Sexual risk among men who have sex with men with online sex partners in New York City: Insight using the Centers for Disease Control and Prevention's Web-based HIV Behavioral Surveillance and National HIV Behavioral Surveillance

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ABSTRACT

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Increasingly the Internet has been used by men who have sex with men (MSM)to facilitate social and sexual relationships. Finding from studies investigating the relationship between sexual risk and MSM who meet sex partners on the Internet in either venue-based (offline) and Internet-based (online) settings have been mixed. In an effort to contribute to the knowledge base on this topic, this study analyzed data from two samples of MSM recruited in New York City: Web-based HIV Behavioral Surveillance (WHBS) and National HIV Behavioral Surveillance (NHBS). The relationship between sexual risk behaviors including unprotected anal intercourse (UAI), drug use, number of sexual partners, use of performance enhancing drugs (also known as erectile dysfunction drugs or PDE5 inhibitors), and group sex participation and mode of sex partner recruitment are examined. Univariate, bivariate, and multivariate analysis were used to examine the research questions and hypothesis.

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CHAPTER 1

INTRODUCTION

The Internet has redefined how people, including men who have sex with men (MSM), interact. Researchers have found that MSM are increasingly using the Internet to facilitate social and sexual relationships (Balan, Carballo-Dieguez, Ventuneac, & Remien, 2009; Cooper, Schere, Boies, & Gordon, 1999; Garofalo, Herrick, Mustanski, & Donenberg, 2007; Hospers, Kok, Harterink, & de Zwart, 2005; McFarlane, Bull, & Rietmeijer, 2000; Toomey & Rothenberg, 2000). Some researchers have stated that there are elements that make seeking sex via the Internet different from seeking sex via classified ads or other offline media. For instance, Cooper (1999), who has termed the Internet's access, affordability, and anonymity as the "Triple-A Engine," contends that these three components intensify online sexual activity. Online sexual connection websites or chat rooms give quick *access* to those seeking to meet sex partners online while the *affordability* of some of these websites facilitate online sexual activity. Further, with the use of multiple screen names individuals seeking sex online can remain *anonymous*.

The discussion that examines the relationship between sexual risk and MSM who meet sex partners on the Internet is an ongoing one. Studies investigating this relationship have been conducted in venue-based and Internet-based settings with results ranging from one end, that the Internet creates opportunities for sex which could facilitate transmission of diseases (Bull & McFarlane, 2000), to the other, that the Internet in and

of itself does not "create a risk for HIV transmission" (Bolding, Davis, Hart, Sherr, & Elford, 2005).

A researcher who supports the idea that the Internet does facilitate the transmission of disease put it this way,

"we cannot ignore the implications that the Internet influence may have on sexual risk and disease transmission. A person seeking a clandestine liaison pre-Internet would be forced to go to some effort to seek out partners, through bars, dating services, or other methods. A person who is not inclined to frequent bars for casual sex partners may have been dissuaded from looking…. the Internet has a greater and more instantaneous reach than any other medium to facilitate encounters that result in sexual activity…it is faster and easier. This may translate into faster, easier, and more efficient transmission of disease and infection" (Bull & McFarlane, 2000).

STUDY OBJECTIVES

Despite many studies on the topic of MSM, the question of whether there exist differences in sexual risk behaviors among MSM who recruit sexual partners via the Internet and those who meet sexual partners in other ways has not been adequately addressed. This dissertation addresses this gap by examining associations between sexual risk behaviors including unprotected anal intercourse (UAI) , drug use, number of sexual partners, use of performance enhancing drugs, and group sex participation and mode of sex partner recruitment. This dissertation addresses the following research questions:

1. What are the socidemographic characteristics of the WHBS and NHBS participants?

2. What is the prevalence of sexual risk behaviors, HIV testing history, HIV status, and prevention activities among WHBS and NHBS participants?

3. What differences in socidemographic characteristics and sexual risk behaviors emerged between MSM who reported meeting sex partners over the Internet and MSM who did not in WHBS and NHBS participants?

4. Are WHBS MSM who reported meeting sex partners online also attending offline risk-associated social venues (RAVs) such as circuit parties and sex establishments (no comparable variable available in the NHBS questionnaire for analysis)?

Hypothesis

I test the following hypothesis:

1. MSM who report meeting sex partners online are more likely to engage in risk behaviors after controlling for age, race/ethnicity, and education.

Is the risk behavior of MSM who report meeting sex partners online different from the sex behavior of those who report meeting sex partners offline? Further, is the risk behavior of MSM recruited online who report online sex partnerships different from the risk behavior of MSM recruited offline who report online sex partnerships? These questions and others like it begin to address the central issue, namely, does the Internet facilitate risk or does it merely draw those who already engage in risky behavior?

SIGNIFICANCE AND CONTRIBUTION OF THIS STUDY

This is one of the first studies to use New York City Web-based HIV Behavioral Surveillance (WHBS) and National HIV Behavioral Surveillance (NHBS) data for comparative purposes to analyze the relationship of sexual risk behaviors among MSM who meet sex partners over the Internet and in offline venues. This research builds on previous research by analyzing two data sets with large sample sizes, diverse recruitment websites (or in the case of NBHS, diverse recruitment venues), sound study designs, and comprehensive survey instruments. Further, though some previous research has looked at sexual risk behavior of MSM who meet sex over the Internet versus those who meet sex partners in venue-based settings, few have not had the opportunity of employing two

studies with different recruitment methodologies that complement each other on almost every question.

