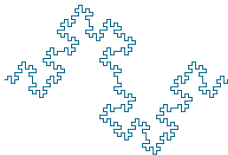# QSEP Research Update

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Savvy Sherpa

June 29, 2018

RESEARCH QUESTIONS

▶ Can we identify a dataset containing the pediatric illness populations of interest and their immediate family members?

▶ Can we quantify the outcomes of interest and their relationship to the hypothesized mediating factors?

▶ Do we see any significant secondary effects of pediatric illness on family members, in comparison to a sensibly-defined control group?

DATASET - FROM DATA TEAM

- ▶ Count of sick children (under 24) in our dataset: 286,836
- ▶ Total member count (family members & sick children combined): 973,718
- ▶ Total family count: 249,249
- ▶ Dataset covers year 2014-2016 and includes months since diagnosis.
- ▶ Between 65-70% of members in each year were enrolled for 12 months

OVERVIEW
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EXPLORATORY ANALYSIS
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MODELING
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NUMBER OF CHILDREN UNDER 16 WITH EACH CONDITION

- ▶ Total sick children under 16: 194,108
- ▶ Autism (ASD): 13,708
- ▶ Type 1 Diabetes (T1D): 2,612
- ▶ Cerebral Palsy: 2,197
- ▶ Asthma: 119,299
- ▶ Cancer: 36,347
- ▶ Traumatic Event: 34,963
- ▶ Multiple Conditions: 14,202

DATA CLEANING

- ▶ Removed spend for members who were enrolled 3 months or less in a given year.
- ▶ Want to look at just sick children under 16, and adults in the same household between 30 to 55.
- ▶ Typically 1 or 2 members per household that meet these criteria, although several households have 3.

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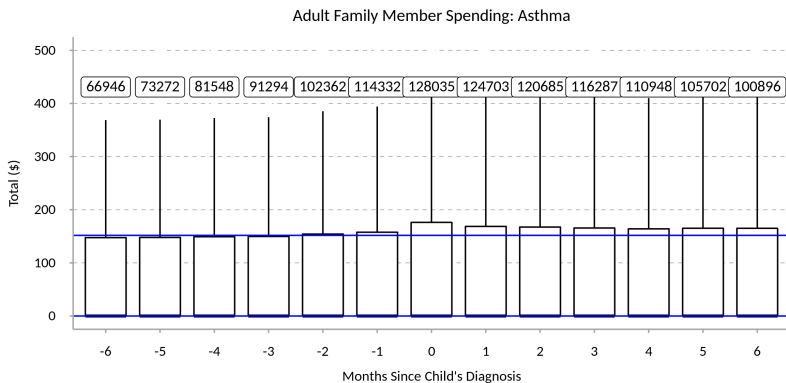○○○

EXPLORATORY ANALYSIS
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MODELING
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ASTHMA - SICK CHILD SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.

Sick Child Spending: Asthma

OVERVIEW
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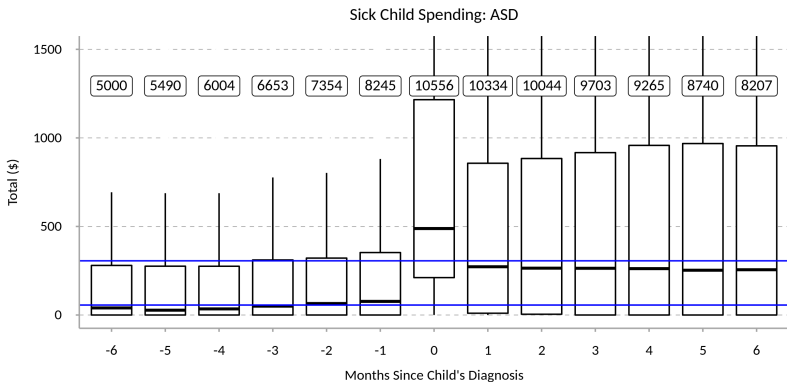EXPLORATORY ANALYSIS
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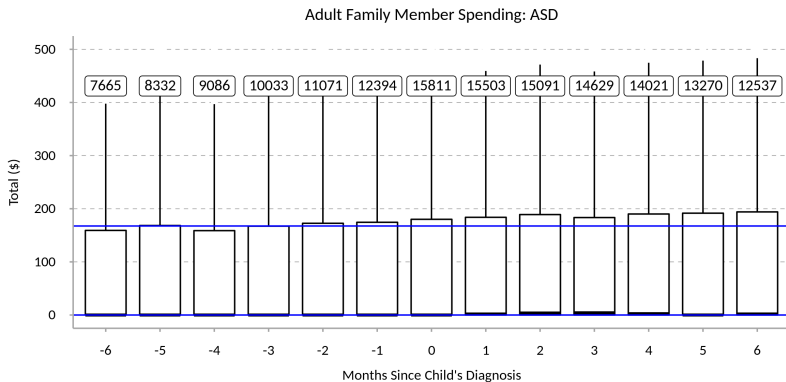
MODELING
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ASTHMA - ADULT SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.

