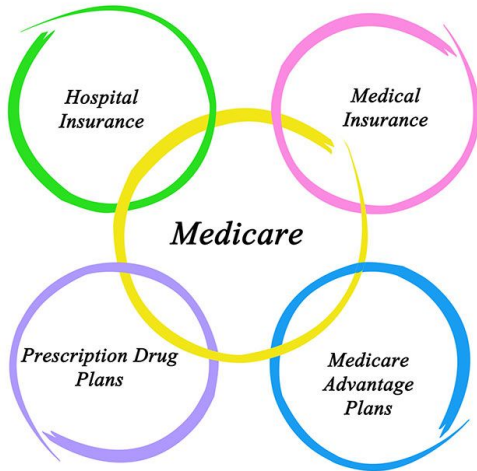
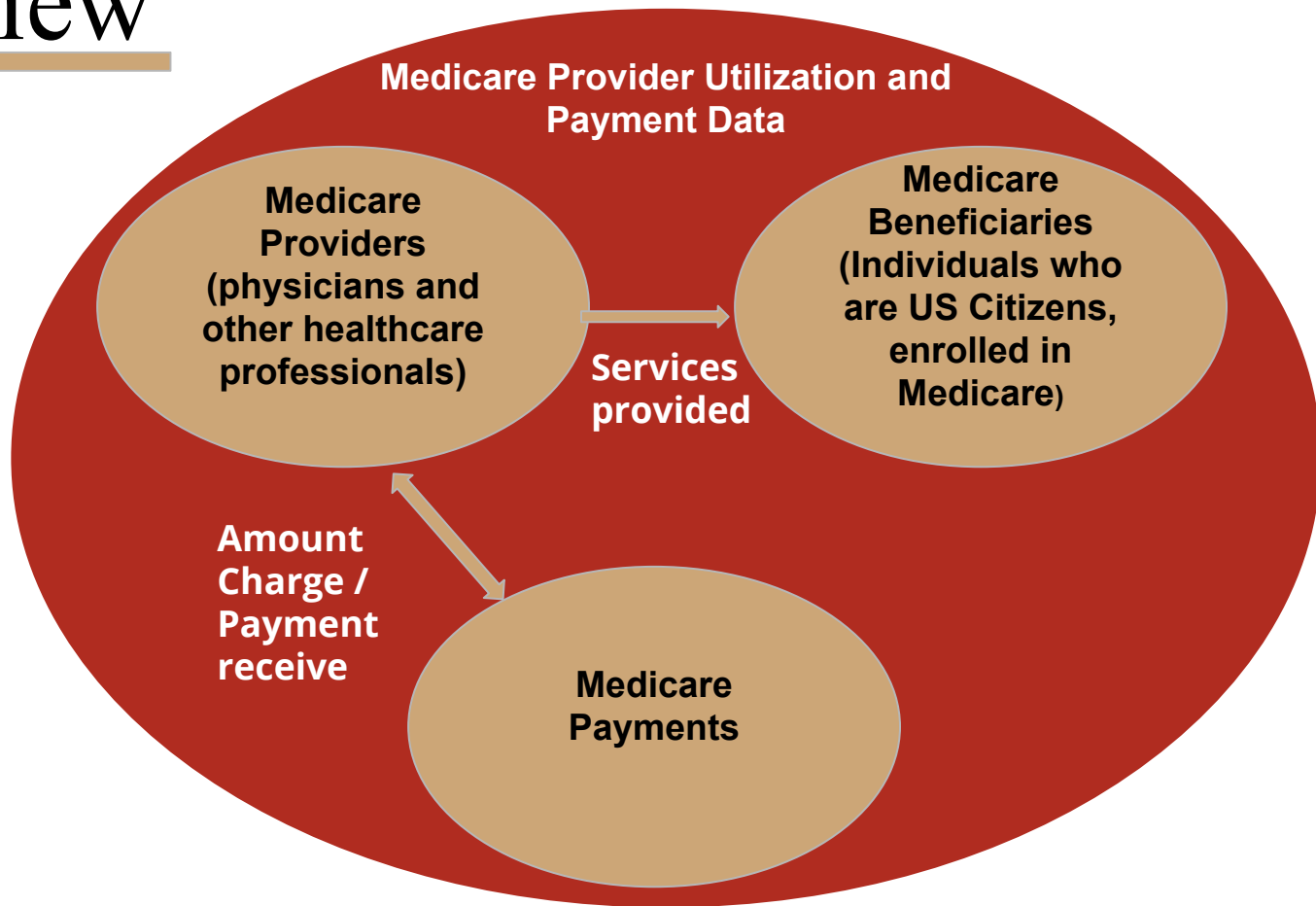


Medicare Provider Utilization and Payment Data Analysis

Aruna Rayapeddi



Overview



Objective

What factors (state, number of visits by beneficiaries, provider type, service type etc;) will impact the variances in the “Average Medicare Payment Amount”.

