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Violence Exposure and Pathways to HIV Risk Behaviors in Black and White Young Men who have Sex with Men

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by
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Dedicated to Madeline Lovell, PhD and Ruth White, PhD, who first recognized and encouraged the social work scholar and educator in me.

Abstract of the Dissertation

The Role of Violence Exposure and Pathways to HIV Risk in

Black and White Young Men Who have Sex with Men.

by

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Professor Wendy Auslander, Chair

HIV remains a critical public health issue facing men who have sex with men (MSM) in the United States. Young MSM (YMSM) ages 13-34 years account for the greatest number of new HIV infections in MSM, with Black YMSM bearing the highest burden of disease. Sexual risk behaviors (e.g. unprotected sex) continue to be the leading transmission mode for HIV among all YMSM and studies have indicated that these behaviors are associated with a number of psychosocial and environmental factors, including adverse childhood experiences (ACEs), exposure to violence, substance use, and mental health problems. Moreover, recent studies based on the syndemic model of HIV risk have shown that exposure to violence, substance use, mental health problems may interact to increase HIV risk in vulnerable populations, including YMSM. However, the relationships among these risk factors and their association with sexual risk behaviors in YMSM are not yet fully understood.

Therefore, the purpose of this cross-sectional, quantitative study was to: 1) describe the degree to which YMSM engage in HIV risk behaviors, are exposed to ACEs and other multiple forms of violence, experience mental health problems, and use substances; 2) identify the ACEs

and violence exposure, substance use, and mental health problems that significantly predict HIV risk behaviors in Black and White YMSM; and 3) test the indirect (through substance use and mental health pathways) effects of violence exposure on HIV risk behaviors. Data was collected using structured computer-assisted personal interviews from a convenience sample of 168 Black (97) and White (71) YMSM recruited at AIDS service organizations that provide HIV prevention programs and testing for YMSM in the St. Louis and Kansas City metropolitan areas.

The current study contributed to knowledge regarding HIV risk behaviors and related syndemic risk factors in service-using YMSM. This study was unique in the assessment of adverse childhood experiences, multiple types of violence exposure, experiences of multiple types of mental health problems, and use of multiple substances in a service-using sample of HIV-negative Black and White YMSM, the populations at highest risk for HIV infection in the US. This study found that a substantial proportion of YMSM are exposed to multiple adverse childhood experiences, intimate partner violence, and community violence, all of which were previously unexplored or understudied in YMSM. Additionally, findings from the study identified unique significant mental health and substance use predictors of unprotected anal sex and number of male sex partners for YMSM when controlling for demographic factors. Further, although relationships between adverse childhood experiences or intimate partner violence and HIV risk behaviors were not significant in multiple regression models, this study demonstrated that adverse childhood experiences and intimate partner violence indirectly affect HIV risk behaviors through polydrug use, whereby higher rates of violence exposure lead to more polydrug use, which leads to a higher rate of multiple male sex partners. The results of this study have implications for social work practice and policy changes that lead to integration of mental health and substance use screening and referral into AIDS service organization that provide HIV

prevention services. Moreover, results can be used by researchers to adapt theoretical models of HIV risk and prevention for YMSM.

Chapter 1: Introduction: HIV Risk in Young Men who have Sex with Men

1.1. Background and Significance

HIV remains a critical public health issue facing men who have sex with men (MSM) in the United States. The Centers for Disease Control and Prevention (CDC; 2016a) estimate that, at the current rate of diagnosis, one in six MSM will contract HIV in their lifetime. The odds of contracting HIV are substantially greater for Black MSM, with the lifetime risk of infection estimated at one in two (CDC, 2016a). Young MSM (YMSM) ages 13-34 years account for the greatest number of new HIV infections in MSM, with Black YMSM bearing the highest burden of disease (CDC, 2017a). While the total number HIV diagnoses in the United States decreased by approximately 10% from 2010-2014 (CDC, 2017b), diagnoses among Black YMSM increased 30% (CDC, 2018). Mirroring national statistics, Black YMSM living in the St. Louis metropolitan area are the group at highest risk for HIV infection in Missouri (Missouri Department of Health and Senior Services, 2016). Sexual risk behaviors (e.g. unprotected sex) continue to be the leading transmission mode for HIV among all YMSM (CDC,2017a), and studies have indicated that these behaviors are associated with a number of psychosocial and environmental factors, including adverse childhood experiences (ACEs), exposure to violence, substance use, and mental health problems. Understanding the factors that are associated with sexual risk behaviors that lead to HIV infection among YMSM is a key component of explicating population-specific pathways to HIV risk as well as building culturally-relevant HIV prevention programs for White and Black YMSM.

1.2 Cost of HIV

Considerable social and financial costs can be contributed to HIV in the US and globally. Annually, HIV is the cause of death for approximately 6,700 people in the US and one million globally (Centers for Disease Control and Prevention, 2017b; World Health Organization, 2017). Although many people with HIV who live in high-income countries like the United States live normal lifespans, HIV is the 8th leading cause of death among those 25-34 years old in the US (Kochanek, Murphy, Xu, & Tejada-Vera, 2016), and a top 10 leading cause of death among people ages 5-49 years globally (World Health Organization, 2017).

In addition to lives lost, HIV also places a substantial financial burden on the U.S. health care system. The estimated lifetime medical costs for an individual diagnosed with HIV at the age of 35 years is $326,500 (Schackman et al., 2015). This cost increases as the age of diagnoses decreases, assuming no reduction in age of death. Using the latest estimation of 37,600 new infections, new HIV infections in the US in 2014 would lead to a total cost of $12.2 billion. This does not account for loss in productivity, which has been estimated to cost nearly 4.5 times the direct medical costs (Hutchinson et al., 2006). Conversely, HIV prevention efforts for individuals at high risk for infection and who remain negative cost approximately $96,700, for a savings of $229,800 in lifetime medical costs per infection prevented (Schackman et al., 2015). One report estimated that from 1991-2006, HIV prevention programs saved the US approximately $125 billion in direct medical costs by preventing an estimated 350,000 new HIV infections (Centers for Disease Control and Prevention, 2011). This savings would likely increase substantially if prevented loss of productivity were included.

1.3 Purpose of the Study

Results of several studies have demonstrated that exposure to violence, substance use, and mental health problems are all independently associated with increased sexual risk behaviors in YMSM (Freeman et al., 2012; Halkitis, Kapadia, et al., 2013; Hart & Heimberg, 2005; Koblin et al., 2006; Mustanski et al., 2007; Mutchler et al., 2012; Perdue, Hagan, Thiede, & Valleroy, 2003). Moreover, recent studies based on the syndemic model of HIV risk have shown that exposure to violence, substance use, mental health problems may interact to increase HIV risk in vulnerable populations, including YMSM (Halkitis, Kapadia, et al., 2013; Mustanski et al., 2007; M. Singer, 1994; Stall et al., 2003). However, the relationships among these risk factors and their association with sexual risk behaviors in Black and White YMSM are not yet fully understood.

The purpose of this cross-sectional, quantitative study was to: 1) describe the degree to which YMSM engage in HIV risk behaviors, are exposed to ACEs and other multiple forms of violence, experience mental health problems, and use substances; 2) identify the ACEs and violence exposure, substance use, and mental health problems that significantly predict HIV risk behaviors in Black and White YMSM; and 3) test the indirect (through substance use and mental health pathways) effects of violence exposure on HIV risk behaviors. Data was collected using structured computer-assisted personal interviews from a convenience sample of 168 Black (97) and White (71) YMSM recruited at AIDS service organizations that provide HIV prevention programs and testing for YMSM in the St. Louis and Kansas City metropolitan areas.

1.4 Research Questions

This study pursued the following research questions using a convenience sample of Black and White YMSM who utilized AIDS service organizations in St. Louis and Kansas City, Missouri:

Research Question 1: What is the extent to which YMSM engage in HIV risk behaviors (i.e. unprotected anal and oral sex, number of sex partners), experience ACEs and other multiple forms of violence, use substances, and experience mental health problems, and do these differ by ethnicity (Black and White)?

Research Question 2: What ACEs, violence exposure, substance use, and mental health factors are significantly associated with HIV risk behaviors in YMSM?

Research Question 3: Do substance use and mental health problems mediate the relationship between exposure to ACEs and other multiple forms of violence and HIV risk behaviors in YMSM?

This study deepens our understanding of the ACEs, violence exposure, substance use, and mental health factors that directly and indirectly contribute to increased HIV risk behaviors in YMSM. Specifically, this study identified the substance use and mental health factors that directly predict HIV risk behaviors, as well as the ACEs and violence exposure factors that influence HIV risk behaviors through substance use. The results of this study can be used by researchers to adapt theoretical models of HIV risk and prevention for YMSM. Moreover, knowledge gained from this study helped to identify the modifiable violence-related and psychosocial factors that can be targeted by community agencies, social workers, and public health professionals when designing innovative, population-specific HIV prevention interventions for YMSM.

Chapter 2: Review of the Literature

To understand the literature that provides the foundation for the current study, this chapter reviews the following areas: 1) exposure to ACEs and other forms of violence among YMSM, 2) substance use among YMSM, 3) mental health problems among YMSM, and 4) the relationships between exposure to ACEs and other forms of violence, mental health, substance use, and HIV sexual risk behaviors in YMSM. Each of the first three sections describe the extent of each problem among YMSM, and the fourth provides a summary of the evidence regarding the association between those problems and HIV sexual risk behaviors in YMSM. An examination of the relationships between disparity in HIV rates and HIV risk behaviors in Black YMSM follows, proceeded by a description of the syndemic framework and a discussion of its application to the present study. Last, a summary of the research questions and hypotheses is presented.

Overall, findings from previous studies regarding the relationships between exposure to ACEs and other forms of violence, substance use, mental health problems, and HIV risk behaviors in YMSM are limited and inconsistent. As detailed in the following sections, results of some studies indicated significant relationships between violence, substance use, and mental health factors and HIV risk behaviors, yet results of others found no significant relationships. In addition, the relationships between certain types of violence exposure, substances, and mental health problems and HIV risk behaviors has been underexplored. The limited number of studies that have examined these relationships and the conflicting findings they reported suggest a need for further investigation in this area.

2.1 Exposure to Violence and HIV Risk in YMSM

Histories of Child Maltreatment and ACEs in MSM. The evidence describing exposure to violence among YMSM is limited. However, results from previous studies of broader populations of MSM indicated that they are more likely than their heterosexual counterparts to experience violence. The evidence for this is strongest regarding childhood sexual abuse. Studies have consistently found that significantly more MSM than heterosexual men report histories of childhood sexual abuse, with prevalence rates ranging from 16.8 – 59.2% (Arreola et al., 2009; Balsam, Rothblum, & Beauchaine, 2005; Fields, Feist-Price, & Malebranche, 2008; Friedman et al., 2011; Lloyd & Operario, 2012; Rothman, Exner, & Baughman, 2011; Welles et al., 2009). The highest prevalence rates have been reported by MSM of color and HIV-positive MSM (Fields, Feist-Price, & Malebranche, 2008; Welles et al., 2009).

In addition to childhood sexual abuse, evidence indicated that a considerable number of MSM have experienced other forms of child maltreatment, such as physical and emotional abuse (Balsam, Lehavot, Beadnell, & Circo, 2010; Phillips et al., 2014; Reisner, Falb, & Mimiaga, 2011; Schilder et al., 2014; Wong, Weiss, Ayala, & Kipke, 2010). Results of a recent study found that approximately 50% of HIV-positive YMSM experienced physical or emotional abuse by a parent (Phillips et al., 2014). Other studies of abuse among YMSM reported that 20-26% of participants experienced physical abuse. Similarly, a study of adult MSM reported that 50% had experienced emotional abuse and 35% had experienced physical abuse while growing up.

Few studies have examined the prevalence of ACEs in MSM. However, results from a limited number of studies indicated that sexual minorities, including MSM, reported experiencing ACEs at a greater frequency than their heterosexual counterparts (Andersen & Blosnich, 2013; Austin, Herrick, & Proescholdbell, 2016) or the general population (Ports et al.,

2017), with the exception of parental separation or divorce. Additionally, these studies reported that a greater proportion of sexual minorities experienced multiple ACEs when compared to heterosexuals. Although the results of these studies have begun to elucidate the experiences of ACEs among MSM and sexual minorities in general, the literature has yet to describe the prevalence and severity of ACEs in YMSM.

Intimate Partner Violence in MSM. Emerging literature has indicated that MSM experience intimate partner violence (IPV) at a rate that is equal to or greater than that of heterosexual women (Finneran & Stephenson, 2013). Results from three studies indicated that approximately 10-23% of YMSM have ever experienced physical violence from a partner (Koblin et al., 2006; B. Mustanski, Newcomb, & Clerkin, E., 2012; Wong et al., 2010). Additionally, two meta-analyses demonstrated that adult MSM reported a higher lifetime prevalence of sexual assault than the general population (Rothman et al., 2003) and their heterosexual counterparts (Katz-Wise & Hyde, 2012), with prevalence rates ranging from 7 – 44.7%.

Community Violence in MSM. Few studies have examined the experience of community violence among YMSM. However, those that did report on elements of community violence indicated that YMSM, especially those living with HIV, were exposed to high levels of community violence. For example, a study of HIV-positive young MSM of color found that over 80% of participants had ever witnessed violence in their community, with over half reporting that they witnessed violence in the past three months (Phillips, 2013). Additionally, approximately 35% had observed someone being attacked with a knife or gun, 15% had ever seen someone killed, and approximately 22% reported being afraid of violence in their neighborhood (Phillips, 2013). A second study of traumatic experiences of HIV-positive YMSM

found that nearly 70% of respondents reported witnessing serious violence outside of their family, 65% had been threatened with physical assault, and 55% had been physically attacked (Radcliffe et al., 2011).

Exposure to Violence and HIV Risk in MSM. In addition to describing exposure to different types of violence, studies of MSM have also demonstrated an association between exposure to violence and increased HIV risk. Several studies, including one meta-analysis (Lloyd & Operario, 2010), found that MSM with histories of childhood sexual abuse were more likely to be HIV-infected and engage in unprotected sex than those who did not report histories of sexual abuse (Brennan et al., 2007; Fields, Malebranche, & Feist-Price, 2008; Welles et al., 2009; Arreola, Neilands, & Diaz, 2009; Saewyc et al., 2006). However, the evidence in support of significant relationships between experiencing other forms of child abuse and increased HIV risk is inconsistent, with one study of YMSM supporting the relationship (Schilder et al., 2014) and one that does not. Moreover, although the majority of previous research on the relationship between ACEs and HIV risk behaviors demonstrated a significant positive association, the samples either did not include sexual minorities or the sexual minority status of participants was not reported (Fang, Chuang, & Lee, 2016; Hills et al., 2000; Ramiro, Madrid, & Brown, 2010). One report from the Chicago Public Health Department (Prachand, 2011) presented results of bivariate statistics that showed a significant relationship between a higher ACEs score and increased likelihood of HIV risk behaviors among MSM. However, this relationship has yet to be tested when controlling for other factors in YMSM.

Additionally, emerging literature has demonstrated a significant relationship between experiencing IPV and increased HIV sexual risk (Koblin et al., 2006; Mustanski et al., 2012), but not between exposure to community violence and HIV sexual risk. Although results from

previous research indicated a significant relationship between exposure to community violence and HIV sexual risk in a primarily heterosexual sample of African American youth (Brady, 2006; Voisin, 2003, 2005), two recent studies found no significant relationship between exposure to community violence and HIV sexual risk behaviors among samples of HIV-positive young MSM of color (Phillips et al., 2014; Radcliffe et al., 2011). Additional research examining the association between exposure to violence (child maltreatment, IPV, and community violence) and HIV sexual risk behaviors among HIV-negative YMSM is needed to better understand this relationship and its potential role in HIV risk.

2.2 Substance Use and HIV Risk in YMSM

Findings of previous studies indicated that a large proportion of YMSM have used substances. Results of a large, multi-site study found that of the 814 YMSM enrolled, 59% reported using marijuana, 40% reported using hallucinogens, 26% reporting using cocaine, 18% reported using methamphetamine, and 14% reported heavy alcohol use in the previous six months (Salomon et al., 2009). A separate study of YMSM found that the vast majority (87%) used alcohol in the past three months, and approximately half (46%) of those who reported using alcohol also reported drinking to the point of intoxication (Pollock et al., 2012).

Results of several studies have indicated that substance use is associated with increased sexual risk among YMSM (Celetano et al., 2005; Freeman et al., 2011; Mutchler et al., 2011; Newcomb, 2013; Newcomb et al., 2011; Rosario et al., 2006; Stueve et al., 2002), however, the strength of the relationship differed by substance. For example, evidence indicated a strong relationship between both methamphetamine and ecstasy use and sexual risk; YMSM who use either methamphetamine or ecstasy were more likely to engage in unprotected sex than those

who do not use those drugs (Freeman et al., 2012; Mutchler et al., 2012). Findings regarding the relationship between alcohol use and sexual risk were less consistent. Two studies reported that alcohol use was positively associated with increased HIV sexual risk (Moeller, Palamar, Halkitis, & Siconolfi, 2014; Newcomb & Mustanski, 2014), yet other research found no significant relationship between the two (Pollock et al., 2012). There is some evidence that age may moderate the relationship between alcohol use and HIV sexual risk, with alcohol use only a significant risk factor for increased HIV sexual risk among younger YMSM (Newcomb & Mustanski, 2014).

2.3 Mental Health Problems and HIV Risk in YMSM

In addition to high rates of substance use, evidence suggest that a large number of YMSM experience mental health problems (Beidas, Birkett, Newcomb, & Mustanski, 2012; Burns, Ryan, Garofalo, Newcomb, & Mustanski, 2015; O'Cleirigh, Traeger, Mayer, Magidson, & Safren, 2013; Perdue et al., 2003; Salomon et al., 2009). Results of previous studies indicated that approximately 14-33% have experienced major depression (Beidas et al., 2012; Burns et al., 2015; Perdue et al., 2003), and 57% have experienced a high number of depressive symptoms (Salomon et al., 2009). Additionally, results of three studies indicated that between 6-33% of YMSM have experienced PTSD (Beidas et al., 2012; Burns et al., 2015; O'Cleirigh et al., 2013). There is limited evidence on the prevalence of anxiety disorders among YMSM, however one study reported that 33% of their sample met criteria for social anxiety disorder (O'Cleirigh et al., 2013).

Evidence regarding the relationship between mental health problems and HIV sexual risk is inconsistent and varies by disorder. Studies of YMSM have indicated either no relationship or

an inverse relationship between experiencing depression and engaging in unprotected sex (Beidas et al., 2012; Perdue et al., 2003). However, a recent study using a probability sample of MSM to test the relationship between depressive symptoms and HIV sexual risk found that those with greatest number of depressive symptoms were significantly more likely to engage in unprotected sex than those with the fewest symptoms (Fendrich, Avci, Johnson, & Mackesy-Amiti, 2013). Similar evidence exists for the relationship between PTSD and HIV sexual risk behaviors. Although one study reported no relationship between PTSD and unprotected sex (Beidas et al., 2012), others demonstrated that experiencing a greater number of PTSD symptoms was associated with a greater likelihood of engaging in unprotected sex (O'Cleirigh et al., 2013; J. Radcliffe, Beidas, Hawkins, & Doty, 2011).

2.4 Disparity in HIV Infection and HIV Risk Behaviors in YMSM

Black YMSM are the group at highest risk for HIV in the US. Further, unprotected sexual intercourse is the most common mode of transmitting HIV among MSM. Therefore, it would be expected that those at greatest risk for HIV infection engage in the highest amount of HIV risk behaviors. However, results of previous studies comparing the frequency and likelihood of engaging in HIV risk behaviors in Black YMSM to YMSM of other ethnicities are inconsistent. For instance, Sullivan and colleagues (2014) found that White MSM had significantly more sexual partners than Black MSM, yet Crosby and colleagues (2007) found that Black MSM had significantly more sexual partners than their White counterparts. Results were also mixed when examining likelihood of unprotected anal intercourse (UAI), wherein one study found that White MSM were more likely to report UAI than Black MSM (Taylor et al., 2012), and another study found no racial difference in likelihood of UAI (Rosenberger et al., 2012). Studies that examined

ethnic differences in HIV risk behaviors in YMSM were fewer in number but produced similarly inconsistent findings. Most of these studies of YMSM found no significant difference in frequency of HIV risk behaviors by ethnicity (Garofalo et al., 2010; Newcomb et al., 2015; Sifakis et al., 2007). However, Kapadia and colleagues (2015) reported that White YMSM engaged in greater amounts of unprotected oral intercourse (UOI) than Black YMSM.

The inconsistency in the literature regarding whether ethnic differences exist in the frequency and likelihood of HIV risk behaviors in YMSM necessitates further research in this area. If there is a significant difference in the frequency of HIV risk behaviors reported by Black and White YMSM, that difference may be explained, in part, by their exposure to ACEs and other forms of violence, experiences of mental health problems, and use of substances.

2.5 Gaps in the Literature

Studies have confirmed significant relationships among exposure to ACEs and other forms of violence, mental health problems, and substance use in MSM (Arreola, Neilands, Pollack, Paul, & Catania, 2008; Balsam et al., 2010; Brennan, Hellerstedt, Ross, & Welles, 2007; Fields, Malebranche, & Feist-Price, 2008; Lloyd & Operario, 2012; Miller, Reed, McNall, & Forney, 2013; Prachand, 2011; Phillips et al., 2014; Radcliffe et al., 2011; Saewyc et al., 2006; Welles et al., 2009). However, studies that examined the relationship between different forms of violence and HIV-related sexual risk in YMSM were limited in number and their findings were inconsistent (Koblin et al., 2006; Miller, Reed, McNall, & Forney, 2013; Phillips et al., 2014; Radcliffe et al., 2011; Schilder et al., 2014). Additionally, although previous studies have examined the relationship between experiencing more than one type of violence and increased sexual risk among YMSM (Koblin et al., 2006; Miller et al., 2013), no studies were identified

that assessed all three types of violence (adverse childhood events/child maltreatment, intimate partner violence, and community violence) and their relationship to increased HIV risk behaviors in the same sample of YMSM. Including all of these types of violence in the same study allows for a more complete conceptualization of violence exposure in different contexts, including in the home (ACEs, child abuse and neglect), in romantic and sexual relationships (intimate partner violence), and in neighborhoods (community violence).

2.6 Study Framework: Syndemic Theory

This dissertation study was informed by syndemic theory (Singer, 2009; Singer, 1994). A syndemic is collection of two or more co-occurring and mutually reinforcing epidemics that interact in a way that causes greater negative health consequences for a community or population than would be expected by simply adding up the negative health consequences of each individual epidemic (Halkitis, Wolitski, & Millett, 2013; Singer, 2009). Syndemics can be differentiated from comorbid diseases by three distinct characteristics: 1) syndemics comprise problems that must be considered epidemics at the population level, 2) diseases or problems that are comorbid are not necessarily mutually reinforcing or synergistic in their effect, and 3) syndemics are driven by social inequalities that perpetuate health disparities (Halkitis, Wolitski, et al., 2013; Mustanski et al., 2007; Singer, 2009).

