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## Modeling substance use in emerging adult gay, bisexual, and other YMSM across time: The P18 cohort study

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### Abstract

**Objective**—To examine patterns of substance use over time in a new generation of emerging adult gay, bisexual, and other young men who have sex with men (YMSM).

**Methods**—Data were drawn from the first four waves of an ongoing prospective cohort study of YMSM who were ages 18 to 19 at baseline and were assessed each 6 months for substance use via calendar based methods. Latent growth curve modeling was utilized to assess changes over time for four drug use categories: alcohol, marijuana, inhalant nitrates, and other drugs (e.g., cocaine, ecstasy) and between groups (race/ethnicity, perceived familial socioeconomic status; SES).

**Results**—Use of all substances increased steadily across the follow-up period. White YMSM demonstrated higher levels of alcohol use at the 18-mo follow-up visit compared to other racial/ethnic groups, while rates of change across groups were similar. Marijuana use at 18 months was highest for Hispanics who also indicated the highest rate of change. Finally, YMSM who reported higher perceived SES reported the lowest use and lowest rates of change for other drug use. Controlling for perceived SES, differences in patterns of drug use by race/ethnicity were evident but differences were not as large.

**Conclusions**—Increases in substance use in the emerging adulthood of YMSM indicate the need for structural and behavioral interventions tailored to address substance use in these young

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men before chronic patterns of use develop. Differences in patterns of drug use across racial/ethnic and SES groups suggest that interventions need to consider person-level differences.

## Keywords

Gay And Bisexual Men; YMSM; Alcohol and Other Drugs; Emerging Adulthood; Longitudinal; Latent Growth Curve Modeling

## 1. INTRODUCTION

Substance use and abuse is highly prevalent among gay, bisexual, and other non-identified young men who have sex with men (YMSM; Outlaw et al., 2011; Thiede et al., 2003; Ueno, 2010; Wong et al., 2013, 2010; Halkitis et al., 2011; Newcomb and Mustanski, 2014; Pachankis et al., 2014). Moreover, the increased use of substances in this population has been linked to a range of health disparities, including higher rates of STI including HIV infection and transmission, greater mental health burdens including depression and suicidality as well as psychosocial burdens such as homophobia and gay-related stigma. The presence of these overlapping burdens of behavioral, mental health and physical health outcomes has been described as a syndemic among YMSM (Guadamuz et al., 2014; Halkitis, 2013b; Halkitis et al., 2011; Herrick et al., 2013; Mustanski et al., 2007; Singer, 1994; Stall et al., 2008, 2003).

### 1.1 Substance use and emerging adulthood

Emerging adulthood, the period typically from ages 18 – 25 when individuals transition from adolescence into adulthood, is considered to be a critical developmental period in relation to onset of substance use, as well as the continued use and abuse of substances (Arnett, 2000; Tucker et al., 2005). Highlighting the onset and development of substance use in emerging adulthood, a recent report from the National Survey on Drug Use and Health (NSDUH) indicates that, across all age groups, prevalence of substance use was highest among emerging adults between the ages of 18 – 20, with 23.9% reporting recent illicit drug use (National Institute on Drug Abuse, 2012). Among YMSM, in addition to alcohol use, the substances most frequently reported include marijuana, cocaine, ecstasy, methamphetamine, GHB, and ketamine respectively (Clatts et al., 2005; Parsons et al., 2014), with a higher frequency of marijuana use in some studies (Bruce et al., 2013; Newcomb and Mustanski, 2014).

### 1.2 Substance use over time and across groups

In prospective studies of adolescents and young adults, the onset of substance use is most often associated with age, often beginning in adolescence and peaking in emerging adulthood (Chen and Jacobson, 2012; Clark et al., 2013; Maddahian et al., 1985). Drawing on data from the Monitoring the Future Study, Kroutil et al. (2010) observed that lifetime prevalence use of alcohol and marijuana increased with age. Finally, the reported lifetime prevalence of alcohol and marijuana use among adolescents has also increased over the last decade (Substance Abuse and Mental Health Services Administration, 2012).

In the general population, studies indicate that White adolescents are more likely to report alcohol consumption, including heavy drinking as well as compared to their non-White peers (Finlay et al, 2012). In addition, White adolescents are more likely to have abused prescription drugs in the last year than those who identify as Hispanic or Black (Kroutil et al., 2010). Longitudinal data also reveal that White young adults are more likely to be chronic marijuana users than Black or Hispanic young adults (Shulenberg et al., 2005). Furthermore, recent findings indicate that Hispanic adolescents report higher frequencies of substance use at a younger age, while White adolescents report greater increases in frequency of use over time and a higher frequency of substance use during the later stages of mid-adolescence through young adulthood (Chen et al., 2012).

