
Trust, Conflicts of Interest, and Concussion Reporting in College Football Players

Christine M. Baugh, Emily Kroshus, William P. Meehan, and Eric G. Campbell

Introduction

A small but growing body of literature suggests that sports medicine clinicians often face external pressures and experience conflicts of interest providing medical care to athletes.¹ In an empirical study of college sports medicine clinicians, over half of responding health care providers reported experiencing pressure to prematurely return athletes to play following an injury.² Critically, those who reported administratively to the athletic department experienced significantly more pressure than their counterparts who reported to a medical institution.³ In response, the National Collegiate Athletic Association (NCAA) member schools voted to adopt legislation that aims to limit structural conflicts of interest.⁴ Specifically, this legislation requires that the administrative structure of the sports medicine department “affirms the unchallengeable autonomous authority of the primary athletics health care providers.”⁵ However, a recent

survey by the National Athletic Trainers’ Association found that less than half of responding clinicians feel that they have medical autonomy and more than half have been pressured to make a medical decision that was not in the best interests of their patient.⁶

“A conflict of interest is a set of circumstances that creates a risk that professional judgment or actions regarding a primary interest will be unduly influenced by a secondary interest.”⁷ In the case of college sports medicine providers, the primary interest is the athlete’s health. Secondary interests that may eclipse the primary interest include: professional advancement or job security. These secondary interests are not inherently “bad,” but rather they become problematic when they are allowed to outweigh the primary interest. The conflict can be resultant from structural features within the environment and may exist regardless of whether an individual is actually influenced by a secondary interest.⁸ For example, in the college sports

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medicine environment, being employed within the athletic department and having direct administrative reporting to the athletic director or a team head coach could create a conflict of interest for a sports medicine clinician, even if the clinician does not alter the course of care as a result. In this example, the conflict exists because the employment structure increases the risk of the clinician being unduly influenced.

Conflicts of interest may alter athletes' trust in their clinicians and their willingness to seek medical care for concussions or other injuries. A substantial literature suggests that concussions frequently go unreported and untreated.⁹ Across this body of research what is emergent is the central importance of perceived behavioral outcomes on behavior. These include outcomes such as the likelihood of experiencing additional harm if a concussion is not reported,¹⁰

and plays an important role in influencing health behaviors and health outcomes.¹⁵ Where patient-clinician trust may drive decision making in the general medical environment, trust in other actors such as a team coach, team owner, agent, or athletic director could also influence athlete health-related decision making in the sports medicine environment. Given the many stakeholders in the athletic environment, it is important to understand whether trusting relationships outside of the traditional patient-clinician dyad is associated with injury reporting in the athletics context. In the case of college athletes, two main non-clinician stakeholders that could be seen as having an influence on athletes' health related decision-making are the athlete's coach and the school's athletic department, which often serves as a supervisory structure for both the coach and the clinician.

In this study, we examined college football athletes' perceptions of trust in their relationship with their sports medicine clinician, coach, and athletic department as well as athletes' perceptions/knowledge of conflicts of interest among those same stakeholders. We evaluated whether trust or perceived conflicts of interest varied by year in school and whether there was an association between trust, conflicts of interests, and athletes' intention to report a concussion to a medical provider or their history of returning to play with symptoms of a possible concussion.

the impact of reporting on playing time and other athletic outcomes,¹¹ and the informal social sanctions for violating what they perceive as team, gender, or position-based norms.¹² Consistent with this working model for under-reporting, athletes' trust in their clinicians or their perceptions regarding clinician conflicts of interest may theoretically influence their willingness to report a concussion by influencing athletes' perceptions of the costs of their reporting behavior. While this has not as yet been examined empirically with respect to concussion, the broader medical literature has recognized the importance of trust in an effective patient-clinician relationship.¹³ Further, empirical evidence demonstrates that a patients' trust in their clinicians is associated with their health behaviors and health outcomes.¹⁴ Is the same true in the context of college athletics?

