

Background

HIV viral suppression is an important indicator of effective HIV treatment, and additionally decreases the likelihood of HIV transmission. Substance use can negatively impact HIV-positive individuals' care engagement, including a higher likelihood of viremia and transmission. Therefore, it is important to understand the relationship between substance use, substance use treatment patterns, and HIV viral suppression.

Methods

Data from 2512 women were collected during six semiannual visits (10/2013-09/2016) at nine sites from the Women's Interagency HIV Study (WIHS)—the largest U.S. cohort study of HIV-positive and HIV-negative women. We compared the use of single substances and substance use treatment indicators to viral suppression, and then used latent class analyses of these domains to predict viral suppression.

Results-Demographics and Observed Levels of Use and Treatment

Table 1. Demographics

	HIV-	HIV+
Marital Status		
Partnered	30.5%	28.7%
Formerly Partnered	24.3%	28.9%
Never Married	33.1%	32.1%
Other	12.1%	10.3%
Education		
Less than High School	32.2%	33.6%
High School	31.1%	31.8%
More than High School	36.7%	34.5%
Race/Ethnicity		
Non-Hispanic White	6.6%	10.3%
Hispanic	15.9%	14.7%
Non-Hispanic Black	72.7%	71.9%
Non-Hispanic Other	4.8%	3.6%
Yearly Household Income		
\$0-\$18,000	62.1%	67.0%
\$18,001-\$36,000	21.4%	19.3%
\$36,001+	16.5%	13.7%

Table 3. Substance Use Treatment Over Time

	HIV-		HIV+	
	%	n	%	n
Professional Treatment				
January 2014 (Mo 0)*	8.7%	43/492	5.3%	64/1212
June 2014 (Mo 6)	8.3%	52/624	5.4%	83/1359
January 2015 (Mo 12)	8.6%	55/637	6.8%	105/1486
June 2015 (Mo 18)	7.7%	51/661	5.9%	102/1594
January 2016 (Mo 24)	8.4%	53/629	4.2%	74/1542
June 2016 (Mo 30)	8.2%	52/632	4.0%	67/1538
Alcoholics or Narcotics Anonymous (AA/NA)				
January 2014 (Mo 0)	6.9%	34/492	4.4%	53/1212
June 2014 (Mo 6)	4.5%	28/624	5.0%	68/1359
January 2015 (Mo 12)	4.6%	29/637	5.7%	84/1486
June 2015 (Mo 18)	5.0%	33/661	4.5%	71/1594
January 2016 (Mo 24)	4.9%	31/629	3.7%	57/1542
June 2016 (Mo 30)	3.0%	19/632	3.8%	59/1538

Substance Use (Table 2, below) is much higher than Substance Use Treatment (Table 3, above)

Table 2. Substance Use Over Time

	January 2014				January 2015				January 2016			
	HIV-		HIV+		HIV-		HIV+		HIV-		HIV+	
	%	n	%	n	%	n	%	n	%	n	%	n
n	-	493	-	1212	-	637	-	1486	-	629	-	1542
Marijuana	25.4%	125	19.2%	233	27.3%	174	19.8%	294	24.6%	155	18.6%	286
Binge Drinking	21.1%	104	14.1%	170	25.3%	161	14.4%	213	26.4%	166	13.1%	202
Stimulants	11.2%	55	7.9%	96	12.4%	79	7.7%	115	9.9%	62	7.5%	116
Opioids	2.6%	13	2.8%	34	2.8%	18	2.7%	40	2.5%	16	1.4%	22
Injector	0.8%	4	0.9%	11	1.3%	8	1.0%	15	0.8%	5	0.7%	11
Other Drugs	4.1%	20	2.5%	30	4.4%	28	2.2%	33	2.9%	18	1.0%	15
Any Drug Use	31.2%	154	24.1%	292	35.0%	223	24.4%	362	30.4%	191	22.7%	350

Results-Single Substance Impacts on HIV Viral Load

Stimulants, Marijuana and Binge Drinking are associated with significantly lower levels of HIV viral suppression when examined individually. Stimulants and Binge Drinking remain significant when controlling all substances used (data not shown).

Table 4. Viral Suppression by Single Substances

	% Suppressed	OR	95% CI
Stimulants	74.1%	0.60	(0.48, 0.75)
No Stimulants	82.6%		
Marijuana	78.7%	0.78	(0.65, 0.92)
No Marijuana	82.6%		
Binge Drinking	78.1%	0.75	(0.65, 0.88)
No Binge Drinking	82.5%		
Opioids	78.2%	0.79	(0.51, 1.20)
No Opioids	82.0%		
Other Drugs	81.7%	0.99	(0.60, 1.64)
No "Other Drugs"	81.9%		
No Drug Use	86.1%		

There were no impacts of substance use treatment when examined as a single predictor. There was a significant interaction of professional treatment and stimulant use (p=.04).

