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Jennifer L. Werner
Cincinnati Children's Hospital Medical Center Division of Sports Medicine, jennifer.werner@cchmc.org

Matthew Propst
Sports Medicine associates, CHI St. Joseph Health

Christy Reed
Cincinnati Children's Hospital Medical Center Division of Sports Medicine

Tim Foster
Department of Neurology and Rehabilitation Medicine, University of Cincinnati Medical Center

Kelsey Logan
Cincinnati Children's Hospital Medical Center Division of Sports Medicine

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Authors

Jennifer L. Werner, Matthew Propst, Christy Reed, Tim Foster, Kelsey Logan, Adam W. Keifer, and Paul Gubanich

An Investigation of School Socioeconomic Status on Adolescent Athletes' Baseline and Post-Injury Concussion Assessments

Jennifer L. Werner MS, ATC*; Matthew Propst MD, FAAP†; Christy Reed*; Tim Foster, MD‡; Kelsey Logan MD, MPH, FAAP, FACP*‡; Adam W. Kiefer PhD*‡; Paul Gubanich MD, MPH*‡.
*Cincinnati Children's Hospital Medical Center Division of Sports Medicine, Cincinnati, OH; †CHI St. Joseph Health, College Station, Texas; ‡University of Cincinnati, Cincinnati, OH

OBJECTIVE
Multifaceted assessments are imperative when managing sports-related concussions. Furthermore, culturally competent knowledge and skills are crucial for clinicians to provide effective concussion prevention, assessment, and management of the whole athlete. The purpose of this study is to determine if socioeconomic status (SES) differences affect baseline and post-concussion performance of adolescent athletes on the King-Devick test (KD), modified Balance Error Scoring System (mBESS), and Post-Concussive Symptom Inventory (PCSI).

DESIGN AND SETTING
Retrospective cross-sectional study.

PARTICIPANTS
Concussed adolescent athletes were recruited from a pre-existing concussion surveillance program (n = 377) conducted in 7 high schools. 20 athletes were included for analysis: 11 athletes from high-SES schools (age = 15.31 ± 1.3 years, 6 females and 5 males, time-since-injury = 7.09 ± 8.26 days) and 9 athletes from low-SES schools (age = 16.17 ± 1.05 years, 3 females and 6 males, time-since-injury = 6.11 ± 2.73 days). Intervention: KD, mBESS, and PCSI.

MAIN OUTCOME MEASUREMENT
The two groups were categorized on the SES of that school. SES of each school was determined by the percentage of students with free or reduced-cost lunches: high-SES as < 50% free or reduced lunches and low-SES as > 75% free and reduced lunches. The concussion surveillance program established baseline scores that included a history and risk factor questionnaire, KD, mBESS, and PCSI. Athletes diagnosed with a concussion repeated these assessments after injury in a hospital based sports medicine clinic. Differences between baseline and post-concussion scores in concussed athletes from low-SES and high-SES schools were assessed for KD, mBESS, and PCSI.

RESULTS
Age (P = .15) and time-since-injury (P = .75) were not significant between groups. At baseline, there was a difference in mBESS between groups (high-SES 28 ± 1, low-SES 25 ± 3, P = .01). There were no other between group differences identified on baseline or post-injury assessments.

CONCLUSION
The comparison of baseline and post-injury assessments such as the KD, mBESS, and PSCI have previously been advocated to provide more accurate diagnosis and a safer return-to-play from concussion in athletic populations. Several studies have attempted to provide normative data on all three measures we included in this study. While limited by sample size, our study found mBESS differences at baseline. Otherwise, SES did not affect performance on these concussion assessments, in this cohort of patients, at baseline and approximately 1 week post injury. As further investigation needs to continue to evaluate for these differences, clinicians should recognize that there may be differences in physical-function and self-reported symptoms that can be influenced by

additional extrinsic factors, such as socioeconomic disparities.

KEY WORDS: *King-Devick test, modified Balance Error Scoring System, and Post-Concussive Symptom Inventory*