Project 1

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Background

The Data:

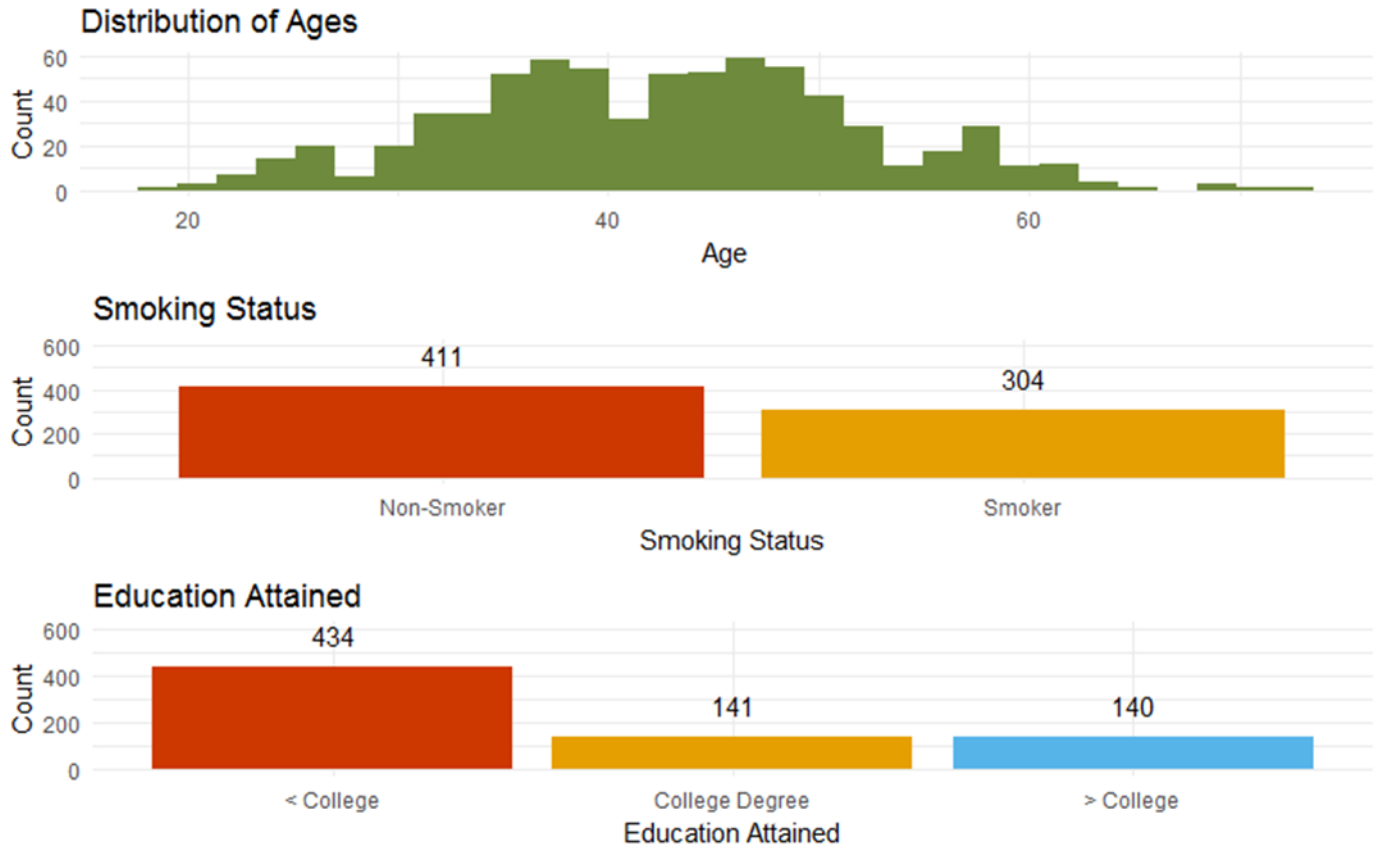
- Prospective study on natural and treated histories of HIV-1 infected men with up to 8 years of data both from lab tests and quality of life assessments
- Subjects were seen annually after beginning HAART
- After data cleaning 474 patients remained, all of which had complete lab test data. 468 had complete QOL data

Question of Interest:

How does treatment response differ from year 0 to year 2 between patients who report hard drug use at baseline and those who do not?

