year presenting to 5 EDs in one health system over a 5-year period, with a 365-day follow-up after each index visit. Patient characteristics (age, sex, race/ethnicity, presence of chronic condition) and visit characteristics (arrival day/time, acuity level, disposition, testing (labs and radiographs, medications) were assessed. The relationship between patient and visit characteristics with utilization and repeat visits was assessed using multivariable regression. RESULTS/ANTICIPATED RESULTS: A total of 20,620 patients with 33,127 ED visits during study timeframe. Thirty three percent (n=6842) had more than one visit in a year; 3964 (19.2%) had two visits, 1542 (7.5%) had three visits, and 1336 (6.5%) had 4 or more visits. Across all visits, over half (52%) were low acuity. The most common diagnoses were respiratory diseases (27%), systemic states (including fever, viral illness, 23%), and gastrointestinal diseases (15%). These diagnoses remained the most common for those with 1, 2, 3, and ≥ 4 ED visits during follow up. As ED visit frequency increased, there was an increase in percentage of children who were older, non-Hispanic Black, and triaged as low acuity. Infants with ≥ 4 ED visits were more likely to be without a chronic condition, have no medications or testing ordered, and be discharged. DISCUSSION/SIGNIFICANCE: There was high ED utilization for those without chronic conditions who were least likely to need medications, testing, and hospital admission. With increasing attention paid to high-utilization in healthcare, it is important to assess why infants use the ED at high rates and develop systems to improve high value care while decreasing resource burden.

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A clinical trial using exergaming with augmented reality to promote physical activity in children with Cerebral Palsy at Children's Hospital Los Angeles

Melissa Bent, Abigail Padilla, Susan A. Rethlefsen, Alison Hanson, Eva Ciccodicola and Tishya AL Wren
Children's Hospital Los Angeles

OBJECTIVES/GOALS: Cerebral palsy (CP) is the most common motor disability in childhood in the US1. Augmented reality (AR) has promise enhancing engagement of rehabilitation[2]. We developed adaptive games for children with CP using Augment Therapy™. The goal of this study was to obtain user experience in the orthopedic clinic to inform a home-based clinical trial. METHODS/STUDY POPULATION: Participants were recruited at a pediatric center from July 1 to September 20, 2023. Inclusion criteria werediagnosis of CP, ages 5-10 years, English/Spanish speaking. Exclusion criteria were cognitive delay, audio or visual impairment, seizures, or recent surgery. The Augment Therapy™ app was delivered through a clinic iPad. The electronic medical record was used to screen eligible patients. 22 patients were screened; 14 were not eligible based on exclusion criteria. 2 patients refused based on not having enough time to participate. Children played 5 games and their movements were tracked using augmented reality. To evaluate the quality of the app, participants were asked to complete a validated questionnaire, the modified Mobile App Rating Scale. Descriptive statistics were used to analyze responses. RESULTS/ANTICIPATED RESULTS: Six participants were eligible and completed phase I. Eighty-three percent (5/6) of participants reported the character was mostly matching their child's movements and easy for their child to follow instructions. Thirty three percent (2/6) reported there were technical issues where the app did not track or froze. 100% reported being interested in participating in the home clinical trial. Parent reported their child's favorite games were flying and obstacle course. The mean and median MARS score was 3.8/5 and 4/5, respectively. Regarding engagement, 66.7% (4/6) reported the app was fun to use. DISCUSSION/SIGNIFICANCE: Families of children with CP reported positive experiences overall with Augment Therapy™ mobile app. The technical issues will need to be addressed. Future studies will need to establish efficacy and dosing time of use of the app for adherence to a program using these modules and engagement with the app to increase habitual physical activity.

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Hypermobile Ehlers-Danlos Syndrome: Phenotypic Presentation, Comorbidity Risk, and Medical Service Utilization in the United States

Rachael E. Bishop, Jane R. Schubart and Susan E. Mills
Pennsylvania State University

OBJECTIVES/GOALS: Hypermobile Ehlers-Danlos syndrome (hEDS) is a heritable connective tissue disorder with no known genetic etiology. Its complex phenotypic presentation with multisystem involvement delays proper diagnosis and treatment, especially for females. This study examines the risk for common hEDS comorbidities and medical service utilization. METHODS/STUDY POPULATION: Electronic health records from over 150 million patients across 92 American healthcare servers were queried using the TriNetX database to determine phenotypic presentation of hEDS and risk of receiving comorbid diagnoses. Contingency tables were created with hEDS as the condition and postural orthostatic tachycardia syndrome (POTS) or gastroparesis as the grouping variables. Advanced analytics were conducted to compare outcomes of two cohorts: (1) patients diagnosed with hEDS and both POTS and gastroparesis, and (2) patients with a sole diagnosis of hEDS. After propensity score matching, differences in medical service utilization and mental health diagnoses were assessed between these two cohorts. All analyses restricted age (12-70 years) and employed established exclusion criteria (e.g., diabetes). RESULTS/ANTICIPATED RESULTS: TriNetX national health records (N = 1,968) reveal that hEDS predominantly affects females (87%) and is diagnosed at a mean of 35 years of age. People diagnosed with hEDS have a high prevalence of comorbid nervous system (81%), mental health (76%), and digestive system (69%) disorders. They are 29.7 times more likely to be diagnosed with POTS [95% CI: 27.1, 32.6] and 66.3 times more likely to be diagnosed with gastroparesis [95% CI: 56.5, 77.9], compared to people without hEDS. After propensity score matching for sex, race, and ethnicity, people diagnosed with hEDS and both POTS and gastroparesis have significantly greater service utilization (72.2% vs. 56.7%; $z = 2.18$, $p < .05$) but not a greater incidence of mental health disorders (34.4% vs. 24.4%; $z = 1.47$, $p = .14$) than people diagnosed with hEDS alone. DISCUSSION/SIGNIFICANCE: This study reveals the phenotypic presentation of hEDS and the elevated risk of co-occurring POTS and/or gastroparesis diagnosis. hEDS and its comorbidities are associated with more frequent medical encounters but not with a greater incidence of mental illness. Findings have implications for both clinical practice guidelines and further research.

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