Traditionally trust and conflicts of interest have been evaluated in the patient-physician dyad; however, broader considerations may be needed in the athletics environment. Trust, more than its correlates satisfaction or communication, is central to the patient-clini-

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Methods

NCAA Division I Football Championship Series (FCS) athletes were recruited to participate in this research study. Recruitment was conducted by contacting athletic trainers from ten teams that had participated in a previous survey-based research study during the fall 2013 football season.¹⁶ Nine of ten teams contacted agreed to participate in 2014. All surveys were administered using pen and paper, in-person, in a group setting at the athletes' home institution, by the

same member of the research team. Athletes were assured that their individual answers would remain confidential and that they would not be shared with their coaches or athletic trainers. If present during survey completion, coaches or athletic trainers were positioned such that they would be unable see athlete responses. All survey responses were entered into an electronic database. Ten percent of the data was randomly selected and entered by a second coder to assess data entry error which was found to be <0.01%. All research activities were approved by the Institutional Review Board at Boston University Medical Center Institutional Review Board and the Institutional Review Board at Boston Children's Hospital.

Measures

TRUST

Athletes were presented with the statement "I trust that my [referent] has my best interests in mind," and asked to rank how strongly they agreed on a seven-point Likert scale (1=strongly disagree, 7=strongly agree). Referents queried were: "sports medicine clinician (athletic trainer or physician)," "coach," "school's athletic department." The responses to the three trust questions were summed to create a composite trust sum variable (range 3-21). Chronbach's alpha=0.785.

PERCEIVED CONFLICTS OF INTEREST

Athletes were presented with the statement "Sometimes I feel like my [referent] puts his/her interests ahead of mine," and were asked to rank how strongly they agreed on a seven-point Likert scale (1=strongly disagree, 7=strongly agree). Referents included were: "sports medicine clinician (athletic trainer or physician)," "coach," "school's athletic department." The three perceived conflict of interest questions were summed to create a composite conflict of interest sum score (range 3-21). Chronbach's alpha=0.801.

INTENTION

On a seven-point Likert scale, athletes were asked to rank how strongly they agreed with the following statement, "I intend to report my concussion symptoms." Given the distribution of responses, this was collapsed into a binary variable with responses of 5, 6, and 7 indicating intention to report and responses 1-4 indicating lack of intention to report.

RETURNING TO PLAY WHILE SYMPTOMATIC

Athletes were provided with a list of concussion symptoms from the Sport Concussion Assessment Tool (SCAT) 3rd Edition¹⁷ and then asked to write-in their response to the following question: "During the previous football season, how many times did you con-

tinue to play (or return to play) in a game or practice while experiencing any of those symptoms after a hit?" Given the non-specific nature of many concussion symptoms, such as those listed on the SCAT, the phrase "after a hit" was included in order to minimize the inclusion of symptoms resultant from non-impact etiologies.

DEMOGRAPHICS

Athletes were asked to indicate their race and ethnicity by selecting all that applied from a list of options. Given literature substantiating differences in white- and non-white patient's trust in clinicians,¹⁸ this was collapsed into a binary variable indicating athletes who did or did not identify as White or Caucasian. They were also asked to indicate their year in school.

Statistical Analysis

One-way analysis of variance (ANOVA) was used to examine whether differences in athletes' trust in clinicians, coaches, and their athletic department were significantly different by their year in school or by their race. Athletes' perceptions about referents' conflicts of interest were similarly assessed. Following a significant F-test, a Tukey post-hoc test was used to determine differences between specific years in school. To assess whether trust or perceived conflicts were associated with an athlete's intention to report a concussion, a logistic regression was used with the binary intention variable on the left-hand side and trust and conflict sum scores on the right, controlling for year in school and race. The same procedure was used to assess athletes' returning to play while symptomatic on the left-hand side. Analyses were performed in SPSS version 20 and R version 3.5.1.

