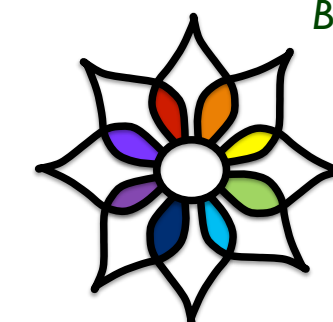




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BACKGROUND

- HIV viral suppression is critical to achieving benefits of antiretroviral therapy (ART) not only for individual health, but also for prevention of onward HIV transmission
- Limited data on viral suppression derive from key populations in low-and-middle-income countries where these groups continue to experience disproportionately high rates of HIV transmission.
- In a large multi-city sample of PWID and MSM from India (n=26,447), we previously demonstrated low levels of awareness of HIV positive status and linkage to care, but have not characterized factors associated with downstream HIV care continuum outcomes
- In this analysis, we characterize factors associated with HIV viral suppression among MSM and PWID who initiated ART across 27 sites in India.

METHODS

STUDY POPULATION

Men who have sex with men (MSM)

- 18 years of age or older
- Provide verbal consent
- Self-identify as male
- History of oral or anal intercourse with another man in the prior 12 months
- Present a valid RDS coupon

Injection drug users (IDUs)

- 18 years of age or older
- Provide verbal consent
- History of injecting drugs for non-medicinal purposes in the prior 24 months
- Present a valid RDS coupon

Table 1. Eligibility Criteria by risk-group

RECRUITMENT

- 26,477 participants were recruited using respondent-driven sampling (RDS; goal of 1000 per site)
- Ethnographic research was initially conducted to identify “seeds” for RDS
- RDS in all sites was initiated with two “seeds” – a third “seed” was added in Delhi (MSM site) and Gangtok (PWID site)
- Each recruit was given two coupons to distribute to their network

STUDY PROCEDURES

- Participants underwent a survey and provided a blood specimen.
- HIV testing was performed on-site (three rapid tests) and results were delivered to participants with pre- and post-test counseling
- Use of ART and adherence were based on self-report. Adherence was based on visual analogue scale.
- HIV-1 RNA was measured on all HIV positive specimens at a central lab using the RealTime HIV-1 assay with a lower limit of detection of 150 copies/ml (Abbott Laboratories)

ETHICAL CLEARANCES

- This study was approved by the JHMI, JHBSPH and the YRGCARE Institutional Review Boards

STATISTICAL METHODS

- Of 1,146 HIV positive MSM and 2,905 PWID, 345 (25%) and 595 (24%) initiated ART and had HIV RNA measures, respectively and were included.
- Overall characteristics and site-level proportions were estimated using Volz-Heckathorn (RDS-II) weights
- Correlates of viral suppression were explored using multi-level logistic regression models with random-intercepts for site (to account for clustering) incorporating scaled RDS-II weights.
- Separate models were constructed to account for the potential mediating effect of adherence
- All analyses were conducted using Stata version 13 (College Station, TX)

	MSM (n = 345; 12 sites)	PWID (n = 595; 15 sites)
Median age, (IQR)	39 (34 – 46)	35 (30 – 40)
Proportion male	345 (100)	415 (69.7)
Sexual identity		
Pantheri	56 (22.7)	N/A
Kothi	157 (38.8)	
DD	102 (25.8)	
Gay/ MSM/ Bisexual	31 (12.6)	
Education		
Primary school or less	102 (34.1)	171 (32.4)
Secondary school	171 (50.8)	301 (51.5)
High school and above	72 (15.2)	122 (16.1)
Marital status		
Never married	90 (24.3)	101 (13.2)
Married/ long-term partner	214 (61.9)	351 (67.5)
Widowed/divorced/separated	41 (13.9)	143 (19.3)
Median monthly income (USD) (IQR)	73 (51 – 103)	44 (0 – 88)
Homelessness*	4 (1.5)	9 (0.7)
Injected drugs*	2 (0.8)	396 (51.7)
Shared needle/ syringe*	N/A	101 (8.9)
Opioid agonist treatment*	N/A	97 (7.9)
Needle/ syringe exchange*	N/A	188 (16.1)
Alcohol use (AUDIT)		
None/Limited use	278 (84.2)	449 (78.8)
Harmful/Hazardous use	39 (11.1)	74 (11.4)
Alcohol dependence	28 (4.7)	72 (9.8)
Sex work*	100 (25.8)	14 (1.7)
Depression (PHQ-9)*	129 (33.6)	238 (43.1)
Region (MSM)		
North/ Central	18 (4.5)	
Karnataka	32 (9.0)	
Tamil Nadu	180 (62.1)	
Andhra Pradesh	115 (24.5)	N/A
Region (PWID)		
Northeast	N/A	498 (89.5)
North/ Central		97 (10.5)
ART use in prior 30 days	333 (96.9)	540 (90.9)
>95% adherence in prior 30 days	266 (76.1)	432 (81.9)
Viral suppression	268 (77.8)	443 (76.7)