This analysis will explore if the Internet "accentuates" sexual risk or if simply there is a "self-selection" among MSM who use the Internet to engage in sexual risk (Liau, Millett, & Marks, 2006). Analysis of WHBS and NHBS data that either confirms or rejects the hypothesis, would make an important contribution to the current literature that currently makes arguments for and against the Internet as an environment conducive to sexual risk among MSM. Findings from this analysis could ultimately address the development of new prevention interventions and build on current ones.

MY ROLE IN THE IMPLEMENTION OF WHBS AND NHBS IN NYC

In WHBS I was responsible for multiple activities. Among these activities were focus group recruitment and monitoring, and data collection and analysis during the pilot phase of WHBS. While NYCDOHMH was not responsible for the development of the core questionnaire of WHBS, we were responsible for developing the NYC local questionnaire. Development of the questionnaire included ensuring appropriate questions were asked by NYC to improve local HIV prevention services. After the launch of WHBS I was involved in all things WHBS including weekly conference calls, completion of WHBS monitoring forms, data management, and data analysis.

My involvement in NHBS, though implemented locally by NYCDOHMH, was limited. I assisted my colleagues with NYC local questions. Specifically, I assisted with the local questions pertaining to group sex activities. They were modified for NHBS purposes.

BACKGROUND AND LITERATURE REVIEW

HIV AND MSM

HIV among men who have sex with men (MSM) in the U.S. continues to be a public health concern. Recent findings from Centers for Disease Control and Prevention (CDC) indicate that the populations most impacted by HIV are gay and bisexual men of any race. MSM represent 48% of the more than one million people living with HIV in the United States (prevalence) and they account for 53% of all new HIV infections in the U.S. each year (incidence). Among all risk groups, this is the only group in which the annual number of new HIV infections is increasing. In fact, the annual number of infections among MSM has been increasing since the early 1990s while the infections of heterosexual and injection drug users has seen a decline (CDC, 2009).

The age at which MSM are becoming infected differ by race and the burden of disease falls among black MSM with most new infections occurring among those between the ages of 13-29. This age group represents more new infections than any other age and racial group of MSM. The number of new infections among young black MSM is almost twice that of white and Hispanic MSM (5,220 infections in blacks vs. 3,330 among whites and 2,300 among Hispanics). For white MSM, most new infections occur among those between the ages of 30-39 and for Hispanics most new infections occur among those between the ages of 13-29, closely followed by those between the ages of 30-39 (CDC, 2009).

Large HIV epicenters such as New York City closely mirror findings from the CDC for men in general. Recent surveillance data from the New York City Department of Health and Mental Hygiene (NYCDOHMH) show that HIV cases reported among men in New York City (NYCDOHMH, 2009) show that between January 1, 2008 and June

30, 2008 (N=1,425), 45.5% of new HIV diagnoses were among black men, 32.6% were among Hispanic men and 17.8% were among White men. Equally disturbing was the finding among men for the same time frame of concurrent HIV and AIDS diagnosis: 41.4% were black, 38.5 were Hispanic, and 14.8% were White (NYCDOHMH, 2008). The surveillance data from the New York City Department of Health detailed above clearly indicate that overall blacks and Hispanics bear the highest burden of new HIV diagnoses. Among these populations are MSM.

THE INTERNET AND MSM

The internet is an increasingly valuable setting in which to identify MSM at risk for HIV and other sexually transmitted infections (McFarlane et al., 2000). Yet there is a need to better understand the behavioral risk factors associated with HIV in this population. The Internet as a risk environment for STIs is documented (Cooper, Galbreath, & Becker, 2004; Hospers, Harterink, Van Den Hoek, & Veenstra, 2002; McFarlane et al., 2000). To get a full understanding of risk behaviors of MSM one must look into current literature on MSM, risk behaviors, and the Internet.

What insight does research conducted over the Internet and in venue-based settings offer about the sexual behavior of MSM and what specifically does the current literature state about the differences in sexual risk behaviors among MSM who meet sexual partners *online* (over the Internet) and those who meet sexual partners *offline* (venue-based settings)*?* Identifying differences can help researchers develop interventions that specifically target subpopulations within this group.

The results in studies conducted over the Internet or venue-based settings have varied. An early venue-based study by Elford et al. (2001) on seeking sex on the Internet

and sexual risk behavior among gay men using London gyms found that seeking sex on the Internet was associated with a recent diagnosis of an STD and high-risk sexual behavior, though it was unable to establish whether the increased risk for STDs or HIV occurred with sexual partners met online. In a venue-based study by Benotsch et al. (2002) conducted at a gay pride festival found that men meeting partners through the Internet reported having sex with more male partners in the previous 6 months and reported engaging in more frequent unprotected insertive and receptive anal intercourse, compared with men not meeting sexual partners via the Internet. And in another venue-based study, Mettey, Crosby, DiClemente, & Holtgrave (2003) found that among men at a sex resort those who sought sex partners on the Internet were significantly more likely to report fisting, having group sex, using poppers and using ecstasy during sex, all activities placing MSM at risk for STDs. Further, a study by McKirnan, Houston, & Tolou-Shams (2007) found that men who reported searching for sexual partners online also reported more unprotected sex and sexually transmitted diseases while a more recent study by Ogilvie, Taylor, Trussler, Marchand, Gilbert, Moniruzzaman, & Rekart (2008) found that MSM who met sex partners over the Internet were more likely to have had more than 10 sexual partners in the past year which can potentially increase the transmission of sexually transmitted diseases.

