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Special Report from the CDC

# Concussion attitudes, behaviors, and education among youth ages 12–17: Results from the 2014 *YouthStyles* survey☆,☆☆

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ABSTRACT

*Introduction:* This study assessed young athletes' (ages 12 to 17) concussion attitudes and behaviors, particularly their self-reported experience learning about concussion and intentions to report a concussion and disparities in these experiences. *Methods:* We used data from Porter Novelli's 2014 *YouthStyles* survey that is conducted each year to gather insights about American consumers. *Results:* Of the 1005 respondents, 57% reported sports participation. Fourteen percent reported they may have had a previous concussion, and among them 41% reported having a concussion more than once while playing sports. Males (17.7%) were significantly more likely to report having a concussion than females (10.0%; $\chi^2$ (1) = 7.01, p = 0.008). Fifty-five percent of respondents reported having learned about what to do if they think they may have a concussion, and 92% reported that they would tell their coach if they thought they sustained a concussion while playing youth or high school sports. Youth from higher income families ($75,000–$124,999) were significantly more likely than youth from lower income families (less than $35,000) to report that they learned about what do if they suspected that they had a concussion. *Discussion:* Age of athlete, parental income level, athlete's sex, and living in a metro versus non-metro area led to disparities in athletes' concussion education. There is a need for increased access to concussion education and an emphasis on customizing concussion education efforts to meet the needs of different groups. *Practical application:* We identified athletes' self-reported previously sustained concussions and predictors of education related to concussion. Further research is needed to explore the age, gender and income gaps in concussion education among athletes.



## 1. Introduction

According to the Centers for Disease Control and Prevention (CDC), a concussion is "a type of traumatic brain injury caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the brain to bounce around or twist in the skull, creating chemical changes in the brain and sometimes stretching and damaging the brain cells." (Centers for Disease Control and Prevention et al., n.d.-a) A concussion is a serious injury, and while most youth athletes have a good recovery and feel better within a few weeks, sometimes symptoms can continue for months or longer (Centers for Disease Control and Prevention et al., n.d.-b). Across the country, nearly 60 million youth (National Council of Youth Sports, n.d.) benefit physically and psychologically from participating in organized youth sports where they develop important life skills, such as leadership and teamwork, and maintain healthy bones and muscles. Sports can provide significant benefits to young athletes (*Physical Activity Guidelines Advisory Committee report*, 2008; The Association Between School-based Physical Activity, 2010); however, protecting the health and safety of young athletes while participating in sports is critical.

In recent years, a heightened focus on sports-related concussion has emerged. A 2016 public opinion poll of 1000 American adults found widespread awareness of concussion, with 65% agreeing that sports-related concussions are a major problem (UMASS Lowell, n.d.). However despite increased awareness and efforts to protect young athletes, research suggests that too many young athletes still do not report their concussion

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symptoms, are not removed from play and continue to play with symptoms, or return to play too soon (Chrisman, Quitiquit, & Rivara, 2013; Hwang, Trickey, Lormel, Bradford, et al., 2014; McLeod, Schwartz, & Bay, 2007; O'Kane et al., 2014; Register-Mihalik et al., 2013; Rivara et al., 2014; Yard & Comstock, 2009).

Further, within the growing body of research on concussion, there is a scarcity of studies about health disparities and population-based factors that contribute to concussion-related health education, attitudes, and behaviors. To inform ongoing public health interventions aimed at protecting young athletes from concussion, this study contributes an analysis of concussion-related health disparities among youth athletes ages 12 to 17 who responded to the 2014 *YouthStyles* survey. Specifically, we assessed young athletes':

1. Self-reported previously sustained concussions,
2. Predictors of education related to concussion, and
3. Concussion reporting behavioral intention.

We included access to education and demographic factors such as race and ethnicity, sex, and geographic location in our analysis. Research indicates that Americans, including young people (Probst, Barker, Enders, & Gardiner, 2016), who live in rural areas are at higher risk of mortality from unintentional injuries when compared to Americans who live in urban areas (Centers for Disease Control and Prevention, n.d.), and we hypothesized that concussion-related health disparities would exist among young athletes based on geographic factors such that young athletes who live in rural areas would report less access to concussion education when compared with young athletes who live in urban areas. We also explored whether concussion attitudes and behaviors varied between male and female athletes.