Overview

Data set - Medicare Provider Utilization and Payment Data Physician and Other Supplier Public Use File

Data set provider - CMS (Centers for Medicare & Medicaid Services)

Content - The data file contains information on utilization, payment (allowed amount and Medicare payment), and submitted charges organized by National Provider Identifier (NPI), Healthcare Common Procedure Coding System (HCPCS) code, and place of service.

*This dataset does not have any information on patients **who are not covered by Medicare**

What Medicare Part B covers

Part B covers 2 types of services

- ◆ **Medically necessary services:** Services or supplies that are needed to diagnose or treat your medical condition and that meet accepted standards of medical practice.
- ◆ **Preventive services:** Health care to prevent illness (like the flu) or detect it at an early stage, when treatment is most likely to work best.

Part B covers things like:

- ◆ Clinical research
- ◆ Ambulance services
- ◆ Durable medical equipment (DME)
- ◆ Mental health
 - Inpatient
 - Outpatient
 - Partial hospitalization
- ◆ Getting a second opinion before surgery
- ◆ Limited outpatient prescription drugs

Analysis

Shape of the data frame - (9714896, 26)

Number of providers who are participating in the Medicare

npi	
medicare_participation_indicator	
N	3517
Y	9711379

Number of Male/Female providers

npi	
nppes_provider_gender	
F	2730509
M	6560832

Number of services provided in a facility / non-facility

npi	
place_of_service	
F	3742554
O	5972342

Analysis

Number of providers who are Individuals / Organizations

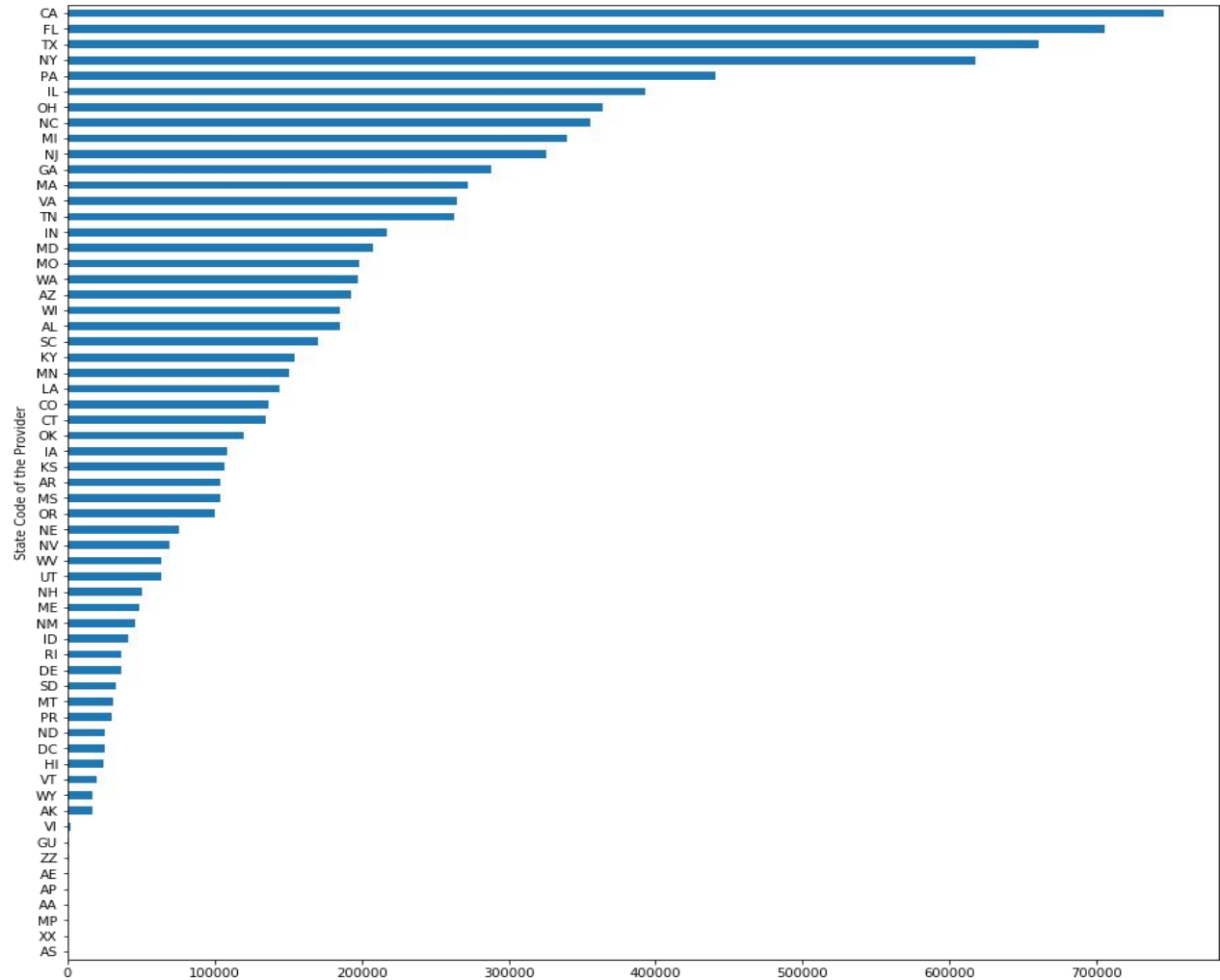
npi	
nppes_entity_code	
I	9291341
O	423555

