



## CDC's Approach to Educating Coaches about Sports-related Concussion

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### ABSTRACT

*Sports-related concussions can happen to any athlete in any sport. Each year in the United States, an estimated 1.6-3.8 million sports and recreation-related traumatic brain injuries (TBIs) occur, most of which can be classified as concussions. To help coaches prevent, recognize, and better manage sports-related concussions, the Centers for Disease Control and Prevention's (CDC) National Center for Injury Prevention and Control (CDC's Injury Center) applied a comprehensive health-education approach to developing a multimedia tool kit for high school athletic coaches. From developing an expert panel and pretesting message concepts to pilot testing, promoting, and evaluating the final product, CDC has shown that this undertaking is highly effective. Results of the pilot study and promotion efforts show that the tool kit is well received by coaches and school officials and that it meets a critical health education need.*

### BACKGROUND

Every year, about 1.4 million Americans sustain a traumatic brain injury (TBI).<sup>1</sup> A TBI is defined as a blow or jolt to the head or a penetrating head injury that disrupts the function of the brain. The leading causes of TBI include falls, motor vehicle-traffic crashes, struck by/against events (i.e., collisions in sports), and assaults.<sup>1</sup> The severity of a TBI may range from mild (i.e., a brief change in mental status or consciousness) to severe (i.e., an extended period of unconsciousness or amnesia). An estimated 1.6-3.8 million sports- and recreation-related TBIs occur in the United States each year. Most of these are mild traumatic brain injuries (MTBIs or concussions) that are not treated in a hospital or emergency department.<sup>2</sup> Concussions can happen to any athlete in any sport, though the risk for concussion increases in collision sports. The proportion of these concussions that are repeat injuries is unknown; however, health risks increase among persons who have had at least one prior concussion.<sup>3,4</sup> Repeated concussions over an extended period (i.e., months or

years) can result in cumulative neurologic and cognitive deficits,<sup>5,6</sup> but multiple concussions within a short period (i.e., hours, days, or weeks) can be catastrophic, or even fatal. The latter phenomenon, termed *second-impact syndrome*, has been reported frequently since it was first characterized in 1984.<sup>7-9</sup>

The Centers for Disease Control and Prevention (CDC) was charged under the Children's Health Act of 2000 to implement a national TBI education and awareness campaign. In response to this mandate, CDC developed a tool kit on MTBI for health care providers. The purpose of the tool kit is to improve clinical management and outcomes for patients with MTBI. Since January 2003, CDC has disseminated more than 200,000 of these tool kits to health care providers.

Encouraged by the positive response from health care providers who received the tool kit, CDC developed a second multimedia educational tool kit for high school athletic coaches. This tool kit, *Heads Up: Concussion in High School Sports*, educates coaches about sports-related concussions

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and the need to prevent, recognize, and manage concussions appropriately.

This article describes the process undertaken by CDC's National Center for Injury Prevention and Control (CDC's Injury Center) to research, develop, test, promote, disseminate, and evaluate educational materials for the coaches' tool kit. Staff at CDC applied a comprehensive health education approach to this initiative to ensure its widespread use and adoption by coaches in high schools nationwide. This approach can be applied to other educational efforts to raise awareness of health issues among target audiences.

## DEVELOPMENT

The tool kit was developed using qualitative and quantitative research methods, including literature reviews, input from experts, focus groups, and a telephone-based survey of coaches. Draft materials were pretested by focus groups comprising high school students in Virginia and Maryland and by high school coaches in Texas, California, and Virginia. Revised materials were evaluated through a pilot study conducted with coaches in Maine, Texas, Michigan, California, and North Carolina. These states were chosen because they represent geographic diversity within the country, including public and private, suburban and urban high schools, with varied student populations. The pilot study methods were approved through the Health and Human Services Office of Management and Budget (OMB).

### *Environmental Scan and Expert Panel*

The development process began March 2003 when CDC conducted an environmental scan to determine what publications already addressed sports-related concussions. Although many individual materials had been developed by various organizations, CDC determined a need for comprehensive sports-related materials about concussion that targeted athletic coaches. In April 2003, CDC brought together an expert panel of sports-related concussion experts and other professionals representing various athletic, medical, and nonprofit organizations.

