

# TEMPORAL RELATIONSHIP BETWEEN HEAVY DRINKING, DRUG USE, AND ANTIRETROVIRAL MEDICATION NONADHERENCE



BROWN  
Alpert Medical School

Susan E. Ramsey, Evan G. Ames, Julia Uber, Samia  
Habib, and Seth Clark

# Introduction

- Antiretroviral therapy (ART) allows persons living with HIV (PLWH) to achieve viral suppression and live healthy lives (Chen, 2007). However, only 60% of PLWH achieve viral suppression, and it is estimated that only 59% are adherent to their ART regimen (CDC, 2018; Ortego, 2011).
- Substance use, including alcohol use, is highly prevalent among PLWH and may contribute to poor ART adherence (Gonzalez, Barinas, & O’Cleirigh, 2011; Gonzalez et al., 2011). To date, associations between substance use and ART adherence have mostly been evaluated within cross-sectional designs.
- An exception is a study by Parsons, Rosof, and Mustanski (2008), which examined temporal relationships between daily alcohol consumption and ART adherence and found that the odds of nonadherence increased on days alcohol was consumed and that the odds of nonadherence increased by 20% with each additional drink consumed on that day.
- The goal of the data analyses presented here is to contribute to our understanding of the temporal association between substance use and ART adherence, expanding on previous work through the examination of the relationship between daily alcohol and other substance use and objectively measured ART adherence. The data presented were collected as a part of an ongoing clinical trial (R34MH108431).

# Methods

**Design.** PLWH were recruited for a study to test the efficacy of a mobile health intervention aimed at increasing ART adherence. After completing a baseline interview, participants were given an electronic pill box (EPB) in which to store their ART. Adherence was monitored for 14 days prior to randomization to treatment condition. During the 1-month follow-up interview, information about alcohol and drug use occurring on those 14 days was collected.

## **Recruitment and Sample.**

PLWH (N=53) were recruited from an urban HIV treatment setting in the Northeastern United States and online via digital advertisements. Inclusion criteria: 1) infected with HIV; 2) prescribed ART; 3) detectable viral load within the past 6 months (> 20 copies/mL); 4) reported < 100% adherence; 5) at least 18 years of age; 6) own a smartphone compatible with the mobile health application; 7) willing to download the mobile health application.

Exclusion criteria: 1) physical impairments that prevent study completion; 2) cognitive impairments that would jeopardize informed consent or study comprehension; 3) active psychosis; 4) not fluent in English.