Findings from the venue-based studies above seem to suggest that sexual risk behaviors of MSM who meet sex partners over the Internet are greater than those MSM who do not meet sex partners over the Internet. However, other venue-based studies such as that by Bolding et al. (2005) found that MSM surveyed in clinics and gyms were no more likely to meet casual UAI partners of unknown or discordant HIV status partners

online rather than offline. Jenness et. al. (2010) found in their venue-based study which analyzed only Internet, only venue-based, and both Internet and venue-based sex partnerships that any association between UAI and Internet sex partnerships was lost after controlling for multiple partners and that there was a slight increase in risk in offline partnerships.

Internet studies have been equally diverse in their findings. Two Internet studies by Rosser et al. (2009; 2009) titled Men's INTernet Sex Study (MINTS) & (MINTS-II) found a relationship between unsafe sex and MSM who men sex partners online. MINTS focused on a high-risk sample of MSM while MINTS-II focused on a general sample of MSM. And while Rosser's two studies found a relationship between unsafe sex and MSM who met sex partners over the Internet, Horvath et al. (2008) found that while seeking sex partners was associated with greater number of sex partners it didn't promote or encourage UAI. In fact, being high and drunk were significantly associated with UAI regardless of where sex partners were met. And in their Internet study to examine risk factors for sexually transmitted diseases and HIV among young adults who seek sex partners on the Internet, McFarlane, Bull, & Reitmeijer (2002) reported that young adults using the Internet were at greater risk for sexually transmitted diseases. Adding to the mix of findings was a study by Chiasson, Hirshfield, Ramein, Humberstone, Wong, Wolitski (2007) which found that MSM who met sex partners either over the Internet or in venue-based settings were *equally* likely to report UAI in the past 3 months. However, Chiasson et el. did find that MSM who reported meeting a sex partner over the Internet in the past 3 months were at "considerable" risk for HIV and other sexually transmitted diseases (STDs), with two-thirds of study participants who had ever met partners over the

Internet reporting an increased number of sex partners since they began using the Internet to meet sexual partners.

Some of the studies described above on the risk behaviors of MSM conducted over the Internet or in venue-based setting, though of sound research, lack a key component, namely, that of comparison. This comparative analysis builds on previous research by analyzing two data sets with large sample sizes, diversity in recruitment (multiple websites in the case of WHBS and multiple venues in the case of NHBS), sound study designs, and comprehensive survey instruments. Once again, this dissertation will try to determine if the Internet facilitates sexual risk behavior among MSM or if simply if it is merely drawing in those who already engage in risky behavior.

THEORETICAL FRAMEWORK

In social work, theories or models allow for a way of understanding problems or behaviors by addressing reasons why people engage in certain behaviors. Questions like "Why do people engage in sexual risk behaviors?" or "Why do MSM who meet sex partners on the Internet engage in sexual risk behaviors such as unprotected anal intercourse?" can be addressed by using theories or models, which can help to both explain behavior and achieve behavioral change. And, when applied, a good theory can help explain why individuals such as MSM engage in sexual risk behaviors.

Detailed below is the theoretical framework by which the sexual risk behavior of MSM recruited online, as with WHBS, or MSM recruited offline, as with NHBS, can be understood. This section details the Escape Model, developed by David J. McKirnan in 1996. The purpose is not to test the postulated hypothesis based on this model but rather to describe or explain sexual risk through the model.

The Escape Model can be used as a lens through which the sexual behaviors of the CDC's epidemiological studies, WHBS and NBHS, are viewed. WHBS and NHBS were developed for purely behavioral surveillance purposes and are not meant to explain behavior (Gallagher, Sullivan, Lansky, & Onorato, 2007); hence, theories or models can be used to gain a better understanding of the outcome—the findings—of these surveillance studies. The model in and of itself does not include a component on the Internet per se, but as with all models and theories, it is one of many existing models that can help explain sexual risk behavior. While there are many models to explain risk behavior the Escape Model, in my estimation, gives us an understanding of the continued sexual risk behaviors of MSM and can provide insight and plausible explanations for the sexual risk behavior of MSM who meet sex partners over the Internet or in venue-based settings. The model is outlined below and is followed by how the model can extend our understanding of the sexual risk behavior of MSM.

THE ESCAPE MODEL

As previously discussed, MSM continue to be disproportionally affected by HIV. Despite safer sex messages and intentions to be safe, infection rates among MSM remain high (CDC, 2009). According to the Escape Model (McKirnan, Ostrow, & Hope, 1996), models or theories that link sexual risk to knowledge, social norms, behavioral intentions, and perceived vulnerability to infection account for only a portion of the continued sexual risk behaviors of MSM. Contrary to other models, the Escape Model proposes that sexual risk does not arise from a lack of community norms or personal standards but rather from a desire to "escape cognitive awareness of very rigorous norms and standards" (McKirnan et al., 1996). Cognitive escape may occur within sexual situations

when self-awareness of HIV risk arouses anxiety and, accompanied HIV prevention fatigue, fatalism, or other negative affect over HIV may may lead people to not follow their norms or their intention to have safer sex. Further, McKirnan's Escape Model (1996) proposes that substance use and sexually stimulating environments can facilitate cognitive disengagement that make the individual more responsive to external pressures toward risk.