Number of Services offered in US - **9714369**

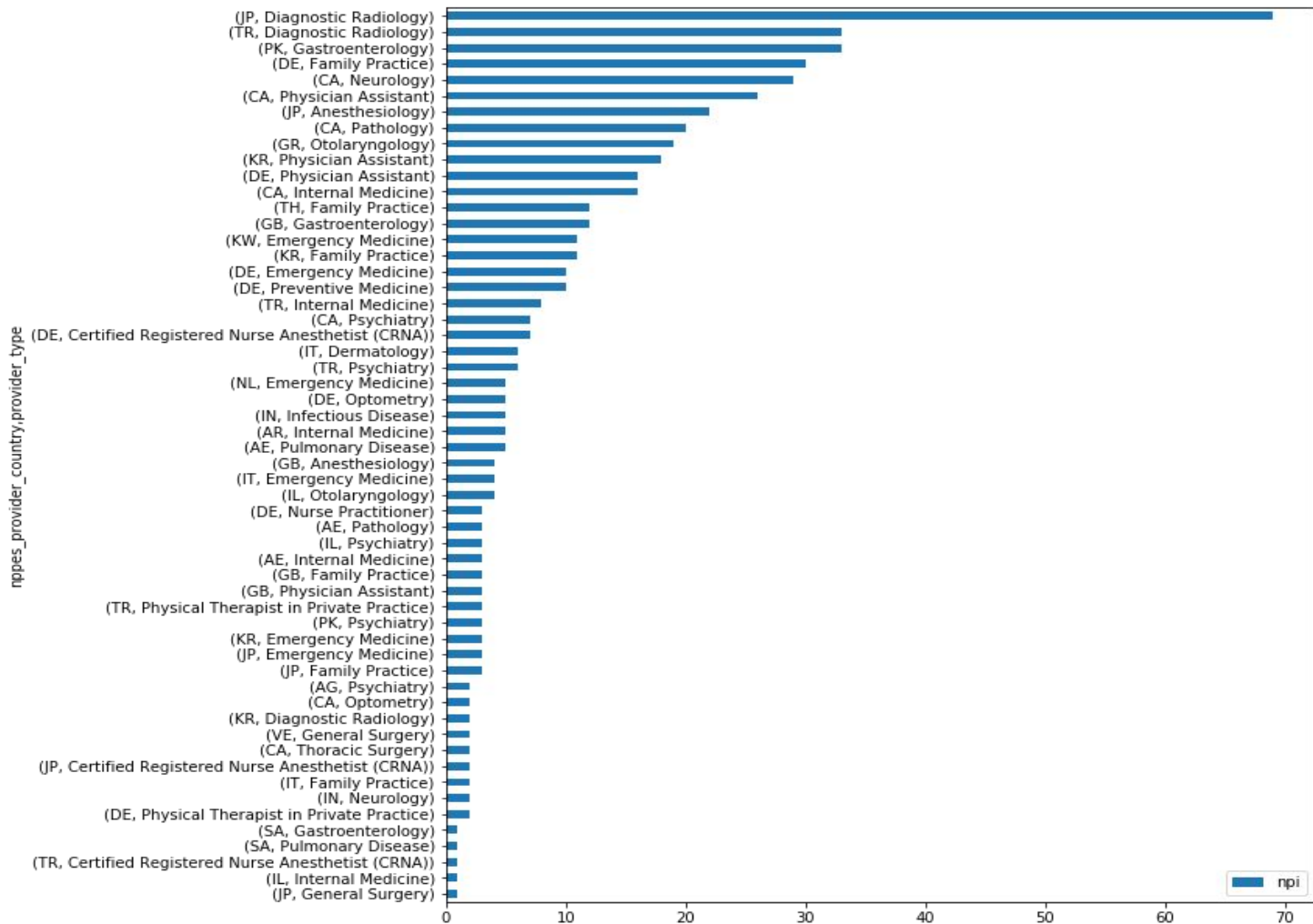
Number of Services offered outside US - **527**

