



# A Systematic Review: Do Concussion Education Protocols Improve Reporting and Return-to-Play Guideline Adherence in Athletes?

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## Purpose

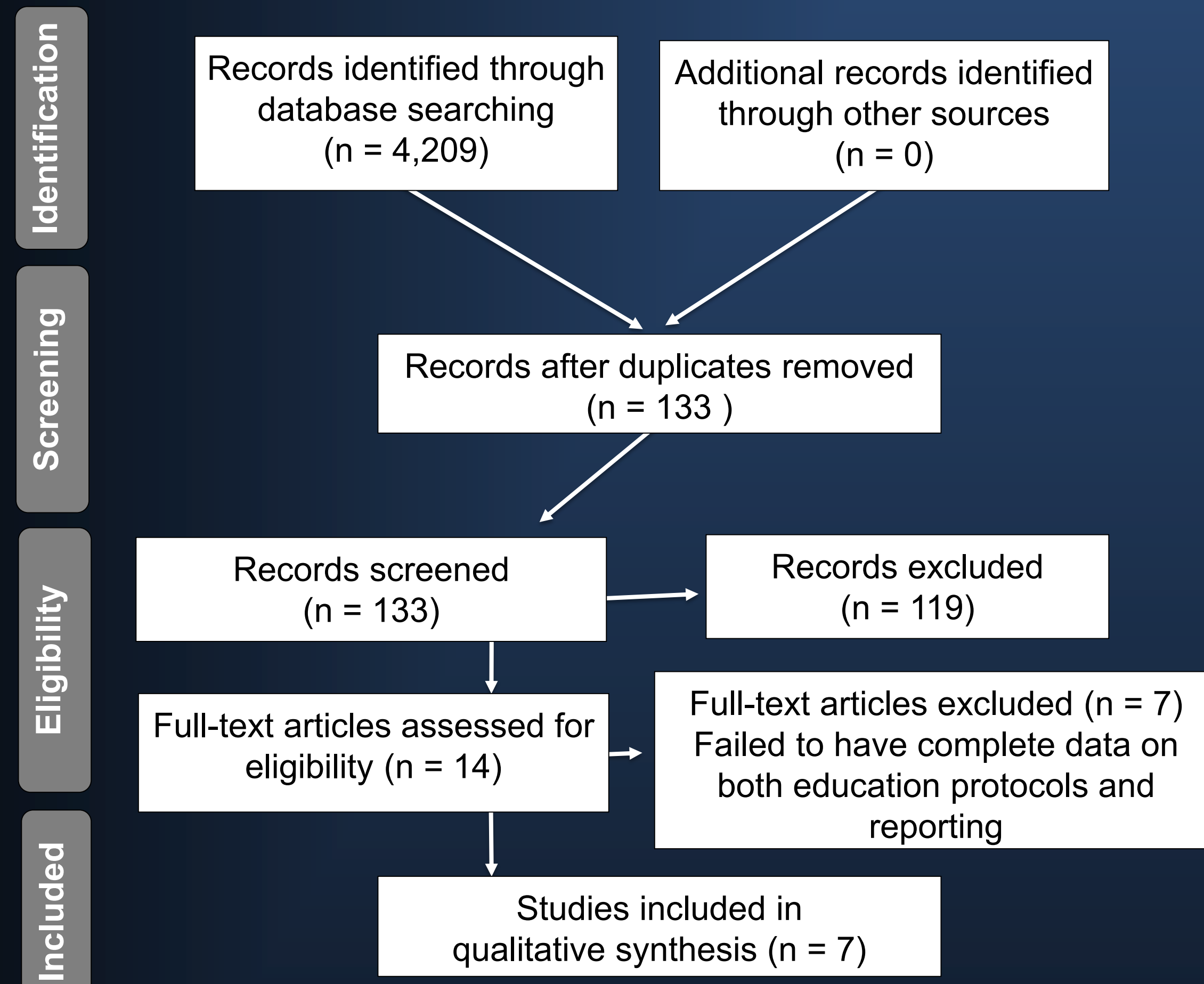
The purpose of this systematic review is to determine the role that concussion education protocols have on both athlete reporting and return-to-play adherence.

## Background

Concussion education protocols are being implemented to manage the growing crisis in concussed athletes. A challenge with concussion management is athlete adherence related to reporting and return-to-play guidelines. A common belief is that athlete education on concussions will enhance their understanding of the topic and will improve the rate at which athletes report symptoms and follow prescribed return-to-play guidelines.