Other models, such as the AIDS Risk Reduction Model (ARRM), use rational indicators for explaining behavior change. These rational indicators include, for instance, recognition of one's behavior as high risk, making a commitment to reduce high-risk sexual encounters, and taking action (Catania, Kegeles, & Coates, 1990). Similarly, the Theory of Reasoned Action (TRA) links individual beliefs, attitudes, intentions, and behavior to help explain behavior (Fishbein & Middlestadt, 1989). These theories basically hold that humans are rational and that behavior is a conscious choice. Though ARRM and TRA often do help explain behavior they assume that people always behave rationally. McKirnan (1996) argues in the Escape Model that understanding sexual risk through "rational" indicators such as those of ARRM and TRA de-emphasizes the "non-rational, emotional nature" of sexuality and that the non-rational nature of risk-taking could stem from the distorted perceptions of personal vulnerability, sexually charged settings, and substance use.

PERSONAL VULNERABILITY, SEXUALLY CHARGED SETTINGS AND DRUG USE

In the Escape Model it is proposed that in behaviors that are pleasurable the rational process is reversed—that is, "people may be 'motivated' to see themselves as not vulnerable to risk, and may ignore or distort information to the contrary rather than

being informed by knowledge that leads to behavioral change (McKirnan et al., 1996). The high rate of unprotected sex among gay men in close relationships is as an example of how emotion can distort perceptions of risk vulnerability (McKirnan et al., 1996; Sullivan, Salazar, Buchbinder, & Sanchez, 2009).

To better understand sexual risk, in his Escape Model McKirnan makes a relevant comparison between the cognitive restraint of dieters and sexual risk-taking. He states that individuals who go on diets generally diet because of external factors such as cultural pressures or because of medical reasons and not because of a loss of interest in food. This "restraint" he argues requires an exhaustive cognitive effort, and effort which ironically creates a heightened awareness of food, which can sometimes lead to a bing—that is, a release, an escape from the diet. Similarly, he argues that "sexual safety is an externally-imposed diet; few people use condoms or abandon desired activities due to an intrinsic motivation" (McKirnan et al., 1996). As with dieting, sexual safety (using condoms) often requires exhaustive cognitive effort; hence, it makes sense that a certain stimulus such as a sexual encounter can "release" a person from his "normal" attitude toward sexual risk-taking and account for some of the "non-rationality of sexual behavior" (McKirnan et al., 1996).

Sexual risk-taking in this perspective can therefore be seen not only as misguided behavior that stems from attitudes and intentions but rather sexual risk-taking may arise from "a lack of self-regulation or decision making" (McKirnan et al., 1996). A sexual encounter, for instance, could remind the individual of enjoyable risky behavior and actually inhibit "decision-making leaving the person less cognitively restrained regarding ongoing risk" (McKirnan et al., 1996). Consequently, environments such as sex clubs or

bath houses (or even Internet websites) can present the individual with not only the opportunity for sexual risking-taking but also with an opportunity for release, a cognitive release—an escape—of sexual norms (McKirnan et al., 1996).

Cognitive escape can be also be influenced by substance use. A recent study found that over 23% of gym-attending MSM reported use of methamphetamine in the last 6 months (Halkitis et al., 2008), potentially increasing sexual risk behaviors and other studies (Reback & Ditman, 1997; Semple, Patterson, & Grant, 2002) including one conducted by Fernández, et al. (2005) found an association between drug use and UAI. The Escape Model proposes that substance use can have both a direct effect and a mediated effect on sexual risk.

The direct effects are clear: drug use can directly affect the central nervous system that heighten sexual arousal, decrease anxiety, or enhance the perception of the immediate sexual experience thereby decreasing the ability to process information regarding norms on sexual safety (McKirnan et al., 1996) and for some MSM, bars are an important social venue that when paired with sex and drug use can create "a strong learned association between" these activities (1996). Though not stated by McKirnan in the Escape Model, it has been shown that pairing sex and drugs with Internet use may also increase an association between these behaviors (Fernandez et al., 2005; Semple et al., 2002).

The Escape Model proposes that all individuals differ and that the effects of drug use on these individuals so too will differ based on psychosocial factors that may mediate the effects of drug use. Further, the Escape Model proposes that individuals differ in their use of drugs to "justify" certain behaviors or to escape from "rational self-

awareness" and those with high sensation seeking may engage in drug use and high sexual risk behaviors in response to anxiety (McKirnan et al., 1996). In later work by McKirnan et al. (2007) it was noted that there was an association between drug use and unsafe sex among MSM who scored higher on a sexual restrained scale indicating that drug use acted as a "releasing mechanism" of sexual norms.

In sum, the Escape Model model classifies the precursors of cognitive disengagement in terms of personal vulnerabilities (such as high performance standards, negative affect, high cognitive restraint, and expectancies) and releasing stimulus (such as internal states, settings, partner characteristics, and substance use) that set off the cognitive escape process (an automatic behavior) and is summarized in the figure below (McKirnan et al., 1996).