The syndemic theory was first proposed by Singer (1994) to explain the relationships between substance use, violence, and AIDS among people of color living in the inner city. This initial syndemic model, referred to in the literature as SAVA (Singer, 2009; Singer, 1994), posits that problems of substance abuse, violence, and AIDS are interrelated to the extent that, in certain populations, it is nearly impossible to understand one problem in the absence of the others. The

SAVA syndemic model was later adapted to include four psychosocial problems (polydrug use, depression, partner abuse, and childhood sexual abuse) for application to a large sample of MSM (Stall et al., 2003), and a slightly different set of psychosocial problems (substance use, psychological distress, partner violence, and sexual assault) for application to YMSM (Mustanski et al., 2007). The SAVA model has also been adapted and tested in a sample of African American MSM (O'Leary, Jemmott, Stevens, Rutledge, & Icard, 2014), a global sample of MSM (Santos et al., 2014), a sample of MSM who use the internet to find partners for unprotected sex (Klein, 2011), and an ethnically diverse sample of adult MSM in New York City (Parsons, Grov, & Golub, 2012). In all of these adaptive models, HIV risk is considered one of several co-occurring and mutually-reinforcing health problems that are perpetuated by social inequality (Mustanski et al., 2007; Singer et al., 2006; Stall et al., 2003). Moreover, though each of these studies included slightly different psychosocial problems as components of a syndemic, results of each demonstrate the synergistic effect of psychosocial health problems on engagement in sexual risk behaviors and HIV infection (Klein, 2011; Mustanski et al., 2007; O'Leary et al., 2014; Parsons et al., 2012; Santos et al., 2014; Stall et al., 2003). As the number of psychosocial health problems increased, so did HIV risk.

Although the literature based on the syndemic framework has supported an additive relationship between the number of psychosocial problems experienced and level of HIV risk among MSM, few studies have examined potential pathways among these variables (Klein, 2011; Miller et al., 2013). Moreover, studies that examined these pathways have included vastly different variables. One recent study examined pathways from three types of lifetime violence exposure (physical, emotional, and sexual) to inconsistent condom use through depression and substance use in a sample of Black YMSM (Miller et al., 2013). Although this study multiple types of lifetime

violence exposure, it did not adequately assess child maltreatment or IPV using standardized measures, and omitted the assessment of community violence. Further, the study limited mental health assessment to depression. A second study limited violence assessment to child maltreatment and limited mental health measurement to depression in a sample of middle-aged MSM who use the internet to find sex partners (Klein, 2011).

In order to add to this emerging literature, the current study used adaptations of the SAVA syndemic model to provide guidance regarding which variables to include in mediating models. Since the SAVA syndemic model does not specify pathways between variables, empirically-based mediating models from prior research on family violence, psychosocial problems, and HIV risk, such as that described by Purcell (2004) were used to identify potential pathways (Mimiaga et al., 2009; Purcell, Malow, Dolezal, & Carballo-Dieguez, 2004). A simplified version of Purcell's (2004) model of the relationship between childhood sexual abuse and HIV sexual risk behaviors in males specified pathways from child abuse to proximal outcomes of substance use and psychological distress, and from these proximal outcomes to the distal outcome of HIV risk behavior. This model did not indicate a direct relationship between childhood sexual abuse (CSA) and HIV risk behaviors and posited that substance use and psychological distress fully mediated the relationship between childhood sexual abuse and HIV risk behaviors. A similar model was tested and supported in a recent study of HIV-negative MSM (Mimiaga et al., 2009), wherein substance use and depression were hypothesized as mediators in the relationship between CSA and HIV risk.

As discussed previously, syndemics are driven by social inequality (Mustanski et al., 2007; Singer, 2009; Singer, 1994). Therefore, those who are most disadvantaged, such as YMSM of low socioeconomic status (SES), may be most negatively affected by the SAVA syndemic. This is

supported by results of a recent study that indicates YMSM of lower SES may be more likely to engage in HIV-related sexual risk compared to those of higher SES (Halkitis & Figueroa, 2013). Therefore, it was important to include demographic factors related to SES (i.e. employment, education, income) in analyses that examined the relationships among exposure to ACEs and other forms of violence, substance use and mental health problems, and HIV risk in YMSM (Research Question 2).

2.7 Innovation and Summary of Study

YMSM are disproportionately affected by HIV. Extant literature suggests that YMSM are also at risk for experiencing a number of psychosocial problems that are associated with greater HIV risk, including exposure to violence, substance use, and mental health problems. However, the evidence in this area is limited. Most studies on violence among YMSM have not examined exposure to ACEs and other multiple types of violence (e.g. histories of emotional, physical, and sexual abuse and neglect; intimate partner violence; community violence) or differences in exposure by ethnicity, despite evidence that individuals often experience multiple forms of violence, and increased exposure is associated with increased health risks (Felitti et al., 1998; Felitti & Anda, 2010; Finkelhor, Turner, & Hamby, 2011). Furthermore, previous studies rarely used standardized measures to capture different types of violence, which has led to an incomplete picture of violence exposure among YMSM. Additionally, studies have not examined the pathways from exposure to ACEs and other multiple types of violence through substance use to HIV risk.

The investigation of the syndemic production of HIV among YMSM has gained traction in recent years at the National Institute of Drug Abuse (NIDA), which has funded multiple

studies on the topic. For example, Halkitis recently completed a NIDA-funded R01 (2R01DA025537-06A1) focused on the syndemic production of HIV among emergent adult MSM that included measurement models and the association between structural factors and syndemic risks for HIV. Additionally, Mustanski is currently funded by NIDA to examine the emergence of syndemic factors among YMSM over time (1U01DA036939-01), and Parsons is funded to examine resilience in relationship to syndemic factors among adult MSM (5R01DA036466-02). Although each of these studies offer important contributions to knowledge of HIV risk among MSM based on the syndemic model, their specific aims do not include examining pathways among the syndemic factors that have been supported in previous research. The current study adds to these NIDA-funded studies by examining exposure to ACEs and other multiple forms of violence among YMSM, assessing multiple mental health problems, and by testing possible pathways among these variables to inform potential targets for HIV prevention interventions.

Results of several studies have demonstrated that exposure to violence, substance use, and mental health problems are all independently associated with increased sexual risk behaviors in YMSM (Freeman et al., 2012; Halkitis et al., 2013; Koblin et al., 2006; Mustanski et al., 2007; Mutchler et al., 2012; Perdue et al., 2003). Moreover, recent studies based on the SAVA syndemic model of HIV risk have shown that exposure to violence, substance use, mental health problems interact to increase HIV risk in vulnerable populations, including YMSM (Halkitis et al., 2013; Mustanski et al., 2007; Singer, 1994; Stall et al., 2003). However, the pathways between these risk factors and HIV-related sexual risk behaviors in YMSM are not yet fully understood.

2.8 Research Questions and Hypotheses

The study attempted to fill the previously described gaps in knowledge by addressing the following research questions using a convenience sample of YMSM (Black and White) recruited from AIDS service organizations that provide HIV prevention and testing services in St. Louis and Kansas City, Missouri:

Research Question 1: What is the extent to which YMSM engage in HIV risk behaviors (i.e. unprotected anal and oral sex, number of sex partners), experience ACEs and other multiple forms of violence, use substances, and experience mental health problems, and do these differ by ethnicity (Black and White)?

Research Question 2: What ACEs, violence exposure, substance use, and mental health factors are significantly associated with HIV risk behaviors in YMSM?

H1: Exposure to violence, substance use, and mental health problems will be significantly associated with HIV risk behaviors in YMSM.

Research Question 3: Do substance use and mental health problems mediate the relationship between exposure to ACEs and other multiple forms of violence and HIV risk behaviors in YMSM?

H2: Substance use and mental health problems will significantly mediate the relationship between exposure to violence and HIV risk behaviors.

Chapter 3: Study Design and Methods

Overview of Research Design

The current dissertation study used a cross-sectional, quantitative design to assess the relationships between exposure to ACEs and other multiple forms of violence, substance use, mental health, and HIV sexual risk behaviors among a convenience sample HIV-negative YMSM (Black and White) who utilized AIDS service organizations in Missouri. The cities of St. Louis and Kansas City were selected as data collection sites because they are the two largest metropolitan areas in the state of Missouri and have similar population demographics.

3.1 Community Research Partners

Participants were recruited from four AIDS-service organizations located in St. Louis or Kansas City. The first organization, Project ARK/The SPOT, was used to pilot the recruitment procedures and instrument, and the other three to collect data for the study. Community research partners were chosen based on a number of criteria: 1) the population served was reflective of the study sample, 2) the organization was interested and supportive of the research and able to provide the resources (i.e., space for survey administration, coordinating data collection at agency events) and 3) the organization was located within the St. Louis or Kansas City regions.

Pilot testing of the interview instrument and procedures was completed at Project ARK/the SPOT in St. Louis. Project ARK began providing HIV prevention and care services to youth and young adults in 1995, and provides an array of services including HIV testing, substance use and mental health counseling, behavioral HIV prevention interventions, and outreach services. Project ARK added the SPOT clinic and drop-in center to their organization in 2008 to provide youth and young adults with accessible social and health services, which include

case management, medical care, and HIV and STD testing and treatment. In 2013, Project ARK/ The SPOT served approximately 4,000 youth and young adults, the majority of who were between the ages of 18-29 and 80% of whom identified as African American. A small number of participants were recruited from Project ARK/the SPOT for the main study.

A second community research partner was St. Louis Effort for AIDS (EFA). EFA is the oldest AIDS service organization in the St. Louis region, and has been providing HIV/AIDS education and prevention for communities affected by HIV since 1985. Currently, EFA reaches approximately 1,500 people for HIV testing, STD screening and treatment, and prevention education each month through services provided at their office and through outreach in a variety of venues including bars, coffee shops, parks, social media applications, and websites. EFA also provides outreach and HIV and STD testing at large events such as PRIDE and National HIV Testing Day.

Rustin's Place, which focuses on decreasing health disparities that negatively impact African Americans who live in the St. Louis region, was another community research partner for this study. Rustin's Place is a drop-in center for Black YMSM that provides HIV testing, prevention-focused social programs, shower and laundry facilities, and community events. Rustin's Place reaches approximately 80 YMSM per month with HIV testing services, and 10-30 YMSM through each community HIV prevention event.

Good Samaritan Project (GSP) in Kansas City also agreed to be a community research partner for recruiting study participants. GSP was established and 1984 as Kansas City's first AIDS service organization. As one of the primary providers of HIV prevention and education services in the Kansas City region, in 2016 GSP provided HIV and STD testing to nearly 1,000 individuals and reached over 19,000 people through community outreach and education. In

addition to HIV screening and community outreach, GSP's HIV prevention programs include individual and group-level behavioral interventions and Pre-Exposure Prophylaxis (PrEP) education and referral. Table 3.1 summarizes the number of participants recruited through specific at each community partner agency.

Table 3.1 Summary of Participants Recruited at Each Community Partner Agency

Community Agency & Program	**Number of Participants**
Project ARK/the SPOT (excluding pilots)[a]	
HIV Testing & Medical Care	1
Drop-In/Group Prevention Programs	4
St. Louis Effort for AIDS	
HIV Testing	67
STD Treatment	10
Rustin's Place	
HIV Testing	24
Group Prevention Programs	18
Good Samaritan Project	
HIV Testing	33
Outreach	11

[a] Organizational changes at Project ARK/the SPOT in the first months of the study necessitated the addition of other community research partner recruitment sites.

3.2 Sample Inclusion Criteria

Participants were eligible for inclusion in the study if they met the following criteria: 1) utilized one of the community partners (Project ARK/the SPOT, EFA, Rustin's Place, GSP); 2) self- identified as Black/African American, White/Caucasian; or multi-racial including Black; 3) self- identified as a male; 4) were between the ages of 18-34; 4) reported engaging in oral or anal intercourse with at least one other man in the past three months; and 5) were HIV-negative or did not know their HIV status. No exclusion criteria were specified for this study.

A total of 213 individuals were screened for eligibility to participate in the study, of which 36 were determined to be ineligible and six declined participation. Of those who were not eligible, 17 were excluded due to reporting no oral or anal sex with men in the last three months,

11 were excluded because they were HIV-positive, four were excluded because they were outside the study age range, and four did not identify as Black or White. Of those who were eligible, six declined to complete the study, however the reasons for declining were not assessed. Demographics of the six who declined participation varied in age and ethnicity, indicating no demographic patterns comparted to those who chose to participate in the study.

3.3 Participant Recruitment and Data Collection

The participant recruitment process was tailored to fit each community research partner agency's work flow. At Project ARK/the SPOT, agency staff announced the study and introduced the interviewer to the youth and young adults attending drop-in services. If a client expressed interested in the study, the interviewer brought the client to a private room to explain the study in more detail. If the client remained interested in participating, the interviewer then led the client through a brief verbal consent process for the eligibility screening. Alternatively, staff sometimes referred specific clients to the interviewer. In this case, the same process for explaining the study and determining eligibility was followed. If a client was eligible and interested in completing the full survey, the interviewer would either consent the client and have them complete the full study or set up a time for them to return to complete the study in the future. A similar recruitment process was completed at Rustin's Place, during which staff introduced the interviewer and his study, and also directly referred individual clients.

At EFA and GSP, agency staff referred HIV and STD testing and treatment clients to the interviewer if they thought the clients met eligibility criteria. The interviewer also approached individuals in the waiting rooms with information about the study. If clients recruited through either method expressed interest in the study, they would accompany the interviewer to a private

room to learn more about the study and, if interested, complete the consent and eligibility screening process. If eligible and interested, clients were then offered the opportunity to complete the consent process and survey immediately or schedule a time to complete the survey in the future.

At each community research partner agency, staff assisted with participant recruitment by distributing study recruitment materials at their organizations. This included hanging flyers in their lobbies and bathrooms, leaving study referral cards in client meeting rooms, and placing recruitment ads on their social media pages and websites. If a participant received information about the study when an interviewer was not on site, he was able to call, text, or email the study for more information. Recruitment materials also directed participants to a study website that provided them with information about the study and several means of contacting the PI if interested in participating. The study PI then conducted a phone call during which the participant was given more information about the study and, if interested, completed a verbal consent and eligibility screening. If eligible and interested, the PI then scheduled an appointment for the participant to complete the full survey. All interviews were conducted in a private room at the community research partner agencies. The recruitment materials are included in Appendix B.

Data were collected through structured interviews using Computer-Assisted Personal Interview (CAPI) technology. Evidence from studies of different survey formats suggested that computer-assisted interviews provide participants with a greater sense of privacy and reduces under-reporting of sexual risk behaviors.(Fenton, Johnson, Mcmanus, Erens, & Free, 2001; Schroder, Carey, & Vanable, 2003b) Prior to beginning the survey, the interviewer oriented each participant to the CAPI survey method, and explained that the participant would read through the survey himself and input his answers into the computer. Participants were encouraged to ask for

clarification on survey items whenever needed. They were also offered the option of having the interviewer read the questions aloud while they followed along and entered their responses on the computer screen, however, no participants selected this option. The computer screen was turned away from the interviewer to increase participant privacy while the survey was completed. Participants were compensated for their time with a $15 gift card and single-use metro ticket.

REDCap electronic data capture software, hosted by the Washington University School of Medicine Division of Biostatistics, was used to collect and manage data. REDCap (Research Electronic Data Capture) is a secure, web-based tool that provides an easy-to-follow interface for accurate data entry, applications for tracking manipulation and exportation of data, and simple procedures for exporting data into statistical software packages such as SAS (Harris et al., 2009).

3.4 Human Subjects Procedures

The study protocol was approved by Washington University's Institutional Review Board and Human Research Protection Office (201503122). Additionally**,** the study received a Certificate of Confidentiality from the National Institute on Drug Abuse (CC-DA-15-090) because of the potential risk associated with participant disclosure of involvement in violence, sexual behaviors, and illegal alcohol and drug use. The IRB also approved a waiver of signed consent to further protect participant confidentiality.

Verbal informed consent was obtained from study participants prior to completing eligibility screening and again prior to survey administration. All study participants were informed that the study was voluntary, that they could choose to stop participation at any time without negative consequences, and that their decision regarding participation in the study would

have no impact on their ability to receive services from the community research partner agency from which they were recruited. Participants were also informed of the risks of participating in the study, which included accidental breach of confidentiality and potential psychological distress that could result from answering personal questions about violence exposure, mental health, substance use, and sexual behaviors. The interviewer explained the methods used in the study to protect the confidentiality of each participant, including the separation of identifying information from the other information provided by each participant, using passwords to protect files, and having data stored on a HIPPA-secure server. Confidentiality was also protected by conducting eligibility screening and survey administration in a private room.

Reviews of the literature regarding participant reactions to participating in research in which they are asked to recall past exposures to violence indicated that the likelihood of experiencing unexpected distress is low, and that this distress is most often tolerable and sometimes beneficial to participants (Newman, Risch, & Kassam-adams, 2015; Seedat, Pienaar, Williams, & Stein, 2004). The risk of psychological distress was minimized by explaining to participants that they may choose not to answer any questions that they do not want to answer and may stop the interview and withdraw their participation in the study at any time without any negative consequence. Additionally, if a participant reported that he was suicidal by endorsing item nine ("Over the past two weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself") on the Patient Health Questionnaire or by telling the interviewer that he was experiencing suicidal ideation or had a plan to hurt himself, he was referred to community research partner agency mental health or medical staff for further assessment. This information was written in the consent form, as well as explained verbally during the informed consent process. Eight participants were referred by the study PI to receive further

assessment by partner agency staff. None were considered to be at imminent risk of hurting themselves.

3.5 Pilot Phase

The purpose of the pilot phase of the study was to determine the feasibility and acceptability of study procedures, including participant recruitment, eligibility screening, administration of the full computerized survey interview to four participants, and to test the ease of importing data from REDCap into statistical software programs.

3.5.1 Community Advisory Panel Review of the Instrument

An advisory panel consisting of agency staff at Project Ark/the SPOT who work with YMSM reviewed the measures proposed for inclusion in the study to assess for relevance, participant burden, and clarity of items. The primary concern voiced by the advisory panel was the large number of items included in the questionnaire, and thus, they recommended removing items if any were redundant or not central to the research questions. The panel also requested that the questionnaire include measures that they could easily incorporate into their mental health and substance use programs in the future. As a result, items regarding sources of monthly income were deemed too burdensome for participants and unessential for answering the research questions and were omitted from the final survey. These items were considered by the advisory panel as less important than other items included to assess socio-economic status, which included monthly income, education, and employment status. Additionally, a community violence subscale that asked the participant if he had ever heard of various types of violence was removed as it overlapped considerably with subscales that assessed experiencing and witnessing community violence. The questionnaire already included publicly available, short measures of

depression, anxiety, PTSD, hazardous alcohol use, and drug abuse that could be easily incorporated into agency screening practice.

3.5.2 Piloting Instrument with Participants

Four pilot participants were recruited from Project ARK/the SPOT and were chosen to be representative of the proposed study sample in age (20-23 years), and ethnicity (one identified as white, two as black, and one as multiethnic-white and black). Two methods of survey administration were piloted: 1) the participants were oriented to the survey by the interviewer and then the interviewer read each item aloud while the participant followed along on the computer and entered his answer; and 2) the participant was oriented to the survey and then completed the items at his own pace without the survey being read aloud. Immediately after completing the survey, each participant was asked to provide feedback in a brief interview about their opinions regarding the acceptability of study recruitment methods, screening procedures, survey length, and survey administration method, as well as the clarity of the questions included in the survey. Participants were compensated with a $15 gift card and a single-use Metro ticket for their time completing the survey. The data from the four participants in the pilot phase were not included in the quantitative analysis for the main study.

Results of piloting the study procedures indicated that both recruitment and screening methods were acceptable to the participants. The time to complete the survey was approximately 45-50 minutes for the participants who had the survey read aloud and approximately 20-25 minutes for the participants who completed the items at their own pace. There were no differences in missing data between the two methods, and participants reported equal satisfaction with both methods. The self-administration method was chosen for use in order to decrease

participant burden related to time. To ensure comprehension, an option to have the REDCap software program read each item aloud was added to the instrument.

Feedback from the participants on the survey items identified two areas for revision and clarification: 1) participants were not familiar with PrEP (pre-exposure prophylaxis); and 2) participants were not clear if the questions about number of unprotected sex acts were in reference to a single sex partner or all of their sex partners within the specified time period. The final version of the questionnaire addressed this feedback by: 1) adding a short measure of Pre-exposure prophylaxis (PrEP) knowledge and use that included a definition of PrEP early in the questionnaire, and 2) clarifying directions for questions regarding number of unprotected sex acts to include the language, "These questions are about your recent sexual behavior with all of your sexual partners." Additionally, data from CAPI interviews were successfully imported from REDCap into IBM SPSS Statistics version 24 for data cleaning and transferred to SAS version 9.4 for coding and analysis.

3.6 Study Variables and Measures

The survey used in the current study is shown in Appendix A.

3.6.1 Demographic/Control Variables:

Participants were asked to provide the following demographic information: Age, in years; Birth year; Ethnicity (Black, White, More than one ethnicity); Sexual identity (gay, bisexual, straight, other); Level of education (less than high school, high school, some college, associates or technical degree, college degree, graduate school); Employment status (full-time, part-time, unemployed); Monthly Income ($0-$499, $500-$999, $1,000-$1,499, $1,500-$1,999, $2000-$2,499, $2,500-$2,999, $3,000 or more); Financial hardship (self-reported difficulty paying bills

each month); health literacy (single-item regarding need for help when reading materials provided by medical professionals); and PrEP awareness and use (ever heard of, from who, past and current use).

Scholars have argued that the term race should be avoided in scientific writing about humans as the biological concept of race (i.e. sub-species) in this context is not scientifically sound and denotes a historically hierarchical classification (Fullilove, 1998; Markus, 2008; Sussman, 2014). The term ethnicity, which refers to self-identified social grouping based on commonalities among members of the group such as place of origin, appearance, history, language, and ancestry has been proposed as an appropriate alternative to race. Accordingly, the term ethnicity was used in the current study.

Participants were also asked about their HIV testing history, including whether they had ever been tested for HIV, the date of their last HIV test, and how many times they had been tested for HIV in the last year. These testing measures were informed by measures used to assess HIV testing behavior among MSM in the CDC's National HIV Behavioral Surveillance System (Oster et al., 2011) and MacKellar's study of HIV risk in YMSM (MacKellar et al., 2006).

