

Screening for cervical spine risk factors could reduce CT scans by half

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An estimated 8 million children suffer blunt trauma annually, and while cervical spine injury (CSI) is serious, it is uncommon. Screening children suffering from blunt trauma for CSI risk factors could cut unnecessary computed tomography (CT) scans—and radiation exposure—by half, a prospective study of more than 4,000 children found.

The findings, published in *Pediatrics*, largely confirm those made in an earlier retrospective study. Together, the studies support a larger ongoing study aimed at developing a CSI risk assessment tool clinicians can use to decide which [children](#) need imaging.

"Injury is the leading cause of morbidity and mortality in children, so we see a lot of children and have to evaluate them for injuries in the prehospital and emergency department settings," said the study's author Julie Leonard, MD, MPH, an Emergency Medicine physician and principal investigator in the Center for Injury Research and Policy at the Abigail Wexner Research Institute at Nationwide Children's Hospital.

"We need to be able to quickly decide which children have serious injuries and provide them the highest level of care and service," said Dr. Leonard, who is also an associate professor of Pediatrics at The Ohio State University College of Medicine. "But we don't want to subject the large majority of children, who have experienced a traumatic event but have minor injuries, to unnecessary and potentially harmful testing and interventions."

Studies estimate that for every 1,000 CT scans in children, one to two new cancers are induced, Dr. Leonard said. "If you cut the current number of CT scans for cervical spine [injury](#) in half, each year you spare hundreds of children from cancer."

Testing children for CSI has skyrocketed 400% in the past two decades, and imaging for these patients has shifted away from X-rays, which emit some radiation, to CT scans, which expose kids to far more, Dr. Leonard adds.

"Historically, the line of reasoning given by general physicians and adult emergency physicians for these scans is that children are difficult to evaluate and don't have identifiable risk factors," said Dr. Leonard.

"This study shows there are risk factors physicians can use to screen children for CSI that can help aid their decision-making as to which children warrant radiographic testing and which children can be cleared based on history and a physical exam."

In this study, of 4,091 children enrolled at four children's hospitals, 74 had CSIs. The researchers found 14 factors had bivariable associations with CSIs and of these, seven were the most useful in predicting who had a CSI and who didn't. The model based on the smaller list of factors was 92% sensitive and 50.3% specific. A model based on the [retrospective study](#) was 90.5% sensitive and 45% specific.

The seven factors that were the most informative are:

- injury acquired while diving
- axial load, from landing on the top of the head or other blunt force directly in line with the spine
- any self-reported neck pain
- reported inability to move neck
- altered mental status on examination in the emergency

department

- intubation due to airway injury, respiratory failure or inability to protect their airway, or respiratory distress

Dr. Leonard and colleagues are now in the first year of a five-year national study that will include more than 20,000 children and observational data from emergency department and emergency medical services providers.

The researchers expect to increase the sensitivity, specificity and confidence factor of the mathematical model, with the goal of providing a Pediatric CSI Risk Assessment Tool that clinicians in all settings can use with children presenting with traumatic injury.

More information: Julie C. Leonard et al, Cervical Spine Injury Risk Factors in Children With Blunt Trauma, *Pediatrics* (2019). [DOI: 10.1542/peds.2018-3221](https://doi.org/10.1542/peds.2018-3221)

Provided by Nationwide Children's Hospital

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