

# Study of former Notre Dame football players finds college players more likely to have brain disorders

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The link between playing football and an increased risk of developing later-life brain disorders like chronic traumatic encephalopathy (CTE) and amyotrophic lateral sclerosis (ALS) has received increasing attention

over the past 15 years. While National Football League (NFL) players are more likely to die from CTE and ALS and more likely to report cognitive impairment, behavioral changes and dementia, similar studies of former college football players have not been reported.

In a new study published today in *JAMA Network Open*, researchers at the Boston University (BU) CTE Center report on the long-term health outcomes and mortality rates of former University of Notre Dame football [players](#) who were seniors on the 1964-1980 rosters. Compared to a representative sample of same age men in the [general population](#), former Notre Dame players were five times more likely to report [cognitive impairment](#) diagnoses, two and a half times more likely to report recurrent headaches and 65 percent more likely to have cardiovascular disorders during life, based on health surveys completed by 216 of the 375 (58 percent) former players who are still living.

Consistent with reports of former NFL players, mortality due to [degenerative brain disease](#), specifically Parkinson's disease and ALS, was higher in the former college players compared to the general population, but the researchers caution that the difference did not reach statistical significance. Unexpectedly, mortality from brain and other nervous system cancers was almost four times higher in the former college players compared to the general population.

The study also found positive long-term health outcomes in the former college football players who had a lower prevalence of diabetes during life and an overall lower mortality rate compared to the general population. Specifically, [death rates](#) from heart, circulatory, respiratory and digestive system disorders, and from lung cancer and violence, were significantly lower in the former players than in the general population.

According to the researchers, results of the new study of former college players are overall quite similar to the former professional players.

"Similar to studies of other former high-level athletes, we found that former college football players have lower overall mortality and lower risk of death from [lung cancer](#) and heart disease," says corresponding author Robert Stern, Ph.D., director of clinical research for the BU CTE Center and professor of neurology, neurosurgery and anatomy & neurobiology at BU School of Medicine. "However, the negative health consequences, especially the brain-related disorders, we found in this group of former Notre Dame players are concerning," Stern adds.

According to the new paper, more than 800,000 student-athletes played football in American colleges since 1960, with more than 250,000 former college players currently over age 60. "From a public health perspective, it is imperative that the long-term neurological and general health consequences of playing football at the college level are better understood," says Stern.

"It is important to note that this study was fully independent of the University of Notre Dame," says Alyssa Phelps, first author of the new report and former research program manager at the BU CTE Center. "A wonderful group of former Notre Dame players, however, had previously formed a Steering Committee and communicated their view of a need for this type of study to Dr. Stern. That group then assisted our BU research team with obtaining contact information for their teammates, spreading the word about the survey, and raising funds to partially support the study. The culture and commitment of these former Notre Dame players made this study possible."

That Steering Committee of Notre Dame alumni includes Pro Football Hall of Famer Dave Casper, All-American and former NFL player Luther Bradley Jr., and four-time Super Bowl Champion Rocky Bleier, among several others. Bleier, who is co-chair of the Steering Committee, says, "We all loved the game that we played at Notre Dame. We just believe that the health of the game and the health of the players go hand

in hand, and hope that the results of this study provide some initial answers and benefits to our teammates, as well as future players and their families at all levels of the sport."

Ed Ziegler, a former player and retired law professor who played a central role in forming and coordinating the Steering Committee, adds, "We began with the hope of joining together to go down a path where we might find some potential answers. The findings of this initial study indicate a need for further exploration and dialogue about ways to maximize the potential health benefits of the game and reduce factors that may increase the risk for later life brain disorders."

The former Notre Dame football players will continue to be followed longitudinally through the new Head Impact & Trauma Surveillance Study (HITSS), funded by a grant from the National Institutes of Health. HITSS is a fully online annual assessment examining the risks of developing later-life brain health issues from repetitive head impacts in American football and soccer. The BU CTE Center researchers are recruiting 4,800 former soccer and football players, age 40 or older, including 2,400 former [football](#) players, who played at any level, i.e., youth, high school, college, or professional.

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**More information:** Association of American college football with long-term health outcomes and mortality, *JAMA Network Open* (2022). [DOI: 10.1001/jamanetworkopen.2022.8775](https://doi.org/10.1001/jamanetworkopen.2022.8775)

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