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The importance of context: Neighborhood drinking norms and heavy drinking among HIV patients

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To the editors

Heavy drinking has harmful consequences among individuals with HIV, including delayed HIV testing and treatment, reduced medication adherence, and organ damage¹. Better understanding factors underlying heavy drinking among those with HIV may inform intervention. Several studies show that individual characteristics (e.g., drinking motives, depression) are associated with drinking levels among HIV patients^{2–7}. However, epidemiologic research as a whole has increasingly highlighted the importance of group-level factors in substance use, including neighborhood poverty^{8,9}, laws^{10–12}, alcohol outlet density^{13–17}, neighborhood sociocultural characteristics^{18,19}, and community drinking norms^{20,21}. For example, the New York Social Environment Study (NYSES) found that neighborhood-level drinking norms were associated with individual-level drinking²⁰. Specifically, acceptability of any drinking was particularly associated with moderate drinking, while acceptability of drunkenness was particularly associated with heavy drinking²⁰. Although neighborhood-level factors are assumed to play a role in drinking

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Conflicts of Interest

We declare no conflict of interest.

among individuals with HIV²², to our knowledge, these associations have yet to be tested. Drinking norms may be particularly relevant for HIV patients, as HIV patients report social motives to drink⁵, and such content could be incorporated into drinking-reduction interventions. Thus, we examined the association of neighborhood-level drinking norms with individual-level drinking among individuals with HIV. Based on prior work²⁰, we hypothesized that more permissive neighborhood-level norms regarding any drinking would be associated with greater drinking quantity and frequency, and that more permissive neighborhood-level norms regarding drunkenness would be associated with greater maximum drinks consumed and binge drinking frequency.

We analyzed a sample of HIV-infected patients recruited from 2007 to 2010 from a large urban HIV comprehensive care clinic to participate in a randomized trial of the comparative efficacy of three brief alcohol interventions²³. Participants were eligible for the trial if they were HIV-infected adult patients in the clinic who spoke English or Spanish, and who had at least one occasion of heavy drinking (four or more drinks on one occasion) in the preceding month²³. Patients who were actively psychotic, suicidal, or who demonstrated gross cognitive impairment were excluded²³. Our current analyses utilize baseline data (i.e., collected prior to intervention) for the 244 patients who provided a residential address in New York City. These 244 patients were primarily male (77.9%), African American (50.8%), middle aged ($M = 45.7$; $SD = 8.15$), and had not completed any college education (89.3%). About half (47.7%) met criteria for DSM-IV current alcohol dependence.

At baseline, patients reported residential address, demographics (age, sex, race, education), and past 30-day drinking. Drinking was reported using the TimeLine FollowBack (TLFB)²⁴ measure, using accepted definitions of standard drinks²⁵. This widely-used measure is reliable^{26–28} and valid^{29,30}. We calculated four drinking variables from the TLFB: drinks per drinking day, drinking frequency (days drank), maximum drinks per occasion, and binge drinking frequency (i.e., days drank five drinks [for men] or four drinks [for women]). Median household income for each community district was determined, using the 2000 Census³¹, as a community-level socioeconomic indicator.

Norms regarding drinking and drunkenness were defined for each community district in New York City based on data from the New York Social Environment Study (NYSES)²⁰. The NYSES was a New York City population-based study, conducted in 2005, that examined the associations between neighborhood-level norms and substance use²⁰. Norm items assessed the acceptability of adults drinking *any* alcoholic beverages and the acceptability of adults getting drunk at least once per week. For the current study, we summarized these norms as the proportions of NYSES respondents in each of the fifty-nine community districts of New York City who considered drinking and drunkenness to be unacceptable. Our HIV patients' residential addresses were geocoded to their New York City community district using the "NYCityMap" geocoding service³². This was used to assign two NYSES norm values (regarding drinking and drunkenness) to each patient based on their neighborhood of residence.

