We are Team Data Devils, composed of Amanda Forrest, Ryland Tuttle, Tyler Heidemann. In this year's DataFest, we were faced with data from The Rocky Mountain Poison and Drug Safety Center. This included data from four countries: US(2018 and 2019), UK, Canada, and Germany. We wanted to find the top three opioids used in these countries. In the U.S.(2018) the most commonly misused drugs were Codeine, Hydrocodone, and Oxycodone. In the U.S. (2019) it was Codeine, Hydrocodone, and Oxycodone. In the U.K.(2018) the drugs were Codeine, Dihydrocodeine, and Tramadol. In Canada (2017) it was Codeine, Morphine, and Oxycodone. In Germany(2017) it was Codeine, Tramadol, Fentanyl. We found that in each country, Codeine was one of the most used opioids.

This led to the question as to what influences the misuse of Codeine. We decided to use a logistic regression in SAS using the variables gender, age, whether or not a student, a veteran, a healthcare professional, race, education level (degree, no degree, trade school). Due to the amount of variables used, we decided to keep it simple by only using first order terms. From the logistic regression we found the following: the US(2018) had significant influence from gender, age, whether or not a student, whether or not a healthcare worker, and their race. Males were 2.3 more likely to use Codeine, students 1.33 times, health care workers 1.24 times and caucasians were less likely by 1.32 times. The area under the ROC curve was 0.72 which is a decent model. The US(2019) usage was influenced by gender, age and race. Males were twice as likely and Caucasians were less likely to misuse Codeine by 1.6 times. The area under the ROC curve is .72, which is a good model. Canada's drug usage was influenced by gender, age, and whether a student. Males were 1.56 times more likely to misuse Codeine and students 1.8 times. The area under the curve though is .57 which means it can be improved. Germany's Codeine usage was influenced by gender and age, where males were 1.56 times more likely to misuse Codeine.The area under the curve was .58, which suggests the model needs improvement. For the UK, it was gender, age, whether a student, and race, with males 1.35 times more likely to misuse Codeine, students are 1.26 times, and Caucasians were 1.3 less likely. The area under the ROC curve is .57 which indicates it needs improvement. One variable we wish that we were able to use would have been income. Unfortunately, due to different currencies and brackets, we decided to omit that variable. It should also be mentioned that Germany and Canada did not have a variable for race in their surveys, though it would have been beneficial to look at for analysis. The odds ratio for age was only one year at time, so it was not mentioned because the ratio was close to one. In future analysis, age should be grouped.

In conclusion, codeine was the most used drug among the datasets. Even though both US models are acceptable based on the area under the curve in our ROC curve; this model could be improved by adding other variables like income, region within the US, and employment status to name a few. But with this model, it gives a good baseline to start at to help prevent misuse. On the other hand, Canda, Germany, and the UK models should be reevaluated with a different set of variables to give a better indication of the misuse of codeine.