

DataFest 2021 - Drug Misuse Exploration

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From the data given to us, we focused our analysis on the US19 survey data. While exploring the data, we noticed a strong correlation between the non-medical use of opioids and the general use of pain prescription drugs. This was expected as opioids are often prescribed to patients with mental health problems or chronic pain, which is concerning as the CDC reported over 36,359 deaths due to opioid overdose. However, once the patient takes these addictive substances for a while, it becomes very difficult to stop, regardless of whether their diagnosis changes. We also found a strong correlation between illegal drug use and the non-medical use of opioids. In our analysis, we decided to focus on modeling the non-medical use of opioids using previous drug use/abuse and medical history. These predictors are listed in the parameter estimates of the presentation.

Our model used illegal drug use, tobacco use, and cannabis use, as well previous diagnoses of anxiety, depression, and chronic pain as predictors; the model response variable was the non-medical use of opioids. The p-values produced by the hypothesis test on the significance of each predictor in the stepwise model showed that all of our predictors were statistically significant in our model, with the exception of depression. Thus, in our final logistic model, we used illegal drug use, tobacco use, cannabis use, and diagnoses of anxiety and chronic pain as predictors. We also created models with these predictors to predict the four main classes of drugs in the survey: pain relievers (containing opioids), sedatives, stimulants, and cannabinoids. The accuracy of the models were all similar.

In both the data and our model, we found that the mean of survey respondents who misused opioids was five times larger if they had used illicit drugs, compared to those who had not. Additionally, we created an ROC (Receiver Operating Characteristics) curve, which showed our model's accuracy as 77.4%. When we used these same predictors to model the abuse of non-prescription drugs, the accuracy was 62.93%. Because opiates are often prescribed for chronic pain or anxiety, these results indicate that previous use of addictive substances is the key factor to consider when determining if it is appropriate to prescribe an opioid.