The panel suggested that concussions are addressed fairly well at the college level. They noted, however, that coaches of community teams, youth leagues, and high school athletics have fewer resources and less access to education about health issues. The panel recommended that education efforts target high school coaches, acknowledging that a general outreach would educate coaches of organized sports at all levels of school activity. Panel members also helped develop key messages, identified contents of the kit and its individual components, and suggested potential partnerships and dissemination channels.

### *Initial Focus Groups with Coaches*

Two telephone focus groups were conducted, totaling 29 participating coaches from New Jersey; Illinois; Texas; and California. The purpose of these focus groups was to test the initial concepts for a tool kit that were proposed by the expert panel. The groups comprised male and female coaches (of girls' and boys' sports) from public and private high schools (suburban and urban), with student populations of varying socioeconomic status. The coaches represented various sports, including football, basketball, baseball, cheerleading, ice hockey, and soccer. The focus groups addressed four main questions: What do coaches know about sports-related concussions? Do coaches need information/tools about sports-related concussions? What concussion management strategies do coaches currently use? What tools (content/type of educational materials) would be helpful to include in the kit?

### *Findings from the Coaches' Focus Groups*

1. What do coaches know about sports-related concussions?

Coaches identified concussions as one of the worst possible injury scenarios they might encounter in high school athletics. Coaches found concussions to be especially worrisome because the after-effects were often not immediately perceptible (i.e., "they're sneaky").

2. Do coaches need information/tools about sports-related concussions?

Coaches expressed strong interest in

receiving materials to educate themselves, their players, and their administrators. Acknowledging their lack of training about how to manage concussions, the coaches expressed great concern for the welfare of their athletes and felt obliged to provide informed assistance in case of injury.

3. What concussion management strategies do coaches currently use?

Most coaches had talked to their students about concussion prevention, often about how to use protective headgear and protect their heads during sports (i.e., "heading" a soccer ball). Most coaches did not have a comprehensive program in place through which to inform their students about concussion injury.

All coaches considered an assessment by another professional (trainer or medical professional) to be an essential part of their approach to managing concussions. Without such a medical assessment, coaches preferred to not make decisions about how to manage a concussion or whether an athlete should return to play. Coaches acknowledged that they were not doctors, they lacked sufficient knowledge about concussions, and they did not always know the best course of action.

4. What tools (content/type of educational materials) would be helpful to include in the kit?

Coaches suggested that the tool kit include information explaining the signs and symptoms of concussions. They also requested the specific steps for handling a concussion. Many thought that an educational video about concussions would be a useful educational tool and emphasized their preference for a tool kit that contained clear, concise guidance that would not overwhelm them with too much information.

### *Literature Review*

Prior to developing new materials, staff at CDC conducted a comprehensive review of literature and relevant articles were referenced throughout the materials. Based on feedback from coaches, CDC decided to include just a few pertinent articles that would be of particular interest to high school coaches. These articles were placed on the resource CD-ROM included in the tool kit.



## TESTING

### Pretests

Using input from the expert panel, focus groups, and literature reviews, CDC developed preliminary tool kit materials. Kit materials were pretested with focus groups of high school athletes and high school coaches. A variety of different sports were represented, including football, basketball, baseball, soccer, softball, wrestling, and volleyball.

### Pretest: Video

Based on input from the expert panel, CDC staff considered using a segment from *The NewsHour with Jim Lehrer* rather than creating a new video for the tool kit. The segment, aired January 2000, addressed sports-related concussions through the challenges of one high school athlete after he sustained two concussions while playing football and consequently suffered severe disabilities.

Ultimately, the effectiveness of the video hinged on student feedback. CDC conducted sessions with two focus groups of high school students to get their appraisal of the video. The first group, from Maryland, comprised six male football players and their coach. The second group, from Virginia, included 14 athletes (9 girls and 5 boys) who played various sports (track, soccer, softball, baseball, lacrosse, swimming, wrestling, basketball, volleyball, and field hockey). CDC developed a set of questions to learn what they knew about concussions, what they thought of the video, and what they learned from it.