## 2. Methods

This study used data from Porter Novelli's 2014 *YouthStyles* survey. Porter Novelli Public Services is a public relations firm contracted by CDC to design and implement the *YouthStyles* survey. The *YouthStyles* survey is part of a series of web-based surveys conducted each year to gather insights about American consumers, including information about their health attitudes and behaviors. Broadly, the *YouthStyles* survey explores relationships with friends, health behaviors, sources of influence, media habits, and media usage. The *YouthStyles* survey is fielded from June to July each year.

In June and July 2014, 1614 youth ages 12 to 17 residing with parents who are members of GfK's Knowledge Panel® were invited to answer the *YouthStyles* survey. GfK's KnowledgePanel® members are randomly recruited using probability-based sampling and include respondents regardless of whether or not they have landline phones or Internet access. If needed, households are provided with a laptop computer and access to the Internet. The panel is continuously replenished and maintains approximately 50,000 panelists. Adult panel members participated in a corresponding survey immediately prior to the youth's participation and provided electronic consent for the youth to participate. Respondents were not required to answer individual questions and could exit the survey at any time for any reason. Of the 2153 households sampled, a total of 1005 *YouthStyles* surveys were returned, representing a response rate of 47%. Households that completed both the adult and youth surveys received reward points worth approximately $5 and were entered into a monthly sweepstakes.

The CDC was provided a license to access data from the 2014 *YouthStyles* survey post-collection from Porter Novelli, and analysis of these data was exempt from institutional review board approval because personal identifiers were not included in the data file.

The resulting data were weighted to match the U.S. Current Population Survey proportions for sex, age, race/ethnicity, number of youth ages 12 to 17 in the household, household income, parent education level, census region, metro status, and whether or not the household had internet access prior to joining the panel.

Seven questions about concussion in sports were included in the 2014 *YouthStyles* survey (see Table 1). The purpose of these questions was to assess young athletes' attitudes and behavioral intention related to concussion.

To explore the context of potential health disparities among young athletes, backward stepwise logistic regression was used to examine the effects of socio-demographic factors influencing the likelihood of having received concussion education. The independent variables included were: a binary variable indicating whether or not a participant had ever received a concussion; the age of the participant; the gender of the participant; a categorical variable for the participant's race/ethnicity; a categorical variable for the household income of the participant; a binary variable for whether or not a participant was located in a metropolitan area; and a binary variable for whether or not a participant had internet access. Lastly, variables examining a categorical by categorical interaction effect between metro status and both income and race/ethnicity category were included in the model to control for possible moderating factors.

## 3. Results

Among the 1005 respondents, over half (57%) reported sports participation and were included in the analysis. This study reports results among youth who indicated sports participation, or 573 of a total 1005 respondents. The remaining 422 respondents replied to Q1 that "I do not play youth or high school sports" and were therefore excluded from this analysis. Table 2 presents the self-reported demographic characteristics of youth who had played youth or high school sports.

When asked, "If you play youth or high school sports, what are the reasons that you play?" youth reported that they participate for various reasons, primarily because sports are fun (n = 514, 90%), their friends play sports (n = 314, 55%), and they want to be in shape (n = 308, 54%). Less

**Table 1**
2014 *YouthStyles* survey questions about concussion in sports.

| |
|---|
| 1. If you play youth or high school sports, what are the reasons that you play? |
| 2. A concussion can be caused by a bump, blow, or jolt to the head that can cause things like headaches and dizziness and/or may make you feel sick to your stomach, confused, or sleepy. Please tell us if you may have gotten a concussion while playing youth or high school sports. |
| 3. If you answered Yes to question 2, please tell us how many times you may have gotten a concussion while playing youth or high school sports. |
| 4. Have you learned about what to do if you think you may have gotten a concussion while playing sports? |
| 5. If you answered Yes to question 4, please tell us how you learned about what to do if you think you may have gotten a concussion while playing sports. |
| 6. If you think you got a concussion while playing youth or high school sports, would you tell your coach? |
| 7. If you answered No to question 6, please tell us why you wouldn't tell your coach. |



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