



## Neighborhood-level and individual-level correlates of cannabis use among young persons living with HIV/AIDS



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### ABSTRACT

**Introduction:** In addition to individual characteristics, there may be a wide range of environmental or neighborhood stressors that contribute to elevated cannabis use in groups of youth living with HIV/AIDS (YLHIV); however, the effects of social disorganization on cannabis use in YLHIV to date have not been studied.

**Methods:** We examined the effects of individual-level and neighborhood-level factors by developing hierarchical generalized linear models estimating odds of current cannabis use (any use during the past 3 months) and daily cannabis use among a sample of YLHIV ( $N = 1921$ ) currently receiving medical care. **Results:** The final model for daily cannabis use in the past 3 months included significant positive effects associated with hostility (O.R. = 1.08, 95% C.I.: 1.05, 1.11), being older (O.R. = 1.12, 95% C.I.: 1.05, 1.20), being a bisexual male (O.R. = 1.72, 95% C.I.: 1.10, 2.70), and residing in a community with a murder rate in the highest quartile (O.R. = 1.91, 95% C.I.: 1.27, 2.87), second highest quartile (O.R. = 1.62, 95% C.I.: 1.06, 2.46), or third highest quartile (O.R. = 1.52, 95% C.I.: 1.01, 2.30).

**Discussion:** This paper advances our knowledge of the multilevel factors associated with elevated cannabis use among groups of YLHIV and furthers our understanding of social and structural determinants of health in this population. Future research into cannabis use among YLHIV should consider, not only cannabis use within the context of the adjustment of living with HIV/AIDS, but also the stressors that characterize the environments in which groups of YLHIV live.

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### 1. Introduction

Public views on the use of marijuana or cannabis in the United States and internationally are undergoing currently a profound shift that coincides with emerging evidence of its use in the treatment of selected health conditions (Tramer et al., 2001; Watson et al., 2000), including HIV/AIDS (Abrams et al., 2003; Woolridge et al., 2005). “Medical marijuana” (including cannabinoids such as tetrahydrocannabinol (THC), cannabidiol (CBD), and their derivatives) is increasingly the focus of legislation in states in the U.S.,

and is already legal in Canada and several European countries. Decriminalization and legalization of recreational use of cannabis in selected jurisdictions has occurred recently, both domestically and internationally. Within this changing public sphere and clinical environment, it is important to understand the multiple influences on cannabis use among young persons living with HIV/AIDS (YLHIV). We adapted Bronfenbrenner’s (1979) ecologic model to examine potential individual-level and neighborhood-level factors associated with cannabis use in this population within an ecologic framework.

#### 1.1. Cannabis and HIV/AIDS

There are consistent findings that cannabis plays a role in symptoms management in HIV/AIDS, especially the alleviation of pain

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and nausea in adult PLHIV (Abrams et al., 2007; Braitstein et al., 2001; Corless et al., 2009; Woolridge et al., 2005). Stress management and alleviation among adult PLHIV have been shown to be facilitated through cannabis use, although there may be significant overlap between “recreational” use and “medicinal” use when considering cannabis, stress and HIV/AIDS (D’Souza et al., 2013; Furler et al., 2004). Data are somewhat equivocal when considering the role of cannabis in facilitating adherence to HIV treatment through improved symptom management (Corless et al., 2009; DeJong et al., 2005).

Few studies have investigated the role of cannabis use among YLHIV. Elevated marijuana use among HIV-positive young men who have sex with men (YMSM) has been associated with stress reduction, adjustment to an HIV/AIDS diagnosis, and relief from medication side effects (Bruce et al., 2013). Intervention studies among YLHIV have documented reductions in cannabis use via participant self-efficacy and social support, but cannabis use has proven more difficult to reduce than alcohol use in these interventions (Murphy et al., 2012; Naar-King et al., 2006).

### 1.2. Individual-level factors

Developmental and identity-related stressors also may contribute to differing levels of cannabis use among youth. Panel data has shown that cannabis use among populations in the U.S. spikes during late adolescence and emerging adulthood, with daily use among persons aged 18–24 estimated at 4–6% (Johnson et al., 2013). The effects of peer norms and social networks (Bell et al., 1998; Kuntsche and Jordan, 2006), and identity development processes and stressors associated with emerging adulthood (Arnett, 2005) have been proposed as developmental mechanisms that may explain elevated use of cannabis during this period, with subsequent declines in use as individuals age over time (Johnson et al., 2013). In addition, stressors associated with sexual identity and sexual orientation may drive cannabis use among groups of YMSM (Bruce et al., 2014; Traube et al., 2013; Wong et al., 2010). Across studies, lesbian gay and bisexual youth have been more likely to report past month cannabis use than heterosexual youth (Marshall et al., 2009).