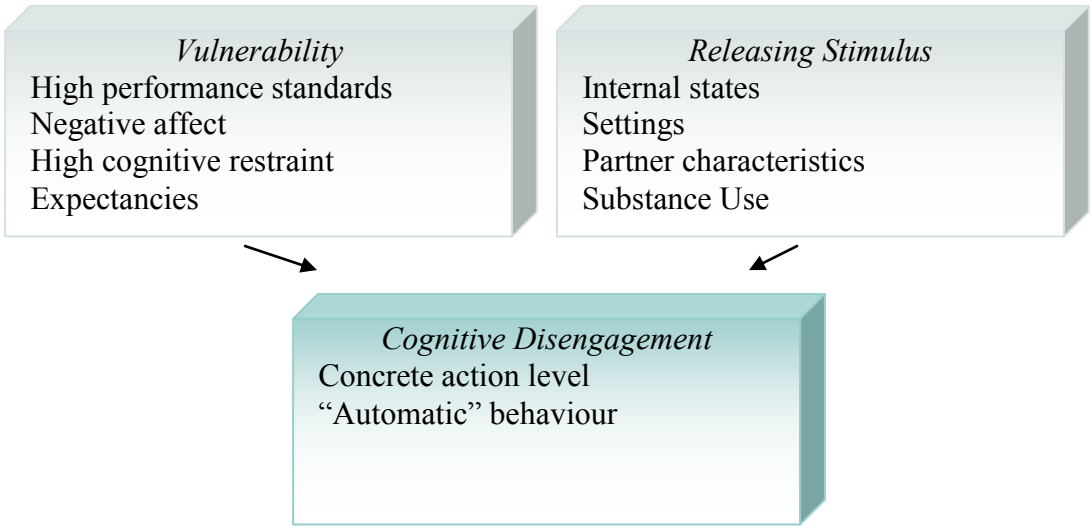

FIGURE 1.1 Escape Model (McKirnan et al., 1996)

With high performance standards an individual may have an excessive self-awareness of the amount of cognitive effort required to maintain normative sexual

behavior (safer sex) while negative affect, such as pessimism regarding HIV among MSM, can set the stage for the cognitive escape process. McKirnan's escape model underscores safer sex itself as an example of cognitive restraint, one of the precursors of cognitive disengagement. Individuals would generally prefer to enjoy condomless sex; however, health standards suggest that condoms always be used. Hence, in a sexual encounter if physical escape is not possible then a cognitive escape may follow (1996).

Cognitive disengagement may be initiated by a "releasing stimulus" (McKirnan et al., 1996). Setting such as bars, clubs, or even an Internet setting, can become associated with sexuality. That stimulus, whether a bar or the Internet may produce sexual arousal, anxiety, and "aversive cognitive restraint that accompany awareness of HIV risk" (McKirnan et al., 1996). Consequently, an individual may approach a releasing stimulus in response to feelings of loneliness, stress, etc. resulting in cognitive disengagement (escape)—that is, in sexual behavior that is automatic, controlled by the immediate stimulus rather than by goals and intentions (McKirnan et al., 1996).

THE ESCAPE MODEL AND THE INTERNET

The Escape Model helps explain the elements that may lead to sexual risk taking among MSM and moves beyond the discourse of knowledge, attitude, and beliefs. And because WHBS and NHBS, the focus of this dissertation, were developed as behavioral surveillance instruments, the Escape Model is important precisely because it can help researchers gain a full understanding of findings from behavioral surveillance studies such as WHBS and NHBS that lack constructs that measure knowledge, attitudes, or beliefs about sexual risk. It may also begin to provide an understanding of why MSM

engage in risk in situations that present the possibility of risk within the context of the Internet, as with WHBS, or outside it, as with NHBS.

Models that indicate that increased knowledge about HIV changes attitudes and beliefs towards sexual risk, though useful and certainly helpful in understanding sexual risk among MSM, may not paint the full picture of sexual risk. In fact, those models seem to fail to capture the irrational nature of sex, a topic addressed by the Escape Model. The latest findings from the CDC (2009) of the continued rise of infection rates among MSM is perhaps a clear example that application of only traditional theories for the understanding the sexual risk behaviors of MSM is not sufficient. According to some researchers, studies which focus only on knowledge, attitudes and behavior cannot account for how sexual risk is perceived and, ultimately, played out (Aggleton, 1995). This may be particularly so among MSM and perhaps, especially so among MSM who seek sex partners online.

Though the Escape Model may offer insight into sexual risk behavior of MSM, it is not without a significant shortcoming. It creates an irony in understanding HIV prevention among MSM: if prevention efforts overemphasize the consequences of unsafe sex it can create anxiety and make self-awareness of HIV risk even more aversive, and, hence, cognitive escape more appealing (McKirnan et al., 1996). McKirnan addresses this issue in the following way:

> "We propose that prevention planner take a marketing approach [to HIV prevention]… Effective broad-based community-level interventions would be optimal…Weaving HIV prevention into health markets that people already are engaging in and that deliver a concrete product—HIV testing, primary health care visits, health clubs or social services—may not arouse the anxiety, stigma, and escape motives that occur with more intensive behavioural interventions, where the individual must identify himself as having a 'problem' with sexual safety that he needs to 'fix'."

Some of what McKirnan proposes in his marketing approach is already being done in New York City, the city from which data for this dissertation was collected. For instance, HIV testing in primary health care settings has become law and is now routinized. HIV prevention in health clubs, though not a novel suggestion, is one that could be developed and arely does one see health promotion messages outside of eating healthier foods. It is said that a person's greatest fear is fear of the unknown. If this is true, even if partly true, McKirnan's marketing approach in the Escape Model to HIV prevention could go a long way in normalizing HIV awareness and thus reducing anxiety and making self-awareness of HIV risk less aversive and consequently making cognitive escape less appealing.