Table 2. Characteristics of HIV-infected MSM and PWID reporting ART use (n=940) across 27 sites in India

All characteristics are presented as n(%) unless otherwise specified; *Reflect behavior/ characteristics in the prior 6 months

RESULTS

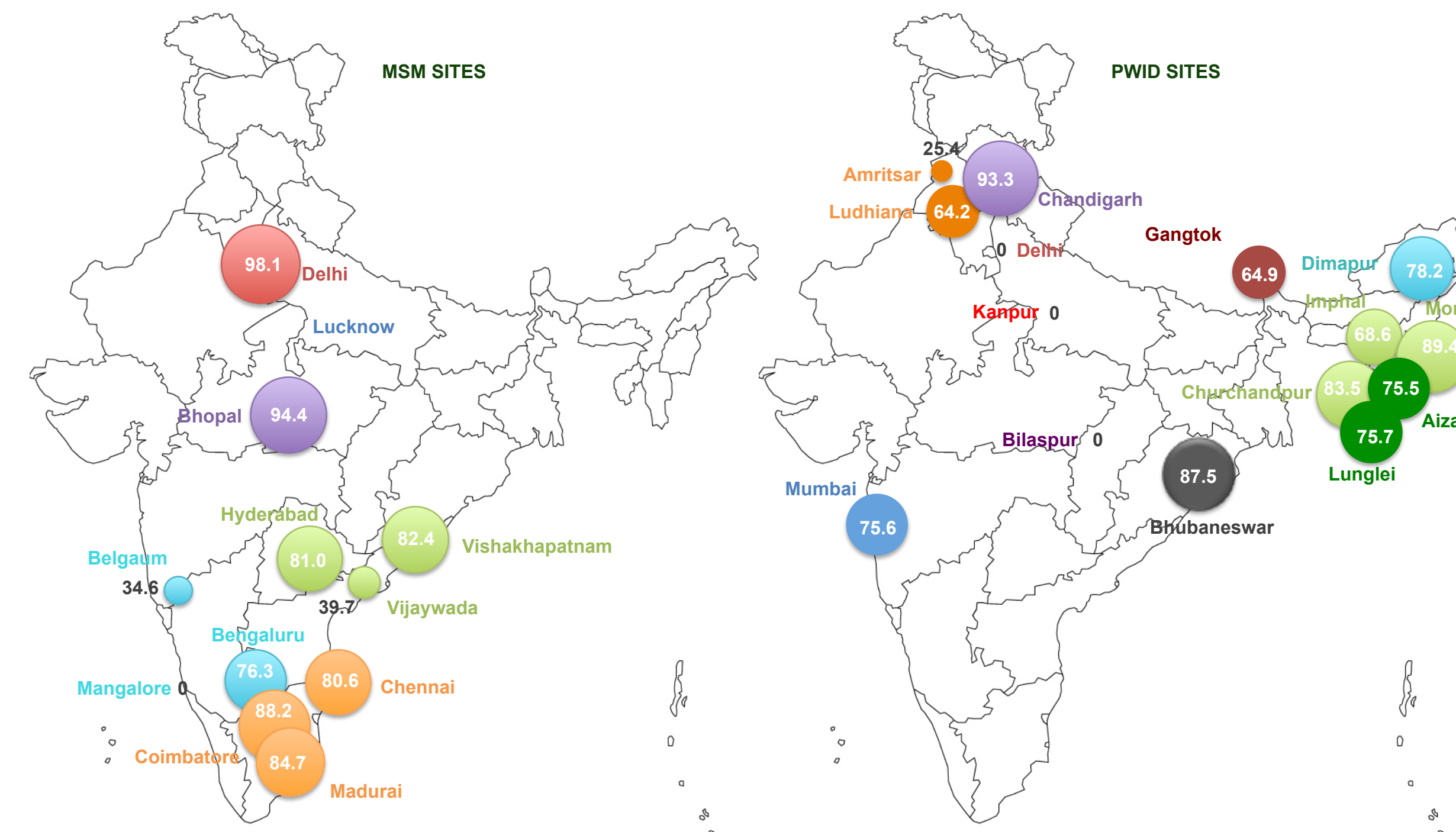


Figure 1. Site-wise viral suppression among MSM (n=345) and PWID (n=595)
Note: Fewer than 10 persons reported initiating ART in Mangalore, Lucknow (none), Bhopal, Bilaspur, Chandigarh, Delhi, and Kanpur