## Methods

A systematic review of recent literature was completed to identify evidence related to the clinical question. The search was completed by utilizing EBSCOhost. A PRISMA strategy utilizing key words identified 4209 articles. After applying screening criteria 7 articles were included for data extraction and analysis. Two reviewers assessed quality of evidence using the checklist developed by Downs and Black. A neutral third reviewer was utilized to resolve disagreements leading to a consensus quality rating of good, fair and poor.



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## Summary of Findings

Year and Lead Author	Downs & Black Score	Quality of Article	Research Type	Subjects (n)	Age of Subjects	Gender of Subjects	Sport	Level	Geographic Location	Findings
2015 Kroshus	23	Good	Prospective Cohort Study	146 initially, 116 for follow-up survey	20.6 y/o (sd = 1.26)	Male	Ice Hockey	NCAA Division I	Various	Perceived reporting norms and athletic identity may be a key component in reducing concussion symptom under-reporting in athletes.
2014 Rivara	18	Fair	Prospective Cohort Study	778	14-19 y/o	Male and Female	Football (M) and Soccer (F)	High School	Washington	The majority of athletes continued to practice or play while symptomatic. More objective and accurate concussion measures are needed, and it is unlikely that athlete attitudes on concussion reporting will be improved through legislation alone.
2012 Bramley	19	Fair	Survey	183	14-19 y/o	Male and Female	Soccer	High School	Ohio and Pennsylvania	High school soccer players who have received concussion education are more likely to notify their coach or athletic trainer of a suspected concussion, as compared with athletes with no education.
2014 Baugh	20	Good	Pilot Analysis	513	19.8 y/o (sd = 1.49)	Male	Football	NCAA Division I FCS	Various	The required acknowledgement component of the NCAA's concussion policy is being inconsistently implemented at member institutions. Additionally, concussion mandates are variably implemented across the country. Concussion mandates should be more specific and more strictly enforced.
2014 Chrisman	19	Fair	Survey	270	20-51+	Male and Female	Football and Soccer	High School	Washington	Concussion education requirements for coaches are being closely followed by public high schools in Washington state. While coaches have received education, concussion education is not as extensive among athletes and parents.
2015 Kroshus, Baugh	23	Good	Prospective Cohort Study	146	20.7 y/o (sd = 1.30)	Male	Ice Hockey	NCAA Division I	Various	Preseason concussion knowledge was not significantly associated with in-season reporting behavior. Reporting intention is more strongly associated with reporting behavior than with concussion knowledge.
2013 Register-Mihalik	17	Fair	Cross-sectional Study	167	15.7 y/o (sd = 1.40)	Male and Female	Football, Soccer, Lacrosse, and Cheer-leading	High School	9 States	Most recalled concussions sustained by high school athletes were not reported. Increased athlete knowledge of concussion topics was associated with increased reporting prevalence of concussion events.

## Results

Quality of articles were determined to be 3 good and 4 fair. 2203 subjects were included for high school and college age athletes across football, ice hockey and soccer. Through cohort investigations and survey tools, the effectiveness of compliance for reporting behaviors and return-to-play guidelines was evaluated. It was identified that a wide variety of protocols and implementation strategies exist. Often, inconsistencies were identified in established reporting mechanisms. For collegiate athletes, there does not appear to be a positive relationship between the implementation of reporting protocols and actual reporting of suspected concussions. Cultural and team norms may have a stronger impact on reporting compliance behaviors than the protocols for this population. For younger athletes, coach knowledge does not seem to impact reporting behaviors, but rather the younger athletes themselves may be challenging established norms and electing to report per protocols more consistently.

## Conclusion

Weighted evidence from this investigation indicates that there is no positive relationship between the use of concussion education protocols and athlete adherence to reporting and following return-to-play guidelines. A consensus is not reached across all analyzed articles as there appears to be an emerging trend that reporting is improved among younger athletes as compared to collegiate athletes. More studies should be done to evaluate the long term impact and cultural norms surrounding concussion education protocols.

## Clinical Relevance

The development and implementation of concussion management protocols should be founded in sound evidence. While it does not appear that such protocols are having a positive impact on collegiate athlete reporting and adherence, it is possible that reporting norms are shifting toward compliance in the young athlete.

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