Predicting Average Medical Payment using Physician Referral Network at the Hospital Service Area Level

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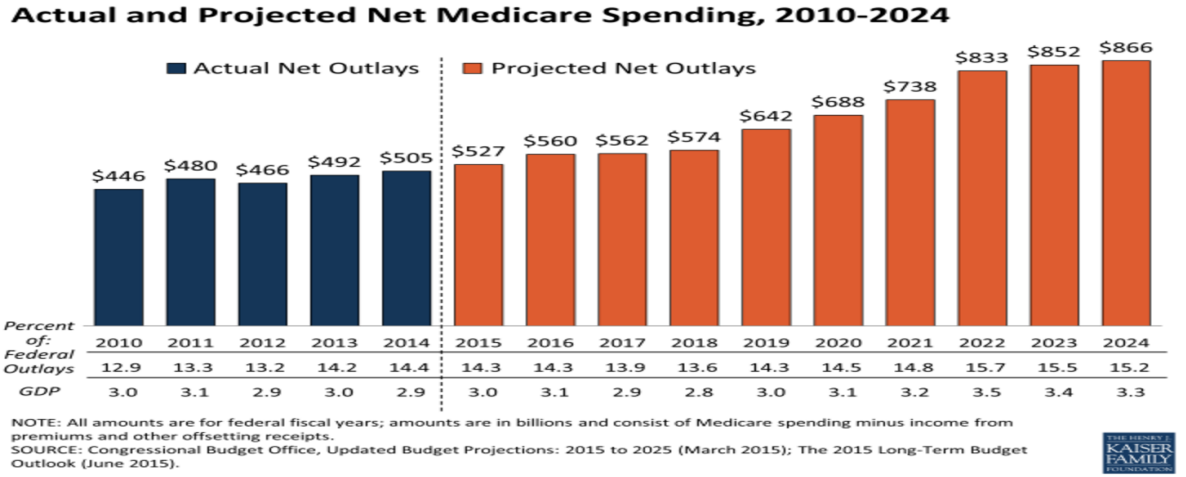
Background

- **Medicare** In 2012, covers more than 61 million citizens and costs hundreds of billions dollsrs every year.



- **The objective** of our study is to investigate whether there are regional differences in cost of care provided to Medicare Part B beneficiaries, and more specifically, to determine if the cost of care is related to local physician referral network structure. Finally trying to lower the cost medicare.

Data sets and Method

- Data sets:
  - Physician referral network 30-day (2012);
  - Hospital Service Areas are collections of zip codes, related covariates corresponding HSA, obtained from dartmouthatlas.org (2012).
  - Physician Payment Data from CMS (2012)
- Set up & data pre-processing:
  - Response Variable: average Medicare allowed amount from Payment data, aggregated over the physicians and services in each HSA.
  - Covariates: – HSA characteristics, like physician count, resident count, average income, crime rate etc ;
    – Network Characteristics, like mean node degree, edge density, transitivity, closeness etc.

Results from regression

- Using stepwise selection by BIC, our model is:
  log(TotalMedicareAllowed) =
  5.07 - 2.21 edgeDensity + 0.026 degMean + 0.02 degSD
  + 0.0017 *vcount -8e-5 ecount - 0.76 localClustCoef
  + 0.013 AveAnnualVisit + 0.31e-5 enrollees + 1.2e-4 skillednursing
  + 4.5e-4 PhyReimbusePerEnrollee
- It seems that, after control some other variables, we should find that some network characteristics are are still significant related to medical cost.

Future directions

- Refine the regression model, and collect a more thorough collections of related variables, and do some more transformations if necessary.
- Look at some representative networks, explore deeply why and how the physician referral network will affect the cost of Medicare.
- Build another model based on 2014 data. To see weather there are changes in the regression model and Network structure after the implementation of Obamacare.