

Project 1: HIV and Drug Use

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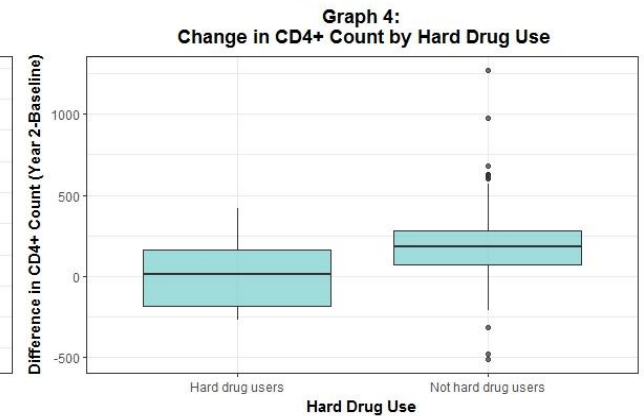
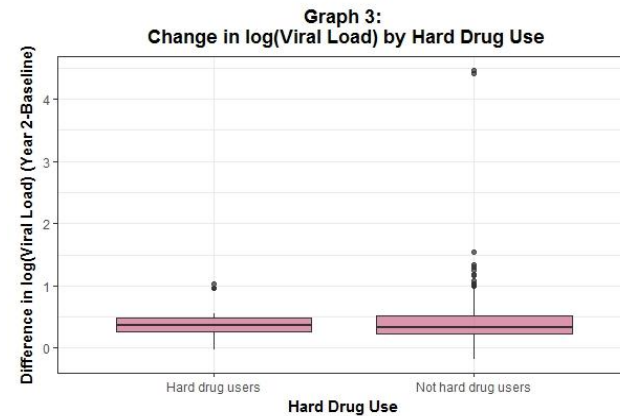
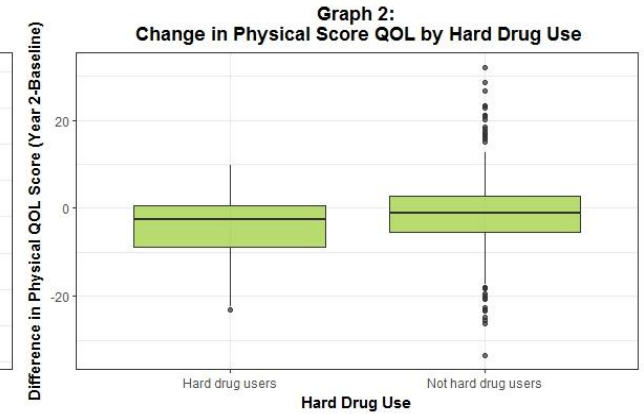
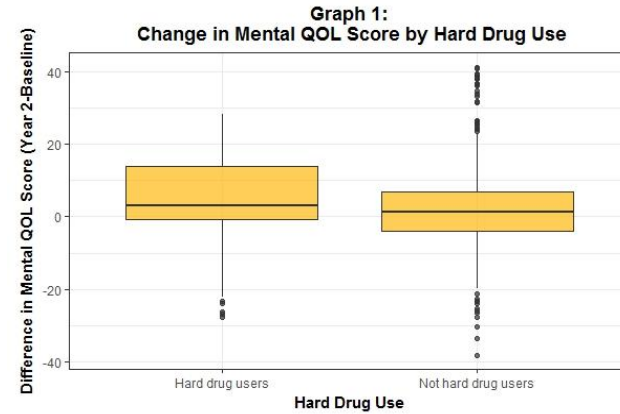
Research Question/Hypotheses

- How does hard drug use affect treatment response in HIV+ men from baseline to two years after initiating HAART?
- Some evidence that Drug Use → poorer immune system, replication
 - Hypothesis: The change in CD4+ and Viral Load from baseline to year 2 will be smaller in drug users compared to non-users
- Not sure how drug use affects Quality of Life (QOL)
 - Hypothesis: The drug users and non-users will differ in their QOL score changes from baseline to year two