3.6.2 Dependent Variables – HIV Risk Behaviors:

Unprotected anal and oral intercourse

Four items were used to measure the number of unprotected anal and oral intercourse occasions in the past three and twelve months. Items included: "In the last three/twelve months, how many times did you have oral sex with another man and not use a condom or PrEP?" and "In the last three/twelve months, how many times did you have anal sex with another man and not use a condom or PrEP?" Defining unprotected sex in each item by not using condoms or

PrEP aligned with recent CDC guidelines regarding HIV prevention (US Public Health Service, 2014). Studies of participant recall indicated that a retrospective period of three months yields the most accurate report of past sexual behaviors, and that frequency and count measures are preferred over dichotomous measures of unprotected sex (Noar, Cole, & Carlyle, 2006; Schroder, Carey, & Vanable, 2003a; Schroder et al., 2003b). Twelve-month counts, which have been shown to be as accurate as three-month counters (Schroder, Carey, & Vanable, 2003a; Schroder et al., 2003b) were also collected to gain a more comprehensive understanding of participant sexual risk behaviors.

Unprotected oral sex is considered a low-risk behavior for HIV transmission, and so is often not conceptualized as a HIV risk behavior in the literature (CDC, 2016b; Patel et al., 2014). In fact, some MSM may engage in unprotected oral sex as a lower-risk alternative to unprotected anal sex (Page-Shafer et al., 2002). However, unprotected oral sex is not a risk-free behavior for HIV, and is considered risky for many sexually transmitted diseases such as gonorrhea and chlamydia (CDC, 2017c; Robinson & Evans, 1999). Moreover, the risk of HIV transmission from unprotected oral sex is increased if an individual has a sexually-transmitted disease, has sores or cuts in their mouth or on their penis, or has bleeding gums (CDC, 2016b). Thus, unprotected oral sex is conceptualized as a HIV risk behavior in the current study.

Number of sexual partners

Participants were asked to report the number of male and female oral or anal sex partners they had in the last three and twelve months. Specifically, the items were "How many male oral or anal sex partners did you have in the last three/twelve months" and "How many female oral, vaginal, and anal sex partners did you have in the last three/twelve months."

3.5.4 Independent Variables

Depression

The Patient Health Questionnaire-9 (PHQ-9 (Kroenke, K, Spitzer, 2002) assessed depression using a nine-item instrument based on DSM-IV symptoms of depressive disorders. It provides cut-off scores to indicate mild (5), moderate (10), moderately severe (15), and severe (20) depression. The PHQ-9 has demonstrated excellent internal consistency (Cronbach $\alpha = 0.86$ and 0.89) in two large health care samples (Kroenke, Spitzer, & Williams, 2001). This instrument was chosen over the Center for Epidemiological Studies Depression Scale (CES-D), which is more often used in literature examining depression among YMSM, because it is half the length of the CES-D and thus could be more easily integrated into agency protocol due to the ease of administration. The internal consistency reliability for the PHQ-9 in the current study was strong at Cronbach's $\alpha = 0.82$.

Anxiety

Anxiety was measured using the Generalized Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 2006). The GAD-7 is a brief, 7-item self-report measure that has shown excellent internal consistency (Cronbach $\alpha = 0.92$) in a large health care sample (Spitzer et al., 2006). Similar to the PHQ-9, the GAD-7 provides clinical cut-off scores to indicate mild (5), moderate (10), moderately severe (15), and severe (20) anxiety. The GAD-7 contains substantially fewer items than other measures of generalized anxiety disorder and has demonstrated adequate criterion validity (Spitzer et al., 2006). Therefore, use of the GAD-7 allowed for sufficient assessment of anxiety while reducing participant burden. The internal consistency reliability for the GAD-7 in the current study was strong at Cronbach's $\alpha = 0.87$.

PTSD

PTSD was assessed using the PTSD Checklist-Civilian Version (PCL-C). The PCL-C is a 17-item self-report measure that assess the extent to which participants experienced 17 DSM-IV symptoms of PTSD in the past month, with responses ranging from 1 ("not at all") to 5 ("extremely") (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The PCL-C recommends a clinical cut-off score of 30 for a general population sample. The PCL-C demonstrated high internal consistency (Cronbach $\alpha > 0.75$) in a variety of samples (Wilkins, Lang, & Norman, 2011). High internal consistency (Cronbach $\alpha = 0.94$) for the PCL-C was also found in a recent study of trauma and sexual risk among young Black MSM (Jerilynn Radcliffe, Beidas, Hawkins, & Doty, 2011). The internal consistency reliability for the PCL-C in the current study was strong at Cronbach's $\alpha = 0.89$.

Substance Use

Participants were asked about their lifetime and past 30 day use (yes/no) of alcohol, marijuana, cocaine/crack, hallucinogens, heroin, inhalants, sedatives, stimulants, tranquilizers and prescription pain-relievers without physician's orders using measures from the PhenX Toolkit (Hamilton et al., 2011). Lifetime use of injection drugs, including which drugs were injected, frequency of use, and whether or not treatment was sought was also be assessed using the Injection Drug Use Protocol provided by the PhenX Toolkit (Hamilton et al., 2011). In addition, participants were asked to report the age at which they first had a drink of alcohol, the number of days on which they had at least one drink of alcohol in the last 30 days, and the average number of drinks they consumed on days when they did drink alcohol.

Hazardous drinking was assessed using the Alcohol Use Disorder Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) (Skinner, 1982). Developed the by the World Health Organization, the AUDIT includes items that measure frequency and amount of alcohol consumption, as well as alcohol-related problems. The instrument has been validated across a variety of populations, and has demonstrated high internal consistency and test-retest reliability (Babor et al., 2001). The internal consistency reliability for the AUDIT in the current study was high at α=.84

Drug abuse was measured using the Drug Abuse Screening Test-10 item version (DAST-10; Yudko, Lozhkina, & Fouts, 2007). The DAST-10, which includes items that measure whether an individual has experienced various negative consequences of drug abuse, has also demonstrated high internal consistency reliability (α=.94; Yudko et al., 2007). In the current study, the Cronbach alphas for DAST-10 was .74.

Adverse Childhood Experiences (ACEs)

The ACEs questionnaire assessed the occurrence of three types of childhood abuse (physical, verbal, and sexual) as well as several forms of family dysfunction, such as parental divorce, parental abuse, and living with a mentally ill, substance-using, or formerly incarcerated adult (Bynum, Griffin, Ridings, Wynkoop, & Anda, 2010; Felitti et al., 1998). The 11-item ACEs questionnaire that was incorporated into the CDC's 2009 Behavioral Risk Factor Surveillance System (BRFSS) for five states (Bynum et al., 2010) was the version of the ACEs questionnaire used in the current study, as it allows for comparisons to BRFSS data. The internal consistency reliability for the ACEs questionnaire in the current study was adequate at .76.

Child Abuse and Neglect

Severity of child abuse and neglect was assessed using four subscales from the Childhood Trauma Questionnaire (CTQ; physical, sexual, and emotional abuse and physical neglect) (Bernstein et al., 1994). Studies have demonstrated adequate internal consistency of the CTQ in a large community sample (Cronbach $\alpha = 0.91$ for total scale; 0.58-0.94 for subscales), as well as in a sample of HIV-risk taking MSM (Cronbach $\alpha = 0.94$ for total scale; 0.71-0.93 for subscales) (Hugh Klein & Tilley, 2012; Scher, Stein, Asmundson, Mccreary, & Forde, 2001). Cronbach alphas for the CTQ subscales used in the current study were: emotional abuse, α=.90; physical abuse, α=.81; sexual abuse, α=.90; and physical neglect α=.64.

The emotional neglect subscale was omitted from the current study for several reasons. First, the items were all reverse-scored and their wording reflected family supportive behaviors (e.g. "When I was growing up, I knew there was someone to take care of me and protect me"), rather than emotional neglect. Additionally, conceptually, the absence of family support is not the same as emotional neglect, and therefore, the meaning of the subscale in the context of child maltreatment is ambiguous and difficult to interpret. In addition, one item from the sexual abuse subscale was accidentally omitted from the computerized survey for the first third of study participants. This was a formatting error that occurred when transferring the survey instrument from the paper to electronic version, where the last item at the end of the page dropped off. This item was added back into the survey as soon as the mistake was discovered. The item was "When I was growing up, I believe that I was sexually abused." This was a summary item of the other four items in the scale, which assess different experiences that would be classified as sexual abuse (e.g. "When I was growing up, someone tried to make me do sexual things or watch sexual things"). Analyses were conducted to determine the correlation between the original five-

item version of the scale and the four-item version of the scale with the dropped item. Results showed a correlation of r=.99, p<.001. Cronbach alpha coefficients for both scale versions were high; five item at α=.93 and the four-item at α=.90. Due to the high correlation and internal consistency reliability of both the four and five-item scales, the four-item scale was used in analysis instead of data imputation.

Intimate Partner Violence

The IPV-GBM Scale (Stephenson & Finneran, 2013) was used to measure intimate partner violence. It is a culturally-appropriate measure of intimate partner violence for gay and bisexual men based on the widely-used Revised Conflicts Tactics Scale-Short version (Straus & Douglas, 2004). The IPV-GBM scale assesses five domains of intimate partner violence (physical and sexual, monitoring, controlling, HIV-related, and emotional) using 23 items (Stephenson & Finneran, 2013). The physical and sexual abuse subscale included items about being hit, kicked, raped, or having property damaged by a partner; the monitoring subscale included items about a partner demanding access to email and phone records without the participants' permission; the controlling subscale comprised items assessing whether the participants' partner prevented them from seeing friends and family; the HIV-related subscale included items regarding a partner lying about his HIV status or intentionally trying to transmit HIV to the participant; and the emotional subscale contained items asking the participant about being insulted by his partner. The IPV-GBM scale has demonstrated adequate internal consistency in samples of both Black (Cronbach α = 0.91) and White MSM (Cronbach α = 0.90) (Stephenson & Finneran, 2013). The internal consistency reliability for the total IPV-GBM scale

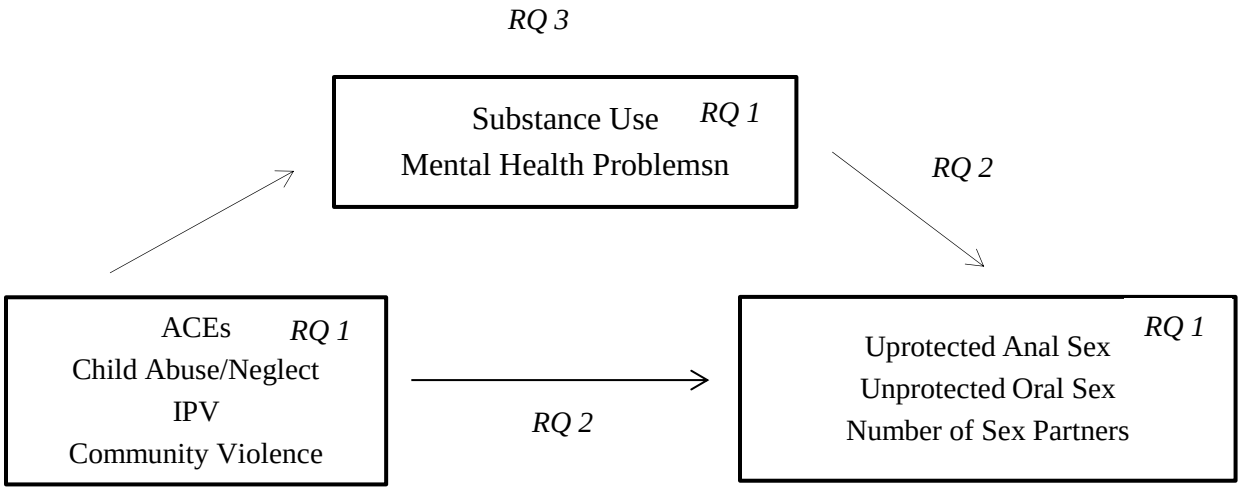
in the current study was high at α=.85, subscale alphas ranged from α=.81 to α=.49. Therefore, the total scale score was used in the analyses.

Community Violence Exposure

Exposure to community violence was assessed using the Neighborhood domain of the CDC M2 Victimization Scale, which uses 25 items to measure exposure (experiencing and witnessing) to community violence (Dahlberg, Toal, Swahn, & Behrens, 2005). This measure was chosen based on its utility for providing results that can be compared to previous studies that have examined the relationship among community violence exposure, psychosocial problems, and HIV risk among primarily heterosexual samples (Voisin, 2003, 2005; Voisin et al., 2007). The internal consistency was adequate at α=.72 for the experienced community violence subscale and high at α=.93 for the witnessed community violence subscale.

Figure 3.6 provides a pictorial representation of study research questions and key variables.

Figure 3.6 Research Questions and Key Variables



3.7 Data Analytic Plan and Power Analysis

First, data was examined for missing and out of bound values, and individual questionnaires were examined to resolve any data problems. Univariate statistics were computed to examine the distribution of each variable. Additionally, all scales were created in SAS and reliability analyses were conducted to determine if the internal consistency reliability coefficients were within the acceptable range (Cronbach's $\alpha \geq .70$; Nunnally, 1978).

Research Question 1: *What is the extent to which YMSM engage in HIV risk behaviors (i.e. unprotected anal and oral sex, number of sex partners), experience ACEs and other multiple forms of violence, use substances, and experience mental health problems, and do these differ by ethnicity (Black and White)?*

Research question 1. Descriptive statistics were calculated for the sample, including means and standard deviations for each HIV risk behavior, each type of violence, use of substances, and each mental health problem. Frequencies were reported on dichotomous

variables, including if the participant has ever been tested for HIV or used a particular substance. Demographic descriptive statistics were reported for the whole sample, as well as by ethnicity. Ethnicity was re-coded into two categories: Black/African American and White/Caucasian. Although several participants coded as Black/African American identified as more than one ethnicity, the syndemic framework of the current study highlights the importance of examining socially disadvantaged populations. Because people from multiple ethnicities including a Black/African American in the United States are most often treated as Black (Ho, Kteily, & Chen, 2017), multiethnic participants were re-coded into the Black/African American group. Spearman correlations were used to identify ethnic differences in HIV risk behaviors.

Research Question 2: *What ACEs, violence exposure, substance use, and mental health factors are significantly associated with HIV risk behaviors in YMSM?*

Research question 2. Categorical variables were dummy coded so that Spearman correlations could be conducted between all ACEs and violence exposure, substance use, and mental health variables and HIV risk behaviors. All variables that were significantly associated with any of the HIV risk behaviors at the bivariate level were included in all negative binomial regression models, which were used to identify the ACEs and other violence exposure, substance use, and mental health variables that were significantly associated with HIV risk behaviors when controlling for demographic variables. The same independent variables were included in all six negative binomial regression models for two reasons: 1) consistency across models, and 2) to allow for the comparison of significant predictors by HIV risk behavior. Four standard negative binomial regression models were completed to predict unprotected anal sex in the last three and twelve months, and unprotected oral sex in the last three and twelve months. Truncated negative

binomial regression models, which account for a lack of zeros in the distribution, were estimated to predict number of male sexual partners in the last three and twelve months.

Research Question 2 Power: A sample size of 170 results in more than adequate power (power > .90 for a hypothesized moderate effect size of r=.30) (Cohen, 1988). The power is similarly high for moderate effect size semi-partial correlations in a multiple regression equation which includes 2-3 covariates.

Research Question 3: Do substance use and mental health problems mediate the relationship between exposure to ACEs and other multiple forms of violence and HIV risk behaviors in YMSM?

A series of simple mediating models were computed to determine if there were significant indirect effects of ACEs and intimate partner violence on HIV risk behaviors through substance use pathways. Mediating models were not estimated for all combinations of independent variables (ACES and violence-related variables), all mediators (mental health or substance use variables), and all HIV risk behavior for two main reasons. First, mediating analysis is usually not used for exploratory analysis, but rather is based on conceptual or theoretical models (Hayes, 2013). Second, analyzing all combinations of dependent, mediating, and independent variables would result in over 300 models tested, significantly increasing the risk of a Type 1 error. Therefore, several criteria were used to determine which models would be tested in the current study. First, the time-ordering for the relationships between the independent, mediator, and dependent variables had to conceptually be logical whereby the dependent variable was measured within a time frame that was not longer (i.e., last 12 months) than the mediator (i.e., last month) or independent variable (last 2 months). This led to the exclusion of all mental

health (last 2 weeks for depression and anxiety; last month for PTSD) and 30-day drug use variables as mediators, since the timeframes were shorter than the shortest dependent variable outcome of three months.

Second, models that were tested were based on theoretical and empirical literature that provided evidence for substance use pathways in the relationship between ACEs and violence exposure and HIV risk behaviors. Studies were identified that gave theoretical and empirical support for substance use as mediators of the relationship between child abuse and HIV risk (Meade, Kershaw, Hansen, and Sikkema, 2009; Purcell et al., 2004), as well as between intimate partner violence and HIV risk (Pitpitan et al., 2012). However, no theoretical and empirical support was found for substance use mediating the relationship between community violence exposure and HIV risk behaviors is scant. Accordingly, only models with child abuse and intimate partner violence as the independent variables were included in this mediating analysis.

Third, due to some overlap conceptually between some of the independent variables and mediating variables (e.g.., overlap between ACES and childhood abuse), several variables were excluded for parsimony. As a result, child abuse and IPV subscales were excluded in favor of ACEs and the IPV total scores.

Finally, to further reduce the number of dependent variables, the two most risky HIV risk behaviors according to empirical evidence were used as outcome variables in the models, i.e., unprotected anal intercourse and having multiple male sexual partners.

This resulted in testing 12 mediating models that are displayed in Table 3.7. Dependent variables (unprotected anal sex in the last 12 months; number of male sex partners in the last 12 months) were dichotomized for mediating models because the analysis is not structured to handle non-normal distributions of continuous dependent variables.

Table 3.7. Mediating models included in analysis

Independent Variable	Mediating Variable	Dependent Variable
ACEs (before 18)	Hazardous Drinking (12mo)	UAI-12
ACEs (before 18)	Drug Abuse (12mo)	UAI-12
ACEs (before 18)	Polydrug Use (Lifetime)	UAI-12
ACEs (before 18)	Hazardous Drinking (12mo)	Male Sex Partners-12mo
ACEs (before 18)	Drug Abuse (12mo)	Male Sex Partners-12mo
ACEs (before 18)	Polydrug Use (Lifetime)	Male Sex Partners-12mo
IPV (12 mo)	Hazardous Drinking (12mo)	UAI-12
IPV (12 mo)	Drug Abuse (12mo)	UAI-12
IPV (12 mo)	Polydrug Use (Lifetime)	UAI-12
IPV (12 mo)	Hazardous Drinking (12mo)	Male Sex Partners-12mo
IPV (12 mo)	Drug Abuse (12mo)	Male Sex Partners-12mo
IPV (12 mo)	Polydrug Use (Lifetime)	Male Sex Partners-12mo

Tests of the statistical significance of the indirect effects of substance use and mental health problems on the relationships between ACEs/violence exposure and HIV risk behaviors were completed using the PROCESS macro in SAS (Hayes, 2013). This program uses a bootstrapping technique to estimate a confidence interval for the indirect effect in each simple mediating model. This technique is an alternative to the traditional causal steps approach to mediation analysis originally described by Baron and Kenny (1986). The causal steps approach requires that statistically significant relationships between the dependent and independent variables, as well as between the mediator and the independent variables, are established prior to testing for mediation. The basic argument for this approach was that a direct effect of the independent variable on the dependent variable needs to exist in order for it to be mediated. However, contemporary scholars argue that a significant direct effect between the dependent and independent variable should not be a pre-requisite for testing for an indirect effect (Hayes, 2013; Rucker et al., 2011; Zhao, Lynch, & Chen, 2010). Rather, it is possible for the independent variable to affect the dependent variable indirectly through the mediator in the absence of significant direct effect. One example of this phenomenon was described by MacKinnon,

Fairchild, and Fritz (2007) as inconsistent mediation, wherein the directionality of one indirect effect may be different than the direct effect or another indirect effect, effectively canceling each other out. This would lead to accepting the null hypothesis of no significant relationship between the independent and dependent variable and preclude a test of the indirect effect if using the causal steps approach (Hayes, 2013; Kenny, 2016). Due to this limitation, as well as the inability of the causal steps approach to provide a test of significance for the indirect effect, this approach was not used in the current study.

Research Question 3 Power: There is little agreement in the literature on the definition of effect size for the test of an indirect effect (mediation) using bootstrapped confidence intervals (Preacher & Kelley, 2011). Preacher and Kelley (2011) suggest a number of possible ways to calculate an effect size for the indirect effect. Hayes (2013) views the indirect effect similar to using r-square as a measure of effect size, since the indirect effect is the result of multiplying two correlations (paths a x b correlations/semi-partial correlations). He suggests squaring the small, medium, and large effect size definitions for r (Cohen, 1988) as input for the power analysis in the case where no effect guidance is available from previous research. This effect size definition is similar in spirit to Preacher and Kelley's (Preacher & Kelley, 2011) completely standardized indirect effect' definition of effect size. Given a sample size of 170, the power is an adequate .70 for an indirect (mediation) effect size of .20 (which is at the upper end of the adjusted Cohen's medium effect size estimate).

Chapter 4: Results

4.1 Participant Demographics

For the present study, 168 YMSM in St. Louis (n=124) and Kansas City (n=44) completed computer-assisted self-interviews. Table 4.1 presents demographic characteristics of the total sample. Participants ranged in age from 18-34 years with a mean age of 25.1 (SD=3.7). A total of 131 participants identified as gay (78.4%), 32 identified as bisexual (19.2%) three identified as queer (1.8%), and one participant (0.6%) identified as pansexual. For analyses, bisexual, queer, and pansexual were collapsed into one category because of small cell sizes. These three sexual identity categories were collapsed because they are all non-monosexual identities as opposed to the monosexual identity of gay (Flanders, 2017).

To participate in the study, respondents had to self-identify their ethnicity as White, Black, or multiethnic including Black. The ethnic composition of the sample was 51.5% (n=86) Black, 44.3% (n=74) White, and 4.2% (n=7) that identified as more than one ethnicity. As shown in Table 1, several participants self-identified **a**s more than one ethnicity (i.e., two identified as Black and White; two identified as Black, White, and First Nations; one identified as Black and Latino; one identified as Black, Latino, Native American, and White; and one identified as Other). For comparative analyses by ethnicity, participants who identified as more than one ethnicity were collapsed in the Black group. Participants who identified as more than one ethnicity including Black were collapsed into the Black to allow for comparisons between majority (i.e. White) and minority (non-White) ethnicity participants. This categorization is supported by results of recent research that demonstrate that both White and Black individuals in the United States are likely to engage in hypodescent (Ho, Kteily, & Chen, 2017).