Results

In total, 817 athletes representing nine teams in the NCAA Division I FCS participated in the survey. The sample included 239 freshmen, 196 sophomores, 170 juniors, 142 seniors, and 67 fifth-year athletes. The majority of athletes trust that their sports medicine clinician (85%), coach (79%), and athletic department (75%) have their best interests in mind. The minority of athletes indicated that they felt that their clinician (21%), coach (21%), or athletic department (20%) sometimes put their own interests ahead of the athletes' interests Table 1.

Trust and perceived conflict of interest varied by athletes' year in school (Table 2). Significant differences by year in school were found across all referents and in the trust sum score (all $p < 0.001$). In all cases, post-hoc tests revealed that freshmen indicated greater trust than most, or all, of their upperclassmen team-

mates (Table 3). There were significant differences in perceived conflicts of interest for each referent and the sum score between athletes of different years in school (all $p < 0.001$). Based on post-hoc tests, freshmen, in all cases, indicated significantly lower perceived conflicts of interest than their upperclassmen peers.

Although previous medical literature outside of athletics suggested that white patients reported significantly higher levels of trust in their physician than their non-white counterparts,¹⁹ there were no significant differences in reported trust in any referent between white and non-white athletes in this cohort.

Athletes who had greater trust in their clinicians, coaches, and athletic department had higher odds of intending to report a concussion. Conversely, those who perceived greater conflicts of interest in their environment had greater odds of returning to play while experiencing concussion symptoms (Table 4).

Discussion

Both trust in and conflicts of interest of stakeholders in the college sports medicine environment are associated with athletes' care-seeking following concussion. Importantly, the vast majority of athletes both overall and within each class year trusted their sports medicine clinician, coach, and athletic department and the minority of athletes perceived conflicts of interest in their sports medicine clinician, coach, and athletic department. Both trust and perceived conflicts of interest varied systematically by athletes' year in school.

In the broader medical literature, trust in the patient-clinician relationship has been established as

Table 1

Football players' trust in stakeholders in their athletic environment and football players' perceptions regarding conflicts of interest of stakeholders in their athletic environment

	% Agree	Mean (SD)
Trust in sports medicine clinician	85.47	5.91 (1.37)
Trust in coach	79.41	5.61 (1.38)
Trust in athletic department	75.00	5.44 (1.42)
Sports medicine clinician perceived COI	21.18	3.01 (1.81)
Coach perceived COI	21.28	3.10 (1.72)
Athletic department perceived COI	20.15	3.21 (1.71)

% Agree represents all athletes that answered slightly agree, agree, or strongly agree
 All questions were answered on a seven-point Likert scale with 1=strongly disagree and 7=strongly agree

an important predictor of health behaviors.²⁰ In the present study, we conceptualized trust in the college sports medicine setting as being inclusive of multiple stakeholders. Increased overall trust was significantly associated with increased concussion reporting intention, an important predictor of concussion reporting behavior.²¹ It should be noted that while the association was statistically significant, the practical implications of a 5-10% increase in the odds of reporting

Table 2

Variation in athletes' trust in stakeholders in the athletics environment by year in school

	Mean (SD)					F	p
	Freshmen	Sophomores	Juniors	Seniors	5th Year		
Trust in sports medicine clinician	6.25 (1.04)*	5.76 (1.39)	5.53 (1.61)	6.09 (1.30)	5.79 (1.57)	8.39	<0.001
Trust in coach	6.06 (1.06)**	5.61 (1.31)	5.15 (1.50)	5.58 (1.47)	5.36 (1.66)	12.08	<0.001
Trust in athletic department	5.91 (1.15)**	5.34 (1.39)	5.11 (1.42)	5.34 (1.56)	5.13 (1.63)	10.49	<0.001
Trust sum	18.21 (2.68)**	16.72 (3.43)	15.76 (3.71)	17.00 (3.54)	16.28 (4.18)	14.35	<0.001

F-statistic and p-value based on a one-way ANOVA.