Table 5. Impact of Substance Use Treatment and Stimulant Use on Viral Suppression

	Baseline
No Stimulants & No Professional Treatment	81.4%
No Stimulants & Professional Treatment	79.9%
Stimulant Use & No Professional Treatment	72.0%
Stimulant Use & Professional Treatment	80.2%

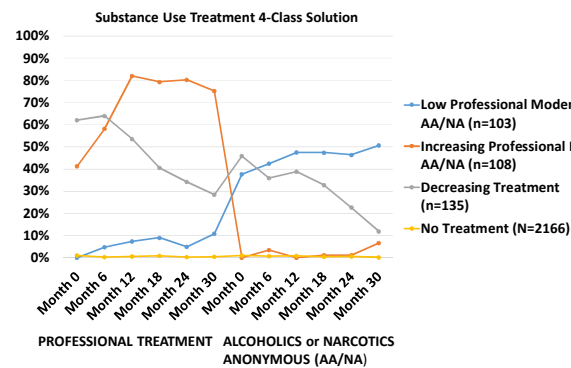
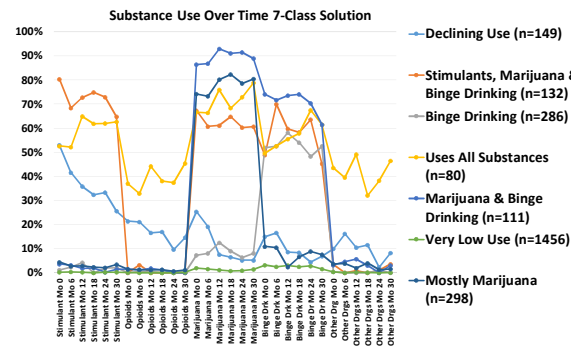
This single substance approach used all times of assessment in the data, but did not look at patterns over time nor did it look at different constellations or patterns of substance and how they change over time.

Latent Class Analysis

We used Repeated Measures Latent Class Analysis to examine different patterns of both substance use and substance use treatment over time. We then looked at how class membership predicted HIV viral suppression over time. Latent Class analysis can be thought of as a data reduction technique where numerous categorical indicators are reduced into a smaller number of latent classes which define subgroups with common patterns of substance use or substance use treatment.

Results-Latent Class Analysis

Analysis showed that a 7-class solution for substance use and a 4-class solution for substance use treatment fit the data better than other class solutions.



Results-Impact of Latent Classes on HIV Viral Suppression

Table 6. Impact of Substance Use Classes on Viral Suppression

	% Virally Suppressed	OR	95% CI
Stimulants, Marijuana & Binge Drinking	62.1%	0.29	(2.38, 5.06)
Uses All Substances	69.0%	0.39	(1.50, 4.36)
Declining Use	72.0%	0.45	(1.57, 3.10)
Marijuana & Binge Drinking	74.0%	0.50	(1.24, 3.20)
Binge Drinking	79.7%	0.69	(1.07, 1.95)
Mostly Marijuana	82.4%	0.83	(0.91, 1.63)
Very Low Use	85.0%	Ref	-

All substance use classes (other than "Mostly Marijuana") had significantly lower viral load than did the "Very Low Use" class. Due to relatively low cell-sizes when we attempted to cross-classify the Substance Use and Treatment classes, we collapsed "Mostly Marijuana," "Marijuana & Binge Drinking," and "Binge Drinking" into "Marijuana &/or Binge Drinking." The 2 classes which included stimulants, "Stimulants, Marijuana & Binge Drinking," and "Uses All Substances," were grouped as "Stimulants + 2 or more."

Table 7. Viral Suppression Cross-Classified by Substance Use and Substance Use Treatment Classes

Substance Use Classes	Substance Use Treatment Classes							
	Increasing Prof/No AA/NA		Decreasing Treatment		Low Prof/High AA/NA		No Treatment	
	Mo 0	Mo 30	Mo 0	Mo 30	Mo 0	Mo 30	Mo 0	Mo 30
Declining Use	55%	69%	70%	82%	68%	96%	73%	69%
Marijuana &/or Binge Drinking	89%	83%	50%	77%	98%	99%	75%	84%
Stimulants + 2 or more	36%	49%	70%	68%	24%	88%	68%	64%
Very Low Use	64%	78%	80%	78%	90%	95%	81%	88%

Consistent AA/NA use was associated with both higher rates of viral suppression and increasing rates of viral suppression over time. Increasing (and relatively high rates of) professional treatment were associated with increases in viral suppression for those using stimulants (and those in the "Declining Use" class wherein 50% began using stimulants declining to around 20%). "Decreasing Treatment" over time for those in the "Declining Use" and "Marijuana and/or Binge Drinking" classes was associated with improved rates of viral suppression. This was not true for those using stimulants—decreasing treatment was associated with little change in viral suppression for stimulant users.

Conclusions

Substance use remains a challenge for HIV care outcomes. Consistent and continued substance use treatment attendance is associated with improvements in viral suppression rates for most substance use patterns.