Table 4.1. Participant demographics by ethnicity

	Total Sample N (%)	Black MSM N (%)	White MSM N (%)
Ethnicity			
Black	90 (53.57)	-	-
White	71 (42.26)	-	-
More than One Ethnicity	7 (4.17)	-	-
Sexual Identity			
Gay	132 (78.57)	66 (68.04)	66 (92.96)
Bisexual	32 (19.05)	28 (28.87)	4 (5.63)
Queer, Pansexual	4 (2.38)	3 (3.09)	1 (1.41)
Employment			
Full-time	122 (72.62)	68 (70.10)	54 (76.06)
Part-time	32 (19.05)	17 (17.53)	15 (21.03)
Unemployed	14 (8.33)	12 (12.37)	2 (2.82)
Education Level			
Did Not Complete HS	2 (1.19)	2 (2.06)	0 (0)
High School or GED	26 (15.48)	21 (21.65)	5 (7.04)
Some College	64 (38.10)	41 (42.27)	23 (32.39)
Associates/Technical Degree	16 (9.52)	6 (6.19)	10 (14.08)
Bachelor's Degree	47 (27.98)	23 (23.71)	24 (33.08)
Graduate School/Post-College	13 (7.74)	4 (4.12)	9 (12.68)
Income (Monthly)			
$0-499	15 (9.04)	10 (10.42)	5 (7.14)
$500-999	26 (15.66)	13 (13.54)	13 (18.57)
$1,000-1,499	32 (19.28)	23 (23.96)	9 (12.68)
$1,500-1,999	25 (15.06)	11 (11.46)	14 (20.00)
$2,000-2,499	27 (16.27)	12 (12.50)	15 (21.43)
$2,500-2,999	13 (7.83)	9 (9.38)	4 (5.71)
$3,000 +	28 (16.87)	18 (18.75)	10 (14.29)
City			
St. Louis	124 (74.25)	75 (77.32)	49 (69.01)
Kansas City	44 (26.19)	22 (22.68)	22 (30.99)
Age*	25.01 (3.58)	24.81 (3.77)	25.27 (3.31)

* M (SD)

Employment, education, and income were used to describe the socioeconomic status of the sample. A majority of the sample was employed, with 122 (73.1%) reporting full-time employment and 33 (19.8%) reporting part-time employment. Most of the participants had also attained education beyond high school. The median gross monthly income for the sample was $1,500-$1,999. Additionally, nearly all participants (97.6%) reported receiving an HIV test

during their lifetime. The number and percentage of participants that reported each type of employment, level of education, and amount of monthly income is presented in Table 4.1.

Recruitment City Differences

Because data were collected from participants in two cities, bivariate analyses were conducted to determine if there were significant differences in any of the dependent variables and demographics by recruitment city. Results of chi-squares and independent samples t-tests indicated no significant differences in demographic characteristics by city. Likewise, results of a series of Wilcoxon rank sum tests revealed that number of unprotected anal sex occasions, number of unprotected oral sex occasions, and number of male sexual partners in the last three and 12 months did not significantly differ by recruitment city. Since analyses indicated that there were no significant differences in the dependent variables by recruitment city, it was not included as a control variable in the analyses for the study.

4.2 Research Question 1: Extent of ACEs/Violence Exposure, Mental Health Problems, Substance Use, and HIV Risk Behaviors

4.2.1 Dependent Variables: Unprotected Sex and Number of Sex Partners

The frequencies and univariate distributions for the seven dependent variables are presented in Tables 4.2 and 4.3.

Extent of HIV Risk Behaviors and HIV Testing

All participants for the current study were sexually active. To be eligible for the study, participants had to report engaging in oral or anal sex with at least one male partner in the past three months. The majority of participants reported engaging in unprotected anal and oral sex in the last three and 12 months. These results are summarized in Table 4.2. Number of unprotected

anal sex occasions in the last three and 12 months ranged from 0-100 and 0-250 respectively, and number of unprotected oral sex occasions ranged from 0-80 in the last three months and from 0-200 in the last 12 months. Most participants also reported having sex with multiple male partners in the last three and 12 months. Number of male sexual partners ranged from 1-90 in the last three months and 1-200 in the last 12 months.

Table 4.2. Frequencies of HIV risk behaviors

Variable	n (%)	N
Unprotected Anal Sex-Last 3 Months	113 (68.48)	165
Unprotected Anal Sex-Last 12 Months	119 (72.12)	165
Unprotected Oral Sex-Last 3 Months	143 (87.20)	164
Unprotected Oral Sex-Last 12 Months	147 (89.09)	165
Multiple Male Sex Partners-Last 3 Months	120 (71.86)	167
Multiple Male Sex Partners-Last 12 Months	138 (83.64)	165

The HIV-risk behaviors included number of unprotected anal sex occasions in the last three (*M*=5.84, *SD*=14.28) and 12 months (*M*=13.43, *SD*=33.72) , number of unprotected oral sex occasions in the last three (*M*=7.52, *SD*=11.81) and 12 months (*M*=18.56, *SD*=33.66), and number of male sexual partners in the last three (*M*=4.98, *SD*= 10.27) and 12 months (*M*=10.27, *SD*=23.34). As shown in Table 4.3, the means and standard deviations indicated that all six variables were positively skewed. Accordingly, non-parametric tests including Wilcoxon rank sum and Spearman correlations were used at the bivariate level to correct for non-normal distribution. Additionally, negative binomial regressions, a modeling technique designed to handle this type of distribution in the dependent variable (Karazsia & van Dulmen, 2008; Xia et al., 2012), were conducted for multiple regression models. For the mediation models (for Research Question 3), the dependent variables were dichotomized (i.e. no unprotected sex vs. any unprotected sex; one sexual partner vs. multiple sex partners) for models that tested the

indirect effects of ACEs and IPV on HIV risk behaviors through substance use pathways. Dichotomizing the variables for mediation analyses was performed because the distributions of HIV risk behaviors in this study violate the assumption of normality required for continuous dependent variables when using the PROCESS macro to estimate bootstrapped confidence intervals for the indirect effects. Although PROCESS cannot correctly estimate models with a negative binomial distribution, it is able to estimate models using dichotomized dependent variables.

Table 4.3. Univariate statistics of HIV risk behavior variables

	Mean	SD	Median	Mode	Range	Skew	Kurtosis	N
Unprotected Sex								
Anal 3 months	5.81	14.24	1.00	0.00	0-100	4.34	20.78	166
Anal 12 months	13.35	33.64	3.00	0.00	0-250	4.74	25.08	166
Oral 3 months	7.49	11.79	3.00	3.00	0-80	3.25	12.42	165
Oral 12 months	18.47	32.59	6.00	0.00	0-200	3.81	17.07	166
Number of Sex Partners								
Male 3 months	4.96	10.24	3.00	1.00	1-90	6.49	47.04	168
Male 12 months	10.22	23.28	4.00	1.00	1-200	6.85	53.00	166

4.2.2. Independent Variables: ACEs/Violence Exposure, Mental Health Problems, and Substance Use

Adverse Childhood Experiences and Violence Exposure

Table 4.4 summarizes the univariate statistics for independent variables of exposure to adverse childhood experiences (ACEs) and other forms of violence, including severity of child abuse and neglect, intimate partner violence, and community violence. ACEs were measured using the ACEs module of the Behavioral Risk Factor Surveillance Survey conducted by the Centers for Disease Control and Prevention. ACEs scores (M=3.31, SD=2.53) ranged from 0-9

and the distribution of these scores approximated normality. The most commonly reported ACE was emotional abuse, which was reported by nearly 65% (n=109) of participants. Regarding other types of childhood abuse, about 35% (n=59) reported childhood physical abuse and 14% (n=24) reported childhood sexual abuse. The frequency with which participants reported experiencing each ACE is reported below in Table 4.5, and the frequency of the number of ACEs reported by participants is summarized in Table 4.6. Results of previous studies demonstrated that experiencing four or more ACEs is associated with greater risk for health problems, health risk behaviors, and overall mortality. Approximately 43% of the current sample reported experiencing four or more ACEs before the ages of 18.

Severity of childhood abuse and neglect was measured using the Childhood Trauma Questionnaire (CTQ). Types of abuse and neglect measured included physical abuse (M=8.20, SD=3.86), emotional abuse (M=10.84, SD=5.61), sexual abuse (M=5.83, SD=3.46), and physical neglect (M=7.41, SD=3.46). Theoretical ranges for physical abuse, emotional abuse, and physical neglect scores were 5-25, and the theoretical range for sexual abuse was 4-20. The distribution of scores from all four child abuse and neglect variables were positively skewed.

The CTQ is a standardized measure that provides cut-off score for severity of child abuse and neglect. According to these scores, participants in this study reported low levels of physical and emotional abuse, and minimal to low levels of sexual abuse and physical neglect.

Intimate partner violence victimization was measured using the IPV-GBM scale (M=28.26, SD=9.89). The scale scores can range from 21-147 and the distribution of scores was positively skewed. Approximately 58% of the sample reported experiencing some kind of IPV in the past year.

Experiencing and witnessing community violence were measured using the community violence portion of Dahlberg's (2005) Victimization Scale. Scores for experiencing community violence (M=13.13, SD=2.27) had a possible range of 12-60 and score for witnessing community violence had a possible range of 13-65. The distribution of scores for both variables were positively skewed. Approximately 35% of participants reported experiencing community violence in the last year, and 46% reported witnessing community violence in the last year.

Table 4.4. Univariate statistics of violence exposure variables (n=168)

	Mean	SD	Median	Mode	Range	Skew	Kurtosis	N
Child Abuse & Neglect								
ACES	3.01	2.20	3.00	1.00	0-9	0.30	-0.89	164
Physical Abuse	8.20	3.86	7.00	5.00	5-23	1.90	3.75	167
Emotional Abuse	10.4	5.61	8.00	5.00	5-25	1.03	-0.02	167
Sexual Abuse (4item)	4.83	3.46	4.00	4.00	4-20	2.24	4.82	167
Sexual Abuse (5item)	6.99	4.04	5.00	5.00	5-25	2.49	6.52	108
Physical Neglect	7.41	3.33	6.00	5.00	5-21	1.64	2.42	167
Intimate Partner Violence								
Total	28.60	9.89	25.00	21.00	21-79	2.56	8.10	167
Physical	7.89	3.67	6.00	6.00	6-34	3.39	16.54	167
Monitoring	7.40	4.37	5.00	5.00	5-30	2.65	8.01	167
Controlling	4.71	1.85	4.00	4.00	4-16	3.53	14.23	167
HIV-Related	3.49	1.28	3.00	3.00	3-11	3.16	10.87	167
Emotional	4.78	2.74	3.00	3.00	3-15	1.73	2.40	167
Community Violence								
Experienced	13.1	2.27	12.00	12.00	12-24	2.88	8.85	167
Witnessed	15.8	6.00	13.00	13.00	13-52	3.81	17.51	167

Table 4.5. Frequencies of types of adverse childhood experiences (n=168)

Abuse	**% (n)**
Emotional Abuse	64.88 (109)
Physical Abuse	35.12 (59)
Sexual Abuse	14.29 (24)
Household Challenges	
Lived with problem drinker or alcoholic	33.33 (56)
Lived with someone who used street drugs or abused prescription drugs	26.79 (45)
Lived with someone who was mentally ill, depressed, or suicidal	31.55 (53)
Household member went to prison	22.02 (37)
Intimate Partner Violence between adults in home	31.55 (53)
Parents separated or divorced	39.02 (64)

Table 4.6. Frequencies of number of adverse childhood experiences (n=168)

Number of ACEs Endorsed	**% (n)**
0	14.63 (24)
1	18.29 (30)
2	13.41 (22)
3	9.76 (16)
4	16.46 (27)
5	12.20 (20)
6	9.15 (15)
7	4.88 (8)
8	0.61 (1)

Mental Health Problems

Univariate statistics for mental health problems, including depression, anxiety, and post-traumatic stress disorder are presented in Table 4.7. The average depression score was 4.55 (SD=4.39) and had a theoretical range of 0-27. The average anxiety score was 3.83 (SD=4.17) with possible scores ranging from 0-21. The average total PTSD score was 26.13 (SD=8.83) and had a theoretical range of 17-85. All mental health problem variables were positively skewed.

Depression, anxiety, and PTSD were each measured using a standardized scale. The PHQ-9 and GAD-7, used to assess depression and anxiety respectively, provide cut-off scores

for levels of symptom severity. The PCL-C, which was used to measure PTSD, provides a single clinical cut-off score. Table 4.8 presents the number of participants who reported depression and anxiety scores at the various levels of symptom severity, and the number of participants who scored at or above the clinical cut-off for PTSD. As demonstrated in the table, approximately 39% of participants reported at least mild depression symptoms, 32% reported at least mild anxiety symptoms, and 27% reported PTSD symptoms at or above the clinical cut-off.

Table 4.7. Univariate statistics of mental health problem variables

	Mean	SD	Median	Mode	Range	Skew	Kurtosis	N
Mental Health Problems								
Depression	4.55	4.39	3.00	0.00	0-22	1.38	2.09	166
Anxiety	3.83	4.17	2.00	0.00	0-19	1.49	2.03	167
PTSD - Total	26.3	8.83	24.00	18.00	17-63	1.41	2.18	165

Table 4.8. Frequency (%) of participants' mental health problem symptom severity (n=167)

Depression	n (%)
Not symptomatic	102 (61.08)
Mild Depression	44 (26.35)
Moderate Depression	16 (9.58)
Moderately Severe Depression	3 (1.80)
Severe Depression	2 (1.20)
Anxiety	
Not symptomatic	114 (68.26)
Mild Anxiety	37 (22.16)
Moderate Anxiety	12 (7.19)
Moderately Severe Anxiety	4 (2.40)
Severe Anxiety	0 (0.00)
PTSD	
At or Above Clinical Cut-off	45 (26.95)

Alcohol and Other Substance Use

Table 4.9 summarizes the univariate statistics for alcohol and other drug use for the study sample. Participants reported drinking on an average of 7.64 (SD=7.74) days in the last 30 and reported drinking approximately three drinks per day on the days that they did drink (M=3.33, SD=2.95). Number of drinking days in the last 30 ranged from 0-30 and number of drinks per drinking day ranged from 0-20. One quarter (n=42) of the sample reported binge drinking in the last 30 days. The average age that participants reported having their first drink was 15 (M=15.32, 4.94), with a range of 8-27 years. Approximately 27% (n=45) of participants reported having their first drink before the age of 15. Hazardous drinking severity was measured using the Alcohol Use Disorder Identification Test (AUDIT), which has a theoretical range of 0-40. Participants reported an average hazardous drinking severity score of 6.93 (SD=5.89). All alcohol use variables were positively skewed except for age at first drink, which was negatively skewed.

Table 4.9. Univariate statistics of alcohol and other substance use variables

	Mean	SD	Median	Mode	Range	Skew	Kurtosis	N
Alcohol Use								
Number Drinking Days	7.64	7.74	5.00	0.00	0-30	1.33	1.00	166
Number of Drinks/Day	3.33	2.95	3.00	2.00	0-20	2.02	6.92	165
Age at First Drink	15.32	4.94	16.00	18.00	8-27	-1.72	3.30	164
Hazardous Drinking Severity	6.93	5.89	5.00	1.00	0-28	1.46	2.28	160
Substance Use								
Polydrug Use, Lifetime	1.54	1.69	1.00	1.00	0-8	1.47	1.99	167
Polydrug Use, 30 Days	0.83	1.13	1.00	0.00	0-5	2.00	4.85	164
Drug Abuse Severity	0.85	1.42	0.00	0.00	0-9	2.51	8.73	164

Table 4.10. Frequencies of number of types of drugs used

Number of Types of Drugs Used	Lifetime % (n)	Last 30 Days % (n)
0	30.36 (51)	48.17 (79)
1	33.33 (107)	32.93 (54)
2	11.31 (19)	9.15 (15)
3	7.74 (13)	4.27 (7)
4	8.33 (14)	3.05 (5)
5	3.57 (6)	-
6	1.19 (2)	1.83 (3)
7	2.38 (4)	0.61 (1)
8	1.19 (2)	-
9	0.60 (1)	-

Table 4.11. Frequencies of types of drugs used

Number of Types of Drugs Used	Lifetime % (n)	Last 30 Days % (n)
Marijuana/Cannabis	69.05 (116)	48.80 (81)
Hallucinogens	20.24 (24)	6.63 (11)
Cocaine	17.26 (29)	7.78 (13)
Stimulants	16.07 (29)	7.88 (13)
Tranquilizers	17.26 (25)	4.17 (7)
Prescription Painkillers	12.50 (21)	7.19 (12)
Inhalants	11.31 (19)	6.63 (11)
Sedatives	6.55 (11)	1.19 (2)
Heroin	1.79 (3)	0.60 (1)
Other Drugs	4.17 (7)	1.19 (2)

One average participants reported using 1-2 different types of drugs in their lifetime (M=1.54, SD=1.69) and 0-1 type of drug in the last 30 days (M=.83, SD=1.13). The most commonly used drug was marijuana, followed by hallucinogens, cocaine, and other stimulants. Frequencies of the number of types of drugs used is shown in Table 4.10 and the frequencies with which participants reported using each type of drug are summarized in Table 4.11. Drug abuse severity was measured using the Drug Abuse Screen Test (DAST), which has scores that can range from 0-10. The average participant drug abuse severity score was .85 (SD=1.42). All drug use variables were positively skewed.

The AUDIT and DAST are standardized scales that provide clinically relevant cut-offs for hazardous drinking and harmful drug use. Approximately 35% of participants scored at or above the clinical cut-off for hazardous drinking, and 10% scored at or above the clinical cut-off for harmful drug use. Additionally, about 35% of the sample reported any polydrug use in their lifetime and 17% reported any polydrug use in the last 30 days.

4.3 Research Question 2:

Significant ACEs/Violence, Mental Health, and Substance Use Factors

Bivariate correlations and multiple regression analyses were conducted to identify the ACEs/violence exposure factors, mental health problems, and substance use variables that were significantly associated with HIV risk behaviors. This study hypothesized that greater amounts of exposure to ACEs/violence, experiencing more mental health problems, and higher levels of alcohol and other substance use would be significantly associated with higher frequencies of HIV risk behaviors.

Due to conceptual overlap between some of the independent variables, intercorrelations between each ACEs and other violence variable, each mental health variable, and each substance use variable were conducted to examine for potential collinearity. Results of these analyses are presented in tables 4.12-4.14. Additionally, variance inflation factors were examined to assess for multicollinearity.

Table 4.12. Intercorrelations between ACEs & other violence-related variables (n=164)

	1	2	3	4	5	6	7
1. ACEs	--						
2. Physical Abuse	.55***						
3. Emotional Abuse	.56***	.68***					
4. Sexual Abuse	.44***	.52***	.45***				
5. Physical Neglect	.42***	.47***	.48***	.40***			
6. IPV-Total	.28***	.19*	.32***	.21**	.09		
7. CV-E	.18*	.22**	.10	.30***	.16*	.32***	
8. CV-W	.21**	.32***	.09	.22**	.02	.26***	.47**

*p<.05 **p<.01 ***p<.001

Table 4.13. Intercorrelations between mental health variables (n=166)

	1	2	3	4	5
1. Depression Raw Score	-				
2. Anxiety Raw Score	.72***				
3. PTSD Raw Score	.71***	.72***			
4. Depression Clinical Cut-Off	.80***	.56***	.55***		
5. Anxiety Clinical Cut-Off	.62***	.83***	.57***	.55***	
6. PTSD Clinical Cut-Off	.60***	.57***	.83***	.46***	.48***

*p<.05 **p<.01 ***p<.001

Table 4.14. Intercorrelations between substance use variables (n=164)

	1	2	3	4	5	6
1. Hazardous Drinking Severity	--					
2. Number of Drinking Days	.55***					
3. Number of Drinks per Day	.34***	.28***				
4. Age at First Drink	-.10	.06	.23**			
5. Drug Abuse Severity	.23**	.23**	-.01	-.05		
6. Polydrug Use-Lifetime	.40***	.34***	-.10	-.10	.51***	
7. Polydrug Use-30 Day	.25**	.31***	-.08	-.08	.58***	.68***

*p<.05 **p<.01 ***p<.001

Results of intercorrelations among the independent variables indicated high correlations between the three mental health variables (see Table 4.13), indicating possible collinearity that

could be problematic in multiple regression models. To address this, depression, anxiety, and PTSD scores were recoded using empirically-validated clinical cut-off scores found in the literature where "0=below the clinical cut-off" and "1=at or above the clinical cut-off" for each scale. As shown in Table 4.13, results of correlations between the recoded variables did not suggest collinearity. Therefore, the clinical cut-off dichotomous variables were used in bivariate and multiple regression analyses. Additionally, as discussed in Chapter 3, the total IPV scale score was used due to low internal consistency reliability in some of the IPV subscales. All variance inflation factors were under 3.0, indicating no multicollinearity.

4.3.1 Bivariate Analyses: Associations between Independent and Dependent Variables

Bivariate Correlations between ACE's Violence Exposure and HIV Risk Behaviors

The Spearman correlations between ACEs/violence exposure and HIV risk behaviors are presented in Table 4.15. Participants with a greater number of ACEs reported significantly more unprotected anal sex occasions [r_s (162) = .16, p<.05] and more male sexual partners [r_s (162) = .16, p<.05] in the last 12 months. Those participants with amounts of IPV victimization [r_s (166) = .16, p<.05] reported significantly more unprotected anal sex occasions in the last 12 months. Witnessing greater amounts of community violence was significantly associated with greater amounts of unprotected oral sex occasions in the last three [r_s (164) = .16, p<.05] and 12 months [r_s (165) = .20, p<.05].

Results of bivariate analyses also indicated an inverse relationship between physical neglect and number of unprotected oral sex occasions, where greater amounts of reported physical neglect was significantly associated with fewer unprotected oral sex occasions at three

[r_s (164) = -.23, p<.01] and 12 months [r_s (165) = -.19, p<.05]. Because of the unexpected direction of this relationship, this relationship was examined further. Results indicated a low inter-correlation between one item ("When I was growing up, the was someone to take me to the doctor if I needed it") and other items in the sub-scale. Dropping this item from the subscale slightly improved the reliability (from .64 to .65) and resulted in non-significant associations between physical neglect and HIV risk behaviors.

ACEs and other violence-related variables were not significantly associated with number of unprotected sex occasions in the last three months, or number of male sexual partners in the last three months.