Hypothesis:

Drug users may have poor treatment response necessitating more aggressive treatment strategies or enrollment in drug rehabilitation programs



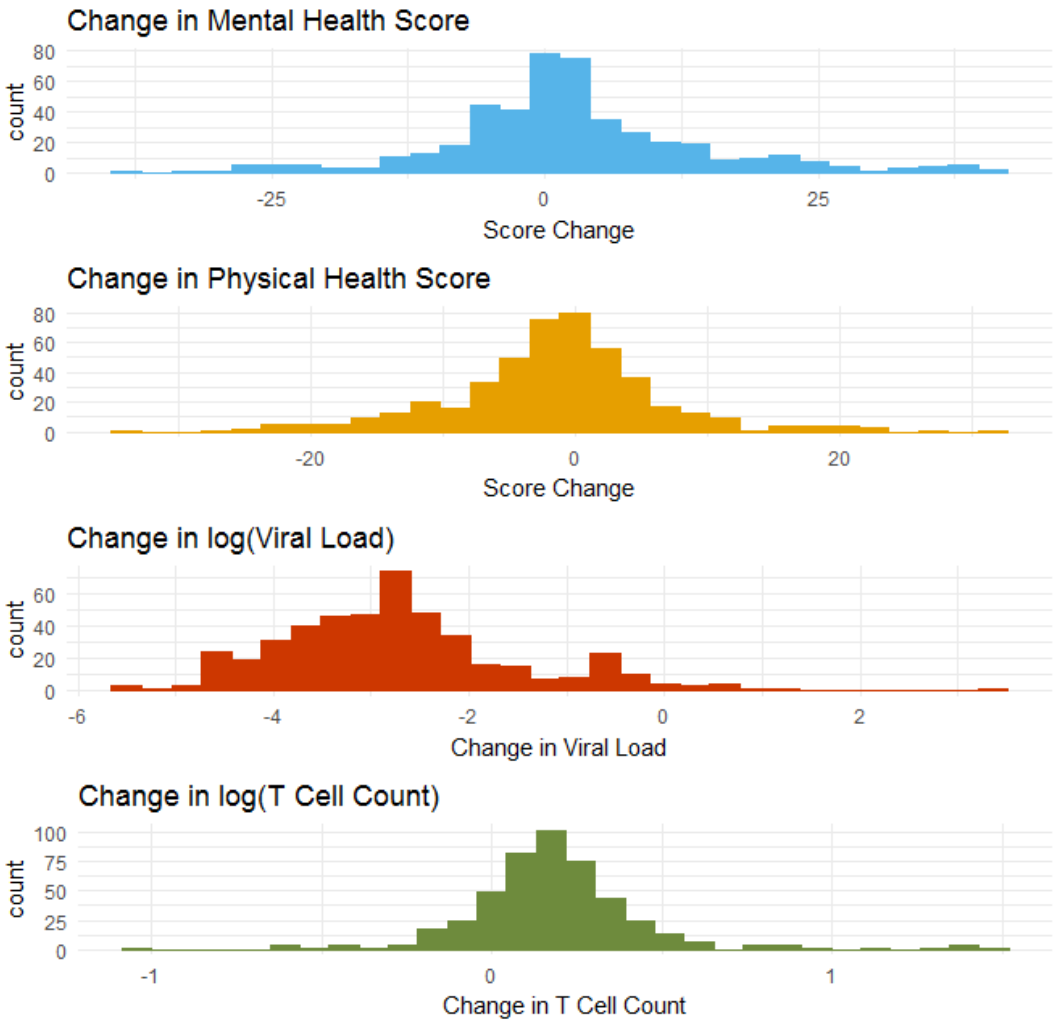
Analysis Plan

Model Formulas

1. Viral Load
   - Model: $\Delta\log(vload) = drugs_{baseline} + age + bmi + adh_{year2} + \text{race} + \text{education} + \text{smoke}_{\text{baseline}} + \log(vload_{baseline})$
2. T-Cell Count
   - Model: $\Delta tcell = drugs_{baseline} + age + bmi + adh_{year2} + \text{race} + \text{education} + \text{smoke}_{\text{baseline}} + \log(\text{tcell}_{\text{baseline}})$
3. Physical Health
   - Model: $\Delta health = drugs_{baseline} + age + bmi + adh_{year2} + \text{race} + \text{education} + \text{smoke}_{\text{baseline}} + health_{baseline}$
4. Mental Health