In the opening paragraph of this chapter Cooper's "Triple-A Engine" was detailed as a way of explaining how Internet's access, affordability, and anonymity intensify online sexual activity (1998). The third component, anonymity, is worthy of closer review, as it can contribute to the understanding of online sexual behaviors of MSM within the context of the Escape Model.

The Internet's anonymity may afford MSM looking for sexual hook ups the opportunity to engage in unsafe sex by allowing them to remove themselves—'cognitively escape'—from the reality of their day lives. These opportunities for anonymous sex that the Internet presents are exacerbated by the wide range of websites found within it that can allow MSM to explore fantasies or sexual roles, which could include unsafe sex that they might not have otherwise entertained had the Internet not

provided this escape. With the Internet functioning as an escape, MSM can become less cognitively restrained with regard to ongoing risk.

A good theory or model can help explain sexual risk behaviors and can help explain the way in which interventions lead to positive health outcomes (Freudenberg, 1995). McKirnan's Escpae Model is a good model for better understanding the sexual risk behavior of MSM, online or offline and contributes to behavioral theories the idea that notwithstanding one's knowledge, attitudes, beliefs and/or commitment to safer sex, in actual sexual encounters internal states such as moods and personal vulnerabilities, and settings such as bars, clubs, or the Internet may lead some MSM to cognitively escape and engage in unsafe sex.

CHAPTER 2

RESEARCH DESIGN AND METHODS

STUDY BACKGROUND

Web-based HIV Behavioral Surveillance

STUDY DESIGN

This dissertation uses data from the Centers for Disease Control and Prevention's (CDC) Web-based HIV Behavioral Surveillance (WHBS) which was launched in six U.S. cities including Baltimore, MD., Boston, MA., Dallas, TX., Los Angeles, CA., San Francisco, CA., and New York City, NY. Specifically, data from the local implementation of WHBS which was conducted by the New York City Department of Health and Mental Hygiene (NYCDOHMH) is used.

WHBS was developed as an alternate method to collecting behavioral data from MSM populations not reached through the National HIV Behavioral Surveillance (NHBS) including men who may not self-identify as gay or bisexual. NHBS is an ongoing U.S. surveillance system discussed in detail in its own Study Background section below.

As part of WHBS the NYCDOHMH conducted an anonymous cross-sectional Internet survey from April through August of 2007. As part of the study design NYCDOHMN had to choose two of three recruitment methods: 1) venue-based-sampling (VBS) using online Internet sites to recruit MSM 2) respondent-driven sampling (RDS) involving peer recruitment, and 3) use of direct market (DM) banner advertisements to recruit MSM. Venue-based-sampling was an active process where WHBS would intercept and recruit individuals online. IRB concerns over active recruitment and

privacy did not allow NYCDOHMN to choose venue-time space sampling; hence, NYCDOHMH decided on RDS and DM. RDS is a type of recruitment that asks recruited individuals are asked to recruit their peers ('seeds') and then those peers are asked to recruit others producing "recruitment chains". Recruitment using RDS was not a success in NYC. In fact, only a handful of seeds were recruited through RDS which resulted in even less completed surveys. Therefore, for this analysis, only DM data are analyzed. Unlike RDS, DM was a success with over 2000 completed questionnaires.

During the formative research phase of WHBS, NYCDOHMH staff conducted focus groups that helped identify local Internet venues and with the assistance of Reveal Communications, a marketing and creative company, banner advertisements were systematically posted and rotated through a variety of websites including some that catered specifically to MSM. Reveal Communications carefully selected sites that would reach the target audience and worked closely with web sites to maximize the impact of the banner placements. Reveal Communications was able to simplify contracting among many websites, it was able to "geotarget" (target subgroups within specific websites such as MSM within Facebook), and it was able to place banner ads a reduced costs.

These websites included but were not limited to the following:

- Manhunt
- Gay.com
- Adam4Adam
- RentBoys
- 365Gay
- MySpace
- Friendster
- Facebook
- BlackPlanet (and sister Asian- and Latin-skewing sites)

The banner advertisements allowed interested individuals direct access to the survey after they gave informed consent. Multiple advertisements were used, each containing images of attractive, semi-clothed (mostly shirtless) men with brief information about the study.

Participating websites had different posting policies; therefore, to view the clickable banner advertisement some websites required registration onto their website, while others did not. When an Internet user clicked on the banner advertisement, the participant was linked to the website hosting the survey. Upon completing a screen page for eligibility a unique study ID was then automatically generated within the system and the participant could begin the survey. The survey was voluntary and it offered no incentive for participation.

Eligibility criteria included being at least 18 years of age, born male, and a resident of the NYC metropolitan area. The survey used Secure Sockets Layer (SSL) encryption technology, a commonly-used protocol for managing the security of a message transmission on the Internet. The host website of the survey did not use cookies, it did not collect IP or email addresses, nor any other identifying information. To help assure website security, the website and supporting technology underwent a rigorous certification and accreditation process. The study was approved by the institutional review boards of the NYCDOHMH and the Centers for Disease Control (CDC, 2007b).

