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## States Address Concerns about Concussions in Youth Sports

*By Carol Kreck*

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After 13-year-old Zackery Lystedt of Washington suffered catastrophic multiple [concussions](#) in a junior high football game in 2006, his state passed a law in 2009 that has been copied – with slight variations – by every state in the country.<sup>1</sup>

Youth sports injuries concerned other states' legislators who passed Lystedt laws in quick succession because results can be horrific after the first concussion, reported rates are high and there may be some failure to report. While good statistics are hard to come by, the Centers for Disease Control [estimates](#) there are at least 1.7 million incidents of traumatic brain injury (TBI) annually – about 75 percent of which are concussions. Each year, almost half a million emergency room visits for TBIs are made by children 0 to 14 years.<sup>2</sup> Worries are [justified](#); the developing brains of children and adolescents are more vulnerable than adult brains and take longer to recover.<sup>3</sup>

ECS reviewed legislation in the 50 states to see how state leaders are responding to concerns about concussions in youth sports. Among some of the highlights:

### *National overview*

- With [Mississippi](#) Gov. Phil Bryant's [signature](#) on Jan. 20, 2014, all states have youth sports concussion laws.
- About half the state laws require coaches to complete a concussion management training program, while 80 percent require coaches get information on recognizing concussions.<sup>4</sup>
- Thirteen states extend concussion law requirements to private entities, such as private schools or youth athletic leagues, in addition to public schools.
- Twelve states offer immunity from civil liability to school districts and employees, officials, volunteers or medical personnel; six don't create or modify liability.

### *State examples*

- [California](#) extended concussion provisions to students in charter and private schools.
- [Connecticut](#) requires annual concussion training for coaches of intramural and interscholastic athletics.
- [Texas](#) prohibits districts from using football helmets that are 16 years old or older. Helmets 10 years old or older must be reconditioned at least every two years.

In addition, this report briefly considers the potential of emerging science and technology – in [baseline testing](#), a [blood test](#) and an [iPad application](#) – in shaping the future of state legislation.

## State responses to concussion concerns

Age makes a difference with concussions. A study in a March 2012 issue of *Brain Injury* journal found that teenagers were more fragile after concussions than children or adults and effects in teens could last six months or longer. Teens are more vulnerable because their frontal lobes are growing in spurts, making them more susceptible to injury.<sup>5</sup>

In some states, provisions to protect student athletes from concussions are found in the education code while, in other states, similar provisions are located in the health code.

These laws generally push [three mandates](#), which revolve around what happens after an injury:

- The laws require education for athletes, coaches and parents.
- The laws require removal of a player if he or she is suspected of having a concussion.
- The laws allow a return to play after at least 24 hours, contingent on the approval of a designated health professional.<sup>6</sup>

About half the state laws require coaches to complete a concussion management training program while about 80 percent require that coaches get information on recognizing concussions.<sup>7</sup>

Beyond those mandates, variations occur from state to state. A large number of laws allow people untrained in traumatic brain injury to clear a student for return to play. Others waive liability for those implementing or enforcing their versions of the Lystedt law.

A [chart](#) from the Children's Safety Network shows how each state's statutes address facets of sports-related injury: baseline testing, removal from play, return to play, coach training, distribution of information to coaches, students and parents, student and parental signatures on receipt of information and whether requirements apply to private youth sports organizations and private schools.<sup>8</sup>

## Questions for the future of state-level policy

Now the question is, will states take involvement in concussion prevention and response in a different direction? Will they allow sports organizations to pass their own sport-specific rules, which may be more effective and cross state boundaries? Will they follow the emerging science in improving diagnoses and monitoring?

Here are three emerging innovations for consideration in policy or guidelines (steps that go beyond symptom-driven diagnosis, which has proven to be an inexact science): baseline testing and – more experimental – a possible pinprick test for protein released from the brain post-concussion and the use of an iPad application to be strapped on a possibly injured player's back while he's still on the field.

