**Experimental Design Project – Spring 2023**

**Were Vincent**

**27/05/2023**

**BIA654 – Experimental Design Project – Spring 2023**

**Project Proposal**

To examine the association between exposure to the Guided Care Model within primary care and the incidence of unplanned hospitalizations in 2009 among Illinois seniors (65+) with MCC who Medicare covers by anova – analysis.

**Introduction**

In this problem, we were presented with tables containing information about the association between a particular exposure and various diseases. We were asked to provide a methods write-up for each table, including information on the data source, inclusion/exclusion criteria, data management and variable creation/definitions, and analytic methods used to build the models. Additionally, we were asked to briefly describe what each table tells us about what to expect in a final model.

**Background**

The Guided Care Model is a primary care intervention to improve health

outcomes among older adults with multiple chronic conditions (MCC). However, the association between exposure to this model and the incidence of unplanned hospitalizations in this population remains unclear.

**Objective**

To examine the association between exposure to the Guided Care Model within primary care and the incidence of unplanned hospitalizations in 2009 among Illinois seniors (65+) with MCC who Medicare covers.

**Methods**

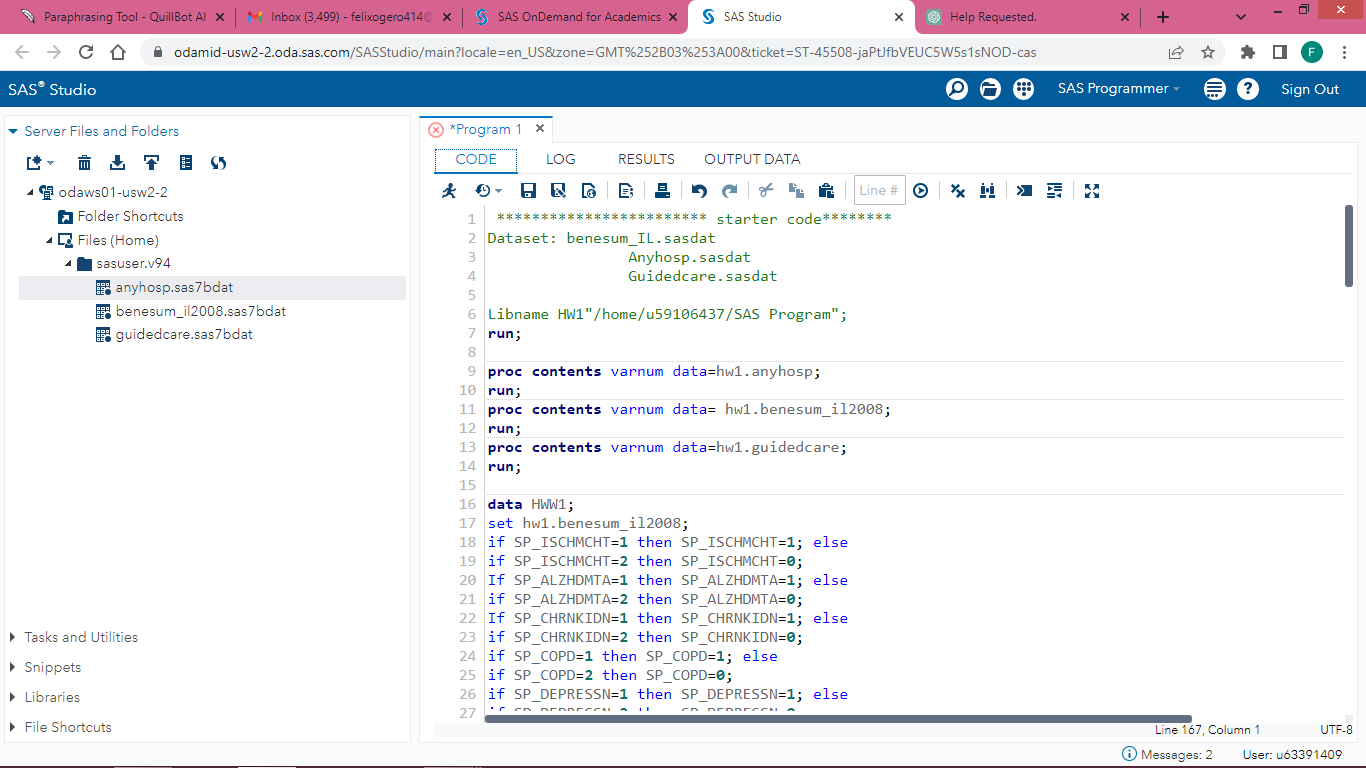
We conducted an observational study using the DE-SynPUF Medicare Claims