	Unadjusted OR (95% CI)		Unadjusted OR (95% CI)	
	MSM	PWID	MSM	PWID
Age (per 10 years)	1.18 (0.94 – 1.46)	1.40 (0.85 – 2.33)		
Sexual identity:				
Pantheri	REF			
Kothi	0.44 (0.20 – 0.94)	N/A		
Double-decker	0.46 (0.15 – 1.40)			
Gay/MSM/Bisexual	0.13 (0.03 – 0.52)			
Female (vs. male)	N/A	2.55 (1.36 – 4.79)		
Marital status:				
Never married	REF	REF		
Married/ long-term partner	0.74 (0.31 – 1.76)	1.41 (0.90 – 2.20)		
Widowed/divorced/separated	0.50 (0.09 – 2.84)	1.30 (0.64 – 2.64)		
Educational attainment:				
Primary school or less	REF	REF		
Secondary school	0.73 (0.47 – 1.13)	0.81 (0.33 – 1.94)		
High school and above	2.41 (1.19 – 4.86)	0.65 (0.22 – 1.91)		
Income (per 15 USD)	0.96 (0.90 – 1.02)	1.02 (0.99 – 1.05)		
Homelessness*	0.56 (0.51 – 0.62)	0.07 (0.01 – 0.45)		
Alcohol use (AUDIT)				
Low alcohol use	REF	REF		
Harmful/ hazardous use	0.78 (0.19 – 3.28)	0.46 (0.25 – 0.84)		
Alcohol dependence	0.51 (0.26 – 0.99)	0.25 (0.13 – 0.47)		
Ever injected drugs	0.26 (0.08 – 0.79)	N/A		
Recently injected drugs*	0.05 (0.00 – 1.12)	0.43 (0.25 – 0.76)		
Used non-injection drugs*	0.70 (0.23 – 2.11)	0.67 (0.36 – 1.25)		
Sex work*			1.49 (0.61 – 3.65)	0.80 (0.33 – 1.95)
Lifetime sex partners (per 5)			1.00 (0.99 – 1.00)	0.97 (0.93 – 1.00)
Opioid agonist treatment*			N/A	0.69 (0.43 – 1.10)
Needle/ syringe exchange*			N/A	0.62 (0.35 – 1.11)
Incarcerated*			0.32 (0.04 – 2.59)	0.46 (0.20 – 1.04)
Depression				
No/mild			REF	REF
Moderate			0.69 (0.41 – 1.16)	1.29 (0.56 – 2.99)
Moderately severe			0.70 (0.15 – 3.20)	0.66 (0.26 – 1.67)
Severe			0.26 (0.04 – 1.97)	4.82 (0.63 – 36.59)
Social support			1.25 (0.89 – 1.75)	0.97 (0.68 – 1.41)
Disclosed HIV status			1.67 (0.48 – 5.84)	1.92 (0.78 – 4.72)
Time since HIV diagnosis				
Within last year			REF	REF
1 to 2 years ago			1.23 (0.19 – 8.05)	0.88 (0.44 – 1.74)
More than 2 years ago			1.33 (0.45 – 3.93)	1.96 (1.13 – 3.40)
Enacted stigma			1.01 (0.95 – 1.07)	0.97 (0.90 – 1.05)
Region/state				
Central/North			REF	
Karnataka			0.03 (0.01 – 0.14)	N/A
Tamil Nadu			0.16 (0.07 – 0.38)	
Andhra Pradesh			0.07 (0.02 – 0.29)	
Northeast region (vs. others)			N/A	0.36 (0.10 – 1.27)
ART adherence >=95%			4.14 (2.73 – 6.29)	4.11 (1.86 – 9.11)