*Significant differences based on tukey post-hoc tests: (Freshmen>Sophomores, Juniors)

**Significant differences based on tukey post-hoc tests: (Freshmen>Sophomores, Juniors, Seniors, Fifth-years)

Table 3

Variation in athletes' perceptions of conflicts of interest of stakeholders in the athletics environment by year in school

	Mean (SD)					F	p
	Freshmen	Sophomores	Juniors	Seniors	5th Year		
Sports medicine perceived COI	2.55 (1.68)*	3.15 (1.83)	3.37 (1.76)	2.98 (1.84)	3.36 (1.96)	6.56	<0.001
Coach perceived COI	2.60 (1.65)**	3.30 (1.72)	3.45 (1.66)	3.13 (1.70)	3.39 (1.84)	8.19	<0.001
Athletic dept. perceived COI	2.68 (1.67)**	3.44 (1.65)	3.58 (1.57)	3.24 (1.78)	3.46 (1.81)	9.23	<0.001
COI sum	7.82 (4.45)**	9.90 (4.23)	10.39 (3.96)	9.38 (4.41)	10.19 (4.91)	11.23	<0.001

F-statistic and p-value based on a one-way ANOVA.

*Significant differences based on tukey post-hoc tests: (Freshmen<Sophomores, Juniors, Fifth-years)

**Significant differences based on tukey post-hoc tests: (Freshmen>Sophomores, Juniors, Seniors, Fifth-years)

Table 4

Relationship between Trust, Perceived Conflicts of Interest, Concussion Reporting Intention, and Returning to Play while Experiencing Symptoms of a Concussion

	Intention to Report Concussion	Return to Play with Concussion Symptoms
Variable	OR (95%CI)	OR (95%CI)
Perceived Conflicts of Interest Sum Score	1.00 (0.96,1.05)	1.05 (1.01,1.10)
Trust in Stakeholders Sum Score	1.10 (1.05,1.16)	1.01 (0.96,1.06)
First-Year Athlete	REF	REF
Second-Year Athlete	1.00 (0.60,1.65)	0.64 (0.42,0.96)
Third-Year Athlete	1.01 (0.60,1.71)	0.93 (0.60,1.42)
Fourth-Year Athlete	0.79 (0.46,1.34)	0.90 (0.58,1.40)
Fifth-Year Athlete	0.79 (0.41,1.56)	0.94 (0.52,1.67)
Race (White)	0.70 (0.48,1.00)	1.44 (1.07,1.94)

Results of logistic regressions examining the relationship between athletes' intention to report a concussion and separately their having returned to play while experiencing concussion symptoms, and their perceived conflicts of interest of and trust in stakeholders in the athletic environment. Regressions controlled for year on the team and race (white v. non-white). 95% confidence intervals that do not include 1.0 are considered significant.

or removing from play are less clear. While we cannot determine the mechanism behind this association, it may be that increased trust in the clinician decreases the athlete's perceived negative consequences of reporting, a factor in theories of health behavior used to model concussion reporting, thereby increasing the intention to report a possible concussion. Furthermore, it was found that trust for other stakeholders was significantly higher in freshmen athletes than it was in upperclassmen. This raises the troubling possibility that during the athlete's collegiate career his trust in others in the athletic environment decreases based on his experiences.

Increasing athletes' trust in clinicians and others influential in their sports medicine care may be an important mechanism to improve concussion reporting. This likely requires taking a systems-level and multi-stakeholder approach to changing institutional culture.²² It is important that all actors provide a clear message of safety in order to improve athletes' trust and ultimately athletes' safety behaviors. Research in the sports medicine context has found that there is variability in concussion education provided to athletes by sports medicine clinicians.²³ Additionally, the extent to which coaches communicate to their athletes in support of concussion safety has been found to vary at the collegiate level.²⁴ Furthermore, athletic departments are often in charge of creating and updating school-wide concussion and other policy, and it has been found that there is differential implementation of concussion management plans across NCAA member institutions.²⁵ In addition to ensuring that consistent formal messaging and policy implementation is consistent with concussion safety, institutions should attend to the informal messaging about what is valued in their environment. Given the multi-stakeholder nature of the sports medicine environment, it is important that all stakeholders provide a clear message of safety in order to improve athletes' trust and ultimately athletes' safety behaviors.