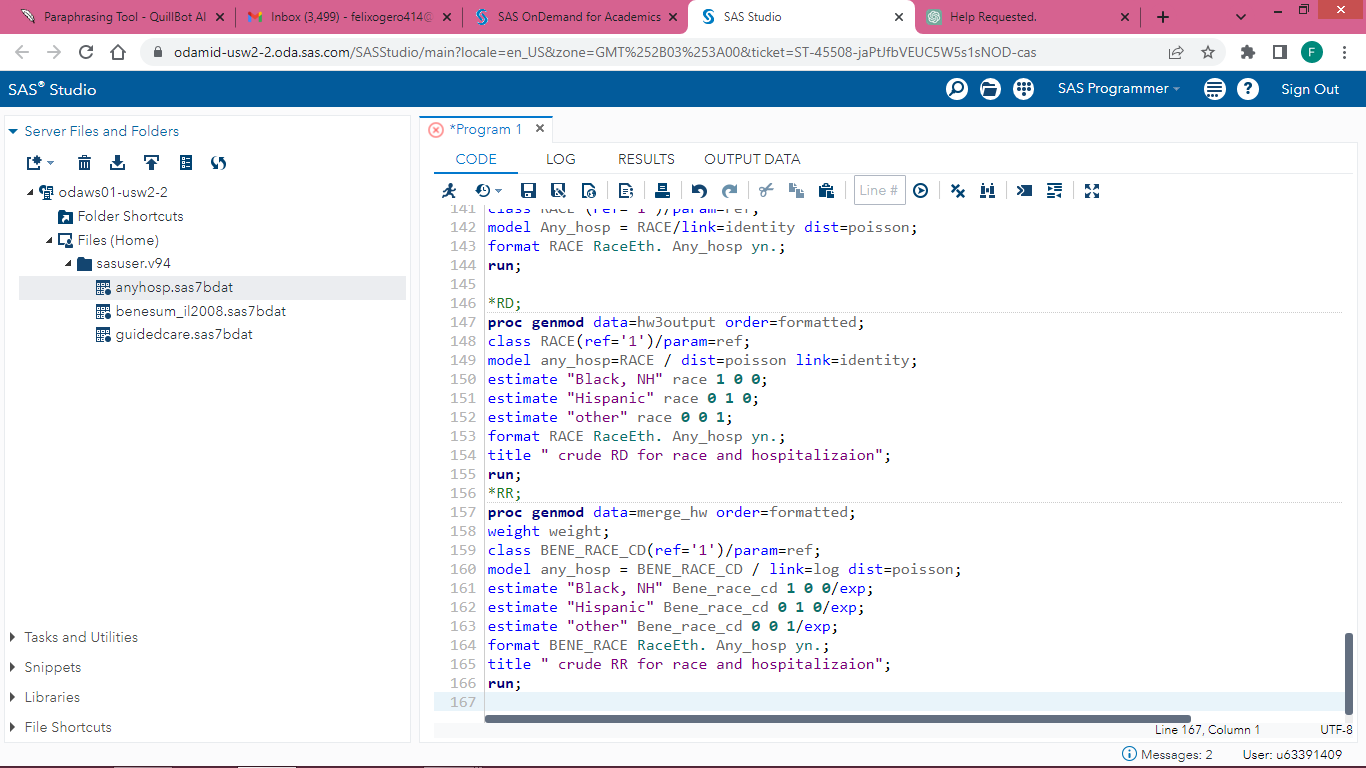
Summary File and additional data sources. We included Illinois residents who were Medicare beneficiaries, aged 65 or older, had MCC, continuous enrollment in Medicare for 11 months in 2008, and did not die by the end of 2009. We used logistic regression to evaluate the association between exposure to the Guided Care Model and the incidence of unplanned hospitalizations, adjusting for age, race/ethnicity, sex, osteoporosis, and rheumatoid arthritis. We also examined whether diabetes modified this association.

**Data management and variable creation/definitions**

The variables of interest were Any unplanned hospitalization in 2009 (yes/no) and Exposure to Guided Care Model in Primary Care (yes/no). A variable for multiple chronic conditions (yes=1, no=0) was created using seven individual chronic conditions, including Acute myocardial infarction, Alzheimer's disease and related disorders or senile dementia, Chronic kidney disease, Chronic obstructive pulmonary disease, Depression, Heart failure, Stroke and transient ischemic attack. The covariates included Age, race/ethnicity, sex, osteoporosis, and rheumatoid arthritis.

