The history of those who serve or have served in this country’s armed forces is a fraught one. One reason for this has been the opioid epidemic that has swept the United States in recent years. According to the CDC, the number of drug overdose deaths has quadrupled in the years since 1999, with over 70% of the deaths in 2019 involving use of an opioid. According to the National Institute of Drug Abuse, the unique stress of deployment, military culture, and response to physical and mental trauma contribute significantly to the rates of opioid and other drug usage.

In 2018, Congress passed the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act in its next step in attempting to address the growing opioid crisis. While the SUPPORT Act was wide in its scope, significant provisions were provided for veterans. The focus point and the main motivation for this project was that the act, according to the Brookings Institution, “established a comprehensive peer support counseling program for women veterans.” Especially since female veterans comprise a very small share of the veteran population, we wanted to examine any trends in opioid usage in current and veteran female soldiers around 2018 and 2019 and provide insight not only on the effect the SUPPORT Act might have had in its first few years but also ways to predict future drug misuse in a specific and under-researched population.

Given US drug use and misuse data from surveys from both 2018 and 2019, we filtered through both datasets for female veterans. One challenging aspect of this project was ensuring that the survey questions remained consistent. We noted that the survey changed in between these years, making the 2019 dataset contain more than twice the number of variables as 2018. We also chose to use the weight variable for our visualization in order to glean a more generalizable sample to the population of US female veterans. Our first goal was to visualize which 2-drug combos (pairs) were most prevalent in the data; that is, if current or veteran female US soldiers misused or abused one drug, what other drugs were they likely to misuse as well? This would be helpful information to know, as knowing if a patient used one might help in the future to predicting other drug abuse, and thus that patient’s doctor might be aware of the issue.

Figure: Chord Diagram of Drug-Misuse Combinations in 2018

We also wanted to model data from 2019 with a Random Forest model, primarily to view variable importance (what demographic variables contribute most to the risk of drug misuse) and with a secondary goal of predicting future misuse. For this, we stuck with the original sample size of female veterans without using the weight variable. The model performed a little strangely with extremely high accuracy, precision, and recall (probably due to the smaller sample size and large imbalance of response variable classification). However, we found that some of the most important variables to prediction were a person’s education, age, and the number of people in the household.

Ultimately, we found that across the years from 2018 to 2019, less drugs were misused in combination with each other. We also found specific predictors that distinguish between female veterans who did and did not misuse an opioid in the 2019 dataset. While we do hope to generalize these conclusions to the general population of US female veterans, it must be noted that for all intents and purposes, the survey data was a convenience sample with a small sample size of observations relative to the general population. However, we hope future work builds upon this and also capitalizes on more data about the veteran and female veteran population.