Data Summary

Table One: Demographics

Variable	All Patients	Drug Users	Not Drug Users
N	476	39	437
Age (mean \pm sd)	43.26 \pm 8.72	44.62 \pm 9.49	43.14 \pm 8.65
BMI (mean \pm sd)	25.21 \pm 4.34	23.62 \pm 3.45	25.34 \pm 4.39
Race (%) (n))			
White	62.61 (298)	48.72 (19)	63.84 (279)
Non-White	37.39 (178)	51.28 (20)	36.16 (158)
Marijuana Use (%) (n))	40.76 (194)	30.77 (12)	41.65 (182)
Income (%) (n))			
<10000	21.57 (99)	35.9 (14)	20.24 (85)
10000-39999	42.7 (196)	41.03 (16)	42.86 (180)
>40000	35.73 (164)	23.08 (9)	36.9 (155)
Smoker (%) (n))	38.87 (185)	76.92 (30)	35.47 (155)
Alcohol consumption (%) (n))			
3 or less/week	93.07 (443)	94.87 (37)	92.91 (406)
4 or more/week	6.93 (33)	5.13 (2)	7.09 (31)
Education (%) (n))			
1 year college or less	21.22 (101)	41.03 (16)	19.45 (85)
4 year college or more	78.78 (375)	58.97 (23)	80.55 (352)
Adherence (%) (n))			
100%	10.5 (50)	2.56 (1)	11.21 (49)
<100%	89.5 (426)	97.44 (38)	88.79 (388)



476 Total Patients

- Only individuals who had all four outcomes at baseline and year 2

Initial differences between Drug users and non-users

- Outcomes: CD4+ count, Viral Load (log), Mental QOL, and Physical QOL
- Demographics: Race, Income, Smoking, and Education

Analysis

- Hybrid Linear regression model
 - Difference between year 2 and baseline for outcomes, adjusting for baseline
- Bayesian Methods
 - Vague Priors
 - Covariates \sim Normal
 - Errors \sim Inverse Gamma
 - PROC MCMC \rightarrow Random walk metropolis-Hastings algorithm
 - Convergence and mixing assessed visually
 - $\sim 200,000$ iterations and $\sim 20,000$ burn in
- Compared Full Models and Crude Models
 - DIC

Results-QOL

Table Three: Hard Drug Use Estimates

Outcome/Model	Estimate	SD	HPD Interval	DIC
Crude-Physical QOL Score	-3.6467	1.3329	(-6.2632, -1.0364)	3320.320
Full*-Physical QOL Score	-3.0955	1.3900	(-5.9218, -0.4560)	3093.463
Crude-Mental QOL Score	-0.0452	1.6673	(-3.2998, 3.2055)	3547.074
Full*-Mental QOL Score	-0.4596	1.7955	(-4.0932, 2.9386)	3328.946

*Full models are adjusted for smoking status, income level, marijuana use, drinks per week, race, education, ART Adherence, BMI, Age, and baseline (year 0) outcome measurement.

- Mental: No evidence that drug users and non-users differed.
 - Estimate: -0.4596 (95% HPD: -4.0932 to 2.9386)
- Physical: Evidence that drug users had lower Physical QOL differences than non-users
 - Estimate: -3.0955 (95% HPD: -5.9218 to -0.4560)

Results-Lab Values

Table Three: Hard Drug Use Estimates

Outcome/Model	Estimate	SD	HPD Interval	DIC
Crude- CD4+ Count	-89.2782	21.7383	(-131.4, -45.8162)	6292.001
Full*-CD4+ Count	-82.7244	22.4302	(-128.0, -40.1647)	5880.173
Crude-log(Viral Load)	-0.0172	0.0615	(-0.1349, 0.1045)	390.493
Full*- log(Viral Load)	-0.0265	0.0664	(-0.1598, 0.1020)	370.170

*Full models are adjusted for smoking status, income level, marijuana use, drinks per week, race, education, ART Adherence, BMI, Age, and baseline (year 0) outcome measurement.

- CD4+: Evidence that drug users had lower CD4+ count difference than non-users
 - Estimate: -82.7244 (95% HPD: -128.0 to -40.1647)
- Viral Load: No evidence that drug users and non-users differed
 - Estimate: -0.0265 (95% HPD: -0.1598 to 0.1020)

Conclusions/Limitations

- Evidence that drug use has a negative effect on Physical QOL and CD4+
- No evidence that drug use has an effect on Mental QOL and Viral Load
- Small Drug user sample
- Only two years of data
- Missing Data