Survey Instrument

The questionnaire collected information on demographics (race/ethnicity, age, education), Internet usage behaviors (personal, work), sex and drug use behaviors (main and casual partners, group sex, injection and non-injection drug use), HIV and STD

testing experiences, access to local HIV prevention services (individual or group counseling) and participation in HIV prevention activities (condom use at last sexual encounter, and Internet-based HIV prevention sessions). Participants could refuse to answer any survey questions. For those interested participants, the questionnaire contained links to HIV information and prevention resources. The survey took approximately 30 minutes to complete unless the respondent reported an extensive drug and/or sexual history, in which case additional questions were asked. For example, those reporting a history of injection drug use were asked about use of clean needles and cookers, and those with extensive sexual histories were asked about their participation in group sex activities, their experience with performance enhancing drugs (Viagra, Levitra, or Cialis), and condom use when using drugs (CDC, 2007b).

SAMPLE

Approximately 1.3 million impressions (pop ups) of the WHBS banner advertisements appeared on monitors across the NYC metropolitan area and approximately 4,700 men clicked on the banner advertisements and were directed to the survey. Overall, 4,143 men were eligible. Of those eligible, 2,046 (49%) completed the questionnaire. Of those completing the questionnaire, 1,700 (83%) reported sex with another man in the past 12 months. These 1,700 comprise the analysis sample (Figure 2.1).

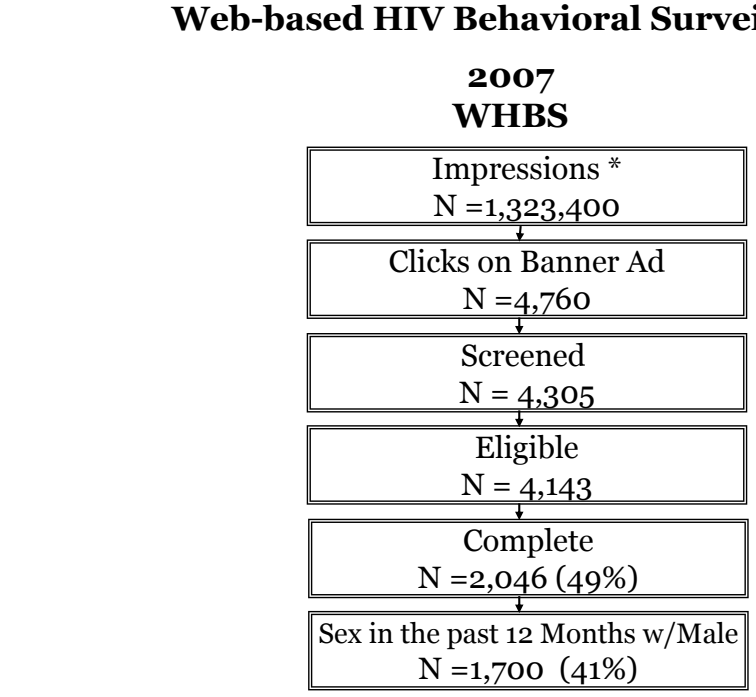

FIGURE 2.1, WHBS Analysis Sample

LIMITATIONS

Since cross-sectional studies capture a subset of a population at one particular point, findings can only be generalized to MSM who completed the survey among the WHBS-participating websites. Further, WHBS data are self-report and subject to bias. Notwithstanding the anonymity of the survey, the nature of some of the questions asked—illicit drug use, number of sex partners, group sex participation—might makes responses prone to social desirability leading to underreporting. It should also be noted that there was under representation of non-White MSM, which may be related to differential access to the Internet, types of WHBS-participating websites (only 1 WHBS-participating website catered specifically to MSM of color), and types of models used in

the recruitment banner advertisements (limited racial diversity). Finally, as with all cross-sectional studies, WHBS can only indicate associations between variables and not causality.

HUMAN SUBJECTS

Potential Risks

WHBS posed minimal risk for participants. Survey questions on drug use or sexual behavior had the potential of making participants uncomfortable.

Methods to Minimize Risk

In an effort to minimize risk, WHBS contained within the survey instrument a "quick hide" button and an "emotional help" button within every page. The former button could be used in instances where the participant taking the survey found the immediate need to exit the survey to maintain privacy; the latter could be used in instances where the participant experienced an adverse reaction in the midst of taking the survey. It would direct individuals to phone numbers for local referral services. Also, if the WHBS website was bookmarked, the link to it was inoperable.

To further minimize risk, WHBS in its entirety (the website and supporting technology) underwent a rigorous certification and accreditation process. WHS did not use cookies, it did not collect IP or email addresses, nor any other identifying information; hence, the potential for loss of privacy was minimized (CDC, 2007b).

Voluntary registration and Reimbursement

Participants self-selected to participate in the WHBS. Participants could refuse to answer any questions and they could withdraw at any moment from the survey. The survey was voluntary and it offered no incentive for participation.

Informed Consent

All WHBS participants were asked a series of screening questions to verify eligibility for the study. Eligible participants were directed by the WHBS website to a consent page upon which participants had to read an informed consent statement and consent to participation by pressing an "I Agree" button prior to beginning the survey. Those that were ineligible or did not consent to participate in the study were redirected to a referral page on local HIV services. The WHBS website included a feature which did not allow individual to press the "back" button on their browser to reenter the website (CDC, 2007b).

DATA USE AGREEMENT

Remote access to WHBS data was made possible by signing a contract with the HIV Epidemiology Program of the NYCDOHMH. The contract specifically indicates that only I—the author of this dissertation—will have access to the data in my home computer and that it will only be used for the purpose of completing the dissertation. There was little to no concern over participant confidentiality as WHBS did not collect any personal identifying information. Zip code was dropped from the data set to further de-identify the data. Upon completion of the dissertation all data is to be destroyed using standard electronic media destruction devices.

