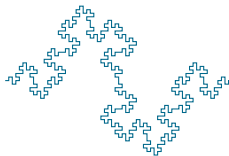


QSEP Research Update

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RESEARCH QUESTIONS

Original

- ▶ 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?

Updated

- ▶ Do we see a difference in adult family member spending before and after a child is diagnosed?

DATASET - FROM DATA TEAM

- ▶ Count of sick children (under 24) in our dataset: 275,819
- ▶ Total member count (family members & sick children combined): 968,471
- ▶ Total family count: 237,829
- ▶ Dataset covers year 2014-2016 and includes months since diagnosis, median household income, distance to PCP.
- ▶ Between 65-70% of members in each year were enrolled for 12 months

NUMBER OF CHILDREN UNDER 16 WITH EACH CONDITION

- ▶ Total sick children under 16: 159,792
- ▶ Asthma: 99,065
- ▶ Autism (ASD): 10,966
- ▶ Cancer: 29,572
- ▶ Cerebral Palsy: 1,802
- ▶ Type 1 Diabetes (T1D): 2,089
- ▶ Traumatic Event: 29,159
- ▶ Multiple Conditions: 12,142

Number of children under 16 with each condition, enrolled for more than 3 months, and for whom we have at least one month of spend data before diagnosis.

- ▶ Total sick children under 16: 136,791
- ▶ Unique Families: 122,588
- ▶ Asthma: 87,872
- ▶ Autism (ASD): 8,732
- ▶ Cancer: 27,466
- ▶ Cerebral Palsy: 1,440
- ▶ Type 1 Diabetes (T1D): 1,434
- ▶ Traumatic Event: 22,313
- ▶ Multiple Conditions: 11,756

DATA CLEANING

- ▶ To identify parents/guardians in the household used the criteria:
 - ▶ Same household as sick child
 - ▶ Older than 15
 - ▶ At least 15 years older than the sick child
 - ▶ No more than 60 years older than the sick child
 - ▶ Within 15 years of the age of the oldest member of the household
- ▶ Typically 1 or 2 members per household that meet these criteria, although several households have 3.

MODELS

- ▶ Goal: model monthly spend per adult family member before and after diagnosis.
- ▶ Model 1: Treat spend as binary and model probability of non-zero spend
- ▶ Model 2: Look at only positive values of spend and model log total allowed amount.
- ▶ Models were fit using generalized additive models to incorporate non-linear effects

PREDICTORS

- ▶ Non-linear Predictors:
 - ▶ Adult's age
 - ▶ Sick child's age
 - ▶ Median household income
- ▶ Linear predictors:
 - ▶ Time
 - ▶ RAF categories
 - ▶ Plan Type: Gated HMO, Choice Plus, Select Plus, Choice, Other
 - ▶ Indicator of male
 - ▶ Indicator of only one adult on the plan that meets the above criteria (no other parents on plan)
 - ▶ Indicator of other children on the plan
 - ▶ Interaction between single adult and other children
 - ▶ Interaction between single adult and male

Predictors of interest:

- ▶ Indicator of after child's diagnosis
- ▶ Interaction between after diagnosis and male

Factor increase in odds of positive monthly spend

	ASD	Asthma	Cancer	Cerebral	T1D	Trauma
Intercept	0.236	0.289	0.295	0.398	0.406	0.29
After child's diagnosis	1.072	1.063	1.056	1.199	1.016	-
After child's diagnosis x Male	1.055	1.03	-	-	1.219	1.066
Male	0.446	0.397	0.41	0.355	0.369	0.4
RAF (0.25, 1]	0.921	0.873	0.893	0.778	0.91	0.848
RAF (1, 5]	3.716	3.002	3.182	3.031	4.384	3.296
RAF (5, 10]	4.892	4.594	3.828	3.614	5.319	4.383
RAF (10, 100]	5.737	4.766	4.219	7.053	12.113	5.195
s(Median Household Income)	1.002	1.002	1.001	1.001	1.002	1.002
s(Age adult)	1.029	1.031	1.031	1.024	1.015	1.027
s(Sick child age)	1.01	0.992	0.992	0.991	-	0.994
Single Adult	0.846	0.93	-	-	1.125	0.983
Other Children	1.016	0.961	0.959	-	-	-
Time	-	-	-	0.998	-	1.002
Choice Plus Plan	1.163	1.134	1.183	1.094	1.131	1.171
Select Plus	1.024	1.063	1.084	0.874	1.248	1.021
Choice	1.07	1.065	1.149	0.955	1.185	1.095
Gated HMO	0.955	0.95	1.013	0.961	0.95	0.912
Male x RAF (0.25, 1]	1.194	1.329	1.31	1.735	1.437	1.362
Male x RAF (1, 5]	1.31	1.524	1.48	2.123	1.712	1.56
Male x RAF (5, 10]	1.057	1.269	1.485	1.944	1.777	1.509
Male x RAF (10, 100]	0.847	1.392	1.444	0.695	0.569	1.489
Other Children x Single Adult	-	1.039	-	1.276	0.838	1.032
Male x Single Adult	0.944	0.916	0.951	0.829	0.798	0.873

"-" indicates coefficient was not significant.