Table 4.15. Spearman correlations between ACES and violence exposure and HIV risk behaviors

Variable	Anal-3	Anal-12	Oral-3	Oral-12	Male Partners-3	Male Partners-12
ACES	.06	.16*	-.00	.05	.07	.16*
Physical Abuse	-.02	-.00	-.11	-.04	-.10	-.02
Emotional Abuse	-.02	.03	-.05	.03	.06	.08
Sexual Abuse	-.10	-.01	-.12	-.06	-.03	.02
Physical Neglect	.02	.01	.06	.01	.10	.08
IPV	.09	.16*	.06	.12	.08	.13
CV-E	-.03	-.00	.01	.04	.07	.02
CV-W	.05	.06	.16*	.20*	.02	.07

Note. Sample sizes for spearman correlations ranged from 161-167; *p<.05 **p<.01 ***p<.001
Note. Community Violence-Experienced (CV-E) and Community Violence-Witnessed (CV-W)

Bivariate Correlations between Mental Health Problems and HIV Risk Behaviors

Table 4.16 summarizes the results of Spearman correlations between mental health problems and HIV risk behaviors. Results indicated that greater depression symptomatology was associated with more unprotected oral sex occasions in the last 12 months [r_s (164) = .24, p<.01] and more male sexual partners in the last three [r_s (166) = .21, p<.01] and 12 months [r_s (164) =

.248, p<.001]. Greater a greater amount of anxiety was associated with more unprotected oral sex occasions in the last three [r_s (164) = .18, p<.05] and 12 months [r_s (165) = .22, p<.01], as well as more male sex partners in the last three [r_s (167) = .26, p<.001] and 12 months [r_s (165) = .32, p<.001]. Similarly, higher PTSD symptomatology was associated with more unprotected oral sex occasions in the last three [r_s (163) = .17, p<.05] and 12 months [r_s (164) = .23, p<.01], as well as more male sex partners in the last three [r_s (165) = .31, p<.001] and 12 months [r_s (163) = .33, p<.001]. No significant associations were found between mental health problems and number of unprotected anal sex occasions in the last three or 12 months. However, results approached significance for the relationship between depression and number of unprotected anal sex occasions in the last 12 months [r_s (164) = .15, p=.06], and the between anxiety and unprotected anal sex occasions in the last 12 months [r_s (165) = .14, p=.07].

Table 4.16. Spearman correlations between mental health problems and HIV risk behaviors

Variable	Anal-3	Anal-12	Oral-3	Oral-12	Male Partners-3	Male Partners-12
Depression	.01	.16*	.17*	.24**	.22**	.26***
Anxiety	.11	.16*	.15	.17*	.14	.19*
PTSD-Total	.11	.13	.15	.19*	.27***	.27***

Note. Sample sizes for spearman correlations ranged from 161-165; *p<.05 **p<.01 ***p<.001

Bivariate Correlations between Alcohol and Other Substance Use and HIV Risk Behaviors

Results of Spearman correlations between alcohol use variables and HIV risk behaviors are presented in Table 4.17. Results demonstrated a significant inverse relationship between age at first drink and number of male partners in the last three [r_s (164) = -.20, p<.01] and 12 months [r_s (163) = -.19, p<.05]. These results indicate that participants who initiated drinking at a younger age reported a significantly greater number of male sexual partners. Additionally, a

greater number of drinking days in the last 30 days was associated with more unprotected oral sex occasions in the last three [r_s (164) = .23, p<.01] and 12 months [r_s (165) = .27, p<.001], as well as more male sexual partners in the last 12 months [r_s (165) = .16, p<.05]. Increased hazardous drinking severity was significantly associated with more unprotected anal sex occasions in the last 12 months [r_s (159) = .20, p<.05], more unprotected oral sex occasions in the last three [r_s (158) = .18, p<.05] and 12 months [r_s (159) = .25, p<.01], and a greater number of male sex partners in the last three [r_s (160) = .17, p<.05]and 12 months [r_s (158) = .28, p<.001]. No alcohol use variables were associated with number of unprotected anal sex occasions in the last three months.

Table 4.17. Spearman correlations between alcohol use and HIV risk behaviors

Variable	Anal-3	Anal-12	Oral-3	Oral-12	Male Partners-3	Male Partners-12
Age at 1st Drink	.02	-.03	-.06	-.08	-.20**	-.19*
Drinking Days	.09	.13	.23**	.27***	.13	.16*
Drinks per Day	.11	.15	.06	.07	.01	.01
Hazardous Drinking Severity	.10	.20*	.18*	.25**	.17*	.28***

Note. Sample sizes for spearman correlations ranged from 158-165; *p<.05 **p<.01 ***p<.001

Table 4.18 summarizes the results of Spearman correlations between substance use variables and HIV risk behaviors. Results indicated that greater substance abuse severity was significantly associated with more unprotected anal sex occasions in the last three months [r_s (162) = .16, p<.05], more unprotected oral sex occasions in the last three [r_s (161) = .33, p<.001]and 12 months [r_s (162) = .29, p<.001], and more male sexual partners in the last three [r_s (164) = .29, p<.001] and 12 months [r_s (162) = .29, p<.001]. In addition, using a greater number of drugs in one's lifetime and in the last 30 days was significantly associated with more unprotected

anal and oral sex occasions in the last three and 12 months, as well more male sexual partners in the last three and 12 months

Table 4.18. Spearman correlations between drug use and HIV risk behaviors

Variable	Anal-3	Anal-12	Oral-3	Oral-12	Male Partners-3	Male Partners-12
Drug Abuse Severity	.16*	.14	.33***	.29***	.29***	.29***
Polydrug-Lifetime	.15*	.22**	.30***	.34***	.32***	.37***
Polydrug-30 Days	.19*	.20**	.31***	.30***	.19*	.16*

Note. Sample sizes for spearman correlations ranged from 158-165; *p<.05 **p<.01 ***p<.001

Bivariate Correlations between Demographic Variables and HIV Risk Behaviors

Spearman correlations between demographic variables and HIV risk behaviors were computed to identify any significant relationships that would need to be controlled for in the multiple regression models. Results indicated that when compared with White YMSM, Black YMSM in this sample reported significantly fewer unprotected anal sex occasions in the last three months [r_s (165) = -.16, p<.05], as well as significantly fewer unprotected oral sex occasions in the last three [r_s (164) = -.29, p<.001] and 12 months [r_s (165) = -.29, p<.001], and significantly fewer male sex partners in the last three [r_s (167) = -.20, p<.05] and 12 months [r_s (165) = -.27, p<.001]. Additionally, being employed full time was significantly associated with more unprotected oral sex occasions in the last 12 months [r_s (165) = .16, p<.05], as was a greater educational attainment [r_s (165) = .16, p<.05]. Finally, higher education level was also significantly associated with a greater number of male sexual partners in the last three [r_s (167) = .22, p<.05] and 12 months [r_s (165) = .22, p<.05]. Neither sexual orientation or recruitment city were significantly associated with any of the HIV risk behavior variables. Results are summarized in table 4.19.

Table 4.19. Spearman correlations between demographics and HIV risk behaviors

Variable	Anal-3	Anal-12	Oral-3	Oral-12	Male Partners-3	Male Partners-12
Ethnic Self-Identity (0=White, 1=Black)	-.16*	-.13	-.29***	-.29***	-.20*	-.27***
Age	.07	.04	.08	.04	.07	.07
Sexual Orientation (0=Bi/Pan/Queer, 1=Gay)	.03	.01	-.01	-.04	-.00	.06
Employment (0=Part-time/ Unemployed, 1=Full-time)	.06	.10	.13	.16*	.00	.01
Education	-.11	-.09	.13	.16*	.22*	.22*
Income	-.07	-.06	-.06	-.06	.08	.04
City (0=St. Louis, 1=Kansas City)	-.04	-.02	-.04	-.04	-.03	-.03

*p<.05 **p<.01 ***p<.001

Bivariate Correlations between Demographics and Independent Variables

Due to significant differences in HIV risk behaviors by demographics, the relationships between demographic variables and the independent variables were examined. Pearson correlations were conducted between demographic variables and ACEs, IPV, experienced and witnessed community violence, mental health problems, and substance use. Correlation results indicated significant demographic difference in number of ACEs, frequency of exposure to IPV and community violence, and substance use. Specifically, participants with a higher income reported significantly fewer ACEs (r = .18, p<.05), and that participants who identified as Black (r = .19, p<.05), bisexual/queer/pan (r = -.19, p<.05), reported lower levels of education (r = -.19, p<.05), and who lived in St. Louis (r = -.18, p<.05) reported significantly greater amounts of experienced community violence than their counterparts. Those with lower educational levels also reported experiencing significantly more IPV (r= -.17, p<.05). Moreover, White participants

reported a significantly higher drug abuse severity (r = -.24, p<.01) as well as greater lifetime (r = -.31, p<.001) and 30-day polydrug use (r = -.21, p<.01). Finally, those who were employed reported drinking on a significantly greater number of days than those who were employed part-time or who were unemployed (r = .18, p<.05). Results did not show any significant demographic differences in mental health problems.

4.3.2 Multivariable Analyses: Predictors of Unprotected Intercourse and Number of Male Sexual Partners

Negative binomial regression models were conducted to determine the ACEs and violence-related variables (ACES, child abuse and neglect, intimate partner violence, and community violence), mental health problem (depression, anxiety, and PTSD) and substance use (alcohol and other drug use and abuse) variables that significantly predicted number of unprotected anal and oral sex occasions, and number of male sexual partners. Separate models were estimated for each HIV risk behavior at each time period (last three and twelve months), resulting in six total models. Those ACEs and violence-related, mental health problem, substance use, and demographic variables that were significantly associated with any HIV risk behavior at the bivariate level were included in the multivariable analyses. Standard negative binomial models were used for models in which unprotected anal and oral sex were the dependent variables, and truncated negative binomial models were used for models predicting number of male sex partners. The truncated models account for a lack of zeros in the distribution of dependent variables. Oral or anal sex with a man in the last three months was an inclusion criterion for the current study, so all participants had at least one male sex partner. Additionally, all dependent variables were winsorized at the 95th percentile to improve model fit (Perry et al.,

2015). Winsorization is a method of reducing the influence of extreme outliers without dropping cases from analysis. Using this method, extreme values (those greater than the 95th percentile) are recoded to a more "reasonable" value (i.e. the highest value within the 95th percentile; Barnett & Lewis, 1984). Prior to winsorization, model fit was poor due to extreme overdispersion in the distribution of the dependent variables, which can bias results towards statistical significance. Winsorization allowed for reduced overdispersion and improved model fit without deletion of observations with extreme values.

Unprotected Anal Intercourse

Pearson chi-square goodness of fit test values for the models predicting unprotected anal intercourse occasions in the last three and twelve months were non-significant, indicating good model fit. Results of multivariable analyses showed that there were no significant predictors of unprotected anal intercourse occasions in the last three months. These results are summarized in Table 4.20.

Table 4.20. Negative binomial regression: Predictors of unprotected anal intercourse-last three months (n=153)

Independent Variables	Regression Coefficient	SE	95% CI	IRR
ACEs	-.01	.07	[-.14, .12]	.99
IPV	.01	.02	[-.02, .05]	1.01
CVE-W	-.03	.02	[-.07, .02]	.97
Depression	.31	.31	[-.29, .90]	1.36
Anxiety	.18	.34	[-.47, .84]	1.20
PTSD	.33	.33	[-.32, .98]	1.39
Hazardous Drinking	-.02	.03	[-.07, .04]	.98
Num. Drinking Days	.01	.02	[-.03, .05]	1.01
Age at First Drink	.03	.03	[-.02, .08]	1.03
Drug Abuse Severity	.06	.10	[-.14, .26]	1.06
Polydrug Use-Lifetime	-.15	.32	[-.79, .48]	.86
Polydrug Use-30 Days	.61	.40	[-.19, 1.40]	1.83
Ethnicity	-.51	.27	[-1.03, .02]	.60
Employment	-.02	.29	[-.60, .55]	.98
Education	-.14	.11	[-.36, .08]	.87
Goodness of fit	χ^2 (137) =146.99, p=.26			

*p<.05 **p<.01 ***p<.001

Table 4.21 shows that participants who scored at or above the clinical cut-off for depression reported significantly more unprotected anal intercourse occasions in the last 12 months (*IRR*=2.11, p<.05) than those with minimal or no depression. In addition, those with lower levels of education reported more unprotected anal sex than those with higher levels of education (*IRR*=.87, p<.05). No other variables significantly predicted unprotected anal intercourse in the last 12 months.

Table 4.21. Negative binomial regression: Predictors of unprotected anal intercourse-last twelve months (n=154)

Independent Variables	Regression Coefficient	SE	95% CI	IRR
ACEs	.02	.07	[-.12, .15]	1.02
IPV	.01	.02	[-.03, .05]	1.01
CVE-W	-.02	.03	[-.07, .03]	.98
Depression	.74*	.34	[.08, 1.41]	2.11
Anxiety	-.15	.40	[-.94, .63]	.86
PTSD	.15	.40	[-.62, .93]	1.17
Hazardous Drinking	-.02	.03	[-.09, .04]	.98
Num. Drinking Days	-.00	.02	[-.05, .04]	1.00
Age at First Drink	.02	.03	[-.03, .08]	1.02
Drug Abuse Severity	.06	.13	[-.19, .31]	1.06
Polydrug Use-Lifetime	.20	.35	[-.48, .90]	1.23
Polydrug Use-30 Days	.27	.46	[-.62, 1.17]	1.31
Ethnicity	-.59	.32	[-1.23, .04]	.55
Employment	.36	.34	[-.31, 1.03]	1.43
Education	-.26*	.13	[-.51, -.01]	.87
Goodness of fit	χ^2 (138) =142.25, p=.38			

*p<.05 **p<.01 ***p<.001

Unprotected Oral Intercourse

Pearson chi-square goodness of fit test values for the models predicting unprotected oral intercourse (UOI) occasions at in the last three and twelve months were significant at p<.01 and p<.05 respectively, indicating a less than perfect model fit. However, the models presented, which included dependent variables that were winsorized at the 95th percentile, produced better model fit than the ones estimated with unwinsorized dependent variables.

As demonstrated in Table 4.22, ethnicity remained a significant predictor of UOI when holding all other variables constant, with White participants reporting a significantly higher rate of UOI than Black participants *(IRR*=.62, p<.05).

Table 4.22. Negative binomial regression: predictors of unprotected oral intercourse-last three months (n=153)

Independent Variables	Regression Coefficient	SE	95% CI	IRR
ACEs	-.03	.05	[-.13, .06]	.97
IPV	.01	.01	[-.01, .03]	1.01
CVE-W	-.01	.02	[-.04, .02]	.99
Depression	.33	.22	[-.10, .76]	1.39
Anxiety	.11	.24	[-.35, .58]	1.12
PTSD	.22	.24	[-.24, .68]	1.25
Hazardous Drinking	-.02	.02	[-.06, .02]	.98
Num. Drinking Days	.01	.01	[-.02, .03]	1.00
Age at First Drink	.01	.02	[-.02, .05]	1.01
Drug Abuse Severity	.08	.07	[-.06, .23]	1.08
Polydrug Use-Lifetime	-.01	.22	[-.44, .42]	.99
Polydrug Use-30 Days	.53	.27	[-.00, 1.07]	1.70
Ethnicity	-.48*	.19	[-.85, -.12]	.62
Employment	.21	.21	[-.21, .63]	1.24
Education	.01	.08	[-.14, .16]	1.01
Goodness of fit	χ^2 (137) =178.96, p<.01			

*p<.05 **p<.01 ***p<.001

Employment remained a significant predictor of number UOI occasions in the last 12 months when controlling for all other variables in the model. Those who reported being employed full-time had a significantly higher incidence rate of UOI than those who worked part-time or who were unemployed (IRR= 1.67, p<.05). Results of negative binomial regressions for UOI occasions in the last 12 months are displayed in Table 4.23.

Table 4.23. Negative binomial regression: predictors of unprotected oral sex-last twelve months (n=157)

Independent Variables	Regression Coefficient	SE	95% CI	IRR
ACEs	.01	.05	[-.09, .11]	1.01
IPV	.00	.01	[-.02, .03]	1.00
CVE-W	-.01	.02	[-.04, .03]	.99
Depression	.47	.25	[-.01, .95]	1.60
Anxiety	-.17	.28	[-.72, .38]	.84
PTSD	.17	.27	[-.36, .70]	1.18
Hazardous Drinking	-.02	.02	[-.07, .02]	.98
Num. Drinking Days	.02	.02	[-.01, .05]	1.02
Age at First Drink	.01	.02	[-.03, .05]	1.01
Drug Abuse Severity	.09	.08	[-.08, .26]	1.09
Polydrug Use-Lifetime	.26	.24	[-.21, .73]	1.30
Polydrug Use-30 Days	.28	.31	[-.33, .90]	1.33
Ethnicity	-.34	.21	[-.76, .08]	.71
Employment	.51*	.24	[.04, .98]	1.67
Education	-.00	.09	[-.17, .17]	1.00
Goodness of fit	χ^2 (138) =170.38, p<.05			

*p<.05 **p<.01 ***p<.001

Number of Male Sexual Partners

As noted previously, truncated negative binomial regression models were conducted to identify significant predictors of number of male sexual partners. The SAS procedure used to compute these models (PROC FMM) does not provide goodness of fit statistics, thus they are not reported here.

When controlling for other variables in the models, age at first drink was inversely and significantly associated with number of male sexual partners in the last three months. As age at first drink decreased, the incidence rate for number of male sexual partners increased (IRR=.96, p<.05). Results of these three regression models are presented in Table 4.24.

Table 4.24. Truncated negative binomial regression: Predictors of number of male sex partners-last three months (n=154)

Independent Variables	Regression Coefficient	SE	95% CI	IRR
ACEs	-.02	.04	[-.10, .06]	.98
IPV	.01	.01	[-.01, .03]	1.01
CVE-W	.01	.01	[-.02, .03]	1.01
Depression	.25	.20	[-.15, .65]	1.29
Anxiety	.01	.21	[-.40, .42]	1.01
PTSD	.27	.21	[-.14, .69]	1.32
Hazardous Drinking	-.02	.02	[-.04, .02]	.98
Num. Drinking Days	.01	.01	[-.01, .03]	1.01
Age at First Drink	-.04*	.02	[-.07, -.00]	.96
Drug Abuse Severity	.07	.06	[-.04, .19]	1.07
Polydrug Use-Lifetime	.30	.20	[-.10, .69]	1.35
Polydrug Use-30 Days	.33	.24	[-.14, .80]	1.39
Ethnicity	.02	.17	[-.32, .36]	1.02
Employment	.05	.21	[-.36, .46]	1.05
Education	.08	.07	[-.05, .22]	1.09

*p<.05 **p<.01 ***p<.001

Table 4.25 presents the results of the truncated negative binomial regression model predicting number of male sexual partners in the last 12 months and shows that lifetime polydrug use remained a significant predictor when controlling for all other models in the variable. Those who reported using multiple drugs over their lifetime had a significantly higher incidence rate of number of male sexual partners in the last 12 months than those who did not (*IRR*=1.83, *p*<.01).

Table 4.25. Truncated negative binomial regression: Predictors of number of male sex partners-last twelve months (n=152)

Independent Variables	Regression Coefficient	SE	95% CI	IRR
ACEs	.02	.05	[-.08, .11]	1.02
IPV	.01	.01	[-.01, .03]	1.01
CVE-W	.01	.02	[-.02, .04]	1.01
Depression	.24	.22	[-.20, .68]	1.28
Anxiety	-.11	.25	[-.59, .38]	.90
PTSD	.39	.24	[-.09, .87]	1.48
Hazardous Drinking	.01	.02	[-.03, .04]	1.01
Num. Drinking Days	.02	.01	[-.01, .05]	1.02
Age at First Drink	-.03	.02	[-.06, .01]	.97
Drug Abuse Severity	.07	.07	[-.08, .21]	1.07
Polydrug Use-Lifetime	.60**	.23	[.15, 1.05]	1.83
Polydrug Use-30 Days	.08	.28	[-.47, .63]	1.09
Ethnicity	-.05	.19	[-.43, .33]	.95
Employment	.10	.23	[-.36, .56]	1.10
Education	.13	.08	[-.02, .28]	1.14

*p<.05 **p<.01 ***p<.001

Table 4.26 provides a summary of the significant predictors of HIV risk behaviors for each negative binomial regression model.

Table 4.26. Summary of significant predictors of HIV risk behaviors

Independent Variables	Dependent Variables (Regression coefficients)					
	UAI-3	UAI-12	UOI-3	UOI-12	Sex Pts-3	Sex Pts-12
ACEs						
IPV						
CVE-W						
Depression		.74*				
Anxiety						
PTSD						
Haz. Drinking						
Age at 1st Drink					-.04*	
Drinking Days						
Drug Abuse						
Polydrug-30day						
Polydrug-Life						.60**
Ethnicity			-.48*			
Education		-.26*				
Employment				.51*		

*p<.05 **p<.01 ***p<.001

Note. Community Violence Exposure-Witnessed (CVE-W); Unprotected anal intercourse (UAI); Unprotected oral intercourse (UOI); Number of male sex partners (Sex Pts.).

4.4 Research Question 3:

Indirect effects of ACEs and IPV on HIV Risk Behaviors through Substance Use Pathway

4.4.1 Indirect Effects of Substance Use on the Relationships between ACEs and IPV and Sexual Risk Behaviors (unprotected anal intercourse and multiple male sex partners)

Six mediating models were computer with UAI in the last 12 months as the dependent variable. Results of bootstrapped tests indicated that there was no indirect effect of ACEs or IPV on UAI in the last 12 months through hazardous drinking, drug abuse, or polydrug use pathways. Direct effects for each model are summarized in Table 4.27. Indirect effects and confidence intervals are presented in Table 4.29.

Table 4.27. Mediating models for unprotected anal intercourse in the last 12 months: Total effects and direct effects

Mediator by Independent Variable	Coefficient	SE	t or z score†	p-value
ACEs				
Hazardous Drinking				
Direct effect (a path: ACEs → Hazardous Drinking)	.06	.21	t = 8.69	.000***
Direct effect (b path: Hazardous Drinking → UAI)	.04	.03	z = 1.07	.286
Direct effect (c' path: ACEs → UAI)	.11	.08	z = 1.43	.153
Drug Abuse				
Direct effect (a path: ACEs → Drug Abuse)	.04	.05	t = .86	.392
Direct effect (b path: Drug Abuse → UAI)	.06	.13	z = .43	.667
Direct effect (c' path: ACEs → UAI)	.14	.09	z = 1.61	.107
Polydrug Use -Lifetime				
Direct effect (a path: ACEs → Polydrug Use)	.20	.07	t = 2.87	.005**
Direct effect (b path: Polydrug Use → UAI)	.39	.20	z = 1.92	.054
Direct effect (c' path: ACEs → UAI)	.11	.08	z = 1.31	.191
IPV				
Hazardous Drinking				
Direct effect (a path: IPV → Hazardous Drinking)	.09	.05	t = 1.73	.086
Direct effect (b path: Hazardous Drinking → UAI)	.04	.03	z = 1.22	.223
Direct effect (c' path: IPV → UAI)	.01	.02	z = .49	.626
Drug Abuse				
Direct effect (a path: IPV → Drug Abuse)	.01	.01	t = .56	.574
Direct effect (b path: Drug Abuse → UAI)	.07	.13	z = .54	.589
Direct effect (c' path: IPV → UAI)	.02	.30	z = .30	.763
Polydrug Use -Lifetime				
Direct effect (a path: IPV → Polydrug Use)	.04	.02	t = 2.83	.005**
Direct effect (b path: Polydrug Use → UAI)	.17	.11	z = 1.63	.104
Direct effect (c' path: IPV → UAI)	.00	.03	z = .15	.884

† a-paths were estimated using OLS regression and used a t-score; b and c'-paths were estimated using logistic regression and used z-scores.
*p<.05 **p<.01 ***p<.001

An additional six mediating models were estimated with multiple male sexual partners as the dependent variable. Direct effects for these models are summarized in Table 4.28. As demonstrated in Table 4.29, results of mediating models indicated a significant indirect effect of both ACEs [*ab*=.07, 95% boot CI (.010-.208)] and IPV [*ab*=.02, 95% boot CI (.001-.056)] on having multiple male sexual partners through lifetime polydrug use. These models are represented in Figures 4.1 and 4.2. Results did not show statistically significant indirect effects

of ACEs or IPV on having multiple male sex partners through hazardous drinking or drug abuse pathways.