The literature on the associations between socioeconomic status and substance use in emerging adulthood is limited. A small set of studies note that heavy alcohol consumption and substance use increases as income increases, particularly among White and Black adolescents (Clark et al., 2013; Maddahian et al., 1986).

Studies examining longitudinal patterns of substance use have predominantly focused on adult MSM. For example, Colfax et al. (2005) reported a decrease in frequency of use among older MSM, but a rise in frequency of substance use among younger men in their sample, over a 48-month period. Consistent with these findings, Halkitis et al. (2007a, 2007b) demonstrate decreased frequency of methamphetamine use in a sample of club-drug-using gay and bisexual men over a period of 12-months, despite a high level of club drug use across time.

While frequency of substance use may decrease over time among older men who have sex with men (MSM), the unique challenges of emerging adulthood faced by YMSM, coupled with the experimentation that often accompanies this period of life for many emerging adults regardless of sexual orientation, may indicate greater vulnerability to substance use in YMSM, as compared to their heterosexual counterparts. Moreover, given the intimate link between substance use, HIV, and other sexually transmitted infections (Halkitis et al., 2011), it is essential to more fully disentangle the patterns of use that develop among emerging adult sexual minority men.

In addition, the bulk of information available on substance use among YMSM come from either cross-sectional studies or studies where sexual minority youth are a small subset of the overall sample. Thus, the development of substance use behaviors and patterns is poorly understood in the population of emerging adult YMSM. This dearth of information is particularly notable given the unique challenges faced by sexual minority men, such as homophobia and heightened forms of discrimination that may increase the vulnerability of these young men to substance use behaviors (Wong et al., 2010) and influence the development of substance use within a larger constellation of overlapping health outcomes that may interact to compromise their overall health (Halkitis et al., 2013c). In addition, it is important to note that substance use among YMSM may be driven by normalized behaviors of alcohol and drug use within certain gay-identified contexts such as bars clubs, and circuit parties (Colfax et al., 2001; Halkitis and Parsons, 2003; Kipke et al., 2007). Thus, young men who participate or engage in such contexts, may be introduced to substance using

behaviors as well as be more likely to increase their substance use due to the normalized nature of substance use in these environments. Finally, while substance use has been shown to vary across race/ ethnicity among MSM (Irwin and Morgenstern, 2005), the extant literature provides little information on the development of substance use behaviors racially/ ethnically diverse YMSM. In light of these factors, data from the first 18 months of a prospective cohort study of YMSM were used to: (1) document the development and trajectories of alcohol and other drug use in a sample of emerging adult YMSM; (2) delineate the extent to which trajectories of alcohol and other drug use are related to race/ ethnicity and socioeconomic status.

## 2. MATERIAL AND METHODS

### 2.1. Study design and procedure

The Project 18 (P18) study is a prospective cohort study that seeks to examine the production of syndemic conditions, including sexual behaviors, substance use and mental health burdens, in a diverse sample of young gay, bisexual, and other YMSM in the New York City metropolitan area. Complete study details and procedures appear in prior publications (Halkitis et al, 2013a, 2013b). Briefly, active and passive recruitment techniques were used from May 2009 to June 2011 to recruit and screen n=2,068 participants were screened for eligibility; of this sample, n=600 were eligible for participation. Eligible participants had to be biologically male, 18 – 19 years old at the time of baseline, report an HIV-negative or unknown status, and at least one reported sexual encounter with a man in the previous 6 months and report residing in the NY metropolitan area.

At the baseline visit, participants completed an audio computer-assisted self-interviewing (ACASI) survey with socio-demographic, mental health, and psychosocial measures. In order to obtain data on substance use behaviors for the 30 days preceding interview, a study staff member administered a Timeline Followback (TLFB) measure, which is a calendar-based assessment technique used to elicit detailed and comprehensive drug use behaviors (Sobell and Sobell, 1996). A federal certificate of confidentiality was obtained for this study and the New York University Institutional Review Board approved the study protocol.