Data with 'medicare_participation_indicator' as 'Y' and country as 'US' were considered for further analysis.

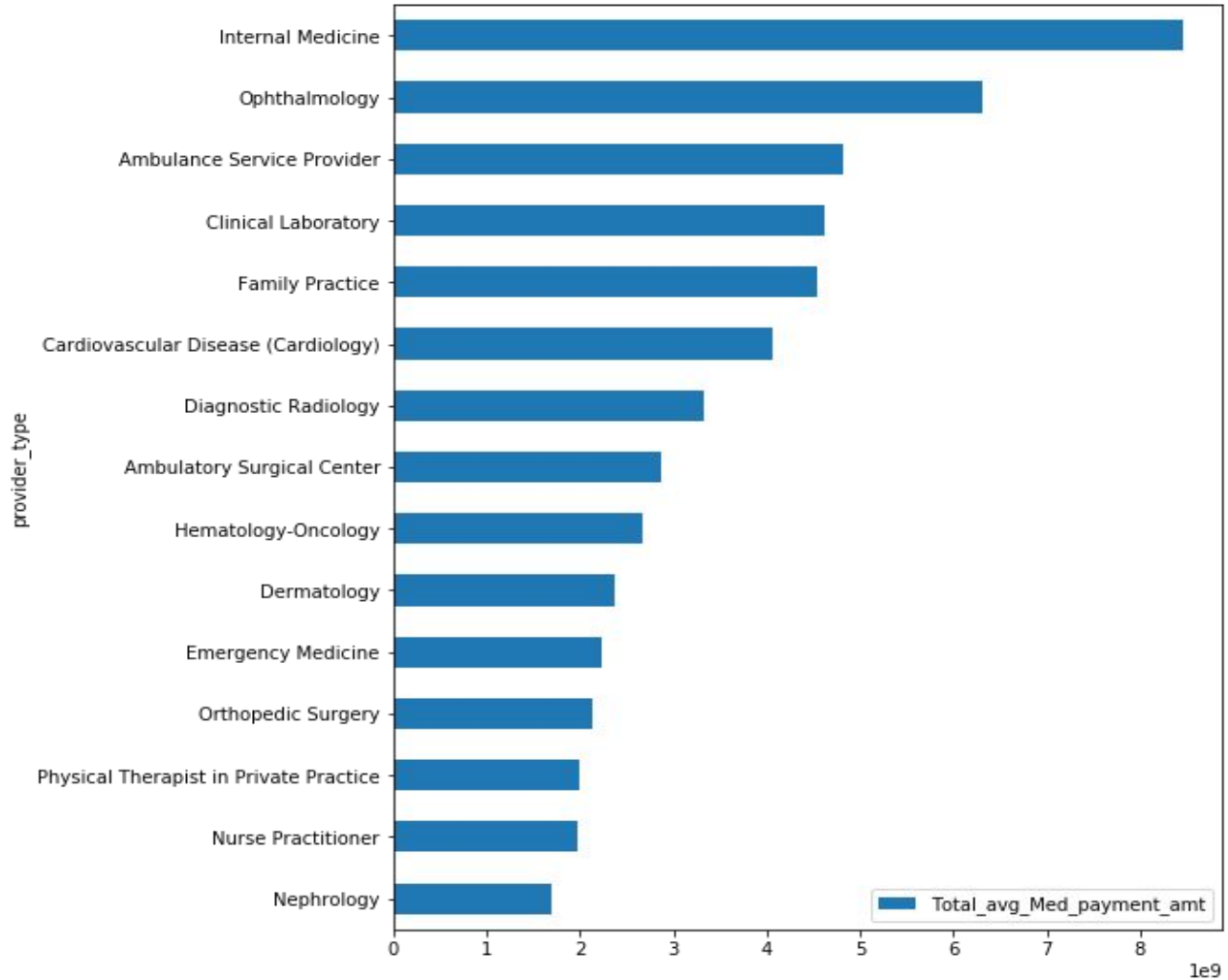
Total number of
services provided
by each state in
US



