

# Opioid Use Disorder can be predicted using marijuana usage, income status, education level, age, ethnicity, and gender.

## Can we use machine learning to identify risk factors and therefore predict patient risk for Opioid Use Disorder?

### Methods:

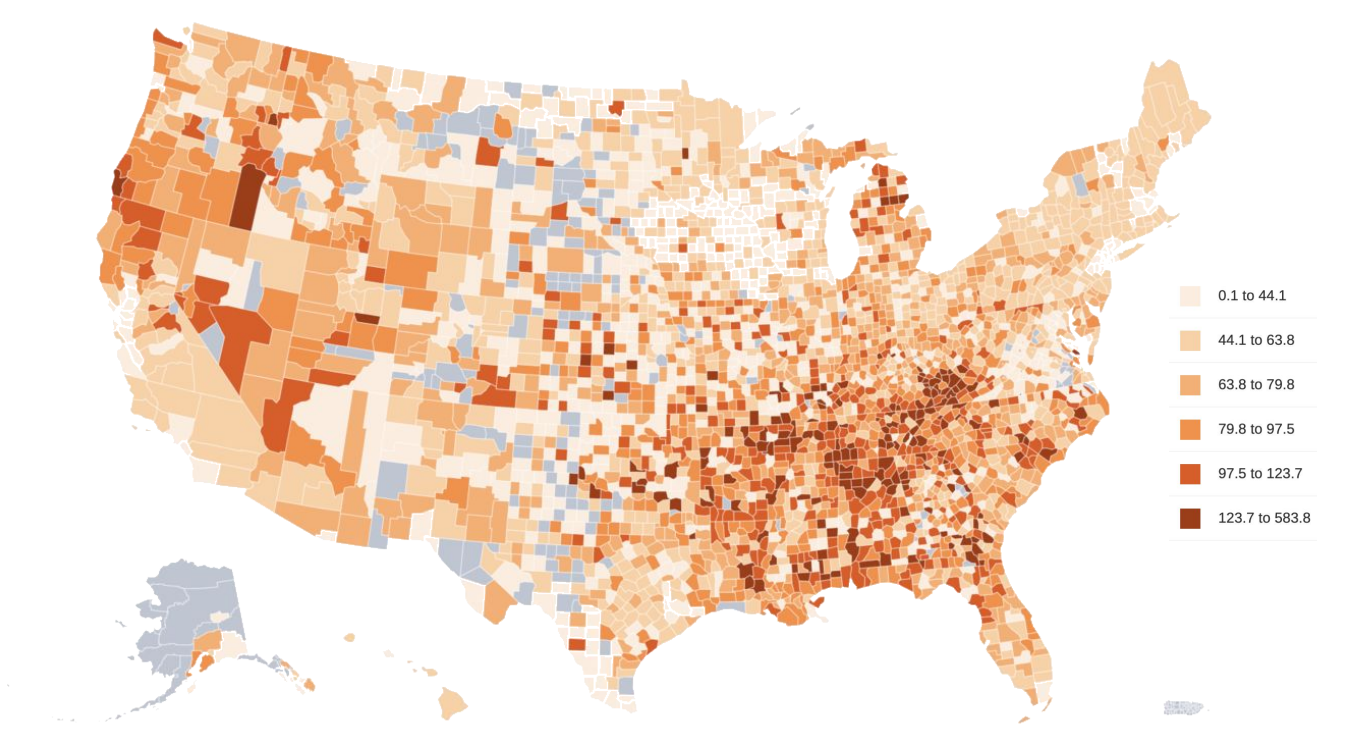
We created two machine learning models to predict high or low risk of Opioid Use Disorder.

We used an MLP classifier, a type of artificial neural network, for the National Drug Use and Health Survey database (NDUHS) and a Random Forest classifier for a national Electronic Intensive Care Unit data (eICU)