The present analysis utilized data from the first four assessments of this cohort study –the baseline visit along with the 6-, 12- and 18-month follow-up visits. To determine whether any differential loss to follow-up would bias the present results, bivariate analyses were conducted to compare key sociodemographic characteristics at baseline between those who were active in the study and completed follow-up visits (i.e., completed the baseline visit and at least 1 follow-up visit) and those lost-to-follow-up (i.e., did not complete any follow-up visits). These comparisons revealed non-differential attrition by race/ethnicity and perceived familial socioeconomic status. Finally, using baseline data, we compared the amount of use for each of the four drug variables examined here between those who completed 18-month follow-up visit and those who did not. Again, we found no significant differences in drug use amount across those who did and did not complete the 18 month follow-up visit (data not shown).

## 2.2. Measures

**2.2.1. Demographic characteristics**—A full description of P18 demographics have been previously published (Halkitis et al., 2013b). Participants self-reported race/ethnicity and perceived familial socioeconomic status (SES) at the baseline visit. Perceived familial socioeconomic status was measured via a 5-point Likert scale (“lower”, “lower middle”, “middle”, “upper middle”, “upper”), which was categorized as lower, middle, and upper perceived familial SES. Perceived familial SES was used instead of income as perceived familial SES, as measured here, has been shown to be a strong indicator of health in adolescents (Goodman et al., 2007). Table 1 describes the analytic sample at each time point in relation to both race/ethnicity and perceived familial socioeconomic status.

**2.2.2. Alcohol and other drug use**—Participant substance use behaviors during the 30 days preceding interview were obtained using the TLFB (Sobell and Sobell, 1996). Participants were asked which days they used any of the following substances: alcohol, marijuana, inhalant nitrates, powder cocaine, ecstasy, GHB, ketamine, crack cocaine, heroin, rohypnol, methamphetamine, or pharmaceuticals without or in excess of their prescribed use. For the present analysis, and given the distribution of the data, we created sum scores indicating the total number of days that participants stated using alcohol, marijuana, inhalant nitrates, and all other drugs to create four summary variables with scores indicating days of use.

## 2.3. Data analysis plan

We began by examining descriptive statistics for each alcohol and drug use variables over time. Next, to examine changes in drug use over time, we fit a series of latent growth curve models. Latent growth modeling is a very flexible technique for modeling systematic within- and between-individual differences in change over time and offers several well-documented advantages over other growth modeling methods (Muthen and Curran, 1997; Willett and Bub, 2005). In particular, latent growth modeling teases out measurement error, thereby disattenuating findings from the influence of this error (Willett and Sayer, 1994). First, to investigate whether there were changes in alcohol, marijuana, inhalant nitrate, and other drug use between baseline and the 18-month follow-up assessment, we fit a series of latent growth models in which we simultaneously estimated in a single unconditional growth model a the final level (i.e., at the 18-month follow-up) and linear rate of change for each of the four drug use variables. Next, to investigate between-individual differences in the final level and rate of change in alcohol, marijuana, inhalant, and other drug use, we fit two conditional growth models: one in which we added a set of dummy variables representing race/ethnicity and one in which we added both race/ethnicity and perceived familial SES. Latent growth models were fitted in MPlus version 6.1 and alternative latent growth models were compared using a set of fit indices including chi-square, CFI, and RMSEA statistics.

## 3. RESULTS

### 3.1. Descriptive analyses

Means and standard deviations and prevalence for the drug use variables across time are presented in Table 2. On average, mean levels of alcohol and marijuana use increased

steadily across the study period. Mean levels of other drug use increased between baseline and the 6-month follow-up, decreased slightly between the 6- and 12-month follow-up, and then increased again by the last assessment. Use of inhalant nitrates remained quite stable across the study period. Correlations among the drug use variables within each assessment were low to moderate ( $r$ s ranged from a low of .08 to a high of .40,  $p < .05$ ). There was considerable within-individual stability in alcohol use ( $r$ s ranged from .55 to .65 across time,  $p < .05$ ) and marijuana use ( $r$ s ranged from .55 to .74,  $p < .05$ ) and moderate stability in poppers use ( $r$ s ranged from .12 to .53,  $p < .05$ ) and other drug use ( $r$ s ranged from .33 to .65,  $p < .05$ ).

An examination of the association between the race/ethnicity dummy variables and SES revealed small to moderate correlations for White, Black, Hispanic, and Asian/Pacific Islander men, but not mixed or men of other race/ethnicity, suggesting there may be a need to account for SES when considering racial/ethnic differences. Specifically, White YMSM had higher SES levels ( $r = .35$ ,  $p < .05$ ), while Black and Hispanic YMSM had lower SES levels ( $r = -.20$ ,  $p < .05$  for both groups). Asian/Pacific Islander YMSM had marginally higher SES levels than White YMSM ( $r = .07$ ,  $p < .10$ ).