   - Model: $\Delta health = drugs_{baseline} + age + bmi + adh_{year2} + \text{race} + \text{education} + \text{smoke}_{\text{baseline}} + health_{baseline}$

Bayesian Priors

1. All priors were uninformative with mean = 0 and variance between 1000 and 1,000,000
   - This enabled the data to provide most of the posterior information
2. T-Cell count, physical health, and mental health all had changes centered at 0 (right)
   - Viral load had mean = -2 but the prior distribution covered its variance well



Results - CD4+ Count

Average change: 1.354 log unit

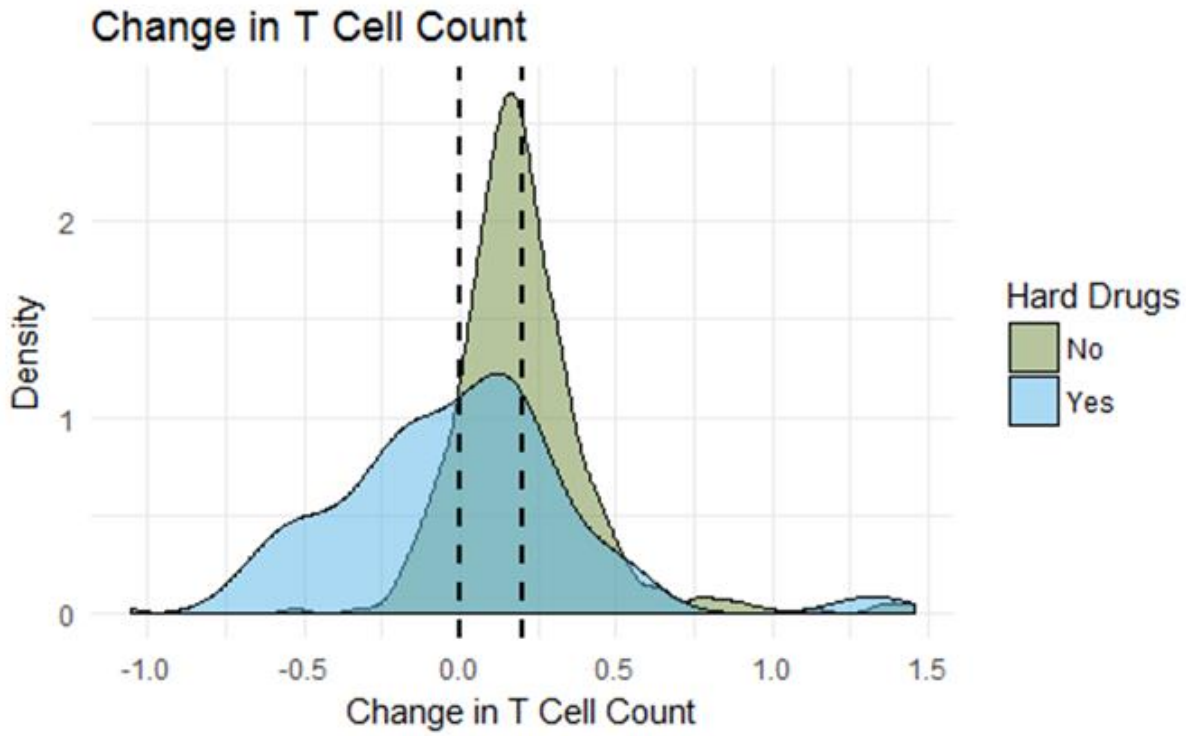
Average for drug users: 1.14 log units

- 95% CI: 1.074-1.204

Frequentist and Bayesian models agreed almost perfectly

Conclusion:

Hard Drug use decreases the CD4+ count improvement seen in patients over 2 years of participation in the HAART regimen.



