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**To place an electronic embedded link to this study and editorial in your story** These links will be live at the embargo time: <http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2016.1203>

<http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2016.1276>

**Concussion Assessment Tool May Help Predict Risk of Persistent Postconcussion Symptoms Among Children**

A clinical risk score developed among children presenting to an emergency department with a concussion was significantly better than physician judgment in predicting future persistent postconcussion symptoms, according to a study appearing in the March 8 issue of *JAMA.*

Rates of concussion have doubled during the last decade, with an estimated 750,000 pediatric acute concussion visits to emergency departments (EDs) occurring annually in the United States. Although many children experience symptom resolution within 2 weeks, approximately 33 percent experience ongoing symptoms, and those that persist beyond 28 days are referred to as persistent postconcussion symptoms (PPCS), which can have serious adverse effects, resulting in school absenteeism, impaired academic performance, depressed mood and lower quality of life. Validated and pragmatic tools to identify children at high risk of developing PPCS do not exist.

Roger Zemek, M.D., of Children’s Hospital of Eastern Ontario, University of Ottawa, Canada and colleagues conducted a study to derive and validate a clinical risk score to stratify PPCS risk occurring after acute concussion in youth using readily available clinical features. The study included children and adolescents (age 5-<18 years) who presented within 48 hours of an acute head injury to a pediatric emergency department, with follow-up 28 days after the injury. The primary outcome for the study was PPCS risk score at 28 days, which was defined as 3 or more new or worsening symptoms using the patient-reported Postconcussion Symptom Inventory compared with recalled state of being prior to the injury. The PPCS risk score incorporates 9 clinical variables containing information from demographics, history, initial symptoms, cognitive complaints, and physical examination.

In total, 3,063 patients (median age, 12 years; 39 percent girls) were enrolled (n = 2,006 in the derivation cohort; n = 1,057 in the validation cohort) and 2,584 of whom completed follow-up at 28 days after the injury. Persistent postconcussion symptoms were present in 801 patients (31 percent). The 12-point PPCS risk score model for the derivation cohort included the variables of female sex, age of 13 years or older, physician-diagnosed migraine history, prior concussion with symptoms lasting longer than 1 week, headache, sensitivity to noise, fatigue, answering questions slowly, and 4 or more errors on the Balance Error Scoring System tandem stance.

“Although the clinical utility of the PPCS risk score will need to be assessed in an externally validated implementation study prior to adoption into routine practice, the risk stratification score has the potential to individualize concussion care through optimal symptom management and appropriate follow-up. Therefore, future research needs to determine if the moderate test characteristics of the PPCS risk score allow for clinicians to confidently provide reassurance, alter management plans, or both. Future clinical benefits might include identifying high-risk individuals for further screening, prioritization for specialized concussion evaluations, and initiation of emerging treatments to prevent PPCS,” the authors write.

(doi:10.1001/jama.2016.1203; this study is available pre-embargo at the For The Media [website](http://media.jamanetwork.com/).)

**Editor’s Note**: Please see the article for additional information, including other authors, author contributions and affiliations, financial disclosures, funding and support, etc.

**Editorial: Identifying Children and Adolescents at Risk for Persistent Postconcussion Symptoms**

Lynn Babcock, M.D., M.S., and Brad G. Kurowski, M.D., M.S., of Cincinnati Children's Hospital Medical Center, write in an accompanying editorial that the clinical risk score developed by Zemek et al, if validated in other settings, may facilitate selection of patients who may be at highest risk of impairments as the optimal target population for much-needed interventional trials.

“Considering the variation in individual symptom profiles and trajectories, personalized patient-oriented approaches to ongoing assessments and delivery of post-injury interventions are needed to facilitate recovery in these vulnerable children and adolescents.”

(doi:10.1001/jama.2016.1276; this editorial is available pre-embargo at the For The Media [website](http://media.jamanetwork.com/).)

**Editor’s Note**: Please see the article for additional information, including financial disclosures, funding and support, etc.

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