### 3.2. Predictive analyses

Parameter estimates and goodness of fit statistics from the unconditional growth models investigating the simultaneous growth in alcohol, marijuana, inhalant nitrates, and other drug use over time are presented in Table 3, Model 1. Results suggest that there was statistically significant positive growth in three of the four indicators of drug use. Specifically, alcohol use, marijuana use, and other drug use increased between baseline and the 18-month follow-up. There was no evidence of growth in inhalant nitrate use over time, however. Importantly, the statistically significant intercepts for all four of the drug use variables suggest that alcohol, marijuana, inhalant nitrate, and other drug use were different from zero at the 18-month follow-up. In other words, on average individuals were using at least some of each of these drugs by the end of the study period. Model fit statistics suggested a reasonable fit to the data. Growth trajectories for each of the drug use variables are presented in Figure 1.

Parameter estimates and goodness of fit statistics from the conditional growth models investigating racial/ethnic and socio-economic differences in drug use growth over time are presented in Table 3. We began by examining the effects of race/ethnicity alone (Model 2). Black YMSM, Hispanic YMSM, Asians/Pacific Islander YMSM, mixed, and other race YMSM demonstrated significantly lower alcohol use at the 18-month follow-up, relative to White YMSM. Effects were largest for Black YMSM and individuals of mixed race and smallest for Asian/Pacific Islander YMSM. No significant racial/ethnic differences in the rate of change in alcohol use were identified. For marijuana use, Hispanics demonstrated a somewhat ( $p < .10$ ) higher level of use at the 18-month follow-up as well as a somewhat ( $p < .10$ ) greater rate of increase in marijuana use between baseline and 18 months. Neither inhalant use nor other drug use differed by race/ethnicity, with one exception. Asian/Pacific Islander YMSM demonstrated a significant decline in inhalant nitrate use from baseline to the 18-month follow-up relative to White YMSM. Model fit was again acceptable. We



display in Figure 2, prototypical growth trajectories in alcohol use by racial/ethnic group. As expected, the trajectory for White YMSM is considerably higher than the trajectories for any other racial group. Importantly, Black YMSM are reporting the lowest levels of alcohol use, while Hispanic YMSM and Asian/Pacific Islander and other YMSM are reporting similar rates of consumption. Note that the trajectories are relatively parallel, reflecting the non-significant racial/ethnic effects on the slope.

We then added an indicator of perceived familial socio-economic status (SES) to the model containing the dummy variables representing race/ethnicity (Table 3, Model 3). Controlling for race/ethnicity, perceived familial SES was a statistically significant predictor of only the final level and rate of change in other drug use. Specifically, higher SES predicted lower levels of other drug use at the 18-month follow-up, as well as slower increases in other drug use between baseline and the 18-month follow-up.

Notably, once SES was taken into account, the pattern of findings for race/ethnicity differed somewhat from the model containing only race/ethnicity. White YMSM continued to exhibit significantly higher levels of alcohol use relative to Black, Hispanic, Asian/Pacific Islander, and mixed race YMSM at the 18-month follow-up. However, YMSM from other racial/ethnic backgrounds reported marginally lower rates of alcohol use relative to White YMSM. Importantly, controlling for SES, Hispanics demonstrated significantly higher final levels of marijuana use and greater increases in marijuana use relative to other racial/ethnic groups. Finally, the pattern of findings for inhalant nitrate use and other drug use remained relatively similar, even after controlling for SES. The one exception to this is that Black YMSM reported somewhat ( $p < .10$ ) lower levels of other drug use relative to White YMSM.

As a final step, to investigate whether the effects of race/ethnicity on final level and rate of change in alcohol, marijuana, inhalant nitrate, and other drug use over time differed by SES, we added to our growth model interactions between the race/ethnicity variables and SES. No significant interactions were identified, suggesting that there was no moderation.

#### 4. DISCUSSION

In the present study, we observed increases in substance use over time in this sample of racially/ethnically and socioeconomically diverse YMSM that are consistent with other studies of youth, in general, (Chen and Jacobson, 2012; Dermody et al., 2014; Kroutil et al., 2010) and, more specifically, of YMSM (Colfax et al., 2005). This effect may also be attributable to the development of men's sexual identities over time; as young men develop their sexual identities, they may increasingly engage with gay and sexual minority cultures and venues where substance use tends to be normative (Marshall et al., 2009; Thiede et al., 2003).

