**Rutgers Data-Science Project 1 Proposal:**

**Project Proposal:**

**Background:**

There is preliminary data that suggests an association between community level increases in influenza infection and cardiovascular mortality. Other studies suggest a near 7 fold increased risk of myocardial infarction in the 7 days following an influenza infection. Influenza virus RNA has been found in human atherosclerotic plaque. Influenza may be a causative agent for myocarditis or myopericarditis. Indirectly, inflammation may be cause a prothrombotic state.

**What is not known:**

The extent of the association and the specific cardiac conditions that are most related to increases in influenza are not as well described. Furthermore, it is not clear whether influenza vaccinations at the community level is associated with protection from the described cardiovascular morbidity

**Purpose of the study:**

The purpose of my study is to look at time and geographic trends in Influenza infection and compare those with cardiovascular hospitalizations for heart attacks, heart failure, arrhythmias, or sudden cardiac death across the United States. As such, we can test the hypothesis that influenza infection increases are associated with cardiovascular morbidity at both a geographic and temporal level. The Second part is to see if variations in influenza vaccine use are associated with changes in influenza infection rates and whether they are associated with changes in risk of heart attacks. Again this would be done at both the temporal and geographical level.

**Hypothesis:**

* Influenza incidence spikes at the community level are associated with increases in cardiovascular mortality, heart failure hospitalizations, hospitalizations with arrhythmias, hospitalizations with myocardial infarctions, hospitalizations with myocarditis, and hospitalizations with pericarditis
* Influenza vaccine use at the community level is associated with lower incidence of influenza virus
* Earlier influenza vaccine prescription trends are associated with more protection from influenza infection
* Influenza vaccine use is associated with lower cardiovascular morbidity as above
* Earlier influenza vaccine prescription is associated with lower cardiovascular morbidity than late vaccine prescription.
* More effective influenza vaccines are associated with lower cardiovascular morbidity than less effective vaccines.

**Data sources to be used:**

- The national inpatient sample is a national database of all admissions in the united states for the years 2014-2017 and provides coding for influenza infections, cardiovascular conditions including myocarditis, pericarditis, heart failure, myocardial infarction, and death.

- BRFSS Questionnaire database uses a representative samples to estimate Flu vaccine compliance across different geographic regions and age groups in the united states.

[LLCP2016.XPT](http://localhost:8888/edit/Documents/GitHub/Flu-Project/Resources/BRFSS/LLCP2016.XPT%20" \t "_blank)