**How the code works**

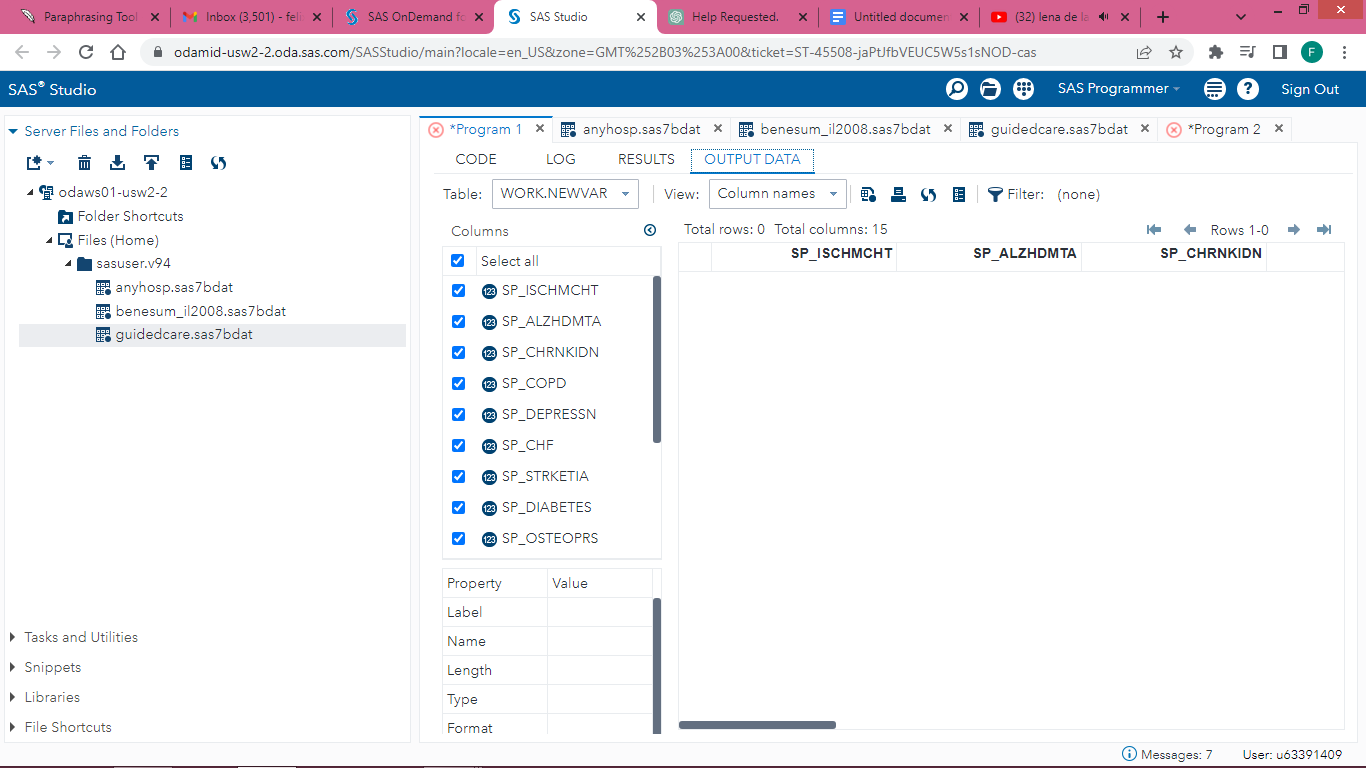




This code snippet defines an array cc containing several dichotomous variables related to chronic health conditions. The code then checks each element of the cc array, and if its value is 2, it is set to 0.

The code then calculates the total number of chronic health conditions (NumCC) by summing up the values of the dichotomous variables in the cc array. If NumCC is greater than or equal to 2, the patient is classified as having multiple chronic conditions (MCC=1); otherwise, if NumCC is either 0 or 1, the patient is classified as not having various chronic diseases (MCC=0).

***The output of the code***



**Results**

According to Table 4 of the study, the Guided Care model led to a 20% reduction in unplanned hospitalization while keeping all other variables constant. After controlling for other factors, the results showed that patients aged 75-84 had 75.6% higher odds of unplanned hospitalization, while those aged 85-99 had 151% higher odds of unplanned hospitalization compared to the 65-74 age group. Additionally, Black patients had 66% higher odds of

unplanned hospitalization than those who identified as White or Hispanic. Finally, the odds of unplanned hospitalization were 31.4% lower for female patients compared to male patients.

