

Needless abdominal CT scans can be avoided in children, study says

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A study of more than 12,000 children from emergency departments throughout the country in the Pediatric Emergency Care Applied Research Network (PECARN) has identified seven factors that can help physicians determine the need for a computed tomography (CT) scan following blunt trauma to the abdomen. Because CT scans pose radiation hazards for youngsters, the findings may enable doctors to determine which children do not need to be exposed to such tests after a traumatic injury.

The study, titled "Identifying children at very low risk of clinically important blunt abdominal injuries," is online first in advance of an upcoming issue of the [Annals of Emergency Medicine](#)."

"CT scans involve significant [radiation risk](#), especially for children, who are more vulnerable than adults to radiation's effects," said principal investigator and lead author of the study James Holmes, a professor of emergency medicine at the UC Davis School of Medicine. "We have now identified a population of [pediatric patients](#) that does not typically benefit from a [CT scan](#), which is an important step in reducing [radiation exposure](#)."

The prospective study involved children who arrived at emergency departments in the PECARN network after blunt trauma to their torsos, such as sustained from a car or bicycle crash, a fall or an assault. A variety of factors related to the children's histories and clinical presentations were evaluated. Among these, seven were identified by

statistical analysis to correlate with risk for involving a clinically important injury. The factors included evidence of trauma on the abdomen or chest (such as seat-belt marks), [neurological changes](#), abdominal pain or tenderness, abnormal breath sounds and vomiting.

Children who had none of the factors when evaluated in the [emergency department](#) had only a 0.1 percent chance of having an abdominal injury that required acute intervention. For the great majority of these cases, therefore, a CT scan would not likely provide additional useful information. According to the authors, the risk of developing a future cancer from radiation exposure from a CT scan in this situation (i.e., when lacking all seven factors) outweighs the risk of having a significant medical problem from the abdominal injury.

The authors stated that the prediction rule is intended only to help "rule out" the need for CT for children when none of the seven factors is present. However, the rule does not mandate a CT solely based on any one of the factors being present. If the prediction rule were used in that way, CT usage would actually increase over current levels. The authors emphasized that clinical judgment must play an important role in determining whether a CT is needed in each case. Extending the period of observation in the emergency department, and using findings from laboratory tests and ultrasonography, can also contribute to decision-making in cases of abdominal trauma.

According to Holmes, the prediction rule must be tested in another clinical trial designed specifically to evaluate its validity before being generally adopted. He expects that this will be carried out in the near future.

Another related ongoing study at UC Davis Medical Center is investigating the role of ultrasonography in the evaluation of abdominal trauma in children, and whether increasing its usage can lead to further

reduction of the need for CT scans.

This study also was conducted through PECARN, a network of pediatric emergency departments throughout the United States that enables researchers to gather enough data to perform significant studies on critical issues in pediatric emergency medicine. PECARN studies have previously led to new standards of care for infants or children presenting with head trauma, diabetic crisis and infections.

"Because of PECARN, we are uniquely positioned to perform large studies that can provide important information," said Nathan Kuppermann, senior investigator of the study, who is professor of pediatrics and emergency medicine and chair of the Department of Emergency Medicine at the UC Davis School of Medicine. "The results of such studies are making [emergency medicine](#) decision-making more of a science and leading to better and safer outcomes for [children](#)."

Provided by UC Davis

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