### Findings from Pretesting the Video

The student athletes reported that the video was educational and "good." Some had not been aware of the severity of concussions or various ways in which an athlete could receive a concussion. When asked if they would do anything differently after watching the video, the athletes responded that they would be sure to get an injury checked out and would stop to consider if they had gotten a concussion after a hard hit. Students said they could relate to the high school athlete featured in the video and that learning about

his story "brings the issue to reality."

### Pretest: Tool Kit

The draft tool kit materials were then pretested with focus groups: six in-person sessions and two telephone sessions. The in-person groups, totaling 50 high school coaches, were conducted in Texas; Virginia; and California. The two telephone groups, totaling 14 participants, were comprised of coaches from rural areas around Montana; California; Colorado; Virginia; Pennsylvania; and Alabama.

All groups were comprised of male and female coaches (girls' and boys' sports) from public and private, suburban and urban high schools, with student populations of varying socioeconomic status. Sports represented included football, basketball, baseball, soccer, softball, wrestling, and volleyball. The questions assessed the coaches' opinions of the tool kit: appearance, helpfulness of components, and intent to use.

### Findings from Pretesting the Tool Kit

Coaches responded favorably to the appearance of the tool kit and were enthusiastic about its contents. Many said that concussion was a relevant, attention-getting topic about which they did not have much information. Most affirmed that if they were to receive the tool kit, it had enough overall appeal that they would review its contents. In fact, several items were described as "especially helpful." The video, for example, was popular and many coaches deemed it mandatory viewing. Coaches said the pocket card was one of the best tools in the kit, noting that in addition to describing the signs and symptoms of concussion, space was provided for listing important phone numbers. They also appreciated the handouts, which provided them with something to pass out to athletes and parents to educate them about concussions. Many said they would use the fact sheets in conjunction with the video.

Overall, the tool kit not only educated coaches, but it also increased their respect for the seriousness of concussions. Many coaches commented that as a result of reviewing the tool kit, they would change their approach to dealing with concussions (e.g., implement-

ing a new plan for handling concussions). In particular, the materials increased their awareness of second-impact syndrome.

### Pilot Test

After incorporating feedback from the pretest focus groups and revising the tool kit, a pilot test was conducted prior to distributing and promoting it nationwide. The pilot test assessed high school coaches' appraisals, perceptions, intent to use, and actual use of the tool kit and materials. A comprehensive pilot test was deemed necessary, given the substantial resources and potential impact reflected in plans for launching the tool kit nationwide.

### Methods for Pilot Testing the Tool Kit

A sample of about 1,000 high school coaches from Texas, Maine, Michigan, California, and North Carolina were identified using the *Clell Wade Coaches Directory*. Sports represented included soccer, softball, football, lacrosse, wrestling, basketball, volleyball, gymnastics, ice hockey, and field hockey.

A tool kit was mailed to each coach. Five days later, coaches received a postcard referring to the tool kit and requesting their participation in a short, private, and voluntary survey about the tool kit. Data collection (phone surveys) began about one week after receipt of the postcard and took place over a two-week period.

### Findings from the Pilot Test

High school coaches responded positively. Of the nearly 500 respondents, most found the tool kit useful and valuable as is, with no need for major revisions; 74% found the materials very easy to use, and 94% said it provided the correct amount of detail. Most coaches said they would give the materials to parents, athletes, and other school officials.

More than two-thirds of coaches interviewed reported they were aware of incidents of sports-related concussions at their schools. One-third did not have access to materials about prevention and management of concussion prior to receiving the tool kit. Additionally, 20% of coaches reported that their athletic department had no plan for



dealing with concussions; however, most of these coaches (96%) thought the tool kit materials could be used to develop one.

Data from the pilot study confirmed that the design of the tool kit met the informational and instructional needs of high school coaches.