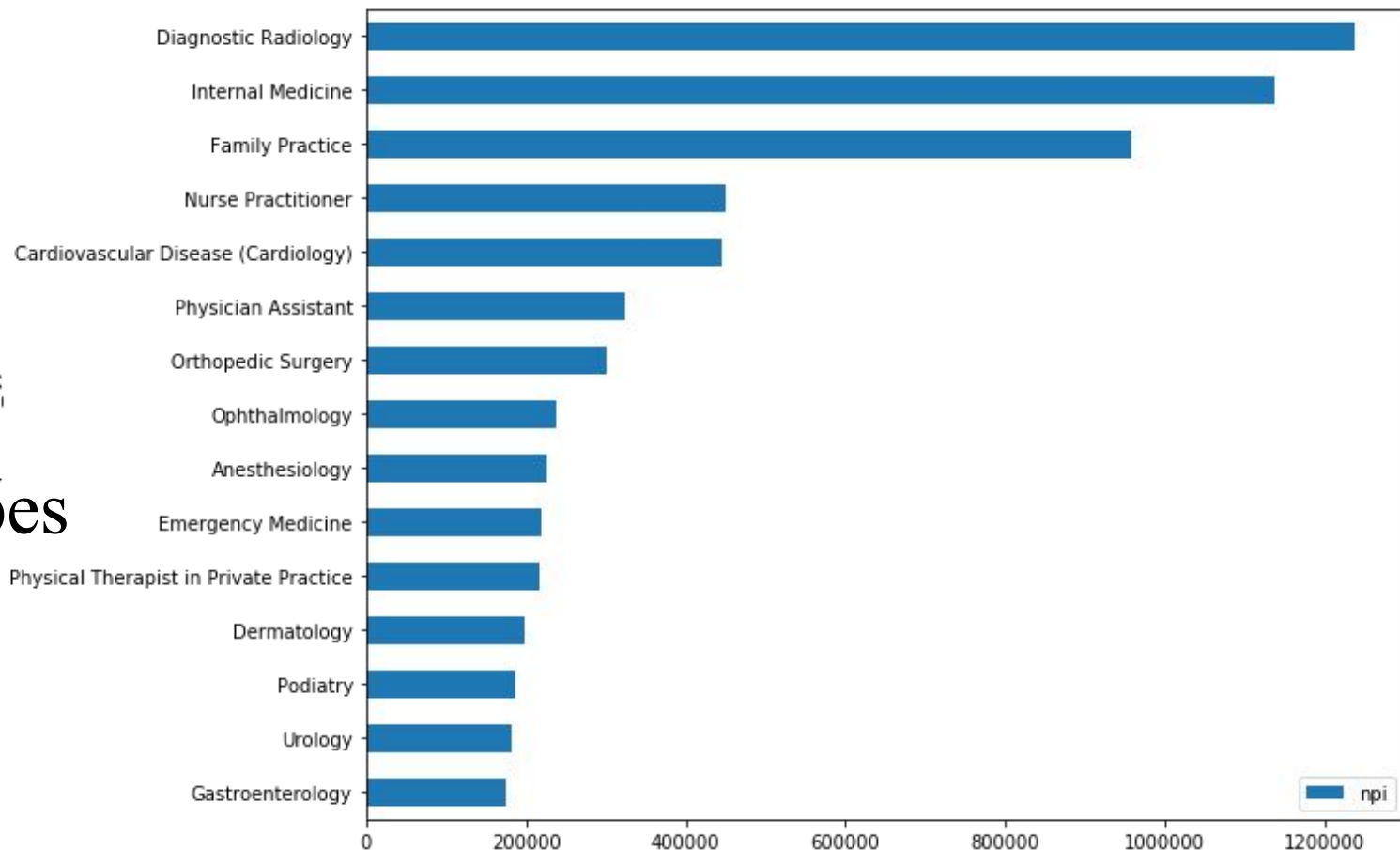
Number of Services offered by each Provider Type (outside US)