Adult Family Member Spending: Asthma
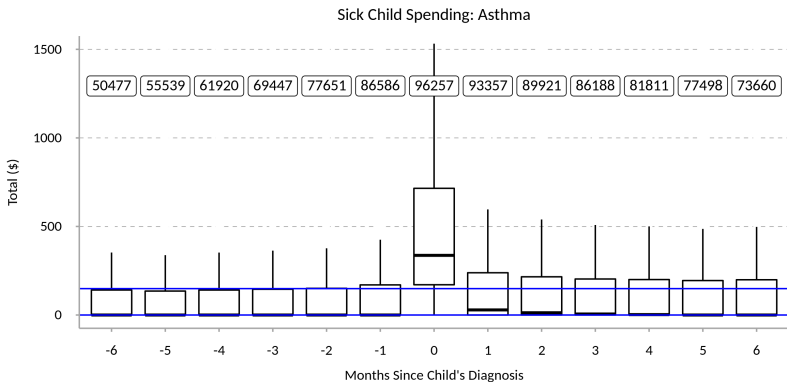
AUTISM - SICK CHILD SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.
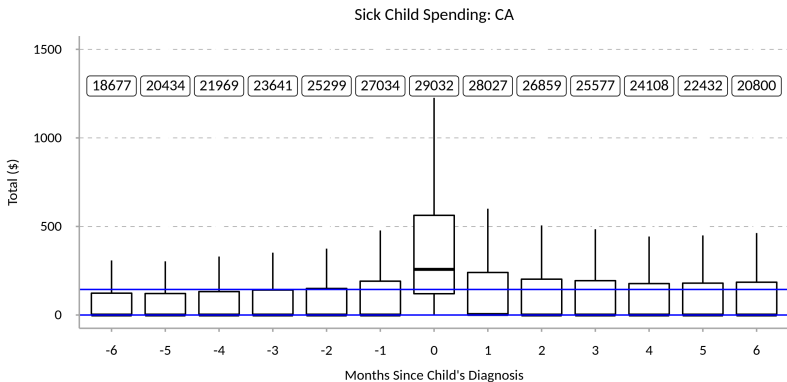

Sick Child Spending: ASD

AUTISM - ADULT SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.
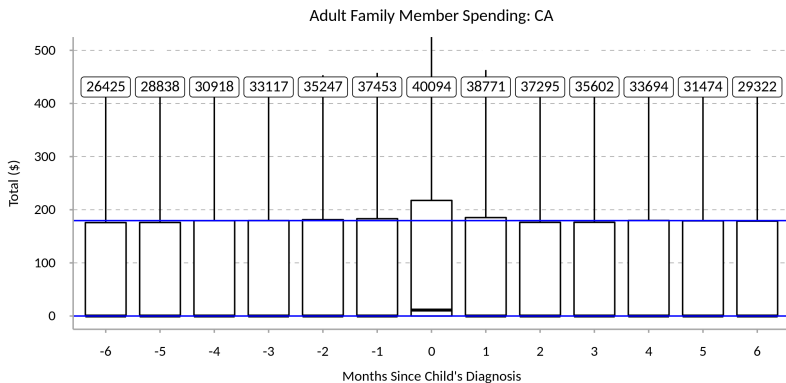

Adult Family Member Spending: ASD

CANCER - SICK CHILD SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.
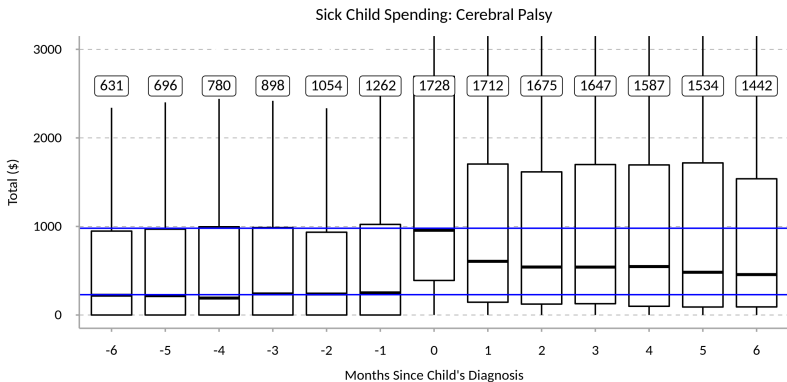

