

# Opioid Addiction and the Criminal Justice System

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# Introduction and Background

Opioid addiction in the United States is a broad issue linked to many variables. We decided to focus our project on the treatment of addicts who interact with the criminal justice system. Our goal is to identify whether race has an effect on how addicts are treated, ie: are some races more likely to be sent to prison while other races are more likely to be sent to public treatment centers?

This question has relevance to the issue of opioid addiction given that 65% of those incarcerated are considered to have a substance abuse problem, according to the National Institute on Drug Abuse. Treatment of such disorders is especially important through the lens of opioid addiction, as opioid addicts have a high rate of recidivism. If addicts are being sent to prison rather than treatment centers, it is in their best interests and in society's best interests to begin or continue methadone or buprenorphine treatment while they are incarcerated. Studies show that in-prison treatment increases the likelihood of continued treatment post-release and reduces recidivism rates. Even with this knowledge, only 11% of inmates who need such treatment receive it.

<https://www.drugabuse.gov/publications/treating-opioid-addiction-in-criminal-justice-settings/treating-opioid-addiction-in-criminal-justice-settings#ref>

# Broad Question

Should opioid use be treated as a criminal justice issue or a public health issue?

## Approach

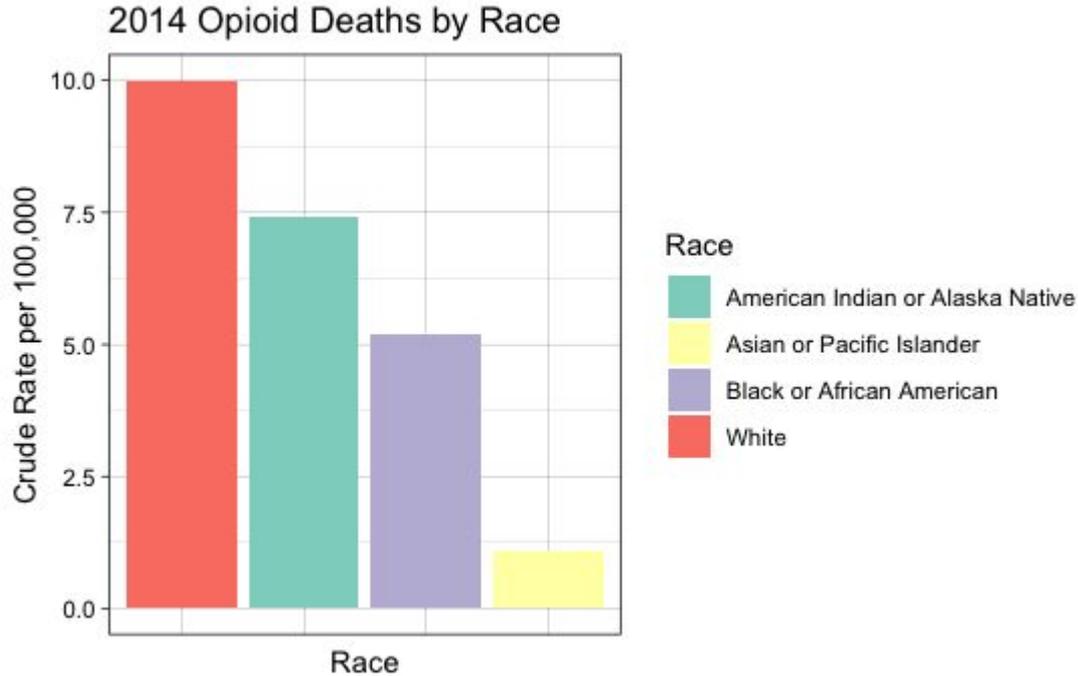
- 1) Does race play a role in arrests and whether or not patients are sent to treatment centers?
- 2) What treatment is best for those in prisons?