### Background:

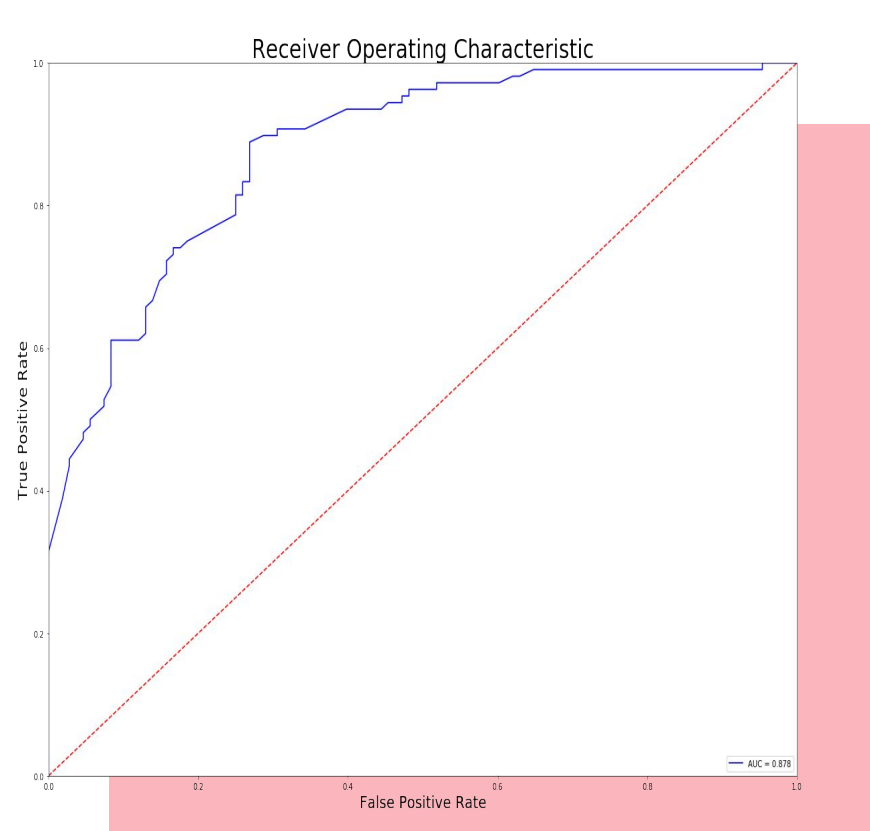
Between 2002 and 2013, heroin related overdose deaths rose by 286% (Liu, Pei, Soto).

Opioid addiction often stems from a previous prescribed dosage (NIH).



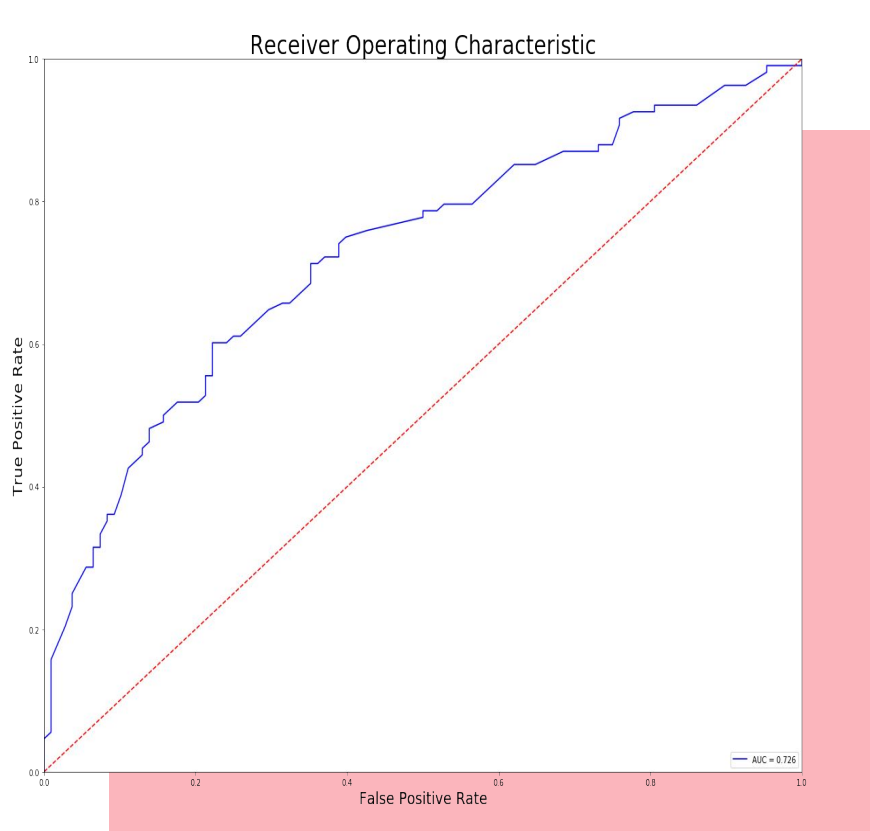
**Figure 1**  
Opioid Prescriptions per 100 Persons in the United States 2017. n ≈ 2.4 million prescriptions per 100 Persons in the Opioid & Health Indicators Database. (n.d.).

### Results:



**NDUHS (avg)**  
AUC = 0.81  
Accuracy = 0.74  
Precision = 0.80  
Recall = 0.70

**Features**  
Marijuana usage, age, education, income, gender, ethnicity



**eICU (avg)**  
AUC = 0.68  
Accuracy = 0.63  
Precision = 0.64  
Recall = 0.63

**Features:**  
Apache score, gender, age, ethnicity, hospital discharge status, prescription

### Discussion:

Our NSDUH model can predict high and low risk of Opioid Use Disorder with approximately 80% accuracy, which is much higher than the eICU model's accuracy of 63%.

We found a promising correlation between marijuana usage and opioid misuse which hasn't been heavily researched before.

This research could be used to redesign the current opioid risk tool and similar metrics and therefore possibly prevent the acceleration of the opioid crisis.



Scan for Research Paper

### Credits:

**Odessa Thompson, Govind Chada, Elaine Chu, Joy Liu**

I would like to thank the entire Magnet staff, Kajal Claypool Ph.D., Andy Kong, Emily Tan, and Jeanette Varela