Table 3. Correlates of viral suppression among 345 HIV-infected MSM and 595 PWID across 27 sites in India
Results from unadjusted multi-level logistic regression models with scaled RDS-II weights; *Reflect behaviors/characteristics in the prior 6 months

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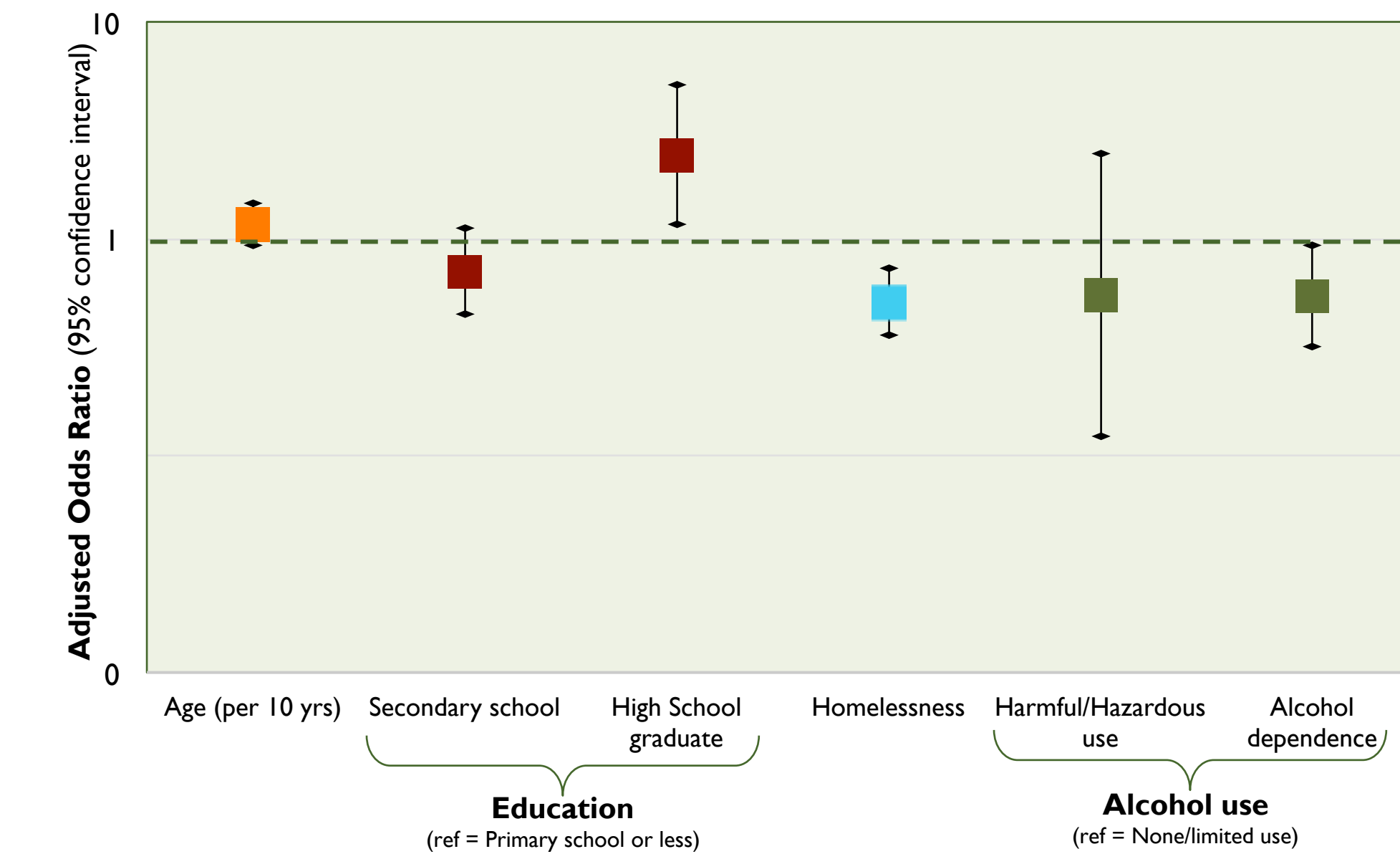


Figure 2. Correlates of viral suppression among MSM (n=345)