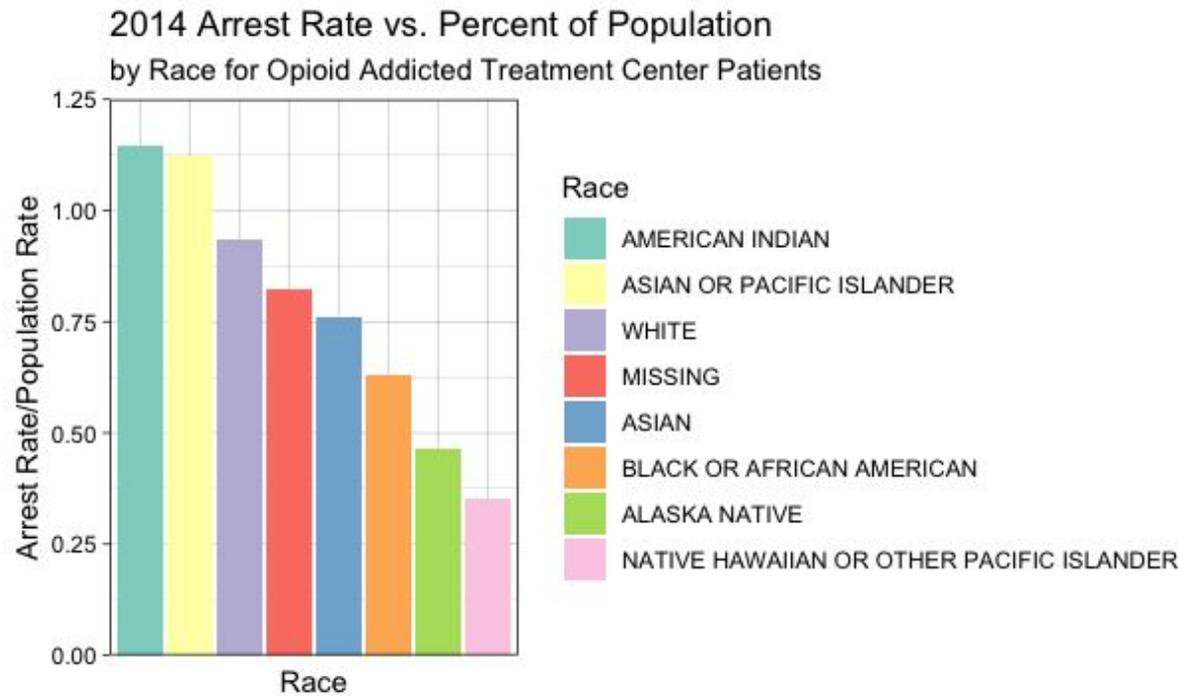
# Data Utilized

2014 was selected as the year of focus, as each database contained detailed records of this year, allowing for specificity in our analysis.

- Treatment Episode Data Set: Admissions (TEDS-A-2014)
  - From the Substance Abuse & Mental Health Data Archive
  - Data subset to include only patients with opioid related primary and secondary substance abuse problems
  - Race, Number of Arrests, and Type of Referral were also used
- Multiple Cause of Death Data
  - From CDC Wonder
  - Data included only deaths from opioid related MCD (codes T40.0-T40.4)
  - Data was subset by Race
- Journal of Substance Abuse Treatment (Volume 70)
  - Data based on sample of prison inmates and their rebooking

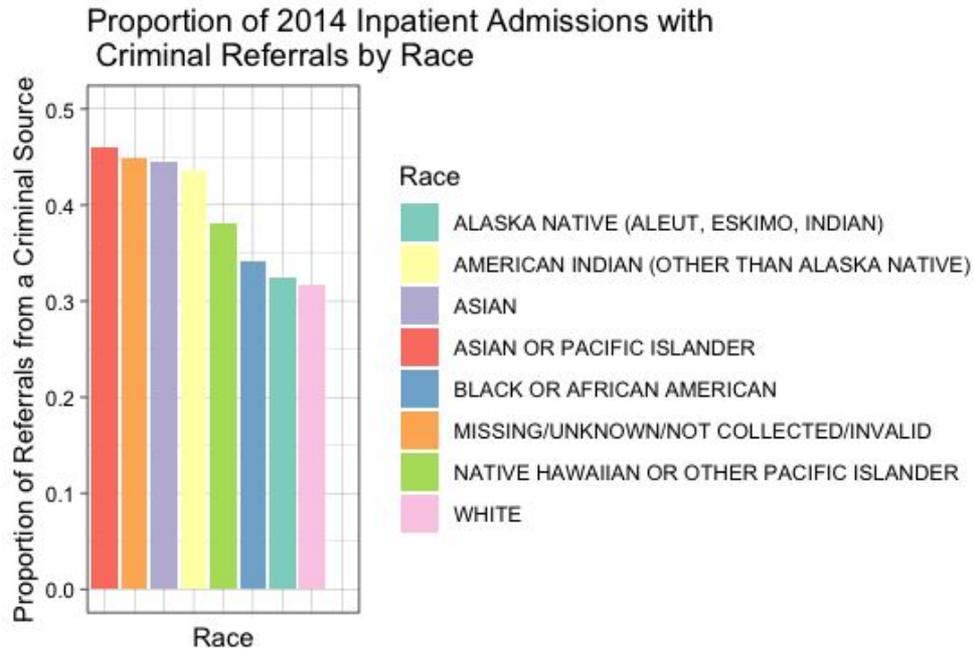


**Figure 1.** In an initial plot to understand the breakdown of deaths by race, the MCD WONDER data was used to plot the crude opioid death rates from 2014 by race. This plot reveals that White Americans, followed by American Indian or Alaska Natives, have the highest death rates in the country. While this does not demonstrate that these races use opioids more than others, it provides insight into which groups are being heavily affected.



**Figure 2.** Using the TEDS-A data, the arrest rate in the 30 days prior to treatment center admission was calculated for each race.

