

# Concussion rates rising significantly in adolescents

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The number of Americans diagnosed with concussions is growing, most significantly in adolescents, according to researchers at UC San Francisco. They recommend that adolescents be prioritized for ongoing work in concussion education, diagnosis, treatment and prevention.

The findings appear online August 16, 2016, in the Orthopaedic Journal of Sports Medicine.

"Our study evaluated a large cross-section of the U.S. population," said lead author Alan Zhang, MD, UCSF Health orthopaedic surgeon. "We were surprised to see that the increase in [concussion](#) cases over the past few years mainly were from adolescent patients aged 10 to 19."

Concussions are a form of mild traumatic brain injury resulting in transient functional and biochemical changes in the brain. They can lead to time lost from sports, work and school, as well as significant medical costs.

Though symptoms resolve in most concussion patients within weeks, some patients' symptoms last for months, including depression, headache, dizziness and fogginess. Neuroimaging and neuropathological studies also suggest there may be chronic structural abnormalities in the brain following multiple concussions.

Recent studies have shown an increase in traumatic brain injuries diagnosed in many U.S. emergency departments. Smaller cohort studies

of pediatric and high school athletes also have indicated a rise in concussions for certain sports, such as football and girls' soccer. However, this is the first study to assess trends in concussion diagnoses across the general U.S. population in various age groups.

In this study, Zhang and his colleagues evaluated the health records of 8,828,248 members of Humana Inc., a large private payer insurance group. Patients under age 65 who were diagnosed with a concussion between 2007-2014 were categorized by year of diagnosis, age group, sex, concussion classification, and health care setting of diagnosis (emergency department or physician's office).

Overall, 43,884 patients were diagnosed with a concussion, with 55 percent being male. The highest incidence was in the 15-19 age group at 16.5 concussions per 1,000 patients, followed by ages 10-14 at 10.5, 20-24 at 5.2 and 5-9 at 3.5.

The study found that 56 percent of concussions were diagnosed in the emergency department, 29 percent in a physician's office, and the remainder in urgent care or inpatient settings. As such, outpatient clinicians should have the same confidence and competence to manage concussion cases as emergency physicians, Zhang said.

A 60 percent increase in concussions occurred from 2007 to 2014 (3,529 to 8,217), with the largest growth in ages 10-14 at 143 percent and 15-19 at 87 percent. Based on classification, 29 percent of concussions were associated with some loss of consciousness.

A possible explanation for the significant number of adolescent concussions is increased participation in sports, said Zhang, MD, who is also assistant professor of orthopaedic surgery at UCSF. It also may be reflective of an improved awareness for the injury by patients, parents, coaches, sports medical staff and treating physicians.

For example, the U.S. Centers for Disease Control and Prevention "HEADS UP" initiative has caused numerous states such as California to alter guidelines for youth concussion treatment.

Many medical centers also are establishing specialty clinics to address this, which could be contributing to the increased awareness. At UCSF, the Sports Concussion Program evaluates and treats athletes who have suffered a sports-related concussion. The team includes experts from sports medicine, physical medicine and rehabilitation, neuropsychology and neurology. Their combined expertise allows for evaluation, diagnosis and management of athletes with sports concussions, helping them safely recover and return to [sports](#).

**More information:** A. L. Zhang et al. The Rise of Concussions in the Adolescent Population, *Orthopaedic Journal of Sports Medicine* (2016). [DOI: 10.1177/2325967116662458](https://doi.org/10.1177/2325967116662458)

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