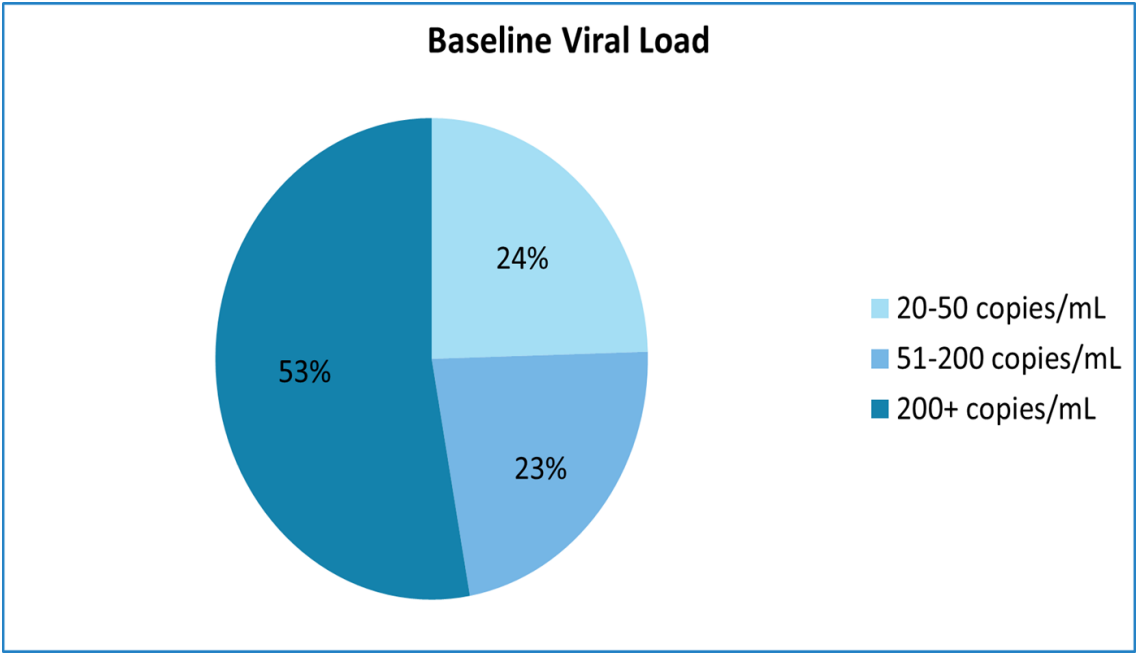
# Methods - Continued

**Measures.** The Timeline Followback (TLFB) (Sobell & Sobell, 1980; Sobell & Sobell, 1979) Interview for alcohol and drug use, viral load test, and EPB data.

**Data Collection.** Baseline interviews were completed from January 2017-February 2019. EPB data were retrieved 2 weeks after the baseline interview. At the 1-month follow-up, the TLFB was used to collect information about number of standard drinks consumed per day and classes of drugs used each day. Heavy drinking days were defined as  $\geq 5$  drinks/day for men and  $\geq 4$  drinks/day for women.

**Data Analysis.** Data were analyzed using Hierarchical Linear Modeling. Specifically, ART nonadherence was regressed onto same day alcohol use and drug use. Any alcohol use and heavy drinking were examined separately.

Demographic	<i>M</i>	<i>SD</i>	Min	Max
Age	46.74	12.40	20	73
ART Adherence (percentage)	78.67	21.63	20	99
Time Since Diagnosis (in months)	158.32	108.76	2	384
Time Since ART Initiation (in months)	134.51	97.29	1	384



Demographic	N	%
-------------	---	---

Demographic	N	%
<b>Gender</b>		

Male	38	71.7
Female	15	28.3

<b>Race</b>		

White	35	66.0
Black/African American	13	24.5
American Indian/Alaskan Native	2	3.8
More than one race	3	5.7

<b>Ethnicity</b>		

Hispanic /Latinx	7	13.2
Non-Hispanic/Latinx	46	86.8

<b>Sexual Orientation</b>		

Heterosexual	16	30.2
Gay/Lesbian	26	49.1
Bisexual	10	18.9
Prefer not to say	1	1.9

Demographic	N	%
-------------	---	---

Demographic	N	%
<b>Relationship Status</b>		

Single	23	43.4
Married	11	20.8
Divorced/Separated	5	9.4
Unmarried, in relationship	13	24.5
Living with someone	1	1.9

<b>Education</b>		

< High school	6	11.3
High school/GED	15	28.3
Some College/Associate Degree	24	45.3
Bachelor's Degree	7	13.2
Advanced Degree	1	1.9

<b>Employment</b>		

Full-time	23	43.4
Part-time	11	20.8
Retired/Disabled	13	24.5
Unemployed	5	9.4
Controlled Environment	1	1.9

# Results

- Participants, on average, consumed half a drink per day ( $M = .45$ ,  $SD = 1.38$ ).
- Mean percentage of heavy drinking days was 2.23% ( $SD = 14.54$ ).
- Mean percentage of drug use days (including cannabis) was 23.74% ( $SD = 42.68$ ).
- Mean percentage of other drug use days (not including cannabis) was 3.12% ( $SD = 16.27$ ).
- Results of analyses:
  - **Heavy drinking days were significantly associated with same day ART nonadherence.**
    - $OR = 4.90$ , 95% CI = 1.79-13.36,  $p = .002$
  - **Drug use (including cannabis) on a given day was significantly associated with same day ART nonadherence.**
    - $OR = 1.80$ , 95% CI = 1.14-2.85,  $p = .012$ .
  - **Neither any drinking nor drug use (not including cannabis) on a given day were significantly associated with same day ART nonadherence.**