The rate for each race was then divided by its percent of the treatment center population. If there were no racial bias, a ratio of around 1 would be expected for each race, as arrest rate would be equal or similar to population rate. However, arrest rates are actually higher for some racial groups, such as American Indians. For other groups, the arrest rates are much lower, such as for African Americans. These results reveal that the African Americans who do receive treatment for opioid addiction are those who are not typically arrested, while the opposite is true for American Indians. Such information may demonstrate how the criminal justice system deals with opioid addiction, in terms of which races are referred to treatment centers instead of being put through the criminal system.



**Figure 3.** The TEDS-A dataset from 2014 was also used to create this visualization. The PSOURCE variable was re-coded into a new variable, CRIMREF, which indicated whether a patient was referred to the treatment center through a criminal or non-criminal referral. This variable was tabulated by race, and the corresponding table was converted into a new data frame. A new variable, PROPORTIONCR, was created to visualize the proportion of patients who were referred through criminal channels for each race. Missing data was not used in the totals used to calculate the proportions. The data indicates that White patients had the lowest proportion of criminal referrals to treatment centers, with Alaska Natives and Black or African Americans following behind. We believe that a possible explanation for the disparity between races is that drug users from minority racial backgrounds do not have the financial means to self-enroll in inpatient treatment programs and therefore are usually referred after a criminal offense rather than by friends, family, or care providers.



# Statistical Analysis of Recidivism

We will be looking at recidivism rates within one year of being released from prison of people treating addiction with methadone while in prison, people treating opioid addiction with detox while in prison, and the general population from a random sample of people released from prison.

We will take a 1-sided lower-tail test under the assumption that methadone leads to lower rates of re-arrest than opioid detox. We will also take a 2-sided test to see if the recidivism rates of people treating addiction with methadone is significantly different from the rates of the general ex-convict population.

*Recidivism - the tendency of a convicted criminal to reoffend*

<https://www.sciencedirect.com/science/article/pii/S0740547215300647>

<https://www.recoveryanswers.org/research-post/does-methadone-help-reduce-recidivism/>



# Hypothesis Testing

## Comparing MMT to Opioid Detox

- $H_0 : p_1 = p_2$  vs.  $H_a : p_1 < p_2$
- $Z = (\hat{p}_1 - \hat{p}_2) / \sigma_{\hat{p}_1 - \hat{p}_2}$ ,  $\sigma_{\hat{p}_1 - \hat{p}_2} = [\hat{p}_1 \hat{q}_1 / n_1 + \hat{p}_2 \hat{q}_2 / n_2]^{0.5}$
- $z = -3.447$
- $RR = \{z < (-z_{\alpha})\} = \{z < (-1.645)\}$
- Reject  $H_0$
- According to the data, the recidivism rates within a year of people treating addiction with methadone is significantly lower than people treating opioid addiction via detox
- p-value = 0.0003

## Comparing MMT to General Population

- $H_0 : p_1 = p_3$  vs.  $H_a : p_1 \neq p_3$
- $Z = (\hat{p}_1 - \hat{p}_3) / \sigma_{\hat{p}_1 - \hat{p}_3}$ ,  $\sigma_{\hat{p}_1 - \hat{p}_3} = [\hat{p}_1 \hat{q}_1 / n_1 + \hat{p}_3 \hat{q}_3 / n_3]^{0.5}$
- $z = 0.569$
- $RR = \{|z| > z_{\alpha/2}\} = \{|z| > 1.96\}$
- Do not reject  $H_0$
- According to the data, there is not enough evidence to conclude a significant difference between the recidivism rates within a year of people treating addiction with methadone and the general population
- p-value = 0.5694

$$n_1 = 117, \hat{p}_1 = 0.534, \hat{q}_1 = 0.466, n_2 = 237, \hat{p}_2 = 0.722, \hat{q}_2 = 0.278, n_3 = 383, \hat{p}_3 = 0.504, \hat{q}_3 = 0.496$$

Tests done using  $\alpha = 0.05$



# Conclusions and Potential Solutions

- Our analysis of treatment center admissions demonstrates that American Indians and Asian or Pacific Islanders were arrested and referred to treatment centers by the criminal justice system more than other races in 2014. These results are surprising as this suggests that both whites and African Americans were less likely to be referred to treatment centers after arrest. White Americans, who had the highest opioid related death rate in 2014, were not being sent to public treatment centers upon arrest despite needing addiction support. For these two groups, it may be that they are being arrested and sent to prison more than other races, though further confirmation of this hypothesis is needed. Since this data is only on public treatment institutions, we do not know if these groups receive private support at a different rate.
- Our statistical analysis of recidivism reveals that methadone treatment within prison is more likely to prevent rearrest than detox while in prison. Given our above conclusion that many addicts are not being referred to public treatment centers, methadone treatment in prison could be an effective method of treating such addicts in the criminal justice system.
- In order to ensure that opioid addicts who are arrested get the treatment they deserve, we suggest higher referral to public treatment centers or at a minimum, methadone treatment within in prisons. Such changes could result in lower recidivism rates, beneficial addiction support, and perhaps fewer deaths in the future.