A Statewide Assessment of Frequent Emergency Department Use by Children

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STUDY PURPOSE
To assess ED visit frequency by demographic and health characteristics of Rhode Island (RI) children with ED visits.

BACKGROUND
Approximately 20% of all children in the United States have at least one Emergency Department (ED) visit each year. Frequent use of the ED is often targeted as a quality improvement metric. While much research has examined frequent ED use among adults, little has focused on children’s frequent ED use.

DATA
Electronic medical records (EMR) for all pediatric patients seen in the ED between January 1, 2005 and December 31, 2014 were reviewed for one major hospital network in RI.

Inclusion criteria:
- Child aged 0 to 17
- Reside in RI

Population: 168,554 children

METHODS
Classified all diagnoses using the diagnosis grouping system developed by the Pediatric Emergency Care Applied Research Network Core Data Project

- Places ICD-9 codes into 21 groups
- Categorized medical complexity with the Pediatric Medical Complexity Algorithm (PMCA)

Home address geocoded with ArcGIS 10.2 to measure the travel distance to the ED visited.

For each calendar year, we calculated the number of ED visits (categorized as 1, 2, 3, or 4+)
- Retained the year of maximum ED use
- If tie existed, used the first year of maximum use

Cochran-Armitage trend test to assess whether prevalence rates of each characteristic varied with ED visit frequency.

Multinomial logistic regression model to estimate the relative risk of increasing visit frequency, comparing children with a maximum of 2, 3, and 4+ visits to those with only 1 visit. Children with a maximum of 1 ED visit in a year served as the referent group.

SAS 9.4 was used for all statistical analyses.

RESULTS

As ED utilization increased:
- Increase in the percentage of children:
  - Age 0 to 1
  - Hispanic
  - Spanish-speaking
  - Publicly insured
  - With a complex or non-complex chronic condition
- Decrease in distance to the ED

Figure 1. Percentage of children with 1, 2, 3, or 4+ visits during the year of maximum ED utilization.

Figure 2. Percentage of diagnoses in the major diagnosis groups by level of ED utilization. Diagnosis codes grouped into Diagnosis Grouping System (DGS) categories (Alessandrini et al. 2010). All diagnoses for all visits during the year of maximum ED utilization are included.

Figure 3. Multinomial Regression Model for Factors Associated with Frequent ED Visits

DISCUSSION
Comparing the highest utilisers (those with four or more ED visits in a year) to those with only one ED visit, we find age, race/ethnicity, language, insurance, medical complexity, and distance to the ED are significant predictors.

Decreasing frequent pediatric ED use will require not only addressing improved medical management of complex medical problems, but also addressing social determinants of health in this population.