# Discussion

- During days in which heavy drinking occurred, there was a nearly five times greater likelihood of same day ART nonadherence. Further, during days in which drug use occurred, there was a nearly two times greater likelihood of same day ART nonadherence.
- These results are consistent with previous research that has found heavy drinking to convey risk for multiple problematic behaviors and support the differentiation between any alcohol use and heavy drinking days as a meaningful distinction.
- The odds of ART nonadherence are greater for heavy drinking days than drug use days. This may be due to the inclusion of marijuana use and the relatively low prevalence of other drug use in this sample.
- Substance use data were collected retrospectively, which may have resulted in underestimation/overestimation. Prospective capture of substance use data may produce more accurate estimates.
- These results suggest that it is important to continue to pursue interventions to effectively address heavy drinking and drug use among PLWH in order to improve ART adherence.



# References

- Center of Disease Control and Prevention. (2018). Monitoring selected national HIV prevention and care objectives by using HIV surveillance data--United States and 6 dependent areas, 2016. *HIV Surveillance Supplemental Report*, 23(4).
- Chen, L. F., Hoy, J., & Lewin, S. R. (2007). Ten years of highly active antiretroviral therapy for HIV infection. *Medical Journal of Australia*, 186(146), 151.
- Gonzalez, A., Barinas, J., & O'Cleirigh, C. (2011). Substance use: Impact on adherence and HIV medical treatment. *Current HIV/AIDS Reports*, 8(4), 223 - 234. doi:10.1007/s11904-011-0093-5
- Gonzalez, J. S., Batchelder, A. W., Psaros, C., & Safren, S. A. (2011). Depression and HIV/AIDS treatment nonadherence: A review and meta-analysis. *Journal of Acquired Immune Deficiency Syndromes* 58(2), 181-187. doi:10.1097/QAI.0b013e31822d490a
- Ortego, C., Huedo-Medina, T. B., Llorca, J., Sevilla, L., Santos, P., Rodriguez, E., . . . Vejo, J. (2011). Adherence to highly active antiretroviral therapy (HAART): A meta-analysis. *AIDS and Behavior*, 15, 1381-1396.
- Parsons, J. T., Rosof, E., & Mustanski, B. (2008). The temporal relationship between alcohol consumption and HIV-medication adherence: A multilevel model of direct and moderating effects. *Health Psychology*, 27(5), 628-637. doi:10.1037/a0012664
- Sobell, L. C., & Sobell., M. B. (1980). *Convergent validity: An approach to increasing confidence in treatment outcome conclusions with alcohol and drug abusers, in Evaluating alcohol and drug abuse treatment effectiveness: Recent advances* (S. M. B. W. Sobell Lc Ed.): Pergamon Press.
- Sobell, L. C., & Sobell, M. B. (1979). Validity of self-reports in three populations of alcoholics. *Journal of Consulting and Clinical Psychology*, 46, 901-907.

# Funding/Disclosures

Research reported in this poster was supported by the National Institute of Mental Health of the National Institutes of Health under Award Number R34MH108431 to Dr. Susan Ramsey. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. Dr. Ramsey is the recipient of an Investigator Sponsored Research Agreement with Gilead Science, Inc. for the provision of medication for another trial.

## Contact:

Susan E. Ramsey, PhD

The Warren Alpert Medical School of Brown University

Rhode Island Hospital

Email: [Susan\\_Ramsey@Brown.edu](mailto:Susan_Ramsey@Brown.edu)