### *Baseline testing*

Preseason, an exam conducted by a trained health care professional can assess an athlete's balance, brain function and signs of concussion symptoms. Baseline results can be compared to post-injury results to determine if a concussion occurred and used again to determine when the brain has returned to a state healthy enough that a player can resume sports.<sup>9</sup>

Complicating decisions about the timing of students' returns is the American Academy of Pediatrics' [alert](#) in October 2013 that a too-soon return to class may worsen symptoms and postpone recovery. In "Returning to Learning Following a Concussion," they write the average recovery time is one to three

weeks, which runs up against the 24-hour rule. In the meantime, trying to concentrate in class as well as being barraged by bright lights and noisy cafeterias may exacerbate symptoms. Further, authors argued, students should be fully recovered academically before returning to sports.<sup>10</sup>

At the Center for Concussion at Rocky Mountain Youth Sports Medicine in Centennial, Colo., they say [the test](#) – a snapshot of the brain – takes about an hour, should be started at the age of 11 and then repeated every two years.<sup>11</sup> The Centers for Disease Control [recommends](#) most components be repeated annually, except for computerized or paper-pencil neuropsychological tests, which can be repeated every two years.<sup>12</sup>

Rhode Island has taken the first state policy step by recommending baseline testing in its version of the Lystedt law.<sup>13</sup>

### ***Blood test***

A [test](#) measuring the brain protein S100B that leaks into the blood stream following a brain injury has been developed by researchers at the Cleveland Clinic and the University of Rochester. Concussions can be difficult to diagnose, but a measure of S100B protein levels would offer a more definitive diagnosis and could be performed anywhere, including a locker room.

The blood [test](#) approach, among others, got part of a \$60 million grant funded by the National Football League and General Electric to jump-start new research and technology into the brain.<sup>14</sup>

### ***During-the-game iPad***

The Cleveland Clinic also has developed an iPad app so that when an athlete takes a hard hit, a coach can strap an iPad onto the player's back and ask her to walk around. The iPad's gyroscope and accelerometer detect balance problems, which may indicate a concussion.<sup>15</sup>

## **Addressing the prevention of concussions**

None of these innovations address concussion prevention, which is still a murky topic. The Centers for Disease Control [recommends](#) limiting contact during sports practices, putting in place rule changes and/or banning or limiting the use of certain drills or techniques to help reduce the chances of injury, and checking sports equipment often.<sup>16</sup>

For example, the [Arizona Interscholastic Association](#)<sup>17</sup> restricts coaches from holding more than half of preseason practices in full pads, and Texas' University Interscholastic has limited the amount of full contact allowed in practice to 90 minutes a week.<sup>18</sup> Texas also prohibits districts from using football helmets that are 16 years old or older.

In recognition of the confusion and controversy that persist in areas of public policy concerning concussion, the Institute of Medicine and the National Research Council convened a committee to review concussion science. That council issued a report in October 2013. That report concluded "much remains unknown about the extent of concussion in youth, how to diagnose, manage and prevent concussions; and short- and long-term consequences of concussions as well as repetitive head impacts that do not result in concussion symptoms."<sup>19</sup>

The committee called for the CDC to establish and oversee a national surveillance system, and the National Institutes of Health and Department of Defense to support research that would establish specific metrics of concussion diagnosis, prognosis and recovery, rather than the current system, which

relies to a great extent on symptom lists. Further, since no one knows whether repetitive head impacts and concussions in youth could result in chronic traumatic encephalopathy (CTE), the basis of a players' lawsuit against the National Football League, the committee recommended a longitudinal study to be conducted by the National Institutes of Health and the Department of Defense.

"Returning to Learning" calls for an extension to education required by most state concussion laws. While those laws generally call for educating athletes, parents and coaches, the "Returning to Learning" authors think the education admonition should also apply to school administrators, athletic directors, teachers, guidance counselors, school psychologists, school physicians, school nurses and athletic trainers as well as people not employed by schools: primary physicians, sports/team physicians and emergency department physicians.<sup>20</sup>

Zackery Lystedt, who sustained an injury at the end of a football game's first half, returned to play in the third quarter. At the end, he collapsed and was airlifted to Harborview Medical Center. He was seven days on a ventilator and three months in a coma before waking up to see his parents. It would take three years before he could, with assistance, stand. He now has become a spokesperson for a campaign to promote the effects of concussion and the importance of medical follow up.<sup>21</sup>

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## For more information

In addition to resources highlighted in this report, ECS tracks state policy changes related to [student health](#) and [school safety](#). Please visit these links to learn more.

## About ECS

[The Education Commission of the States](#) was created by states, for states, in 1965. We track policy, translate research, provide unbiased advice and create opportunities for state policymakers to learn from one another.

The conclusions presented in this report are those of ECS, which receives the majority of its funding from the states and territories it serves. As part of the services ECS provides to states, staff members are available for consultation and to serve as third-party experts in legislative hearings.

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## Endnotes

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- <sup>10</sup> Mark E. Halstead, et al., "Returning to Learning Following a Concussion," *Pediatrics*, (October 2013), doi: 10.1542/peds.2013-2087.
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