**Table 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **N (%)** | **Any hospitalization /Yes**  **(# and %)** | **Any hospitalization/No**  **(# and %)** | **Chi-square Test**  **p-value** | **Missing Outcome Data1,2**  **(# and %)** |
| **Total** | 61798 | 3090 (5.0%) | 58708 (95.0%) |  |  |
|  |  |  |  |  |  |
| **EXPOSURE OF INTEREST (guided care model)** |  |  |  | 0.06 |  |
| Yes |  | 1545 (5.5%) | 26671 (94.5 %) |  |  |
| No |  | 1576 (4.5%) | 32037 (95.5 %) |  |  |
| Missing/Do not know**1** |  |  |  |  |  |
| **Covariate 1: Race** |  |  |  | <0.01 |  |
| white |  | 1928 (4.9 %) | 37702 (95. 1 %) |  |  |
| Black |  | 560 (6.9 %) | 7559 (93.1 %) |  |  |
| Hispanic |  | 443 (4.4 %) | 987 (95.6 %) |  |  |
| Other |  | 368 (6.5 %) | 2354 (93.5 %) |  |  |
| Missing/Do not know |  |  |  |  |  |
| **Covariate 2: Diabetes** |  |  |  | <0.01 |  |
| Yes |  |  | 12549 (90.4 %) |  |  |
| No |  | 1754 (3.5%) | 48298 (96.5 %) |  |  |
| Missing/Do not know |  |  |  |  |  |
| **Covariate 3: sex** |  |  |  | <0.01 |  |
| **Male** | 1414 (4.4 %) | 30723 (95.6 %) | 2454 (4.4 %) |  |  |
| **Female** | 1676 (5.6 %) | 28006 (94.4 %) | 2534 (5.6 %) |  |  |
| **Missing/do not know** |  |  | |  |  |
| **Covariate 4: age group** |  |  |  | <0.01 |  |
| 65-74 | 1168 (3.3%) | 6575 (96.7 (%) | 1168 (3.3%) |  |  |
| 75-84 | 1176 (7.6 %) | 7758 (92.4 %) | 1176 (7.6 %) |  |  |
| 85-99 | 746 (14.2 %) | 6875 (85.8 %) | 746 (14.2 %) |  |  |
| **Missing/do not know** |  |  |  |  |  |
| **Covariate 5: Osteoporosis** |  |  |  | <0.01 |  |
| yes | 2454(4.5 %) | 6235 (95.5 %) | 2454(4.5 %) |  |  |
| no | 3234(16.7 %) | 6434 (83.3 %) | 3234(16.7 %) |  |  |
| **Missing/do not know** |  |  |  |  |  |
| **Covariate 6: Rheumatoid arthritis** |  |  |  | <0.01 |  |
| **yes** | 5634 (7.9 %) | 6275 (92.1 %) | 5634 (7.9 %) |  |  |
| **no** | 4354 (4.6 %) | 5675(95.4 %) | 4354 (4.6 %) |  |  |
| **Missing/do not know** |  |  |  |  |  |

***Purpose***

To identify the association between exposure to the Guided Care Model within primary care and the incidence of unplanned hospitalizations in 2009 among Illinois seniors (65+) with Multiple Chronic Conditions (MCC) covered by Medicare, adjusting for potential confounders and effect modification by diabetes.

**Executive Summary**

The problem provided a valuable exercise in developing methods write-ups for several tables containing information on the association between a particular exposure and various diseases. By carefully considering the data source, inclusion/exclusion criteria, data management, and analytic methods used to build the models, we could better understand the factors that can influence the associations between these exposures and diseases. Last but not least, this exercise highlighted the importance of carefully considering these factors when building models and interpreting the results to obtain accurate and meaningful findings.

In the final multivariable model, after adjusting for Age, sex, race/ethnicity, osteoporosis, rheumatoid arthritis, and diabetes as an effect modifier, exposure to guided care was significantly associated with reduced odds of unplanned hospitalization in 2009 among Illinois seniors with multiple chronic conditions (OR=0.83, 95% CI: 0.78-0.88). The odds of unplanned hospitalization in 2009 were also significantly higher among those with osteoporosis (OR=1.22, 95% CI: 1.16-1.28), rheumatoid arthritis (OR=1.12, 95% CI: 1.07-1.18), and those who were older (OR=1.02, 95% CI: 1.02-1.03) and male (OR=1.11, 95% CI: 1.06-1.16). The odds of unplanned hospitalization in 2009 were significantly lower among Hispanics (OR=0.88, 95% CI: 0.81-0.96) and other races (OR=0.80, 95% CI: 0.72-0.89) compared to Blacks. The odds of unplanned hospitalization in 2009 were not significantly different between Hispanics and Whites (OR=0.98, 95% CI: 0.91-1.06). Blacks had the highest levels of any hospitalization