Overall, frequencies of alcohol and marijuana use increased over the 18 month study period, and these two substances were the most commonly-used across all waves, with approximately 4–6 days of use per month. By month 18, nearly 9 out of 10 men (87%) reported alcohol use, and half (56%) reported marijuana use. These two substances were also the most frequently used, with a mean of 5 days of alcohol use and 7 days of marijuana use in the prior 30 days. We note that these increases appear to be the inverse of trends noted

in Add Health, where alcohol use demonstrated greater change in frequency of use and marijuana demonstrated more stability from adolescence to young adulthood (Chen and Jacobson, 2012).

White YMSM demonstrated the highest trajectories of alcohol use when compared to ethnic minority YMSM. Conversely, Black YMSM demonstrated the lowest trajectories of alcohol use. Data from Add Health has indicated greater levels of alcohol use among White youth (Chen and Jacobson, 2012; Clark et al., 2013; Dermody et al., 2014), and prior data from New York City has indicated similar findings among YMSM (Halkitis et al., 2012). We note that the differences in trajectories found in the present study were attributable to the intercepts rather than the slopes. That is, while race/ethnicity was associated with frequency of alcohol use by month 18, race/ethnicity did not demonstrate an effect on increases in the frequency of alcohol use over time. This is in line with prior research that shows comparable changes in alcohol consumption over time across racial/ethnic groups (Chen and Jacobson, 2012).

The observed increase in the frequency of marijuana use falls in line with prior research that indicates increasing use with age among youth (Chen and Jacobson, 2012). For marijuana, Hispanic men evidenced the highest trajectory of use, compared to White YMSM. This difference held for both frequency of use at 18 months, as well as for increases in use over time. Youth Risk Behavior Survey data also indicate that the prevalence of recent marijuana use was greater among Hispanic young men than White young men (Centers for Disease Control, 2014), and data from Add Health indicate that levels of substance use in early adolescence were highest among Hispanic youth (Chen and Jacobson, 2012). We also note that the prevalence of recent marijuana use was substantially higher (46%–56%) than national data indicate for youth ages 18–25 (16%–19%; Substance Abuse and Mental Health Services Administration, 2013).

Other drug use, which included illicit drugs and prescription misuse, was substantially lower than alcohol or marijuana use. Use overall followed a pattern of increase in the first 6 months, a decrease by month 12, and then a rebound in month 18. While approximately a fifth of the sample reported other drug use in the prior month, the mean number of days of use remained below 1 throughout the study period. Compared to White YMSM, Black men had lower levels of other drug use by month 18, although race/ethnicity had no effect on change over time. When controlling for race/ethnicity, SES exerted an effect on both levels of use, as well as change over time; men of higher SES evidenced less frequent use and slower inclines in use over time. Frequency of inhalant nitrate use remained fairly constant, while the prevalence of recent use increased slightly during the study period, from 3% at baseline to just over 5% by month 18. Overall, YMSM appear to be more likely to have recently used poppers with increasing age, although the use remains infrequent. Similar to the noted increases in alcohol consumption, the increase in prevalence of inhalant nitrate use may be attributable to increased engagement in sexual behavior and sexual cultures as young men develop their sexual identities.



## 4.1 Limitations

Prior to drawing final conclusions, some study limitations should be noted. First, emergent adulthood is a period of exploration and dynamic change; still, our data consist of a relatively short follow-up period (18 months). Second, the convenience sampling strategy, as well as the urban environment of New York City, may limit generalizability to other populations of YMSM. We recognize that by employing a non-probability sampling strategy, our study sample is not representative of the underlying YMSM population in New York City. However, this sampling has provided sufficient sample sizes across race/ethnicity and perceived SES thereby allowing us the ability to establish patterns of alcohol and drug use by salient characteristics. This is a critical first step prior to seeking to more fully explicate behavioral, psychosocial, and contextual factors that may predispose substance use patterns across these groups. Third, prior research has indicated that substance use peaks when adolescents/young adults reach the 20s (Chen and Jacobson, 2012), and thus there are likely further fluctuations in substance use as YMSM continue to age. In addition, we note that the existing data show the potential for crossover effects of racial/ethnic differences in substance use levels (Chen and Jacobson, 2012; Clark et al., 2013; Finlay et al., 2012). Thus, the trajectories noted here should not be extrapolated beyond the 18 months of follow-up analyzed. Fourth, it is important to note that these data are self-reported and thus there may be under-reporting of drug use due to socially desirable responding. Prior research has shown that Black MSM may underreport drug use compared to other racial/ethnic groups (White et al., 2014). Finally, we recognize that substance use may emerge earlier than age 18 among YMSM and that for a subset of the men in this study these patterns of substance use, including alcohol use, may have been developing for several years prior to the first assessment of the cohort study (Pollock et al., 2012). Finally, data for the present analysis come from the TLFB, which is an interviewer-administered assessment and therefore only conducted during on-site interviews. Given this, data for those who relocated is not available as the TLFB was only completed by participants who were interviewed in person; thus data may not be missing completely at random and we recognize the potential bias this may introduce.