Analyses were conducted using Proc Glimmix in SAS version 9.3³³. Specifically, multilevel regression models were used to assess the relation between neighborhood-level norms and

individual-level alcohol consumption. Separate models were fit for each of the four drinking outcomes. Negative binomial models were chosen to appropriately model the distribution shapes of the drinking outcome variables. Drinks per drinking day and drinking frequency were regressed on neighborhood unacceptability of any drinking, and maximum drinks per occasion and binge drinking frequency were regressed on neighborhood unacceptability of drunkenness. Each model included a random intercept for community district to account for correlations among individuals within community districts. All models included control covariates at the individual level (age, sex, race and education) and community district level (median household income).

Patients were distributed throughout fifty-one of the fifty-nine community districts, across all five boroughs of New York City. The median number of patients per community district was 4 (range: 1 – 14). The average number of days patients drank in the past 30 days was 9.8 (SD = 7.3), and the average number of days they binge drank was 7.4 (SD = 6.8). Patients consumed an average of 6.9 (SD = 3.7) drinks per drinking day, and a mean of 10.6 (SD = 5.6) drinks on their maximum drinking occasion. Using the NYSES data, the average percent of residents that felt any drinking was unacceptable across the 51 community districts was 33.0% (SD = 13.5, range = 2.8 - 60.1%) and the average percent that felt getting drunk at least once a week was unacceptable was 76.9% (SD = 7.5, range = 53.1–88.7%).

In our primary analyses, greater neighborhood unacceptability of drunkenness was significantly associated with fewer drinks consumed on patients' maximum drinking occasion ($p < 0.05$) (see Table 1). Specifically, for every 10% increase in neighborhood unacceptability of drunkenness, the expected average number of drinks consumed on patients' maximum drinking occasion decreased by 10% ($\exp[10 * (-0.01)] = 0.90$). Although the other predicted associations between neighborhood-level norms and individual-level drinking were in the hypothesized direction, they were not statistically significant.

Importantly, this study suggests that neighborhood-level unacceptability of drunkenness relates to less drinking on HIV patients' heaviest drinking occasion. This finding is consistent with studies in other populations that find that the neighborhood context—including neighborhood-level drinking norms²⁰ and other neighborhood-level variables^{8–19}—is related to the substance use of its residents. However, to our knowledge, this is the first demonstration of this association among HIV patients, where detection of heavy drinking is critically important to health and survival.

The study has certain limitations. Data were collected in one large urban HIV clinic, so generalizability is unknown for individuals not in HIV treatment, those in rural and suburban areas, and those in other geographic regions. Also, the sample size was relatively small for multilevel analyses. However, participants were distributed throughout a large number of community districts, making such analyses appropriate³⁴. The current study also has several strengths, including the novel application of neighborhood norms to understanding drinking among HIV patients, availability of New York City drinking norm data from the NYSES, and use of the reliable and valid TimeLine FollowBack measure.

This study emphasizes the relevance of context to the heavy drinking of HIV patients, and suggests potential research directions and clinical applications. For neighborhoods that are permissive regarding drunkenness, HIV patients may be exposed to greater availability of alcohol, modeling of heavy drinking, and/or social pressure to drink, prompting more consumption in heavy drinking occasions. These potential mechanisms require future study in a larger sample. Interventions with HIV patients could discuss detection of and response to contextual triggers. Some existing alcohol interventions for other populations attend to social factors, although mostly in regard to correcting estimates of peers' drinking behavior³⁵. Future research should study how interventions with HIV patients could be improved by better addressing relevant contextual factors.

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Table 1

Associations between neighborhood-level norms and individual-level alcohol consumption in HIV comprehensive care.

Neighborhood attitudes toward drinking and drunkenness	Drinking Frequency			Drinks per Drinking Day			Binge Drinking Frequency			Maximum Drinks/Occasion		
	Beta	SE	p-value	Beta	SE	p-value	Beta	SE	p-value	Beta	SE	p-value
Unacceptability of Any Drinking	-0.001	0.007	0.872	-0.004	0.004	0.337						
Unacceptability of Drunkenness		---			---		-0.004	0.009	0.691	-0.010	0.005	0.046 [*]

Note.

^{*} Indicates significance at $p < 0.05$.

Models are adjusted for covariates at the individual level (age, sex, race, and education) and community district level (median household income). Beta estimates are from negative binomial models and represent log change in outcome for a 1 percentage point increase in the neighborhood-level norm variable.