Total medicare
payment amount
(in billions)
for the top 15
provider types



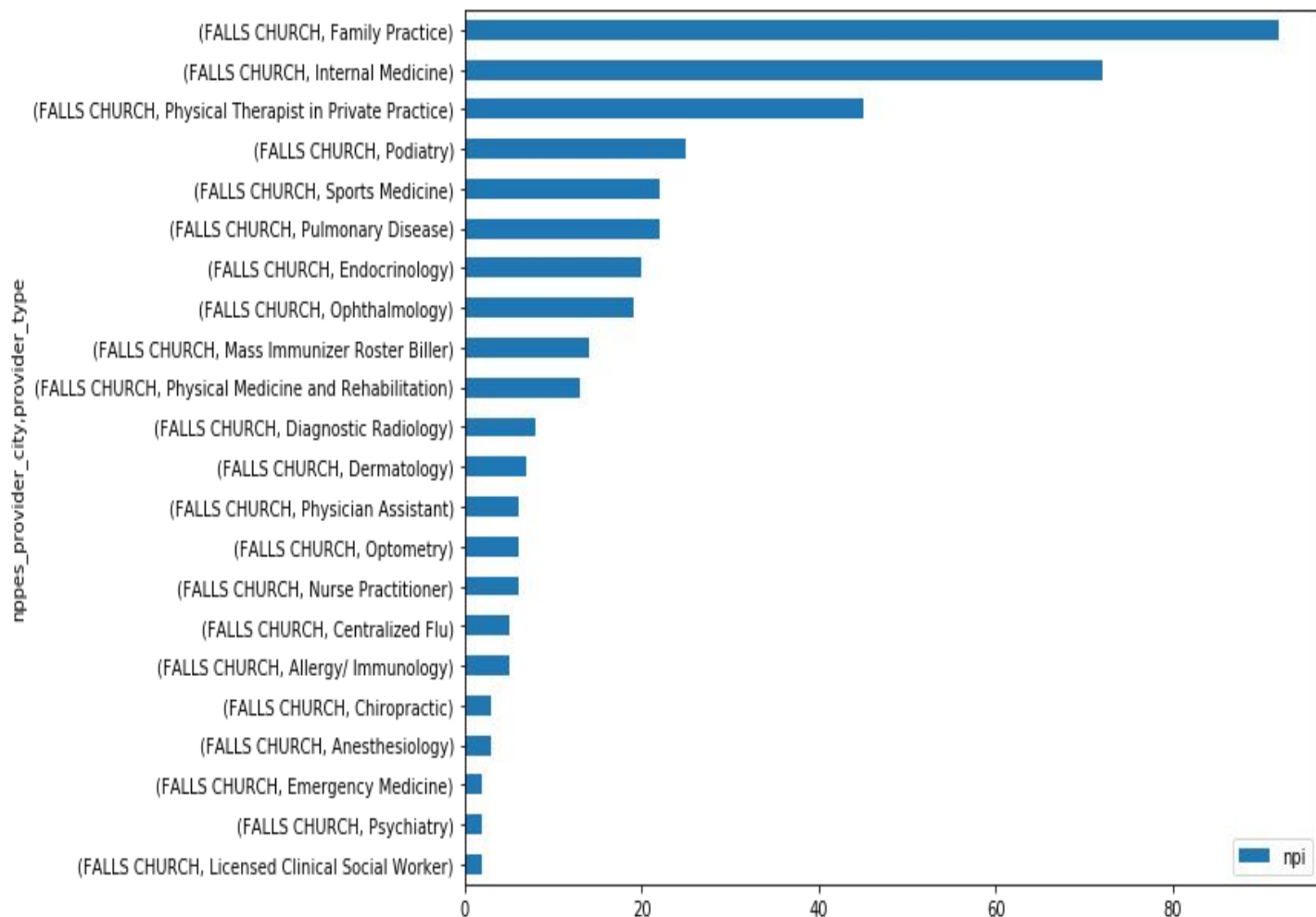
Number of Services provided by the top 15 provider types



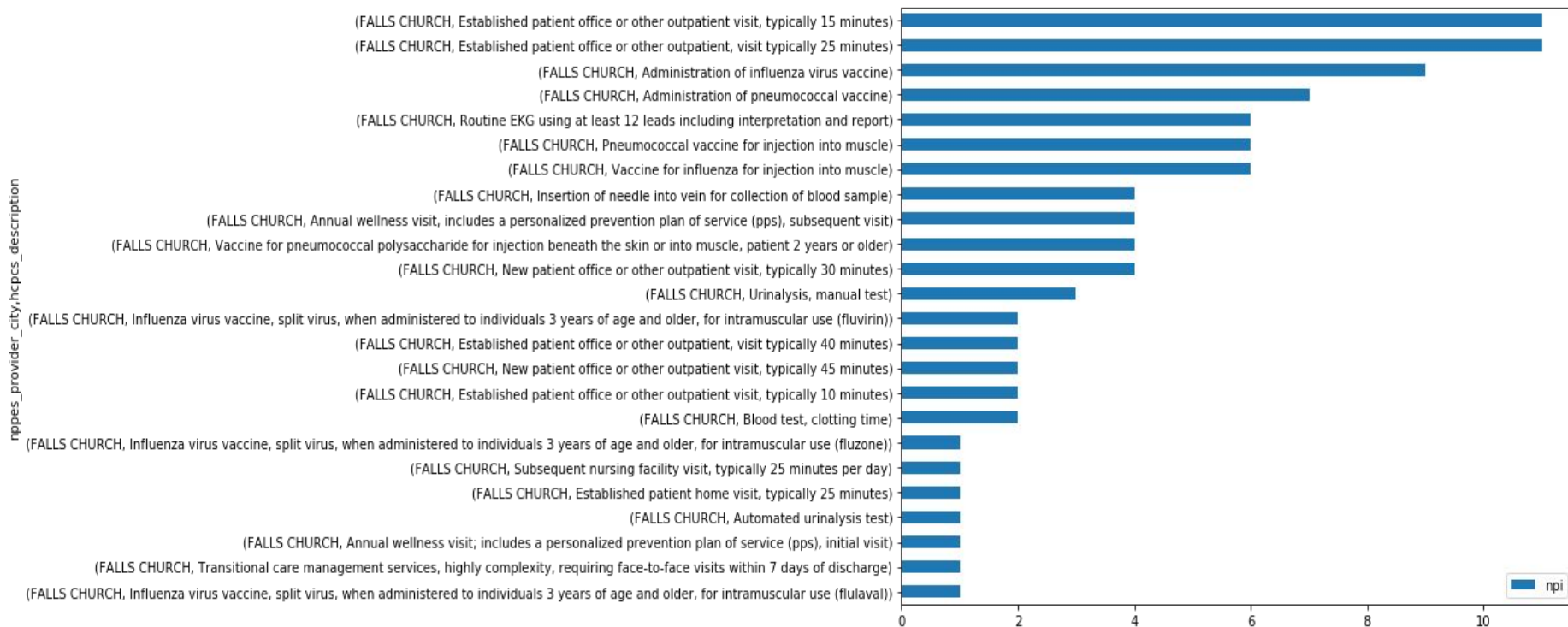
Analysis- Virginia

- Data has been analyzed for the state of VA
 - Total number of services provided for people participating in the Medicare is **258125**
 - Total number of services provided under “Cardiovascular Disease (Cardiology)” is **10510**
 - Total number of services provided under “Family Practice” is **33799**
 - All of the providers, specific services offered by each of the provider, within the zip code as 22046 - “Falls Church” have been analyzed.

Number of services provided within Falls Church (22046) by Provider type



Number of services provided within the Family Practice in Falls Church (22046)



Predictive Analysis

Linear Regression : R2 score : 0.79

Random Forest Regression : R2 score : 0.6

Takeaways

More features to explore.

From my analysis, the 'average_Medicare_payment_amt' values are influenced by these features.

- 'provider_type',
- 'nppes_entity_code',
- 'hcpcs_description',
- 'place_of_service',
- 'nppes_provider_state'
- 'line_srvc_cnt',
- 'bene_unique_cnt',
- 'bene_day_srvc_cnt',
- 'average_submitted_chrg_amt'