Despite these limitations, the present work has several strengths. First, the large, diverse sample of YMSM has allowed an examination of the potential heterogeneity in substance use trajectories across race/ethnicity and SES. Moreover, the use of longitudinal data has a significant advantage over cross sectional data, in that cross-sectional data may be capturing “bursts” of substance use rather than one-time, snapshots of use (Marshall et al., 2009).

## 4.2 Conclusion

Though there is limited research on trajectories of substance use among YMSM, the present study indicates high levels of alcohol and marijuana use in particular. The findings point to important directions for future study, as emerging adulthood is a critical period of development (Arnett, 2000). Future research may examine the role of social stressors that likely exacerbate YMSM substance use (Marshall et al., 2009, 2008), as well as the factors that predict onward trajectories or maturing out of high levels of substance use. During the period of emerging adulthood YMSM transition into adulthood, a period often accompanied by leaving their family homes and higher levels of engagement in that gay community. It is

in this period that YMSM also often become increasingly vulnerable to drug and alcohol dependence. Thus prevention programming must be specific to the conditions of this developmental period as you men make their places in the world and further form their identities as gay and bisexual men. Thus, the development of drug and alcohol prevention programming at both the structural (i.e., community-wide) and behavioral level could prove effective in ameliorating the trajectories into substance use in sexual minority men. Such structural interventions may include the development of community social gatherings that that are alcohol and drug environments that provide alternative to bars and clubs where drugs are often at the center of such contexts. Moreover, ongoing vigilance to laws that protect the rights of sexual minority men (e.g., job protection, right to marry) will decrease the psychological burdens experienced by YMSM and in turn potential reliance on substances to mitigate the effects of these emotional states.

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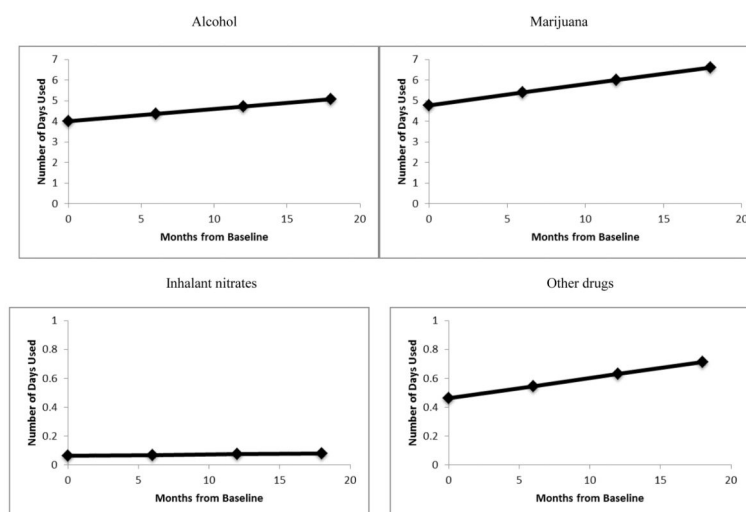
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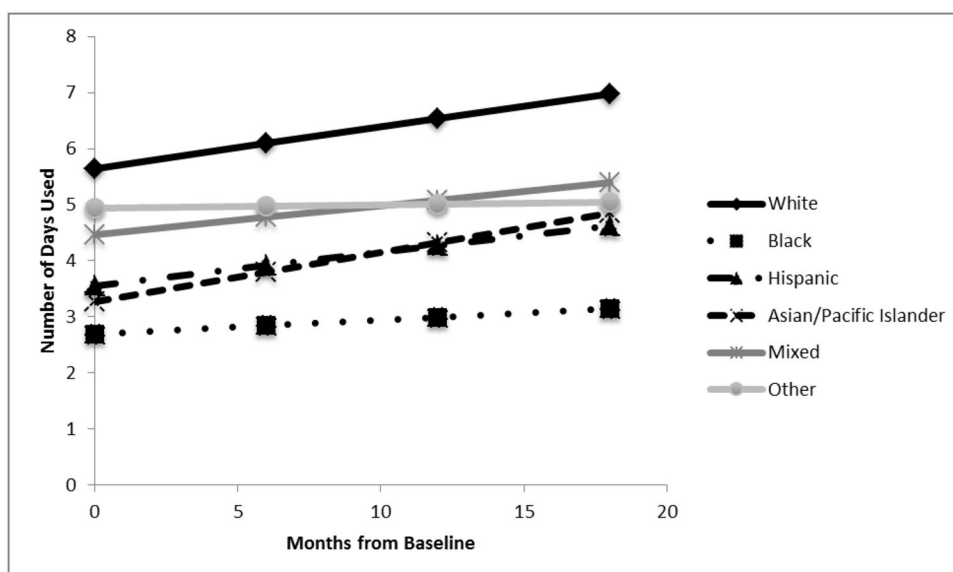
### Highlights