Table 4.28. Mediating models for multiple male sex partners in the last 12 months: Total effects and direct effects

Mediator by Independent Variable	Coefficient	SE	t or z score†	p-value
ACEs				
Hazardous Drinking				
Direct effect (a path: ACEs → Hazardous Drinking)	.01	.21	t = .08	.934
Direct effect (b path: Hazardous Drinking → MSP)	.12	.05	z = 2.19	.029*
Direct effect (c' path: ACEs → MSP)	.35	.12	z = 2.89	.004**
Drug Abuse				
Direct effect (a path: ACEs → Drug Abuse)	.04	.05	t = .70	.484
Direct effect (b path: Drug Abuse → MSP)	.13	.19	z = .70	.481
Direct effect (c' path: ACEs → MSP)	.35	.12	z = 2.85	.004**
Polydrug Use -Lifetime				
Direct effect (a path: ACEs → Polydrug Use)	.18	.07	t = 2.66	.009**
Direct effect (b path: Polydrug Use → MSP)	.38	.19	z = 2.01	.044*
Direct effect (c' path: ACEs → MSP)	.30	.12	z = 2.48	.013*
IPV				
Hazardous Drinking				
Direct effect (a path: IPV → Hazardous Drinking)	.09	.05	t = 1.84	.068
Direct effect (b path: Hazardous Drinking → MSP)	.12	.05	z = 2.24	.025*
Direct effect (c' path: IPV → MSP)	.00	.02	z = .13	.894
Drug Abuse				
Direct effect (a path: IPV → Drug Abuse)	.00	.01	t = .33	.739
Direct effect (b path: Drug Abuse → MSP)	.16	.18	z = .86	.392
Direct effect (c' path: IPV → MSP)	.01	.02	z = .41	.681
Polydrug Use -Lifetime				
Direct effect (a path: IPV → Polydrug Use)	.04	.01	t = 2.59	.010*
Direct effect (b path: Polydrug Use → MSP)	.50	.20	z = 2.53	.012*
Direct effect (c' path: IPV → MSP)	.00	.02	z = ..02	.984

† a-paths were estimated using OLS regression and used a t-score; b-paths were estimated using logistic regression and used z-scores.
*p<.05 **p<.01 ***p<.001

Table 4.29. Indirect effects of substance use on the relationships between ACEs and IPV and HIV risk behaviors

	Unprotected Anal Sex-12mo			Multiple Male Sex Partners-12mo		
	Indirect Effect	Boot SE	95% Boot CI	Indirect Effect	Boot SE	95% Boot CI
ACEs						
Hazardous Drinking	.00	.01	-.013, .050	.00	.03	-.058, .072
Drug Abuse	.00	.01	-.008, .052	.00	.02	-.011, .096
Polydrug Use -Lifetime	.03	.03	-.009, .110	.07*	.05	.010, .208
IPV						
Hazardous Drinking	.00	.01	-.002, .026	.01	.01	-.003, .050
Drug Abuse	.00	.00	-.001, .008	.00	.00	-.003, .014
Polydrug Use -Lifetime	.01	.01	-.001, .027	.02*	.01	.001, .056

*p<.05 **p<.01 ***p<.001

Figure 4.1. Indirect effect of ACEs on multiple male sex partners through polydrug use (n=163)

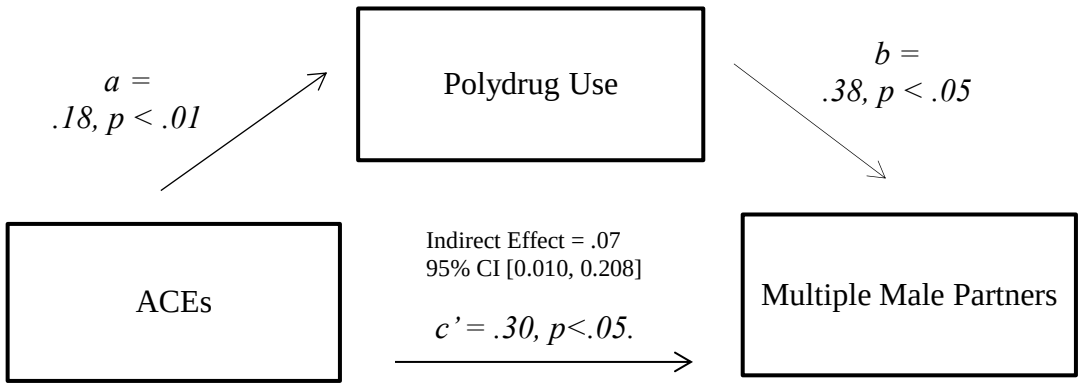
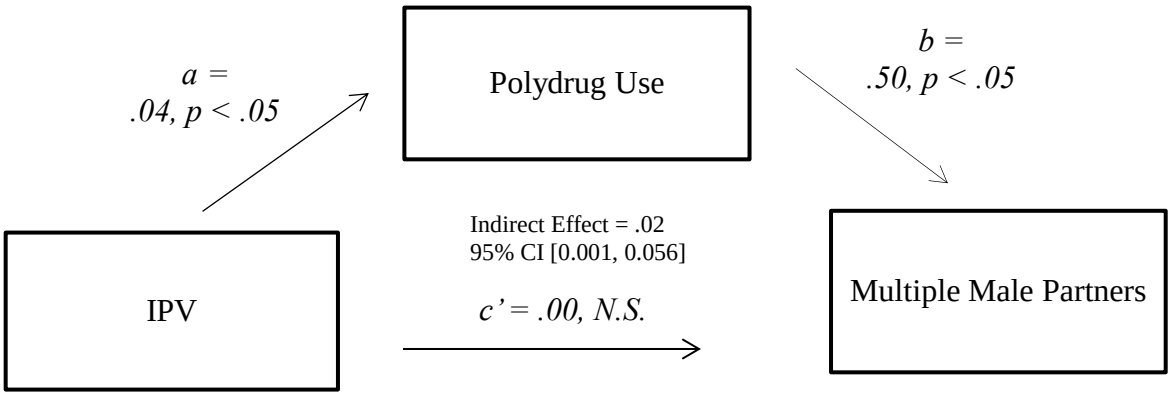


Figure 4.2. Indirect effect of IPV on multiple male sex partners through polydrug use (n=166)



Chapter 5: Discussion and Implications

5.1 Overview of Key Findings

This study examined the extent to which adverse childhood experiences, violence exposure, mental health, and substance use factors were significantly associated with HIV risk behaviors, and whether substance use mediated the relationships between violence exposure and HIV risk behaviors in YMSM. In this chapter, key findings are discussed and implications for social work practice, policy, and research are presented. The chapter concludes with a discussion of the methodological limitations and scientific contributions of the study.

5.1.1 Key Descriptive Findings: HIV Risk Behaviors

Findings from this study indicated rates of HIV risk behaviors that are similar to rates reported by MSM ages 18-39 years in a nationally representative sample collected by the CDC (2016). Approximately 68-72% of the CDC sample reported unprotected anal intercourse in the last 12 months, compared to 72% in the current study. Similarly, the median number of male sex partners in the last 12 months reported by MSM in the CDC sample ranged from 3-4 and YMSM in current study reported a median of four male sex partners in the last 12 months. The percentage of YMSM ever tested for HIV was also similar between the current study and CDC national sample, with nearly 98% ever being tested in the current sample and 96% in the CDC sample. No comparison data from the national sample was available regarding the frequency of unprotected oral sex.

Because Black YMSM experience disproportionate rates of HIV infection, this study examined whether there was a significant difference in the frequency of HIV risk behaviors between Black and White YMSM. Previous studies of MSM in similar geographic areas and using similar recruitment methods have reported inconsistent findings regarding ethnic

differences in rates of HIV risk behaviors, perhaps due to differences in the composition of the samples (e.g. Crosby et al., 2007; Eaton, Kalichman, & Cherry, 2010; Garofalo, Mustanski, Johnson, & Emerson, 2010; Taylor et al., 2012). Studies with a higher proportion of HIV-positive MSM in the sample reported no ethnic differences in HIV risk behaviors and studies with few to no HIV-positive MSM in the sample reported higher rates of HIV risk behaviors in White MSM. For example, one study of HIV negative MSM recruited from gay-focused venues reported that White MSM engaged in significantly greater amounts of HIV risk behaviors than Black MSM (Eaton, Kalichman, & Cherry, 2010), yet a different study MSM recruited from similar venues, 20% of whom were HIV-positive, found no significant ethnic difference in HIV risk behaviors (Crosby et al., 2007). Findings from the current study are aligned with that of previous research on HIV-negative or mostly HIV-negative samples of MSM (Eaton, Kalichman, & Cherry, 2010; Taylor et al., 2012) and indicated that White YMSM engage in significantly greater frequencies of HIV risk behaviors than their Black counterparts. As discussed in the following section, ethnicity did not remain a significant predictor of most of the HIV risk behaviors when examined as a covariate in the regression models.

5.1.2 Key Multivariable Findings

Predictors of HIV Risk Behaviors in YMSM Vary by Behavior

Overall, findings from negative binomial regression models indicated that the significant predictors of HIV risk behaviors varied by type of behavior. Specifically, a greater amount of depression symptoms was significantly associated with engaging in more unprotected anal sex when controlling for ethnicity. Additionally, a lower age at first drink was significantly associated with more male sex partners in the last three months, and lifetime polydrug use was

significantly associated with more male sex partners in the last twelve months, when controlling for ethnicity and education.

Depression: Previous studies that examined the relationships between depressive symptoms and HIV risk in MSM found that depression is predictive of increased HIV risk behaviors (Koblin et al., 2006). Findings from the current study are consistent with these previous results. YMSM in the current study who scored at or above the clinical cut-off for depression reported significantly more unprotected anal sex occasions.

Depression may affect HIV risk behaviors in a number of ways. Individuals with depressive symptoms can experience decreased motivation to initiate or maintain healthy behaviors (Allgower, Wardle, & Steptoe, 2001), which may include condom or PrEP use when engaging in anal sex. Also, YMSM who are depressed may attempt to ameliorate their symptoms by seeking out unprotected sex, a behavior that some YMSM associate with increased feelings of pleasure and emotional intimacy (Golub, Starks, Payton, & Parsons, 2012). Moreover, longer periods of depression may exacerbate HIV risk through repeated use of risk behaviors to cope with symptoms or as a result of decreased motivation for self-care. Research suggests that MSM with depression may delay accessing mental health care, which can lead to prolonged periods of depressive symptomology and resulting risk behaviors.

Lifetime Polydrug Use: Findings of the current study also indicated that polydrug use was predictive of a greater number of male sexual partners in the last twelve months. These findings are consistent with previous research on predictors of multiple male sex partners (Halkitis et al., 2011; Sewell et al., 2017) and other HIV risk behaviors in MSM (McCarty-Caplan, Jantz, &

Swartz, 2014) and other higher risk populations, such as injection drug users and their partners (Abdala et al., 2012).

Polydrug use may be indicative of high-risk personality profile that is typified by high levels of sensation-seeking and negative self-perception, and low levels of impulse control (Patterson, Semple, Zians, & Strathdee, 2005). These traits have been observed in polydrug-using MSM who engage in high rates of HIV risk behaviors. Alternatively, other scholars suggest that MSM engage in polydrug use as a means to cope with loneliness or psychological distress (McCarty-Caplan, Jantz, & Swartz, 2014). Finally, social and environmental context may play a substantial role in polydrug use. Historically, YMSM have congregated in physical (e.g. bars, night clubs) and virtual (geosocial networking application) venues where substance use is common and accepted. In this type of environment, YMSM may experiment with different drugs as they are being used by other MSM in the environment, which can lead to risk-taking behavior such as inconsistent condom use or sex with multiple partners (Halkitis et al., 2011).

Findings from the current study indicated that the drugs most commonly used by YMSM were marijuana, hallucinogens (e.g. ecstacy, ketamine), cocaine, and stimulants (e.g. amphetamine). These are similar to the most commonly used drugs reported by MSM in other studies (McCarty-Caplan, Jantz, & Swartz, 2014; Mustanski et al., 2011; Sewell et al., 2017). The current study did not examine whether use of specific types of drugs were predictive of HIV risk behaviors in YMSM. However, several studies have shown a strong relationship between use of club drugs, which include cocaine, stimulants, and certain hallucinogens, and greater HIV risk behaviors in MSM (Clatts, Goldsamt, & Yi, 2005; Garofalo et al., 2007; Mustanski et al., 2011). In addition, a smaller number of studies have shown a significant relationship between

marijuana use and increased HIV risk population in MSM (Celetano et al, 2006; Drumright et al., 2006).

Age at First Drink: A number of factors may account for the relationships between younger age at first drink and HIV risk behaviors in YMSM. Earlier onset of alcohol use can interfere with normal brain development, leading to reduced capacity for cognitive reasoning and behavioral control (Baldwin, Shrestha, Potrepka, & Copenhaver, 2013). These dysfunctions in cognition and behavior may impede impulse control and consequently lead to increased risk-taking behaviors in early drinkers. Furthermore, early onset of alcohol as a response to stress may establish a maladaptive coping strategy for YMSM that can persist and worsen as the individual ages (Baldwin et al., 2013). For example, Rothman et al. (2008) found that adults who reported adverse childhood experiences were likely to report and earlier age at first drink as a means to cope with the stress associated with those experiences.

Additionally, earlier age at first use of alcohol is shown to be highly associated with early sexual debut (Baldwin et al. 2013). Earlier sexual debut, in turn, is predictive of higher rates of HIV risk behaviors (Nelson et al., 2016; Outlaw et al., 2011). These relationships suggest a profile of YMSM who engage in multiple types of risky behavior from an early age. It is unclear from the literature whether early alcohol use leads to early sexual debut and ultimately HIV risk behaviors, or if early sexual debut leads to early alcohol use that then increases risk for HIV risk behaviors. In fact, the relationships between these variables may be bidirectional and have a synergistic effect on overall health risk (Baldwin et al., 2013). Further research is needed to explicate these relationships and the mechanisms by which early initiation of drinking leads to higher rates of HIV risk behaviors.

Finally, early age at first drink is also predictive of later hazardous use of alcohol and multiple types of drugs (Barry et al., 2016; Liang & Chikritzhs, 2015). Hazardous levels of drug use, especially through an individual's mid-twenties while the brain is still developing (Victor & Hariri, 2016), may lead to several negative neurocognitive outcomes. These can include diminished executive functioning, decreased capacity for learning and memory, and low levels of inhibition (Baldwin et al., 2013), all of which can increase an individual's likelihood of engaging in risk-taking behavior like unprotected sex or sex with multiple partners in a short period of time.

As stated earlier, findings from the current study indicated that significant predictors of HIV risk varied by each risk behavior. As demonstrated, depression was a significant predictor of unprotected anal sex, but not multiple partners. Polydrug use was a predictor of number of male sex partners, but not unprotected oral sex. The unique significant risk factors for each HIV risk behavior in YMSM has not yet been examined in the literature. However, in one study of HIV risk behaviors among injection drug users in Russia, Abdala and colleagues (2012) found that two distinctive HIV risk behaviors, unprotected anal sex and sex with multiple partners, were predicted by unique variables. Findings from the current study suggest a similar dynamic between the syndemic factors of mental health (i.e. depression) and substance use (i.e. age at first drink, polydrug use) and HIV risk behaviors (Mustanski et al., 2007) in YMSM.

5.1.3 Key Findings: Indirect Effects of ACEs and IPV on HIV Risk Behaviors through Substance Use

This study was the first to examine the indirect effect of different types of violence exposure on HIV risk behaviors through the mediating path of polydrug use in YMSM. Previous

studies have examined the indirect effect of *childhood sexual abuse* on HIV risk behaviors through substance use in MSM (Mimiaga et al.,2009), and *intimate partner violence* on HIV risk behaviors through substance use in South African women (Pitpitan et al., 2012). Results of both studies indicated that substance use significantly mediated the relationship between violence exposure and HIV risk behaviors. Furthermore, this is the first study to test the indirect effect of adverse childhood experiences, which includes family and household dysfunction (e.g. living with an alcoholic parent, witnessing IPV) in addition to child abuse items, and intimate partner violence on HIV risk behaviors in this high-risk population.

Findings from the current study indicated that of the twelve mediating models that were estimated, two were significant. Although adverse childhood experiences and intimate partner violence were not significant predictors of HIV risk behaviors when controlling for other covariates in the multivariable models, both forms of violence exposure had a significant indirect effect on sex with multiple male partners through lifetime polydrug use. This finding supports the study hypothesis that violence exposure has a significant indirect effect on HIV risk behaviors through polydrug use.

Results also indicated that neither drug abuse severity or hazardous alcohol use severity mediated the relationships between adverse childhood experiences or intimate partner violence and HIV risk behaviors. This suggests that the number of different types of drugs used over one's lifetime (i.e. polydrug use) has a greater influence on YMSM HIV risk behaviors than problematic substance use (i.e. hazardous alcohol use or drug abuse). The finding that adverse childhood experiences and intimate partner violence are associated with polydrug use aligns with results from previous studies with other types of participants, such as Native American youth and young adults (Brockie et al., 2015), parents (Locke & Newcomb, 2004), and MSM (Koblin et al.,

2006, Stall et al., 2003). However, these relationships have not been sufficiently examined in *young* MSM and the mechanisms that underlie these associations have not been fully explicated. One possible explanation for these relationships is that those exposed to adverse childhood experiences or intimate partner violence experience negative emotions as a result of these exposures, which they choose to self-medicate through use of different types of drugs (El-Bassel et al., 2005; Locke &Newcomb, 2004). The relationships between adverse childhood experiences, which include living with a parent who uses illegal substances, and polydrug use may also be explained by observational learning theory (Bandura, 1986; Locke &Newcomb, 2004), wherein YMSM may learn to use multiple types of drugs by watching their parents use them. This pathway from adverse childhood experiences or intimate partner violence to HIV risk behaviors through polydrug use pathways suggest that reducing polydrug use may reduce the negative consequences of adverse childhood experiences or intimate partner violence on HIV risk.

5.2 Implications for Social Work Practice, Policy, and Research

Integrate Substance Screening, Brief Intervention, and Referral into HIV Prevention

One of the key findings from the current study is that polydrug use was a significant predictor of HIV risk behaviors for YMSM; polydrug use was directly associated with significantly more male sexual partners and also mediated the relationship between adverse childhood experiences and intimate partner violence and having multiple male sexual partners. However, the majority of HIV prevention services for YMSM in these two cities and across the country are not designed to address substance use in their HIV-negative client population. Thus, one strategy for meeting the prevention needs of these clients in the AIDS service setting is the

integration of the Screening, Brief Intervention, and Referral to Treatment (SBIRT) approach, described by the Substance Abuse and Mental Health Services Administration (SAMHSA; 2017) as a public health approach used to quickly assess and provide a brief intervention for those who have substance use disorders or who are at risk for developing a substance use disorder. Three primary components comprise the SBIRT model: screening, brief intervention, and referral to treatment. First, a healthcare professional screens the client for risky substance use behaviors using standardized measures (e.g. AUDIT, DAST). Next, the healthcare professional engages the client in a brief intervention that includes explaining the client's score on the assessment tool, providing feedback, listening, and exploring behavior change options. Finally, clients who scored in the hazardous level of substance use are referred resources that can provide more specialized substance use treatment.

SBIRT has been successfully integrated into primary care and hospital settings, including among young people seeking rapid HIV testing in an emergency department (Edelman et al., 2012) and in primary care settings for people living with HIV (Savage & Sanchez, 2016). Although SBIRT has been shown to be acceptable and efficacious for a variety of populations, it has not been well-tested among HIV-negative YMSM. Additionally, although evaluations of SBIRT have examined drug use, they most often screen for severity and not use of multiple drugs (Rogers et al., 2016; Rose et al., 2015; Savage & Sanchez, 2016). SBIRT has the potential to reduce HIV risk behaviors in YMSM directly by reducing substance use and indirectly by mitigating the effects of adverse childhood experiences and intimate partner violence on HIV risk behaviors. Future research can test the feasibility, acceptability, and efficacy of implementing an SBIRT approach that is inclusive of lifetime polydrug use in AIDS service organizations that deliver HIV testing and prevention services for YMSM.

The successful implementation of substance use services into existing HIV prevention interventions requires changes to the current funding landscape. Over the past decade, funding for behavioral HIV prevention programs has dwindled, and most prevention funding is now directed towards HIV testing and linkage to care. HIV testing programs and the local, state, and federal agencies that fund them do not conceptualize non-injection substance use interventions as a component of their interventions. Accordingly, they do not provide funding for substance use services and consequently HIV prevention programs are unable to provide those services. Integration of these two areas is needed to improve HIV prevention outcomes for YMSM.

Depression Screening and Referral in HIV Prevention and Testing

Findings from this study and others indicate that mild to moderate levels of depression are predictive of greater amounts of HIV risk behaviors in YMSM. This suggests that prevention programs, including HIV testing, may be strengthened by adding a brief depression assessment and referral component to their scope of service. The depression screener used in the current study, the PHQ-9, has been integrated into a number of healthcare settings (Gillbody, Richards, Brealey, & Hewitt, 2010) and is currently used by one of this study's community partner agencies. Moreover, guidelines for medical treatment of individuals living with HIV recommend screening for depression at each visit due to the association between higher depression symptoms and decrease adherence to medication (Crane et al., 2010). Depression may also negatively impact adherence to HIV prevention medication (i.e. PrEP) and behavioral HIV prevention strategies like condom use. Therefore, HIV prevention programs may be able to increase adherence to HIV prevention strategies and reduce HIV risk among YMSM by briefly screening them for depression and helping them access appropriate mental health care if needed.

