Introduction: Sickle cell disease (SCD) is a rare monogenetic disorder marked by acute exacerbations that lead to frequent hospitalizations, devastating morbidity, and premature death. The disease is complicated by a number of genotypes with wide clinical variation. Also, because prevalence is low, some pediatrics residents finish training having little to no clinical experience managing acute complications. Infrequent clinical encounters coupled with the inherently complicated nature of SCD have contributed to knowledge and training gaps. Pediatrics residents need opportunities for clinical experience managing acute complications of SCD. The purpose of this study was to create a reliable and valid simulation-based pediatric SCD intervention to teach and assess pediatrics trainees acute care skills.

Methods: Scenarios were created from actual patient cases and followed the ABP and ACGME content outlines. The iterative development process included review by faculty members with expertise in SCD and simulation, the creation of teaching points for objective-directed debriefing, and pilot testing. Participants were required to make diagnostic and treatment interventions within a 5-minute period. Two raters independently scored performances using a diagnostic & therapeutic action checklist and global evaluation.

Results: The assessment cohort included 16 interns, 5 PGY-2, 2 PGY-3, 2 chief residents, and 3 Hem/Onc fellows. Asthma exacerbation was the scenario most proficiently managed (mean checklist score= 77%, SD 12.9); Posterior reversible encephalopathy syndrome proved most challenging (mean checklist score= 46.1%, SD 12.8). Senior residents and fellows performed significantly better than interns on both scoring system with a wide range of scores within groups (Figures). Checklist scoring had strong interrater reliability (0.73 0.93); global evaluations varied widely (0.46 0.84).

Conclusions: This is the first study using mannequin-based simulation to teach and assess pediatrics resident skills in the acute management of a single disease process. The model proved valid for differentiating skills of more experienced pediatrics trainees from those early in training. It provided a reliable evaluation of a participants ability to recognize and respond to simulated acute exacerbations of SCD. Future research will test the model at another medical center and seek to determine its affect on patient outcomes.