- Emerging adulthood is a vulnerable period for the onset of lifelong patterns of drug and alcohol use in young men who have sex with men (YMSM)
- Growth in use of alcohol and other drugs is noted in an ongoing cohort study of new generation of YMSM
- Latent growth curve models support growth in alcohol and drug use over an 18-month period with a sample who is ages 18–19 at baseline
- Differences emerge with regard to patterns of use by race/ethnicity and socioeconomic status





**FIGURE 1.** Unconditional growth model displaying prototypical growth in alcohol, marijuana, inhalant nitrates, and other drug use



**FIGURE 2.**  
Conditional growth model displaying prototypical growth in alcohol use by racial/ethnic group

**Table 1**

Sociodemographic characteristics across follow-up visits in the P18 cohort

	Baseline ( <i>n</i> = 600)*		6 months ( <i>n</i> = 460)		12 months ( <i>n</i> = 445)		18 months ( <i>n</i> = 428)	
	% (n)		% (n)	<i>p</i>	% (n)	<i>p</i>	% (n)	<i>p</i>
<b>Race/ethnicity</b>								
White	28.9 (173)		30.3 (139)	.97	29.1 (129)	.81	27.7 (118)	.91
Black	14.9 (89)		15.9 (73)		16.0 (71)		16.9 (72)	
Hispanic	38.3 (229)		37.6 (172)		38.8 (172)		38.7 (165)	
Asian	4.8 (29)		4.6 (21)		5.6 (25)		4.9 (21)	
Mixed race	9.4 (56)		8.1 (37)		7.0 (31)		8.0 (34)	
Other race	3.7 (22)		3.5 (16)		3.4 (15)		3.8 (16)	
<b>Perceived familial SES</b>								
Lower	33.5 (200)		33.1 (152)	.82	32.0 (142)	.94	33.6 (143)	.87
Middle	37.1 (222)		36.9 (169)		39.3 (174)		38.3 (163)	
Upper	29.5 (176)		29.9 (137)		28.7 (127)		28.2 (120)	

**Table 2**

Mean days use (SD) and prevalence (n) of any use in previous 30 days for alcohol and drugs

	Baseline (n = 600)	6 months (n =460)	12 months (n =445)	18 months (n =428)
<b>Alcohol</b>				
Mean days (SD)	4.08 (4.17)	4.23 (4.68)	4.76 (5.25)	5.16 (5.19)
Prevalence	79.26 (474)	80.87 (372)	82.92 (369)	86.68 (371)
<b>Marijuana</b>				
Mean days (SD)	4.78 (8.67)	5.17 (8.88)	5.60 (9.41)	6.86(10.47)
Prevalence	46.32 (277)	53.04 (244)	51.01 (227)	55.61 (238)
<b>Inhalant nitrates</b>				
Mean days (SD)	0.07 (.64)	0.07 (.42)	0.07 (.42)	0.08 (.43)
Prevalence	2.68 (16)	4.13 (19)	3.6 (16)	5.37 (23)
<b>Other drugs</b>				
Mean days (SD)	0.55 (2.55)	0.64(2.40)	0.61 (2.15)	0.72 (2.57)
Prevalence	12.88 (77)	15.00 (69)	17.75 (79)	21.73 (93)

**Table 3**

Individual growth models for alcohol, marijuana, inhalant nitrates, and other drug use from baseline to the 18 months