Effect of a diagnosis on men and women's odds of monthly spend

	Female	Male
ASD	1.072	1.212
Asthma	1.063	1.164
Cancer	1.056	1.115
Cerebral	1.199	1.438
T1D	1.016	1.258
Trauma	1	1.066

Factor increase in amount of monthly spend

	ASD	Asthma	Cancer	Cerebral	T1D	Trauma
Intercept	101.693	114.376	103.383	150.702	140.57	130.982
After child's diagnosis	1.007	1.03	1	1.093	-	0.951
After child's diagnosis x Male	-	-	-	-	-	1.112
Male	0.813	0.817	0.795	0.827	0.864	0.775
RAF (0.25, 1]	1.016	0.984	1.035	0.93	1.189	1.004
RAF (1, 5]	1.913	1.904	1.931	2.168	2.654	1.945
RAF (5, 10]	4.383	4.364	3.821	4.502	4.792	3.862
RAF (10, 100]	8.69	6.484	5.935	6.866	11.901	8.089
s(Median Household Income)	1.003	1.003	1.003	1.003	1.004	1.002
s(Age adult)	-	1.001	1.005	0.991	0.997	0.999
s(Sick child age)	-	0.993	0.989	-	0.991	0.995
Single Adult	1.067	0.961	1.01	1.126	-	-
Other Children	-	1.001	1.039	1.059	-	-
Time	1.003	1.001	1.001	-	-	1.003
Choice Plus Plan	1.147	1.047	1.019	0.9	0.796	0.992
Select Plus	1.292	1.029	1.02	1.055	0.711	0.998
Choice	1.165	1.118	1.084	0.989	0.838	1.049
Gated HMO	1.011	0.951	0.965	0.863	0.629	0.902
Male x RAF (0.25, 1]	0.91	0.99	0.998	1.332	0.923	0.982
Male x RAF (1, 5]	1.067	1.001	1.073	1.109	1.197	1.071
Male x RAF (5, 10]	0.88	0.86	0.953	1.633	1.463	0.945
Male x RAF (10, 100]	0.874	1.076	1.198	1.052	1.032	0.868
Other Children x Single Adult	-	1.03	0.935	-	-	-
Male x Single Adult	-	1.026	-	-	-	-

"-" indicates coefficient was not significant.

Effect of a diagnosis on amount of men and women's monthly spend

	Female	Male
ASD	1.007	1.007
Asthma	1.03	1.03
Cancer	1	1
Cerebral	1.093	1.093
T1D	1	1
Trauma	0.951	1.058

Combined Model - diagnosis terms

	Logistic	Log-normal
(Intercept)	0.289	114.740
After ASD	1.119	1.056
After Asthma	1.079	1.028
After Cancer	1.131	1.057
After Cerebral	1.020	0.985
After T1D	0.965	0.953
After Trauma	0.964	1.003
After ASD x male	1.071	0.983
After Asthma x male	1.004	1.011
After Cancer x male	1.012	1.045
After Cerebral x male	1.013	1.129
After T1D x male	1.110	1.053
After Trauma x male	1.042	0.924

Combined Model - other terms

	Logistic	Log-normal
male	0.406	0.814
RAF (0.25, 1]	0.873	1.054
RAF (1, 5]	3.112	1.915
RAF (5, 10]	4.347	5.108
RAF (10, 100]	4.794	1.003
s(MedianHouseholdIncome)	1.002	1.001
s(Age Adult)	1.030	0.994
s(sick child age)	0.993	0.974
single adult	0.953	1.007
other child	0.968	1.001
time	1.000	1.042
Choice Plus Plan	1.142	1.047
Select Plus	1.050	1.109
Choice	1.078	0.946
Gated HMO	0.963	0.977
Male x RAF (0.25, 1]	1.332	1.032
Male x RAF (1, 5]	1.517	0.987
Male x RAF (5, 10]	1.335	1.014
Male x RAF (10, 100]	1.365	1.025
single adult x other child	1.030	114.740
male x single adult	0.916	1.056