Associations between mental health and substance use disorders have been documented theoretically (Wills and Shiffman, 1985), epidemiologically (Armstrong and Costello, 2002; Compton et al., 2007), and neurobiologically (Brady and Sinha, 2005), and populations living with HIV/AIDS have been characterized by increased risk for psychiatric and substance use co-morbidities (Bing et al., 2001; Chandler et al., 2006; Walkup et al., 2008). High levels of stress and co-morbid mental health or substance use disorders associated with disease management have been found among adults living with HIV/AIDS (Brown and Vanable, 2008), yet the precise relationship between cannabis and different mood disorders is not well understood (Crippa et al., 2009). There is evidence of cannabis use by PLHIV to alleviate depression and anxiety (Prentiss et al., 2004). Among those newly diagnosed with HIV across all ages, cannabis use is higher among depressed patients while for adolescents living with HIV cannabis use is more likely among those experiencing anxiety (Bhatia et al., 2011; Korthuis et al., 2008). Health anxiety, in particular, has been found to be associated with elevated cannabis use among YLHIV (Murphy et al., 2001).

### 1.3. Neighborhood-level factors

Social disorganization and neighborhood disadvantage have been theorized to be related to substance use through a number of stress mechanisms, including social interactions and discrimination, decreased social resources available to individuals, the undermining of individuals’ psychological resources, and increased

psychological distress (Boardman et al., 2001). Multiple studies have linked neighborhood disadvantage, disorganization, or disorder to increased drug use among adults (Boardman et al., 2001; Karriker-Jaffe, 2013; Latkin et al., 2007) as well as adolescents (Furr-Holden et al., 2011; Tucker et al., 2013; Winstanley et al., 2008).

Examination of National Longitudinal Study of Adolescent Health (Add Health) panel data has shown high neighborhood unemployment to be the most consistent predictor of initiation of cannabis use, with stronger associations than individual and social network factors (Tucker et al., 2013). A significantly greater prevalence of cannabis use has been found among sexual minority youth living in neighborhoods with higher prevalence of LGBT assault hate crimes (Duncan et al., 2014). Among African American youth, perceived neighborhood violence has been shown to be significantly associated with greater cannabis use, while perceived control is correlated with less cannabis use (Lambert et al., 2004). For YLHIV, in addition to developmental, identity-related, and HIV-related stressors, as well as associated mental health issues, there may be a wide range of environmental or neighborhood stressors that contribute to elevated cannabis use in groups of YLHIV from disadvantaged communities; however, the effects of social disorganization on cannabis use in YLHIV to date have not been studied.

### 1.4. Aims of current study

In light of the evidence that cannabis use may be associated with individual-level and neighborhood-level factors, we aimed to examine the effects of these multiple factors by developing hierarchical generalized linear models estimating odds of current cannabis use (any use in the past 3 months) and daily cannabis use among YLHIV. We hypothesized that (1) lesbian gay or bisexual sexual orientation, higher levels of mental health symptomology, and recent HIV diagnosis and (2) greater social disorganization as indicated by higher levels of poverty, unemployment, crime, and housing vacancy would be positively associated with current and daily use.

## 2. Methods

### 2.1. Study procedures

From December, 2009 to June, 2012, 2225 YLHIV receiving primary care at 20 geographically diverse clinics within the Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN) were recruited to participate in a cross-sectional survey (see Acknowledgements for the 17 metropolitan areas represented). To be eligible, youth had to be: (1) between 12 and 26 years of age (inclusive); (2) living with HIV/AIDS; (3) aware they were HIV-infected; (4) engaged in care in one of the ATN’s clinical sites or affiliates; and (5) able to understand English or Spanish.

Written informed consent or assent was obtained from all participants to (1) an audio-computer assisted self-interview (ACASI) to assess psychosocial factors, and (2) medical record abstraction to extract clinical data such as antiretroviral therapy (ART) usage and viral load (HIV RNA) assay results. Most sites did not require parental consent for participants younger than 18, in order to protect the confidentiality of participants and their HIV status, although parental consent was obtained at sites where it was required by the local institutional review board (IRB). Participants were given a small incentive the amount determined by each IRB based on previous history of research with YLHIV at each site. The study was reviewed by community advisory boards at each site and approved by the IRBs at each site as well as those from the members of the protocol team. It is the policy of the ATN for protocol teams to write a lay summary of findings to be distributed to study participants at each site.

### 2.2. Measures

**2.2.1. Cannabis use.** We used the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) (WHO Assist Working Group, 2001) to assess cannabis use, including (1) ever using cannabis during the past 3 months, and (2) frequency of use among current cannabis users during the past three months. Current use was defined as any use during the past 3 months. Frequency of current use was assessed with a four-point scale: once or twice, monthly, weekly, daily or almost daily. To

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