**A1: Individual Post-Assessment**

Hsiu-Ping (Alice) Huang

Master in Business Analytics, Hult International Business School

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Professor Luis Escamilla

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**Executive Summary**

To enhance bargaining power in the US health insurance market, this research aims to expand client base strategically. From analysis, smoking behavior, age, obesity level, and the number of children have a powerful impact on healthcare expenditure with an 86% accuracy in predicting if a person will spend over $25,000 a year. Offer various options for different groups and partner with corporates tactically will secure market position. Yet, limitations of this research are longevity, disease area, and income factors. In the future, mapping the add-on coverage to predicted demand with minimizing biases is highly encouraged.

**Situational Overview**

According to 2013 OECD Health Statistics, health spending as a share of GDP in the US is around 1.5 times than Japan, Germany, France, Canada, and a bunch of other countries, but American government spending on health care is about the same size as these others. The huge private sector makes US healthcare so expensive because each party can only represent a small portion of people and we don’t have strong bargaining power. Thus, an expanded and improved Medicare for All Act in 2017 proposed a buy-in option to let eligible public access to the national healthcare program. (Vox, 2017)

As a particular player in this huge private sector “pond”, strengthening bargaining power is critical. Therefore, this paper aims to suggest a direction of how to expand the client base through precisely pivoting target customers with the specific characteristics. In this paper, historical data of sample patients’ medical bills is utilized to analyze the significant factors that correlate to their health expenses and build a prediction model to forecast new profiles that will incur over $25,000 health expenditure in a year.

**Analysis**

From research, 72.43% of the healthcare expenses can be explained by the individual’s age, smoking behavior, number of children, and obesity level, whereas 62% come from smoking behavior. This finding is also packed by Lightwood’s and Glantz’s (2016) research. As pointed, a 10% decrease in smoking in each state was expected to drop $63 billion in healthcare expenditure the next year. Making a strong argument about the positive correlation between healthcare expenditure and smoking behavior. (Lightwood & Glantz, 2016)

Based on Naïve Bayes, a prediction model is created. By grouping age, BMI, and the number of children, the model reaches the accuracy at 86% of predicting whether a person will spend over $25,000 in healthcare expenditure a year. According to the model, a new customer profile who is a smoker, over 27 years old, and has a BMI index over 30 seems to match.

The test result of the model reveals that 97% of a prediction for a person incurring less than $25,000 annual health care expenses is likely to be true, which means if we don’t encourage customers in this group to upgrade their healthcare plan to wider coverage and higher out-of-pocket maximum, we will possibly miss 3% of potential customers for advanced plan.

On the other hand, there is a 51% precision while predicting individual spending more than $25,000 every year, meaning that approximately half of the targeted group will truly spend that much. It is fine because we don’t mind upgrading more customers to the advanced plan. They will pay more, and we will gain more bargaining power with the health service providers for the extended coverages, too.

Surprisingly, BMI, gender, and region don’t necessarily have an impact on health expenditure, especially BMI index. The significant correlation only appears when the BMI index is converted to obesity levels, more precisely, to people whose BMI is between 30 and 35, also being categorized as obesity class I. Showing a conflict with Cecchini’s statement, the demand for healthcare services from people having BMI over 40, named obesity class III, should increase significantly. (Cecchini, 2018) Longevity and other diseases not related to obesity might be unconsidered factors, however, lies out of the scope of this research. (van, et al., 2008)

**Recommendations**

Rather than building a brand-new public health insurance system in the US with an equal and transparent pricing strategy, incremental improvements may better match the legislative realities. For example, offer more options to expand current coverage. (Glied, 2019) This is not only applied to the public sector but also the private sector.

My first recommendation is to build an advanced plan over or parallel with Medicare and promote to clients who are expected to spend over $25,000 a year in our prediction. For people who are eligible for Medicare advanced plan, differentiate our offering from the governments’. This doesn’t have to be a this-or-that choice. They can take both. For the people who aren’t eligible for public insurance, offer them a more comprehensive package plan instead. Design the coverage based on the characteristics in our model, including more items targeted specific diseases related to smokers, obesity, and so on. For those who we assume won’t spend over $25,000 annually, keep them stay in the regular plan.

Second, bound with corporate clients. While employers starting to open the option for eligible workers to switch their employer-sponsor insurance to Medicare buy-in program, there might have some workers opt-out to public insurance. Yet, the out-of-pocket maximum would be a key factor to determine their decisions. (Spiegel, 2020) The thing is, do we want to keep those individuals? In our model, every individual spends almost $300 more than last year while growing their age. If they got married and had one or more babies, each child adds almost $500 expenses for healthcare in a year. Not to mention that people tend to get fat while they get older because of the metabolism slowing down. All these factors make elderly workers a high-spending group compared with the relative youngers. Thus, I’d recommend setting the out-of-pocket maximum the same or even slightly lower than the Medicare buy-in option. This could secure the youth workers’ loyalty but give the non-loyal older workers an excuse to opt out of our plan. Even though we will lose a portion of senior customers, our cost will go down as well.

**Limitations & future studies**

This paper includes some limitations that are out of the targeted scope. First, longevity and disease areas are not discussed in the research, but they are potential factors affecting healthcare expenditure. National data is expected to be accessed via government websites but might not perfectly fit the internal database. Also, personal information protection might be an issue. Hence, if the internal database covers this information and is accessible for further analysis, that would be the best resource. (van, et al., 2008)

Another limitation is the lack of information about clients’ income and assets. Rupp and Sears found that compared with elderly Medicare recipients, eligible elderly QMBs (Qualified Medicare Beneficiary) and SLMBs (Specified Low-Income Medicare Beneficiary) have a worse health condition. They have not only limited income resources but also a greater demand for potentially expensive medical care. 2.5 million eligible individuals were not approached and enrolled in the QMB and SLMB in 1999. Outreach seems to be another difficulty when the eligible population is getting bigger. (Rupp & Sears, 2000)

Future studies can also dig deeper into the exact coverage of Medicare and plan for our added-on advance plan according to the targeted client base. Meanwhile, avoid biased samples in the long term by doing stratified random sampling, keeping retain and testing the model.

# Reference

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