Early Prevention Interventions to Delay Substance Use

Findings from the current study also suggest that delaying the age of alcohol use initiation may help to reduce HIV risk behaviors in YMSM. An intervention aimed at alcohol use prevention for adolescents would likely take place outside of the AIDS service organizations. Most alcohol use prevention interventions take place in the school setting due to widespread and prolonged access to adolescents (Stigler, Neusel, & Perry, 2011). A review of school-based alcohol prevention interventions suggests that effective interventions: 1) are theory driven; 2) address social norms and build social skills; 3) are interactive; 4) use peer leaders; 5) integrate components that involve aspects of the community outside of the school and parents; 6) are conducted across multiple sessions and years to achieve proper dosage; 7) provide adequate facilitator training; and 8) are developmentally and culturally appropriate for the intervention participants (Stigler, Neusel, & Perry, 2011). This last component may be especially relevant for YMSM. School-based prevention programs most often take a universal prevention approach to reach all students. Although this works for students of majority social identities (e.g. white, heterosexual), this may diminish the effectiveness of the intervention for minority students like YMSM, especially Black YMSM. Further investigation is needed on the extent to which these prevention programs are effective for ethnic and sexual minority students, which can inform culturally appropriate adaptations of the intervention.

The Need for Trauma-Informed HIV Prevention Services

Considering the significant indirect effect of adverse childhood experience and intimate partner violence on HIV risk behaviors demonstrated in the current study, HIV prevention programs for YMSM may benefit from incorporating assessment and referral for the negative

consequences of violence exposure such as trauma. Similar to substance use, the majority of HIV prevention programs in the US are not funded to provide assessment and referral for violence exposure, and so these services are not provided. Properly assessing for exposure to these types of violence and making appropriate referrals may allow YMSM to engage in services that help them to effectively cope with and resolve their violent and stressful life experiences, which may lead to reducing HIV risk behaviors.

Effective integration of assessment and referral for adverse childhood experiences and intimate partner violence may require adopting a trauma-informed care (TIC) approach to HIV prevention services. According to SAMHSA's National Center for Trauma-Informed Care (2015), TIC is an organization and systems-level approach to service provision that recognizes present trauma symptoms and their impact on the lives of clients. In adopting this approach, HIV prevention programs would: 1) increase understanding of the widespread impact of trauma and paths to recovery; 2) have service providers who recognize the signs and symptoms of trauma; 3) integrate understanding of trauma into policies, procedures, and practices; and 4) actively avoid re-traumatization (SAMHSA, 2015). The holistic approach to TIC would require not only prevention service staff training, but training for agency administrators and leaders and the revision of agency policies and procedures. This is a substantial undertaking without proper funding. Thus, the argument can be made that funding agencies would also benefit from adopting a TIC approach to HIV prevention with YMSM and can help their grantees do the same by providing support for the work.

A systematic review of trauma-focused HIV prevention programs suggested that trauma-focused interventions can improve HIV prevention and treatment outcomes in women (Sales, Swartzendruber, & Phillips, 2016). However, the effectiveness of these types of interventions to

decrease HIV risk in YMSM in the United States is unknown because, as the authors note, only one of the intervention studies took place in the United States and none of the interventions included male participants. Further research is needed to tailor trauma interventions for YMSM and assess their effectiveness for decreasing trauma reactions and ultimately HIV risk behaviors.

Expand Ryan White HIV/AIDS Program to HIV Prevention with YMSM

Results from the current study indicated that violence exposure, mental health problems, and substance use were each directly or indirectly related to HIV risk behaviors in YMSM. As discussed previously in this chapter, these findings suggest that HIV risk behaviors may be reduced by helping YMSM engage in mental health and substance use treatment. However, gaining access to the service systems in place to address these problems can be difficult because these services are not well-integrated with HIV prevention services and can be costly for those without health insurance.

One potential solution to improving access to mental health and substance use services for HIV-negative people at high risk for HIV infection (e.g. YMSM) is to expand the Ryan White HIV/AIDS program service model to include primary HIV prevention. Funded by the US Health Resources and Services Administration (HRSA), the Ryan White program provides comprehensive medical and support services for individuals living with HIV who are uninsured or underinsured (HRSA, 2017). Support services, which comprise less than 10% of the total Ryan White budget (Crowley & Kates, 2013) include access to case management as well as mental health and substance use treatment. Adhering to the current model, funding for this expansion could be dispersed directly to state and regional health departments, as well as directly

to community-based organizations who agree to expand their Ryan White program to include support services for high-risk HIV-negative individuals.

Federal policy change to expand the Ryan White HIV/AIDS program to include primary HIV prevention is a logical next step given the recent integration between HIV care and HIV prevention. In response to findings from three large studies (Bavinton et al., 2017; Cohen et al., 2011; Cohen et al., 2016; Rodger et al., 20160, the CDC (2017) recently issued a statement asserting that people living HIV who are adherent to their medication and have an undetectable viral load are effectively at no risk of transmitting HIV to their HIV-negative sexual partners. This suggests that increasing the number of individuals with HIV who are screened and linked to medical care is a critical component to reducing overall HIV transmission. Moreover, the National HIV/AIDS strategy calls for work to reduce HIV incidence throughout the HIV prevention and care continuum (Crowley & Kates, 2013). Thus, the purpose of the Ryan White HIV/AIDS program has already expanded to include some aspects of HIV prevention. Further expansion to provide support services for HIV-negative individuals would only increase the effectiveness of the program at an estimated cost increase of less than 10 percent.

Research to Deepen Understanding HIV Syndemic in YMSM

The present study was one of the first to examine the syndemic factors (i.e. adverse childhood experiences, violence exposure, mental health, substance use) that were associated with frequency of HIV risk behaviors in YMSM, as well as to test pathways among these syndemic factors and HIV risk behaviors. Although this study contributed to the extant literature by including adverse childhood experiences, multiple forms of violence exposure, multiple mental health problems, and multiple measure of substance use, further research is needed to

fully understand the mechanisms at play among these syndemic factors. First, future studies may wish to add specificity to the type of adverse childhood experience and type of substance used when identifying unique significant predictors and mediators of HIV risk. It is possible that the adverse childhood experiences that were most frequently endorsed by YMSM in the current study (e,g, emotional abuse, physical abuse) may be more predictive of HIV risk behaviors than others that were endorsed less frequently (Hills, Anda, Felitti, & Marchbanks, 2001). Additionally, because of the different biochemical effects of specific drugs, use of certain substances such as cocaine and methamphetamine might be more predictive of HIV risk than others (Sewell et al., 2017). Specific adverse childhood experiences and substance use factors could then be used to estimate refined mediation models, the results of which could be used to inform intervention targets.

Drawing on results of the multivariable analyses may help to identify other important mediators in the paths from violence exposure to HIV risk behaviors in YMSM. For instance, depression may represent an important factor in the pathway between violence exposure and unprotected anal sex in YMSM. Pathways from ACEs and many other types of violence exposure to unprotected anal sex in this high-risk population have not been thoroughly examined in the literature, suggesting an important area for future investigation.

Additionally, age at first drink may be an important intermediate outcome in the path between adverse childhood experiences and sex with multiple partners. This model would also be difficult to accurately test in the current study because the age when participants experienced each adverse childhood event was not recorded. Therefore, YMSM who began drinking before the age of 18 may have experienced some adverse child experiences after they drank alcohol for the first time. Future studies can more carefully match timeframes on mediating model variables

to improve the ability to accurately test pathways from violence exposure to specific HIV risk behaviors through mental health problems and substance use.

Although the majority of previous studies have used simple mediating models with a single mediator to examine pathways from violence exposure to HIV risk behaviors, an emerging body of research is testing more complex models. These models include multiple mediators that are hypothesized to occur simultaneously (parallel mediation) or in order (sequential mediation; Hayes, 2013). For example, Cottonham (2018) theorized a sequential mediating model where in African American women experienced stressful events (e.g. discrimination) that led to negative emotions like depression, which then led to maladaptive coping through hazardous alcohol use, which ultimately ended in increased unprotected sexual behavior. A similar model could be tested for YMSM, wherein violence exposure leads to mental health problems, which lead to substance use that ultimately results in increased unprotected sex or a greater number of sexual partners. The sequential mediating approach would also be strengthened by the use of longitudinal data. Collection of data at multiple timepoints over a period of 18-24 months would bolster the argument for the time-ordered mediating relationship. Alternatively, mediators may occur simultaneously and have unique effects on the relationship between violence exposure and HIV risk. This hypothesis could be tested using a parallel mediating model. Although these models have not yet been empirically tested, conceptual frameworks describing the pathway from childhood sexual abuse to HIV risk behaviors in men provide theoretical support for this line of inquiry (Purcell et al., 2004). The extent to which future research can specify the mechanisms that exist among syndemic factors and HIV risk behaviors will directly impact the ability to design and implement targeted and effective behavioral HIV prevention interventions for YMSM.

5.3 Methodological Limitations

Several methodological limitations of this study must be considered when interpreting the findings. The study limitations include the use of a convenience sample, a cross-sectional research design, participant self-report data, use of count data, and measurement issues. A convenience sample was recruited for this study due the absence of a complete sampling frame of HIV-negative YMSM utilizing AIDS service organizations St. Louis and Kansas City. Convenience sampling limits the external validity of the results of the current study. However, as presented earlier in this chapter, comparisons of rates of HIV risk behaviors between the current study sample and a national sample of YMSM showed many similarities (CDC, 2016). Although results may not be generalizable to the broader population of Black and White YMSM because the study did not recruit outside of the AIDS service setting or in diverse geographical regions, they are likely representative of YMSM who access HIV prevention services at AIDS service organizations in mid-sized, Midwestern urban areas.

It is also possible that the study sample does not accurately represent the population of YMSM utilizing AIDS service organizations because those who chose to participate in the study may differ in some way from those who declined to participate. However, this concern is mitigated by the low number of eligible participants who declined participation in the study. As described in Chapter 3, less than three percent of YMSM who were eligible to participate declined to complete the study.

The cross-sectional design of the study limited the ability to infer causation between the independent and dependent variables. However, this limitation was also minimized by the choice of measures and their timeframes. For example, participants answered questions about their experiences of adverse childhood experiences (independent variable) before the age of 18, which

occurred before the timeframe that assessed HIV risk behaviors (dependent variable; past three months; past 12 months).

Yet, the time-ordering of mental health variables did limit the ability to analyze the indirect effects violence through mental health pathways because the mental health measures assessed symptoms with timeframes (2 weeks, 1 month) that were shorter than those used to assess HIV risk behaviors (3 and 12 months). Therefore, the indirect effect of violence exposure on unprotected oral sex through depression was not investigated in this study because logically it would be assumed that the dependent variable (HIV behavior) would come after in time than the independent variables.

The study relied on self-report from participants to collect data on a number of sensitive topics, including sexual behaviors, ACEs, exposure to violence, mental health, and substance use. It is possible that the desire to provide socially desirable answers influenced the responses of some participants. However, the data collection procedures were chosen to minimize social desirability bias. Participants were able to enter their answers into a computerized survey that did not require them to enter identifying information or to inform the interviewer of their responses. Findings from previous research has demonstrated that this is an effective way to increase the accuracy of self-report data regarding sexual behaviors and other sensitive behaviors (Gnambs & Kaspar, 2015; Langhaug, Sherr, & Cowan, 2010).

Some of the results of the predictors of HIV risk were inconsistent between variables that were similar or overlapping conceptually. For example, adverse childhood experiences, which contain items that assess child abuse, was significantly associated with HIV risk behaviors, yet results indicated no significant relationships between HIV risk behaviors and child abuse or neglect severity. This may indicate problems with validity of certain measures in this population.

The Childhood Trauma Questionnaire (Bernstein & Fink, 1998), used to assess severity of child abuse and neglect, has been shown to reliable and valid in previous samples, but has not been thoroughly evaluated for use in a sample of *young* MSM with a large proportion of Black participants. Future research is needed to evaluate the reliability and validity of these scales for use in populations at high risk for HIV, including YMSM.

Last, the use of count data may have presented some limitations to this study. As in the current study, count data frequently yields a non-normal distribution with a positive skewness that is overdispersed (Karazsia & van Dulmen, 2008). This distribution can bias results towards statistical significance if analytic methods do not account for it. The limitation was minimized in the current study by choosing analytic methods that were appropriate for the non-normal distribution of the data. In accordance with previous HIV risk studies using count measures, spearman correlations were used to bivariate analyses and negative binomial regression was used for multiple regression analyses (Hu, Pavlicova, & Nunes, 2011; Perry et al., 2016; Xia et al., 2012). Further, outcome variables were all winsorized at the 95th percentile to reduce overdispersion and improve model fit, thereby reducing the chance of a Type 1 error (Perry et al., 2016). Future research would benefit by developing other valid and reliable measures of HIV risk behaviors that result in more normal distributions.

5.4 Study Contributions and Conclusion

This study makes several contributions to the scientific literature regarding HIV risk behaviors and related syndemic risk factors in service-using YMSM. This study was unique in the assessment of adverse childhood experiences, multiple types of violence exposure, experiences of multiple types of mental health problems, and use of multiple substances in a

service-using sample of HIV-negative Black and White YMSM, the populations at highest risk for HIV infection in the US. This study found that a substantial proportion of YMSM are exposed to multiple adverse childhood experiences, intimate partner violence, and community violence, all of which were previously unexplored or understudied in YMSM. Although relationships between adverse childhood experiences or intimate partner violence and HIV risk behaviors were not significant in multiple regression models, this study demonstrated that adverse childhood experiences and intimate partner violence indirectly affect HIV risk behaviors through polydrug use, whereby higher rates of violence exposure lead to more polydrug use, which leads to a higher rate of multiple male sex partners.

There remains much work to be done to more fully understand the relationships among adverse childhood experiences, intimate partner violence, community violence, mental health, substance use, and HIV risk behaviors in YMSM. As research pushes forward, findings from the current study suggest it is important to utilize a syndemic approach to HIV risk in YMSM in the research, practice, and policy of HIV prevention. Conceptualizing HIV risk as part of a syndemic necessitates that behavioral HIV prevention funding and programs move beyond a singular focus on changing HIV risk behaviors and identify multiple modifiable factors (e.g. violence exposure, mental health, substance use) for intervention. The field of dissemination and implementation science can provide guidance for the effective translation of this approach to social work practice and policy. This work will be complex and will take time but may ultimately improve our ability to reduce HIV infection in those at highest risk in the United States.

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Appendix A: Survey Instrument Codebook

Data Dictionary Codebook 03/07/2018 6:55am

#	Variable / Field Name	Field Label *Field Note*	Field Attributes (Field Type, Validation, Choices, Calculations, etc.)
Instrument: St. Louis Health Study for Young Men (st_louis_health_study_for_young_men)			
1	record_id	Record ID	text
2	id	Participant ID Number	text (number, Min: 001, Max: 200), Required
3	age	Section Header: *First, please tell us about yourself.* How old are you (years) ?	text, Required
4	birthyr	In what year were you born?	text
5	ethnic	What is your ethnicity?	radio, Required 1, Black 2, White 3, More than one ethnicity 999, I refuse to answer this question
6	mixed Show the eld ONLY if: [ethnic] = '3'	Please specify your ethnicity.	text
7	sex_or	What is your sexual orientation?	radio, Required 1, Gay 2, Bisexual 3, Straight 4, Other 999, I refuse to answer this question
8	sex_oth Show the eld ONLY if: [sex_or] = '4'	Please write your sexual orientation in the text box to the right.	text Custom alignment: RH

9	edu	What is your highest level of education?	radio, Required 1 Did not complete high school or equivalent 2 Completed high school or GED 3 Some college 4 Received Associates or technical degree 5 Received Bachelor's (4-year college) degree 6 Graduate school or post-college 999 I refuse to answer this question
10	employ	What is your current employment status?	radio, Required 1 Employed full-time 2 Employed part-time 3 Unemployed 999 I refuse to answer this question
11	income	Which category most accurately represents your total monthly person income before taxes?	radio, Required 1 $0-$499 2 $500-$999 3 $1,000-$1,499 4 $1,500-$1,999 5 $2,000-$2,499 6 $2,500-$2,999 7 $3,000 or more 999 I refuse to answer this question
12	bills	Do you have di culty paying your bills?	radio, Required 1 Yes 0 No 999 I refuse to answer this question
13	sils	How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy?	radio, Required 1 Never 2 Rarely 3 Sometimes 4 Often, 5 Always 999 I refuse to answer this question

14	prep_1	Section Header: *Pre-exposure prophylaxis (or PrEP) is when people at very high risk for HIV take HIV medicines daily to lower their chances of getting infected. A combination of two HIV medicines sold under the name TruvadaÂ® (pronounced tru vÃ¡ duh), is approved for daily use as PrEP to help prevent an HIV-negative person from getting HIV from a sexual or injection-drug-using partner who is HIV-positive. Studies have shown that PrEP is highly e ective for preventing HIV if it is used as prescribed. PrEP is much less e ective when it is not taken consistently.* Had you ever heard of PrEP before today?	radio, Required 1 Yes 0 No 999 I refuse to answer this question
15	prep_2 Show the eld ONLY i f: [prep_1] = '1'	How did you hear about PrEP?	radio 1 Friends 2 The media 3 Online 4 A medical provider, like a doctor or nurse 5 A sexual partner 6 Other 999 I refuse to answer this question
16	prep_2a Show the eld ONLY i f: [prep_2] = '6'	Please describe how you heard about PrEP	text
17	prep_3	Have you ever taken PrEP before having sex?	radio, Required 1 Yes 0 No 999 I refuse to answer this question
18	prep_4	Are you currently taking PrEP daily?	radio, Required 1 Yes 0 No 999 I refuse to answer this question
19	prep_4a Show the eld ONLY i f: [prep_4] = '1'	For how long have you been taking PrEP?	radio 1 Less thank 1 month 2 Between 1 month and 3 months 3 Between 4 months and 6 months 4 Between 7 months and 12 months 5 More than 12 months (1 year) 6 I refuse to answer this question

20	phq_1	Section Header: *Over the last 2 weeks, how often have you been bothered by any of the following problems?* Little interest or pleasure in doing things	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
21	phq_2	Feeling down, depressed, or hopeless	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
22	phq_3	Trouble falling or staying asleep, or sleeping too much	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
23	phq_4	Feeling tired or having little energy	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
24	phq_5	Poor appetite or overeating	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
25	phq_6	Feeling bad about yourself-or that you are a failure or have let your family down	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question

26	phq_7	Trouble concentrating on things, such as reading the newspaper or watching television	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
27	phq_8	Moving or speaking so slowly that other people could have noticed. Or the opposite-being so dgety or restless that you have been moving around a lot more than usual	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
28	phq_9	Thoughts that you would be better o dead or hurting yourself in some way	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
29	phq_10	If you checked o any problems, how di cult have these problems made it for you to do your work, take care of things at home, or get along with other people?	radio 1 Not at all di cult 2 Somewhat di cult 3 Very di cult 4 Extremely di cult 999 I refuse to answer this question
30	gad_1	Section Header: *Over the last 2 weeks, how often have you been bothered by any of the following problems?* Feeling nervous, anxious, or on edge	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
31	gad_2	Not being able to stop or control worrying	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question

32	gad_3	Worrying too much about di erent things	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
33	gad_4	Trouble relaxing	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
34	gad_5	Being so restless that it's hard to sit still	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
35	gad_6	Becoming easily annoyed or irritable	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
36	gad_7	Feeling afraid as if something awful might happen	radio (Matrix), Required 1 Not at all 2 Several days 3 More than half the days 4 Nearly every day 999 I refuse to answer this question
37	gad_8	If you checked o any problems, how di cult have these problems made it for you to do your work, take care of things at home, or get along with other people?	radio 1 Not at all di cult 2 Somewhat di cult 3 Very di cult 4 Extremely di cult 999 I refuse to answer this question

38	pcl_1	Section Header: *Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully and select the answer to indicate how much you have been bothered by that problem in the last month.* Repeated, disturbing memories, thoughts, or images of a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
39	pcl_2	Repeated, disturbing dreams of a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
40	pcl_3	Suddenly feeling or acting as if a stressful experience were happening again (as if you were reliving it)	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
41	pcl_4	Feeling very upset when something reminded you of a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
42	pcl_5	Having physical reactions (e.g. heart pounding, trouble breathing, or sweating) when something reminded you of a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question

43	pcl_6	Avoid thinking about or talking about a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
44	pcl_7	Avoid activities or situations because they remind you of a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
45	pcl_8	Trouble remembering important parts of a stressful experience from the past	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
46	pcl_9	Loss of interest in things that you used to enjoy	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
47	pcl_10	Section Header: *Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully and select the answer to indicate how much you have been bothered by that problem in the last month.* Feeling distant or cut o from people	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question

48	pcl_11	Feeling emotionally numb or being unable to have loving feelings for those close to you	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
49	pcl_12	Feeling as if your future will be cut short	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
50	pcl_13	Trouble falling or staying asleep	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
51	pcl_14	Feeling irritable or having angry outbursts	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
52	pcl_15	Having di culty concentrating	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question

53	pcl_16	Being "super alert" or watchful on guard	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
54	pcl_17	Feeling jumpy or easily startled	radio (Matrix), Required 1 Not at all 2 A little bit 3 Moderately 4 Quite a bit 5 Extremely 999 I refuse to answer this question
55	aces_1	Section Header: *I'd like to ask you some questions about events that happened in your childhood before you were 18 years old. All questions refer to the time period before you were 18 years of age. Now, looking back before you were 18 years old...* Did you live with anyone who was depressed, mentally ill, or suicidal?	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
56	aces_2	Did you live with anyone who was a problem drinker or alcoholic?	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
57	aces_3	Did you live with anyone who used illegal street drugs or abused prescription medications?	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
58	aces_4	Did you live with anyone who served time or was sentenced to serve time in a prison, jail, or other correctional facility?	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
59	aces_5a	Were your parents ever married?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question

60	aces_5b Show the eld ONLY if: [aces_5a] = '1'	Were your parents separated or divorced?	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
61	aces_6	Section Header: *Looking back before you were 18 years old...* How often did your parents or adults in your home ever slap, hit, kick, punch, or beat each other up?	radio (Matrix), Required 0 Never 1 Once 2 More than once 999 I refuse to answer this question
62	aces_7	Before age 18, how often did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way? Do not include spanking. Would you say...	radio (Matrix), Required 0 Never 1 Once 2 More than once 999 I refuse to answer this question
63	aces_8	How often did a parent or adult in your home ever swear at you, insult you, or put you down?	radio (Matrix), Required 0 Never 1 Once 2 More than once 999 I refuse to answer this question
64	aces_9	How often did anyone at least 5 years older than you, or an adult, ever touch you sexually?	radio (Matrix), Required 0 Never 1 Once 2 More than once 999 I refuse to answer this question
65	aces_10	How often did anyone at least 5 years older than you, or an adult, try to make you touch them sexually?	radio (Matrix), Required 0 Never 1 Once 2 More than once 999 I refuse to answer this question
66	aces_11	How often did anyone at least 5 years older than you, or an adult, force you to have sex?	radio (Matrix), Required 0 Never 1 Once 2 More than once 999 I refuse to answer this question