Results - Physical Health

Average change: 17 point increase

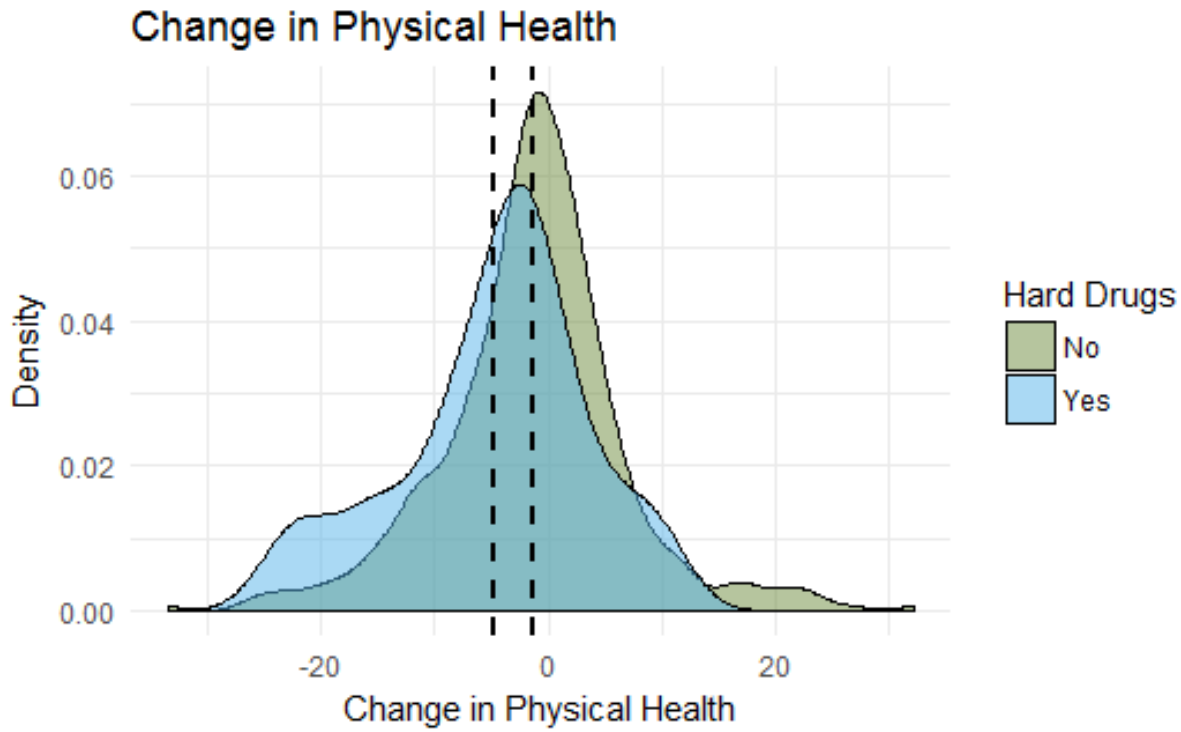
Average for drug users: 13.45

- 95% CI: 10.64-16.26

Frequentist and Bayesian models agreed almost perfectly

Conclusion:

Hard Drug use decreases the Amount of Physical improvement seen in patients over 2 years of participation in the HAART regimen.



Takeaways

1. No Impact:
    1. Mental Health Quality of Life
    2. Diminishment of Viral Load
2. Negative Impact:
    1. Physical Health Quality of Life – 4 point decrease
    2. T Cell Count Improvement – .2 log units
3. The analysis was hindered by many patients lost to follow-up by year two (241) and model ignorance of data at year one
4. Analysis in a longitudinal framework could take advantage of repeated measures over 8 years and better estimate the effects of hard drug use