	Growth Model	Race/Ethnicity	Race/ethnicity and SES
	Model 1: Mean (SE)	Model 2: Mean (SE)	Model 3: Mean (SE)
<b>Alcohol use intercept</b>			
Black	5.06*** (.223)	6.98*** (.403)	6.06*** (.825)
Hispanic		-3.84*** (.674)	-3.53*** (.719)
Asian/Pacific Islander		-2.36*** (.533)	-2.12*** (.567)
Mixed race		-2.13*** (1.05)	-2.06*** (1.05)
Other race		-2.51** (.861)	-2.35** (.868)
Perceived familial SES		-2.42* (1.20)	-2.21 <sup>+</sup> (1.21)
			.385 (.300)
<b>Alcohol use slope</b>			
Black	.059*** (.011)	.074*** (.021)	.100* (.043)
Hispanic		-.049 (.034)	-.058 (.037)
Asian/Pacific Islander		-.015 (.027)	-.021 (.029)
Mixed race		.014 (.054)	.013 (.054)
Other race		-.023 (.045)	-.028 (.045)
Perceived familial SES		-.006 (.062)	-.011 (.062)
			-.011 (.015)
<b>Marijuana use intercept</b>			
Black	6.60*** (.452)	5.68*** (.838)	3.95* (1.72)
Hispanic		.880 (1.40)	1.50 (1.50)
Asian/Pacific Islander		2.10 <sup>+</sup> (1.11)	2.56* (1.18)
Mixed race		-1.37 (2.18)	-1.26 (2.18)
Other race		1.04 (1.79)	1.33 (1.80)
Perceived Familial SES		-1.09 (2.46)	-.682 (2.49)
			.724 (.626)
<b>Marijuana use slope</b>			
Black	.101*** (.023)	.037 (.042)	-.076 (.086)
Hispanic		.070 (.070)	.110 (.075)
Asian/Pacific Islander		.100 <sup>+</sup> (.056)	.130* (.059)
		.079 (.109)	.087 (.109)

	Growth Model	Race/Ethnicity		Race/ethnicity and SES	
		Model 1: Mean (SE)	Model 2: Mean (SE)	Model 3: Mean (SE)	
Mixed race			.113 (.090)	.133 (.091)	
Other race			.020 (.123)	.047 (.124)	
Perceived familial SES				.047 (.031)	
<b>Inhalant nitrate use intercept</b>		.080***(.017)			
Black			.093**(.032)	.140* (.066)	
Hispanic			.016 (.053)	.000 (.057)	
Asian/Pacific Islander			-.021 (.042)	-.033 (.045)	
Mixed race			-.009 (.083)	-.012 (.083)	
Other race			-.054 (.069)	-.062 (.069)	
Perceived familial SES			-.089 (.094)	-.100 (.095)	
				-.020 (.024)	
<b>Inhalant nitrate use slope</b>		.001(.001)			
Black			.001(.003)	-.003(.005)	
Hispanic			.004 (.004)	.005 (.004)	
Asian/Pacific Islander			.001 (.003)	.002 (.004)	
Mixed race			-.015* (.007)	-.015* (.007)	
Other race			.000 (.005)	.001 (.005)	
Perceived familial SES			-.002 (.007)	-.001 (.007)	
				.001 (.002)	
<b>Other drug use intercept</b>		.714***(.107)			
Black			.868***(.200)	1.70***(.409)	
Hispanic			-.347 (.334)	-.639+ (.355)	
Asian/Pacific Islander			-.041 (.265)	-.261 (.281)	
Mixed race			-.603 (.516)	-.652 (.514)	
Other race			-.404 (.431)	-.543 (.432)	
Perceived familial SES			-.586 (.587)	-.786 (.590)	
				-.347* (.149)	
<b>Other drug use slope</b>		.014* (.006)			
Black			.010(.011)	.053* (.022)	
Hispanic			-.001 (.018)	-.016 (.019)	
			.013 (.014)	.001 (.015)	



	Growth Model	Race/Ethnicity		Race/ethnicity and SES	
		Model 1:Mean (SE)	Model 2: Mean (SE)	Model 3: Mean (SE)	
Asian/Pacific Islander			-.006 (.028)	-.009 (.028)	
Mixed race			.005 (.024)	-.002 (.024)	
Other race			-.020 (.032)	-.030 (.032)	
Perceived familial SES				-.018* (.008)	
<b>Model Fit Statistics</b>					
Chi square	328.46***		373.42***	379.49***	
CFI	.914		.914	.915	
RMSEA	.066		.055	.053	