, several of these items are, in fact, available. The Centers for Disease Control and Prevention has developed educational materials, which are useful to educate children, parents, and the concussion management team. The Heads Up Concussion Program (<http://www.cdc.gov/headsup/youthsports>) also produces useful educational material that is helpful for educating athletes especially. This is just one of the many resources available to school nurses. In addition, depending on the state's concussion law, educational resources may be available at the state level, such as the Zackery Lystedt Foundation in Washington (Bompadre et al., 2014). There are also best practice guidelines that could be used to develop a respective school's own educational materials by outlining management of a sport-related concussion, strategies for care, members of the concussion management team, and steps and guidelines for recovery (Kirkwood, Randolph, & Yeates, 2009).

### *Challenges Concerning Community Health-Care Providers*

A very prominent theme regarding challenges perceived by school nurses was a lack of education and consistent training with other health-care providers in the community (Pleacher & Dexter, 2006; Zemek et al., 2015). More than one participant spoke of health-care providers, specifically physicians, returning students to school or sports while the student was still symptomatic. This finding is consistent with previous literature suggesting that cognitive rest is not routinely prescribed among physicians (Arbogast et al., 2013; Carson et al., 2014; Upchurch, Morgan, Umfress, Yang, & Riederer, 2015). Returning a student-athlete prematurely to sport while symptomatic can lead to lengthening the amount of time the patient remains symptomatic and increase the risk for second impact syndrome (Cantu & Voy, 1995; Saunders & Harbaugh, 1984).

Another challenge noted regarding community health-care providers was a lack of communication.

A recent study noted that less than 42% of the school nurses surveyed had been contacted by a community health-care provider in the last 12 months to coordinate concussion care for a student (Wing et al., 2016). Apart from a lack of communication, participants also expressed a variety of diagnostic and management criteria. Participants spoke of students discharged from the emergency department without a diagnosis of concussion because they did not experience a loss of consciousness. While loss of consciousness was once a diagnostic standard, this has since changed and a loss of consciousness is no longer required for concussion diagnosis, and even more so, has no bearing on the timeline of recovery (McCroory et al., 2017).

One study examined ways individuals from one state have helped to decrease challenges faced with meeting state concussion law requirements (Doucette, Bulzacchelli, Gillum, & Whitehill, 2016). Findings revealed eight emergent themes that helped secondary school personnel minimize challenges regarding state concussion law requirements: (a) utilization of neurocognitive baseline assessment testing, (b) authority of athletic trainers in removal from play and return-to-play decision-making, (c) concussion education decisions, (d) use of an online documentation system, (e) onsite medical professional collaboration (athletic trainer and school nurse), (f) implementing a mandatory 5-day rest period, (g) establishing a written policy for academic adjustments following a concussion, and (h) independent physician use in diagnosis and return-to-play decisions (Doucette et al., 2016). While these findings are limited to one state, these experiences can help make policy makers aware of potential strategies to help decrease challenges faced in policy creation and implementation.

Results from the current study highlight the need for school nurses to be in consistent contact with the community health-care providers who routinely diagnose and manage their student's concussions, allowing them a role in the concussion management team (Williams & Valovich McLeod, 2015). If a student-athlete under the school nurses' care chooses to seek care from a physician outside of the school nurses' familiar provider list, the school nurse and physician should collaborate to better care for that student-athlete. This education and communication challenge is not unique to school nurses but also from the perspective of athletic trainers (Welch Bacon et al., 2018). The concussion management team must function as one entity. If the members are providing inconsistent recommendations, it may lead to confusion for parents and students alike, ultimately decreasing the quality of care.

### *Limitations and Future Directions*

The participating school nurses were chosen randomly from a sample of school nurses who had completed a

previous study regarding their familiarity with academic accommodations following a concussion (Weber et al., 2015). Although these school nurses had participated in the previous study, their survey results were not considered, due to the anonymity of the data. Future research regarding the roles of the other members of the concussion management team would be useful in guiding suggestions for a complete, collaborative concussion management process at the secondary school level.

## Conclusions

The findings of this study indicate that a lack of education at all levels in concussion management is a significant challenge for the school nurse practicing at the secondary school setting. Concussion education should be advocated for a variety of persons including school personnel, coaches, parents, and students, but most of all concussion education needs to be aimed at health-care providers, especially regarding implications for current practice. As well as education, concussion management policies should also be in place at every secondary school. These policies should develop specific outlines describing the concussion management process, personnel involved, and specific roles of all members of the concussion management team. Potential personnel involved may include administrators, teachers, counselors, the school nurse, and athletic trainer. School medical personnel should reach out to their community health-care providers to make an attempt to collaborate on concussion management protocols allowing for more consistent recommendations and plans ultimately improving patient care.

Our results suggest many areas for improvement within current practice. Consistent education and training for all future medical providers should be drafted and implemented, along with required continuing education courses for providers already in practice to enhance continuity of care. A specific, well-defined concussion management policy should be developed outlining roles and responsibilities of all team members to promote efficient and effective care for students and student-athletes suffering from concussion.

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