This study provides evidence about athletes' perceptions of conflicts of interest in the sports environment. Previous research has described the pressures on collegiate sports medicine clinicians to prematurely return athletes to play following concussion,²⁶ but the extent to which this conflict was understood or internalized by the athlete was previously unknown. In this study, nearly one in four athletes felt that coaches, clinicians, or their athletic department had conflicts of interest. Higher perceived conflicts of interest were associated with more frequently returning to play while experiencing concussion symptoms. It is possible that athletes who perceive conflicts of interest among stakeholders in their environment view the

perceived outcome of reporting a concussion as more negative than athletes who do not see stakeholders as having conflicts. This, in turn, may influence athletes' willingness to disclose a concussion or to stop playing when experiencing concussion symptoms. Given the cross-sectional nature of this study, the exact mechanism of influence between perceived conflicts of interest and returning to play while symptomatic cannot be causally determined. Interestingly, freshmen athletes perceived fewer conflicts of interest than their upperclassmen counterparts. This is in line with previous research²⁷ that found freshmen perceived more support from their coach for concussion reporting than their upperclassmen teammates. It also supports recent work that suggests football players' willingness to report a concussion or other injury decreases over injuries experienced.²⁸ It is possible that during their college football experience athletes learn that stakeholders have more conflicts than they initially thought and that this influences their willingness to report a concussion across time.

College sports medicine clinicians' experience of pressure to prematurely return athletes to play has been documented,²⁹ but the relationship between clinicians' experience of this pressure and athletes' trust in clinicians or their perceptions of clinicians' conflicts of interest is unknown. It is possible that athletes' perceptions track with clinicians' experiences of conflicts or it may be the case that they are independent. Future research pairing interviews with clinicians about the pressures/conflicts they experience along with surveys of athletes regarding their trust in and perceived conflicts of clinicians and other stakeholders in their athletics environment would help elucidate the relationship between these two phenomena. Conflicts of interest and dual loyalties of team doctors have been described, but this has typically been discussed in the professional sports context.³⁰ The college sports medicine environment is unique for reasons such as age of the athlete population, the lack of direct payment to athletes, the pairing with an educational institution, and the ability to structure clinician employment outside of the athletics realm (e.g., with university health service) and thus warrants more detailed investigation. Conflicts of interest and dual loyalties of college sports medicine clinicians specifically is an important area for future conceptual and empirical research.

Limitations

The study's cross-sectional design limits the ability to draw causal inferences. Future research allowing for the determination of causality is warranted. An additional limitation of the cross-sectional design is that it does not allow for understanding of the mechanisms

influencing the differences in trust and perceived conflicts of interest between athletes of different years in school. Longitudinal research in this area would be beneficial. Furthermore, the convenience sample of Division I football players may be a threat to the external validity and the results are not necessarily generalizable to other sports or level of play within football. We use single measures for trust and perceived conflicts across stakeholders, which may not fully capture the complexity of these concepts. Future research should consider using a multi-dimensional measure of trust and of conflicts of interest.

Conclusion

This study provides critical insight into important issues of clinician-patient trust, conflicts of interest in the sports environment, and their relation to concussion reporting intention and behaviors in college football athletes. The collegiate sports environment is complex, involving multiple stakeholders, varying interests, and the possibility for athletically-incurred injury. Understanding how athletes internalize this environment and the extent to which it is related to their decision to engage in appropriate injury reporting behaviors is critical. This study extends the existing literature on physician-patient trust by finding that athletes who have greater trust with stakeholders in their athletic environment are more likely to intend to report their concussion symptoms and less likely to continue playing while experiencing symptoms of a concussion. Fostering this trust through consistent formal and informal communication in support of concussion safety across stakeholders, may increase concussion reporting intention among athletes. Reducing real or perceived conflicts of interest of stakeholders in the athletic environment may also improve appropriate concussion reporting behaviors among athletes. This study reinforces the important role that all actors in the sports environment can support appropriate injury reporting by collegiate athletes.

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