### FINALIZING THE COACHES' TOOL KIT

After pretesting, evaluating results, and modifying its contents, the tool kit was finalized. It contained an introductory letter from CDC; an information guide for coaches; a wallet card and clipboard sticker; fact sheets for athletes and parents (in English and Spanish); two posters; a video (VHS and DVD); and a CD-ROM with downloadable kit materials, relevant resource materials, and journal articles.

The tool kit covered many relevant topics: definitions of concussion, incidence, and risk factors; explanation of who is at risk; signs and symptoms of concussion; advice on management of concussion; information about effective prevention strategies; and suggestions for coaches' roles in concussion education, prevention, and communication with athletes, their families, and other school officials.

### DISSEMINATION AND PROMOTION

In September 2005, the tool kit was launched nationally to coincide with the beginning of the school year and the high school sports season. In preparation, CDC invited the U.S. Surgeon General, Vice Admiral Richard H. Carmona, MD, MPH, FACS, to serve as one of the key spokespersons during promotion efforts. Staff also developed a press kit (containing a press release, fact sheet, and flyer), and other promotional materials tailored for partners and the general public. Promotional materials were posted on CDC's Web site ([www.cdc.gov/injury](http://www.cdc.gov/injury)) for downloading and ordering. National outreach also involved intensive, targeted media pitches consisting of e-mails sent to hundreds of media outlets, followed by phone calls. More than 100 pitch calls were made to long- and short-lead national, regional, and local media outlets. Media efforts focused on

targeting editors and reporters affiliated with the general and specialty magazines (e.g., *Coach* and *Athletic Director Magazine*), and the health and sports editors and reporters of national and regional newspapers (top 25 news markets in the U.S.).

The combined promotion efforts of CDC staff, partners, and expert panel members, resulted in more than 20,000 tool kits distributed nationwide within three months of its launch. Information and articles about the tool kit have appeared in magazines, television programs, national and regional newspapers, and on nationally and internationally based Web sites.

Radio interviews about the tool kit with the Surgeon General and the Director of CDC's Injury Center, Dr. Ileana Arias, were broadcast nationwide, reaching an audience of more than three million listeners.

### PARTNERSHIP DEVELOPMENT

Partnerships with various organizations, especially coaches' associations and groups such as the National Federation of State High School Associations (NFSHS), were key to the tool kit's successful development, promotion, and distribution. For example, focus group participants explained that some coaches who were unfamiliar with CDC and the Department of Health and Human Services might not value a publication that came from these organizations. However, endorsement and involvement of groups such as NFSHS brought credibility and value.

In addition, partners and expert panel members noted that coaches are a hard-to-reach audience and that athletic directors generally serve as informational gatekeepers. To address this issue, the tool kits were not mailed to coaches initially; instead, the kits were mailed directly to athletic directors and principals.

To obtain endorsement and involve multiple and diverse organizations, partners were engaged early in the process. This enabled them to review and approve the materials through their organizations. Involving partners during the early stage of development made it possible to inform

them regularly about project details and opportunities for further involvement, particularly participation in promotion and distribution. Overall, 14 partner organizations participated, in varying levels, to disseminate and promote the tool kit. Partner organizations were acknowledged on the box and in the text of the materials.

### EVALUATION

A follow-up evaluation will assess high school coaches' appraisal, perceptions, and use of the tool kit. The evaluation will also measure whether the tool kit improved coaches' knowledge and management of concussions. The evaluation will survey a nationally representative sample of high school coaches 12 months after the national launch. After the survey results have been tabulated, a sample of the participants will be asked to take part in focus groups to provide CDC with in-depth information that will help guide future development of concussion-related materials.

### DISCUSSION

*The Heads Up: Concussion in High School Sports* tool kit is a comprehensive educational initiative aimed at helping high school coaches prevent, recognize, and manage sports-related concussions. The process for developing this multimedia tool kit has been described in detail to enable other health educators to learn from and potentially replicate CDC's approach. Adherence to a logical, comprehensive health education approach has proven to be highly effective in accomplishing the goals of the project. The results of the pilot study and promotion efforts demonstrated the tool kits' effectiveness with the target audience. Pilot study results clearly showed the tool kits' potential to increase prevention and improve management of concussions among high school athletes.

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#### DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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