67	ctq_1	Section Header: *The following questions ask about some of your experiences growing up as a child and a teenager before you were 18 years old. For each question answer: never true, rarely true, sometimes true, often true, or very often true. Please respond the way that best describes you.* *Although some of these questions are of a personal nature, please try to answer as honestly as you can.* When I was growing up, I didn't have enough to eat.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
68	ctq_2	When I was growing up, I knew that there was someone to take care of me and protect me.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
69	ctq_3	When I was growing up, people in my family called me things like "stupid,""lazy" or "ugly".	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
70	ctq_4	When I was growing up, my parents were too drunk or high to take care of the family.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
71	ctq_5	When I was growing up, there was someone in my family who helped me feel that I was important or special.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question

72	ctq_6	When I was growing up, I had to wear dirty clothes.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
73	ctq_7	When I was growing up, I felt loved.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
74	ctq_8	When I was growing up, I thought that my parents wished I had never been born.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
75	ctq_9	When I was growing up, I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
76	ctq_10	Section Header: *The following questions ask about some of your experiences growing up as a child and a teenager before you were 18 years old. For each question answer: never true, rarely true, sometimes true, often true, or very often true. Please respond the way that best describes you.* *Although some of these questions are of a personal nature, please try to answer as honestly as you can.* There was nothing I wanted to change about my family	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question

77	ctq_11	When I was growing up, people in my family hit me so hard that it left me with bruises or marks	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
78	ctq_12	When I was growing up, I was punished with a belt, a board, a cord, or some other hard object	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
79	ctq_13	When I was growing up, people in my family looked out for each other	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
80	ctq_14	When I was growing up, people in my family said hurtful or insulting things to me	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
81	ctq_15	When I was growing up, I believe that I was physically abused	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question

82	ctq_16	When I was growing up, I had the perfect childhood	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
83	ctq_17	When I was growing up, I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
84	ctq_18	When I was growing up, I felt that someone in my family hated me	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
85	ctq_19	Section Header: *The following questions ask about some of your experiences growing up as a child and a teenager before you were 18 years old. For each question answer: never true, rarely true, sometimes true, often true, or very often true. Please respond the way that best describes you.* *Although some of these questions are of a personal nature, please try to answer as honestly as you can.* When I was growing up, people in my family felt close to each other	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
86	ctq_20	When I was growing up, someone tried to touch me in a sexual way or tried to make me touch them	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question

87	ctq_21	When I was growing up, someone threatened to hurt me or tell lies about me unless I did something sexual with them	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
88	ctq_22	When I was growing up, I had the best family in the world	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
89	ctq_23	When I was growing up, someone tried to make me do sexual things or watch sexual things	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
90	ctq_24	When I was growing up, someone molested me	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
91	ctq_25	When I was growing up, I believe that I was emotionally abused	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question

92	ctq_26	When I was growing up, there was someone to take me to the doctor if I needed it	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
93	ctq_27	When I was growing up, I believe that I was sexually abused.	radio (Matrix), Required 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
94	ctq_28	When I was growing up, my family was a source of strength and support.	radio (Matrix) 1 Never True 2 Rarely True 3 Sometimes True 4 Often True 5 Very Often True 999 I refuse to answer this question
95	ipv_1	Section Header: *The following questions ask about some of your experiences with romantic or sexual partners in the last 12 months. For each question, please answer if this has happened: Never; This has happened, but not in the last year; Once in the last year; Twice in the last year; 3-5 times in the last year; More than 5 times in the last year. Please respond the way that best describes you. Although some of these questions are of a personal nature, please try to answer as honestly as you can.* Punched, hit, or slapped you.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
96	ipv_2	Kicked you.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question

97	ipv_3	Pushed or shoved you.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
98	ipv_4	Forced you to do something sexually that you didn't want to do.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
99	ipv_5	Raped you.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
100	ipv_6	Damaged your property (for example, broke a TV or cell phone).	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question

101	ipv_7	Demanded access to your cell phone.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
102	ipv_8	Demanded access to your email.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
103	ipv_9	Read your text messages without your knowledge.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
104	ipv_10	Read your email without your knowledge.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question

105	ipv_11	Repeatedly post on your social networking pages.	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
106	ipv_12	Section Header: *The following questions ask about some of your experiences with romantic or sexual partners in the last 12 months. For each question, please answer if this has happened: Never; This has happened, but not in the last year; Once in the last year; Twice in the last year; 3-5 times in the last year; More than 5 times in the last year. Please respond the way that best describes you. Although some of these questions are of a personal nature, please try to answer as honestly as you can.* Prevented you from seeing your family	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
107	ipv_13	Prevented you from seeing his family	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
108	ipv_14	Prevented you from seeing your friends	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question

109	ipv_15	Prevented you from seeing his friends	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
110	ipv_16	Lied to you about his HIV status	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
111	ipv_17	Did not tell you he had HIV before sex	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
112	ipv_18	Intentionally transmitted HIV to you	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question

113	ipv_19	Called you fat or ugly	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
114	ipv_20	Asked or told you to "act straight" around certain people	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
115	ipv_21	Criticized your clothes	radio (Matrix), Required 1 Never 2 Not in the last year 3 Once 4 Twice 5 3-5 times 6 More than 5 times 999 I refuse to answer this question
116	m2_1	Section Header: *The following questions ask about some of your experiences in your neighborhood in the past 12 months. For each question answer: never, once, sometimes, or often. Please respond the way that best describes you. Do not include experiences perpetrated by parents/guardians or romantic/sexual partners. Although some of these questions are of a personal nature, please try to answer as honestly as you can. In your neighborhood, how often have you been...* Hit	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
117	m2_2	Kicked	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question

118	m2_3	Pushed or shoved	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
119	m2_4	Badly beaten up	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
120	m2_5	Threatened with a knife or sharp weapon	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
121	m2_6	Attacked with a knife or sharp weapon	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
122	m2_7	Threatened with a gun	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
123	m2_8	Shot at	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question

124	m2_9	Verbally or emotionally abused, that is, being called names or having things said to you that make you feel bad about yourself or afraid.	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
125	m2_10	Sexually harassed	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
126	m2_11	Sexually assaulted	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
127	m2_12	Robbed	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
128	m2_13	Section Header: *In the last 12 months in your neighborhood, how often have you seen others being...* Hit	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
129	m2_14	Kicked	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question

130	m2_15	Pushed or shoved	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
131	m2_16	Badly beaten up	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
132	m2_17	Threatened with a knife or sharp weapon	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
133	m2_18	Attacked with a knife or sharp weapon	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
134	m2_19	Threatened with a gun	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
135	m2_20	Shot at	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question

136	m2_21	Verbally or emotionally abused, that is, being called names or having things said to them that made them feel bad about themselves or afraid.	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
137	m2_22	Sexually harassed	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
138	m2_23	Sexually assaulted	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
139	m2_24	Robbed	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
140	m2_25	In a ght after drinking or getting high	radio (Matrix), Required 1 Never 2 Once 3 Sometimes 4 Often 999 I refuse to answer this question
141	test_hiv	Section Header: *Now we'd like to ask you about your experiences with HIV testing.* Have you ever been tested for HIV?	radio, Required 1 Yes 0 No 999 I refuse to answer this question

142	lsttst_hiv Show the eld ONLY i f: [test_hiv] = '1'	When was the last time you were tested for HIV?	text (date_mdy)
143	numtst_hiv Show the eld ONLY i f: [test_hiv] = '1'	How many times have you been tested for HIV in the last 12 months, or year?	text, Required
144	msexp_3	Section Header: *Now I'd like to ask about your sexual partners. First, think about the last 3 months.* How many male oral or anal sex partners did you have in the last 3 months?	text, Required
145	fsexp_3	How many female oral, vaginal, or anal sex partners did you have in the last 3 months?	text, Required
146	msexp_12	Section Header: *Now think about the last 12 months.* How many male oral or anal sex partners did you have in the last 12 months?	text, Required
147	fsexp_12	How many female oral, vaginal, or anal sex partners did you have in the last 12 months?	text, Required
148	oral_3	Section Header: *These questions are about your recent sexual behaviors with all of your sexual partners. In your answer to each question, please include the sex you have had with all of your sexual partners of the speci ed gender in each question. Please answer as honestly as you can. First, I want to ask you about the last 3 months.* In the last 3 months, how many times did you have oral sex with another man and not use a condom or PrEP?	text, Required
149	anal_3	In the last 3 months, how many times did you have anal sex with another man and not use a condom or PrEP?	text, Required
150	vag_3	In the last 3 months, how many times did you have vaginal sex and not use a condom or PrEP?	text, Required
151	oral_12	Section Header: *Now I'd like to ask you about the last 12 months.* In the past 12 months, how many times did you have oral sex with another man and not use a condom or PrEP?	text, Required
152	anal_12	In the past 12 months, how many times did you have anal sex with another man and not use a condom or PrEP?	text, Required
153	vag_12	In the past 12 months, how many times did you have vaginal sex and not use a condom or PrEP?	text, Required

154	alc_evr	Section Header: *This next section includes questions about your use of alcohol and other drugs. First, we want to know about your alcohol use. For these questions, count a drink of alcohol as a can or bottle of beer; a wine cooler or glass or wine, champagne, or sherry; a shot of liquor; or a mixed drink or cocktail.* In your entire life, have you had at least 1 drink of any kind of alcohol, not counting small tastes or sips?	radio, Required 1 Yes 0 No 999 I refuse to answer this question
155	alc_fstdnk Show the eld ONLY i f: [alc_evr] = '1'	How old were you when you had your rst drink of alcohol?	text
156	alc_30day Show the eld ONLY i f: [alc_evr] = '1'	Think about the last 30 days, including today. During the past 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?	text
157	alc_num Show the eld ONLY i f: [alc_evr] = '1'	On the days that you drank during the past 30 days, how many drinks did you usually have each day? Count drinks as a can or bottle of beer; a wine cooler or a glass of wine, champagne, or sherry; a shot of liquor or a mixed drink or cocktail.	text
158	audit_1	Section Header: *The following are additional questions about your use of alcohol in the past year. Please answer each question honestly.* In the past year, how often have you had a drink containing alcohol?	radio, Required 0 Never 1 Monthly or less 2 2-4 times a month 3 2-3 times a week 4 4 or more times a week 999 I refuse to answer this question
159	audit_2 Show the eld ONLY i f: [audit_1] = '1' or [audi t_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	In the past year, how many drinks containing alcohol did you have on a typical day when you're drinking?	radio 0 1 or 2 1 3 or 4 2 5 or 6 3 7 to 9 4 10 or more 999 I refuse to answer this question

160	audit_3 Show the eld ONLY if: [audit_1] = '1' or [audit_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	In the past year, how often did you have six or more drinks on one occasion?	radio 0 Never 1 Less than monthly 2 Monthly 3 Weekly 4 Daily or almost daily 999 I refuse to answer this question
161	audit_4 Show the eld ONLY if: [audit_1] = '1' or [audit_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	How often during the last year have you found that you were not able to stop drinking once you had started?	radio 0 Never 1 Less than monthly 2 Monthly 3 Weekly 4 Daily or almost daily 999 I refuse to answer this question
162	audit_5 Show the eld ONLY if: [audit_1] = '1' or [audit_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	How often during the last year have you failed to do what was normally expected of you because of drinking?	radio 0 Never 1 Less than monthly 2 Monthly 3 Weekly 4 Daily or almost daily 999 I refuse to answer this question
163	audit_6 Show the eld ONLY if: [audit_1] = '1' or [audit_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	How often during the last year have you needed a rst drink in the morning to get yourself going after a heavy drinking session?	radio 0 Never 1 Less than monthly 2 Monthly 3 Weekly 4 Daily or almost daily 999 I refuse to answer this question
164	audit_7 Show the eld ONLY if: [audit_1] = '1' or [audit_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	How often during the last year have you had a feeling of guilt or remorse after drinking?	radio 0 Never 1 Less than monthly 2 Monthly 3 Weekly 4 Daily or almost daily 999 I refuse to answer this question

165	audit_8 Show the eld ONLY i f: [audit_1] = '1' or [audi t_1] = '2' or [audit_1] = '3' or [audit_1] = '4'	How often during the last year have you been unable to remember what happened the night before because of your drinking?	radio 0 Never 1 Less than monthly 2 Monthly 3 Weekly 4 Daily or almost daily 999 I refuse to answer this question
166	audit_9	Have you or someone else ever been injured because of your drinking?	radio, Required 0 No 2 Yes, but not in the last year 4 Yes, during the last year 999 I refuse to answer this question
167	audit_10	Has a relative, friend, doctor, or other health care worker ever been concerned about your drinking or suggested you cut down?	radio, Required 0 No 2 Yes, but not in the last year 4 Yes, during the last year 999 I refuse to answer this question
168	sed_evr	Section Header: *Now we'd like to ask about your use of other drugs. Have you EVER used any of these medicines or drugs when NOT prescribed by a doctor in order to get high?* Sedatives, for example sleeping pills, barbituates, Seconal, Quaaludes, or Chloral Hydrate	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
169	tranq_evr	Tranquilizers or anti-anxiety drugs, for example Valium, Librium, muscle relaxants, or Zanax	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
170	pain_evr	Painkillers, for example Codeine, Darvon, Percodan, OxyContin, Dilaudid, or Demerol	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
171	stim_evr	Stimulants, for example Preludin, Benzedrine, Methedrine, Ritalin, uppers, or speed	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question

172	marj_evr	Marijuana, hash, THC, or grass.	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
173	coc_evr	Cocaine or crack	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
174	hallu_evr	Hallucinogens, for example Ecstasy/MDMA, LSD, mescaline, psilocybin, PCP, angel dust, or peyote	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
175	inh_evr	Inhalants or solvents, for example amyl nitrite, nitrous oxide, glue, tolune, or gasoline.	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
176	her_evr	Heroin	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
177	anyo_evr	Any other drug.	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
178	anyo_spec Show the eld ONLY i f: [anyo_evr] = '1'	What other drug have you used?	text, Required
179	sed_30	Section Header: *Think about the last thirty days, including today. During the last 30 days, on how many days did you use the following drugs when NOT prescribed by a doctor in order to get high?* Sedatives	text, Required
180	tranq_30	Tranquilizers or anti-anxiety drugs	text, Required
181	pain_30	Painkillers	text, Required
182	stim_30	Stimulants	text, Required
183	marj_30	Marijuana or hashish	text, Required
184	coc_30	Cocaine	text, Required
185	crack_30	Crack	text, Required

<table>
<tr><td>186</td><td>hallu_30</td><td>Hallucinogens</td><td>text, Required</td></tr>
<tr><td>187</td><td>inh_30</td><td>Any inhalant for kicks or to get high</td><td>text, Required</td></tr>
<tr><td>188</td><td>her_30</td><td>Heroin</td><td>text, Required</td></tr>
<tr><td>189</td><td>anyo_30</td><td>Any other medicines, drugs, or substances</td><td>text, Required</td></tr>
<tr><td>190</td><td>inj_evr</td><td>Section Header: The following questions are about the di erent ways that certain drugs can be used.
Have you ever, even once, used a needle to inject a drug not prescribed by a doctor?</td><td>radio, Required<table><tr><td>1</td><td>Yes</td></tr><tr><td>0</td><td>No</td></tr><tr><td>999</td><td>I refuse to answer this question</td></tr></table></td></tr>
<tr><td>191</td><td>inj_drg
Show the eld ONLY i f:
[inj_evr] = '1'</td><td>Which of the following drugs have you injected using a needle?</td><td>checkbox<table><tr><td>1</td><td>inj_drg___1</td><td>Cocaine</td></tr><tr><td>2</td><td>inj_drg___2</td><td>Heroine</td></tr><tr><td>3</td><td>inj_drg___3</td><td>Methamphetamine</td></tr><tr><td>4</td><td>inj_drg___4</td><td>Steroids</td></tr><tr><td>5</td><td>inj_drg___5</td><td>Any other drug</td></tr><tr><td>999</td><td>inj_drg___999</td><td>I refuse to answer this question</td></tr></table></td></tr>
<tr><td>192</td><td>inj_age
Show the eld ONLY i f:
[inj_evr] = '1'</td><td>How old were you when you rst used a needle to inject any drug not prescribed by a doctor?</td><td>text</td></tr>
<tr><td>193</td><td>inj_time
Show the eld ONLY i f:
[inj_evr] = '1'</td><td>How old were you when you last used a needle to inject a drug not prescribed by a doctor?</td><td>text</td></tr>
<tr><td>194</td><td>inj_num
Show the eld ONLY i f:
[inj_evr] = '1'</td><td>During your life, altogether how many times have you injected drugs not prescribed by a doctor?</td><td>radio<table><tr><td>1</td><td>Once</td></tr><tr><td>2</td><td>2-5 times</td></tr><tr><td>3</td><td>6-19 times</td></tr><tr><td>4</td><td>20-49 times</td></tr><tr><td>5</td><td>50-99 times</td></tr><tr><td>6</td><td>100 times or more</td></tr><tr><td>999</td><td>I refuse to answer this question</td></tr></table></td></tr>
</table>

195	inj_oft Show the eld ONLY i f: [inj_evr] = '1'	Think about the period of your life when you injected drugs the most often. How often did you inject then?	radio 1 More than once a day 2 About once a day 3 At least once a week but not every day 4 At least once a month but not every week 5 Less than once a month 999 I refuse to answer this question
196	drg_tx Show the eld ONLY i f: [inj_evr] = '1'	Have you ever been in a drug treatment or drug rehabilitation program?	radio 1 Yes 0 No 999 I refuse to answer this question
197	dast_1	Section Header: *The following questions concern information about your possible involvement with drugs NOT including alcoholic beverages during the past 12 months. Please carefully read each statement and decide if your answer is Yes or No, then select the appropriate response. In the statements, "drug use" refers to 1) the use of prescribed or over the counter drugs in excess of the directions, and 2) any non-medical use of drugs. Drugs may include: marijuana, hash, solvents or glue, tranquilizers (e.g. valium), barbiturates, cocaine, stimulants, hallucinogens (e.g. Ecstasy or molly), or narcotics (e.g. heroin). Remember that these questions do NOT ask about alcoholic beverages. In the past 12 months...* Have you used drugs other than those required for medical reasons?	radio (Matrix), Required 1 Yes 0 No 999 I refuse to answer this question
198	dast_2 Show the eld ONLY i f: [dast_1] = '1'	Do you use more than one drug at a time?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
199	dast_3 Show the eld ONLY i f: [dast_1] = '1'	Are you always able to stop using drugs when you want to?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
200	dast_4 Show the eld ONLY i f: [dast_1] = '1'	Have you had "blackouts" or " ashbacks" as a result of drug use?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question

201	dast_5 Show the eld ONLY i f: [dast_1] = '1'	Do you ever feel bad or guilty about your drug use?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
202	dast_6 Show the eld ONLY i f: [dast_1] = '1'	Does your partner/spouse/signi cant other or parents ever complain about your involvement with drugs?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
203	dast_7 Show the eld ONLY i f: [dast_1] = '1'	Have you neglected your family because of your use of drugs?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
204	dast_8 Show the eld ONLY i f: [dast_1] = '1'	Have you engaged in illegal activities in order to obtain drugs?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
205	dast_9 Show the eld ONLY i f: [dast_1] = '1'	Have you experienced withdrawal symptoms (felt sick) when you stopped taking drugs?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
206	dast_10 Show the eld ONLY i f: [dast_1] = '1'	Have you had medical problems as a result of your drug use (e.g. memory loss, hepatitis, convulsions, bleeding, etc.)?	radio (Matrix) 1 Yes 0 No 999 I refuse to answer this question
207	st_louis_health_study_ for_young_men_comp lete	Section Header: *Form Status* Complete?	dropdown 0 Incomplete 1 Unveri ed 2 Complete

Appendix B: Recruitment Materials

Palm Cards:

Front:

Back:

Flyers:

THE MIDWEST YOUNG MEN'S HEALTH STUDY

PURPOSE

To identify factors that impact the health of young men, including risks for HIV.

ELIGIBILITY

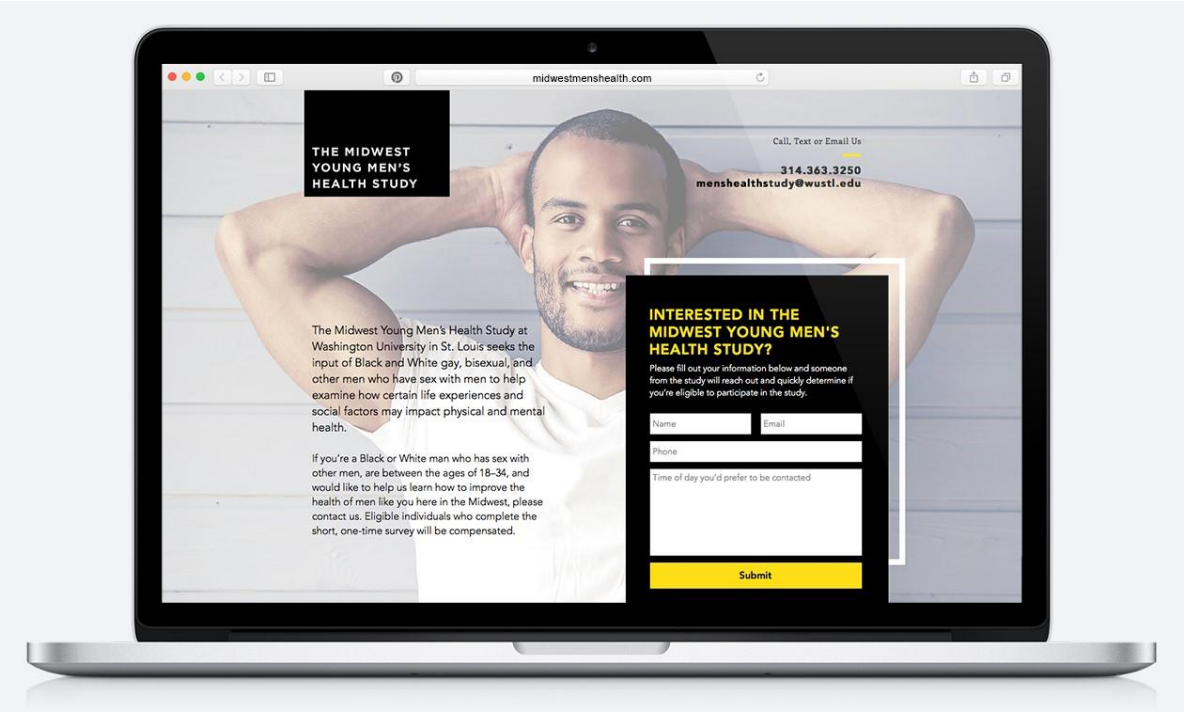
Black or white males
Ages 18–34

Create a positive impact on the future of men's health.
Call or text **314.363.3250** or email **menshealthstudy@wustl.edu** to see if you're a good candidate for the short survey.

Visit **midwestmenshealth.com** to learn more about the study.

FOR IRB USE ONLY
IRB ID #: 201503122
APPROVAL DATE: 12/14/16
RELEASED DATE: 12/14/16
EXPIRATION DATE: 12/13/17

Website:



Mobile website: