Name: Aidan Taggart Project Name: Competitive Analysis in Medicare Advantage Market

Link to GitHub repository: https://github.com/NordicNyte/sql-project.git

Job Description (Selection and Relevance): There are several main reasons why I chose this job description to utilize for my project. Firstly, the Healthcare & Medical market is a data rich industry, especially surrounding Medicaid and Medicare plans. There's an abundance of data ranging in the customer information, financial data, disease data, and, as this role is primarily responsible for, actuarial data. Generically put, actuarial data is numerical and statistical data used to calculate a variety of critical "risk" data points in Insurance and Medical industries. "Risk" refers to the 'uncertainty' of the accuracy of assumptions used to set policy and premium prices. In the Medicaid/Medicare section of this industry, actuarial data can refer to categories such as capitation rate setting (historical healthcare usage, costs, and demographic information), risk adjustment (analyzing risk to adjust payment for medicaid and medicare plans), financial forecasting and creating capital reserves to cover claims, policy development and impact evaluation, as well as cost management and containment (analyzing trends to find areas to cut costs without upsetting customers and regulation basically). The primary goals of this job are to perform actuarial analysis, then to create insights related to the drivers of financial performance and risk adjustment, create financial projections and plans that align with the org's vision, and assist with accounting in providing accurate regulatory reporting. The second reason why I chose this posting is because there's a ton of public data related to this industry, and because of that, there are several large APIs available: CMS Public Data API, Blue Button 2.0 API, Data at the Point of Care API as well as data resources: CMS Data Resources and publicly listed Medicare Provider Utilization and Payment data. The final reason I chose this was honestly because I'm a curious person with ADHD and I havent had the chance to get the dopamine rush of hyperfocusing on absorbing information from the medical industry yet (which is genuinely on my 'to-do-list'). While this might not be an area that I'm interested in, the skills that I can learn from this can be passed from industry to industry as an Analyst.

Problem (Proposed Solution's Relevance): Actuarial data is one of the primary drivers for pricing within this industry, and pricing is probably the most important point of competition within this industry. If a company can aggressively, and successfully, use this data to outprice competitors earlier then they're more likely to drive new clients and sales. My solution is to conduct a competitive analysis of Medicare Advantage plans to identify market trends with the goal of creating competitive advantages early.

Data Sources (Integration in Solution): API's: CMS Public Data API (vast amount of data related to everything from provider services to payment plans) Blue Button 2.0 (Claims Data) Data at the Point of Care API (Data related to patients under care) Web Scraping: I plan to analyze insurance comparison websites, provider websites, and also healthcare directories to compile information on pricing, benefits, and coverage on health plans.

Solution (Methodology):

- Data Integration and Cleaning:
    - SQL Query: Merge and clean data from CMS's API and the scraped web data to create a unified database. Example SQL operations will include JOIN commands to align data from different sources on common keys and WHERE clauses to filter out incomplete or irrelevant records.
- Analytical Queries:
    - Descriptive Analytics: Use SQL to calculate basic statistics like average costs, utilization rates, and standard deviations by provider type and region. I'll use SQL functions like AVG(), COUNT(), and STDDEV().

    - Diagnostic Analytics: Identify outliers in payment or service use that could indica areas for improvement. This would involve GROUP BY clauses and window functions like ROW_NUMBER() and RANK() to compare individual provider performance against regional averages.
- Visualization:
    - Develop dashboards in Tableau to visualize key metrics such as cost trends, provider performance scores, and risk model outputs. Visualizations will include time series graphs to track changes over time, heat maps to show geographic variations, and scatter plots to identify correlations between service usage patterns and cost effectiveness.

Going to have to adapt

- Health insurance plans
- For a single 22 year old man
- 2024
- Arizona

Most apis weren't able to give me access to the data or the api keys took 7 days to receive