Sick Child Spending: CA

CANCER - ADULT SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.
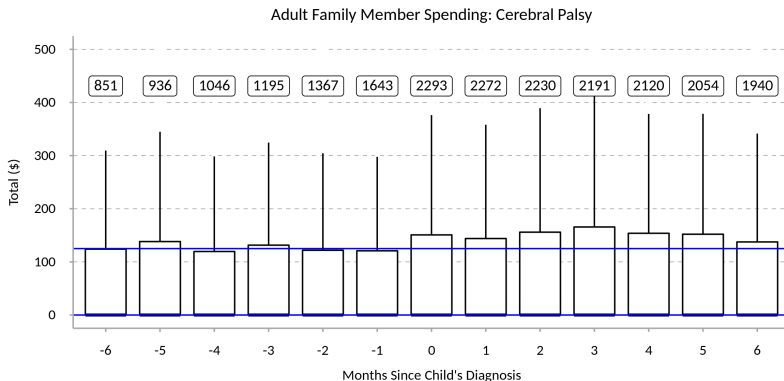

Adult Family Member Spending: CA

CEREBRAL PALSY - SICK CHILD SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of
spend before diagnosis. Numbers shown are number of member
months included in boxplot.

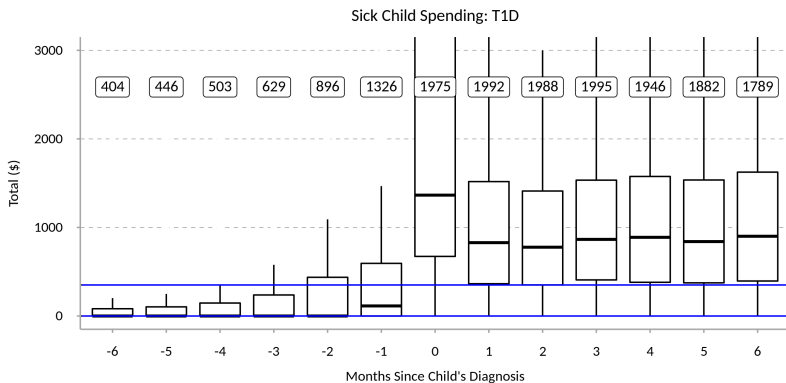

Sick Child Spending: Cerebral Palsy

CEREBRAL PALSY - ADULT SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.

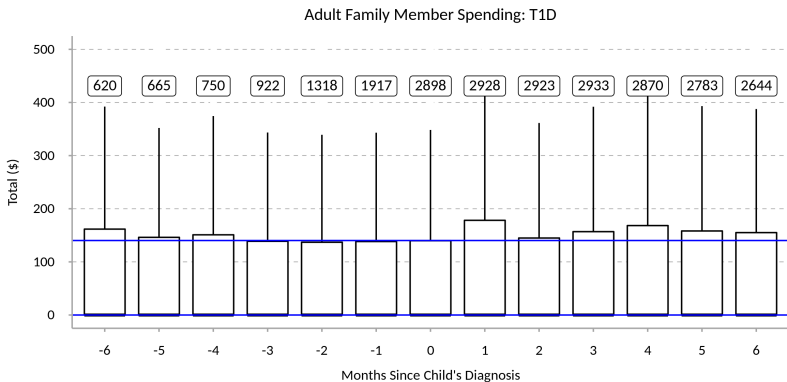Adult Family Member Spending: Cerebral Palsy

TYPE 1 DIABETES - SICK CHILD SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.
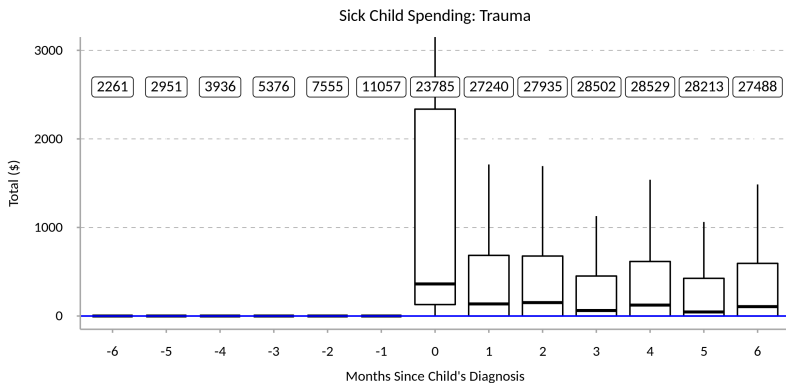

Sick Child Spending: T1D

TYPE 1 DIABETES - ADULT SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.

Adult Family Member Spending: T1D

TRAUMA - SICK CHILD SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.

