# Investigation of the Patient Population at Bruner Clinic

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**Project Description:** For my Practicum project I am planning on doing a fusion of my school work in the Master’s in Data Science program at Regis with my work at SCL Health by running an advanced population health project centered around the patient population at Bruner Health. I’ve spent the last two months getting clearance from SCL’s IRB board so that is hurdle has been jumped over. The project will be laid out as such, I will start by collecting 2-3 years of data SCL is already collecting on patients that go into the Bruner Clinic in downtown Denver, Colorado. I will at patients with specific chronic conditions which are very common for people to have; those chronic conditions are: hypertension, coronary heart disease (CHD), stroke, diabetes, cancer, arthritis, hepatitis, weak or failing kidneys, asthma, and chronic obstructive pulmonary disease (COPD). After creating a data set with these ten chronic conditions I will run an exploratory data analysis (EDA) on the population to be able to understand and visualize the population which chronic conditions are most prevalent? What are common variables are we seeing within these conditions? Are there any secondary diagnosis that we are finding that can be coupled with these diseases? What type of patients are we seeing these issues with more (Gender, Race, etc.)? Then we will look at factors that aren’t tracked on a hospital flowsheet. By looking into patients zip code, we will find out a lot about the environment the patients are living in, what is their socioeconomic status, their proximity to health food options, their proximity to fitness and exercise, the crime they experience in their neighborhood, etc. and start building what the population health community calls social determinants of health. After forming all the metrics and data that I need I will be using an unsupervised learning algorithm using k-means and an HCA to cluster together variables which most likely contribute to a patient having a specific chronic condition, as well again at finding different diagnosis that appear together to see if any more information turns up that can be useful to know about this patient population. From here, I’ll document, report and present my findings to clinicians, clinical directors, several analytics departments within the SCL Health, managers, directors as well as some officers of the business that I’ve discussed the project with over the summer and then to Regis as well. My last steps will be sitting down with some clinicians and discuss the findings as well as zero in on the chronic conditions which have the most patients at risk and they would like to help the most. I will then create a ANN model which outputs a risk score which will be calculated for every time a patient comes in for a doctor’s visit how likely they are of developing a specific chronic condition, this can alert the medical staff of the risk the patient is in and help create a proactive plan to prevent the condition from forming and turn their healthcare plan from reactive to proactive. I’m hoping that I can work on this project throughout Practicum 1 and 2. With how extensive and ambitious this project is I will need all 16 weeks to get to a satisfying resolution.

**Project Timeline:**

Data Collection: Weeks 1 & 2.

EDA: Weeks 3, 4, & 5.

Cluster Analysis: Week 6 & 7.

First report, and presentations: Week 8 & 9.

Meet with Clinicians for Chronic Conditions of highest interest: Week 10.

Create and Test Artificial Neural Network: Week 11, 12, 13, 14.

Report and Present findings: Weeks 15 and 16

**Tools Used:** SQL Server, Tableau, Alteryx, Python, RStudio