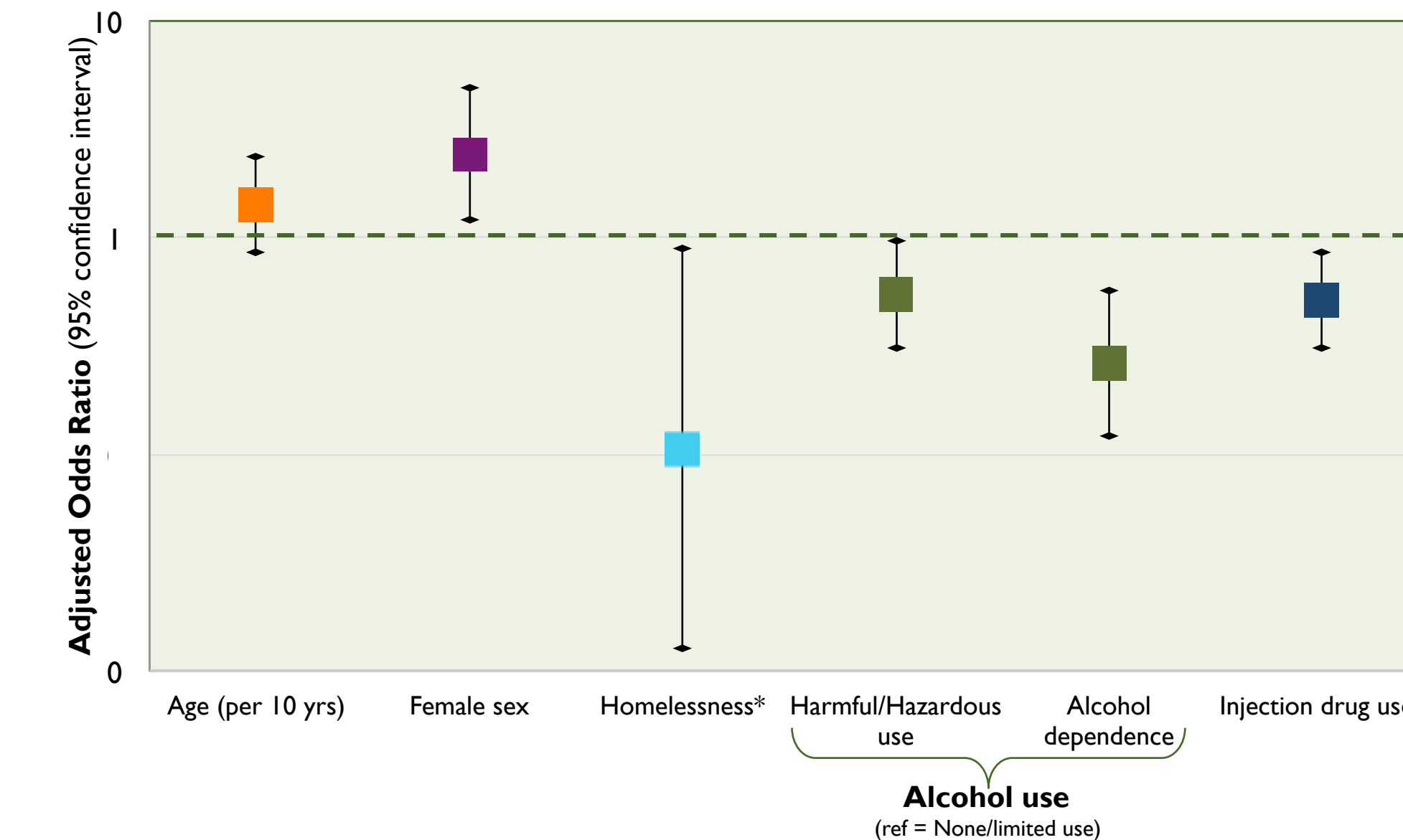


Figure 3. Correlates of viral suppression among PWID (n=595)

Results from figures 2 and 3 from multi-level logistic regression models with scaled RDS-II weights; Models also adjusted for region; Adjustment for adherence only marginally attenuated associations; *Reflect behaviors/ characteristics in the prior 6 months

CONCLUSIONS

- Levels of viral suppression among those on ART in this population were high, but are still short of new UNAIDS targets (90-90-90).
- The primary barriers to viral suppression in both MSM and PWID appeared to be ongoing drug and alcohol use.
- Moreover, while viral suppression among those on ART was high, overall viral suppression (19% among MSM and 18% among PWID) was suboptimal.
- Population viral suppression will only be achieved through broad-based interventions that simultaneously support testing, linkage and adherence.
- Interventions need to be targeted towards those with active substance use, as they may also be most likely to transmit HIV to others.