Sick Child Spending: Trauma
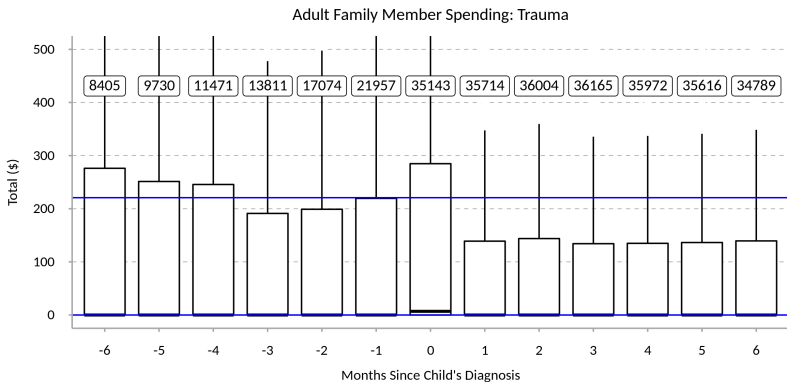
TRAUMA - ADULT SPENDING

Outliers not shown. Blue lines represent median and 75 percentile of spend before diagnosis. Numbers shown are number of member months included in boxplot.


Adult Family Member Spending: Trauma

INITIAL MODEL

- ▶ Calculated average monthly spend per adult family member before and after diagnosis, using data within 24 months of diagnosis.

- ▶ Response: square root of average monthly spend.

- ▶ Predictors: RAF, Age, Indicator of after child's diagnosis, Indicator of male, Indicator of only one adult on the plan (No other 'parents' on plan).

- ▶ Scaled average RAF and Age to have mean 0 and variance 1 in order to compare size of parameter estimates.

- ▶ Fit linear least squares model and linear quantile regression model looking at change in median and 75th quantile. Calculated parameter estimates and 95% confidence intervals using 1000 bootstrap samples.
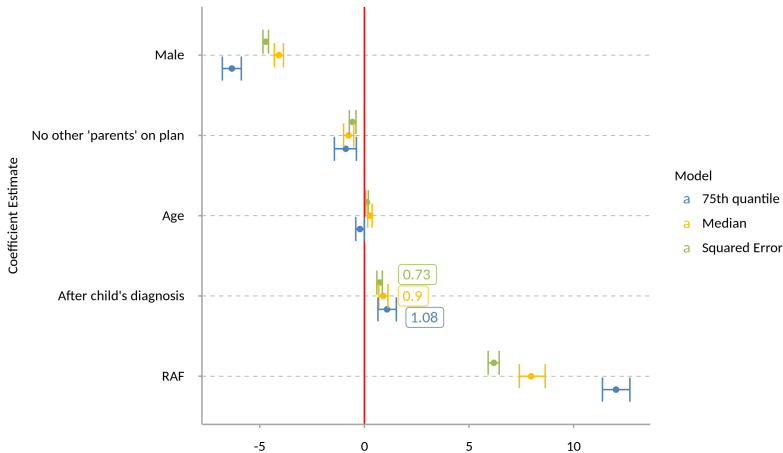
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AUTISM DIAGNOSIS EFFECT ON ADULT FAMILY.

Linear effect on the square root of total spend of adults age 30-55 in the same household as a child with autism.
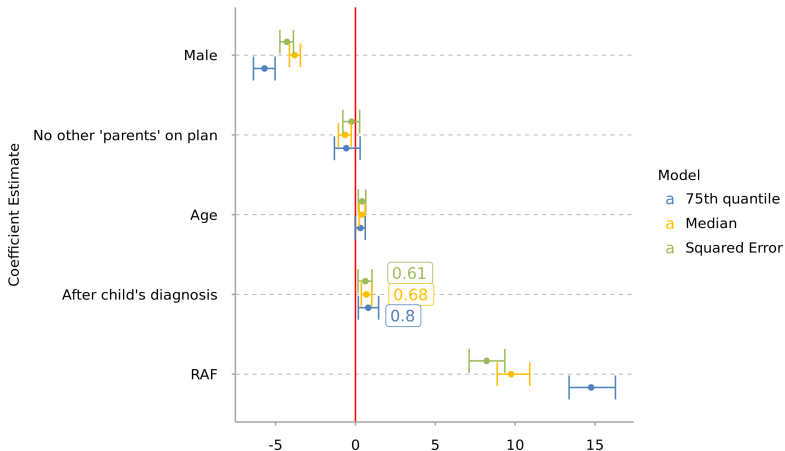
ASTHMA DIAGNOSIS EFFECT ON ADULT FAMILY.

Linear effect on the square root of total spend of adults age 30-55
in the same household as a child with autism.

Quantile regression fit on sample of data (25,000), due to large size ($> 100,000$)

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DIABETES DIAGNOSIS EFFECT ON ADULT FAMILY.

Linear effect on the square root of total spend of adults age 30-55 in the same household as a sick child.