National HIV Behavioral Surveillance (NHBS)

Study Design

As indicated earlier, this dissertation will also use data from the Centers for Disease Control and Prevention's (CDC) National HIV Behavioral Surveillance (NHBS)

which was launched in 2003 to monitor trends in HIV risk behaviors. As with WHBS, only data from the local implementation of NHBS will be analyzed.

NHBS research activities are implemented in data collection cycles which focus on men who have sex with men (NHBS-MSM), injecting drug users (NHBS-IDU), or heterosexuals at risk of HIV infection (NHBS-HET). These cycles are repeated over time in subsequent rounds such that data are collected from any given risk group every three years. The primary objective of NHBS is conducting behavioral surveillance among a representative group of people at high risk for infection HIV. Risk and HIV testing behaviors are assessed as are exposure to, use of, and impact of HIV prevention services.

In 2008 NYCDOHMH conducted its second cycle of data collection of NHBS-MSM (NHBS-MSM2) at randomly selected NYC venues such as bars, clubs, parks, restaurants, gyms, and public strolls. This data collection year was the most comparable to the WHBS collection cycle and is therefore used for this dissertation. Eligibility was similar to WHBS and included being born male, at least 18 years old, NYC resident, and the ability to speak English or Spanish.

The NHBS cycle used venue-based time-space sampling which is a systematic method of enumerating attendees of a particular venue such as a bar, club, particular area of a park, or a community based organization and then picked a representative sample to be interviewed. First, staff construct a "universe" of MSM-identified venues where MSM can be interviewed. Once the universe of MSM venues is identified a monthly sampling frame of venues and venue-specific day-time periods are selected. Finally, surveillance of MSM is conducted at venues and day-time periods that are randomly sampled from constructed frames (Gallagher, 2007).

Survey Instrument

NHBS collected much of the same information collected by WHBS. In many instances it collected the same information from identical questions which make the two studies ideal for comparative purposes. It collected information on demographics (race/ethnicity, age, education), Internet usage behaviors (personal, work), sex and drug use behaviors (main and casual partners, group sex, injection and non-injection drug use), HIV and STD testing experiences, access to local HIV prevention services (group counseling) and participation in HIV prevention activities.

The survey took approximately 30 minutes to complete unless the respondent reported an extensive drug and/or sexual history, in which case additional questions were asked. Additional minutes were required if the participant completed the HIV testing component (CDC, 2007a).

Sample

Initiation of NHBS required the development of two sampling frames—a venue frame and a day-time frame. A venue frame was developed by selecting venues where recruitment would occur during the recruitment month; a day-time frame was developed by selecting the day-time periods when recruitment would occur at the venues chosen.

Overall, 1130 men were approached to participate. Of those, 781 were intercepted, of whom 581 were screened. Five-hundred and seventy three (573) were eligible. Of those eligible, 550 reported sex in the past 12 months. These 550 comprise the analysis sample (Figure 2.2).

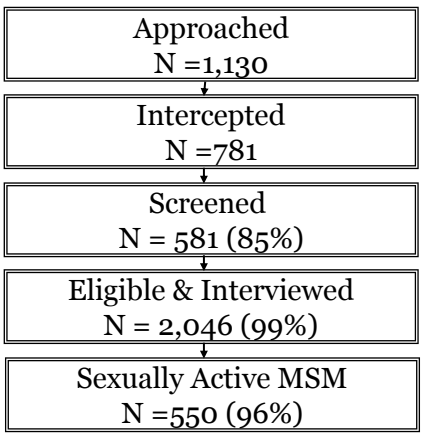

FIGURE 2.2, NHBS Analysis Sample

LIMITATIONS

The limitations of NHBS are very similar to those of WHBS. As with WHBS, NHBS is a cross-sectional study that captures a subset of a population at one particular point; hence, findings can only be generalized to MSM who completed the survey among the NHBS-participating venues. NHBS data are self-report and subject to bias. And, as with WHBS, the nature of some of the questions asked—illicit drug use, number of sex partners—might makes responses prone to social desirability leading to underreporting. Finally, NHBS cannot infer causal relationships between variables; it can only indicate associations between them.

HUMAN SUBJECTS

POTENTIAL RISKS

NHBS posed minimal risk for participants. As with WHBS, survey questions on drug use or sexual behavior had the potential of making participants uncomfortable. Also, the potential for loss of some privacy existed, as participants approached in public settings could be recognized by their acquaintances.

Methods to Minimize Risk

NHBS followed several procedures to minimize risk to participants. First, NHBS maintained anonymity of the participants. Participant names were not included in any NHBS data collection instruments. Second, NHBS protected the electronic security of surveillance databases**.** Electronic databases containing NHBS data were protected using coded passwords. And, third, NHBS protected the transmission of electronic data. NHBS data was transmitted to CDC using an Internet-based system referred to as the Secure Data Network (SDN), which was encrypted before being sent to CDC (CDC, 2007a).

Voluntary registration and Reimbursement

Participation in NHBS, including the survey and HIV testing, was completely voluntary. Participants could refuse to take the survey or the HIV test. Participants could elect to participate in the survey and refuse the HIV test but not the inverse. Once participants had started the survey, they could refuse to answer any question. The participant could end the survey at any moment.

A $25 cash incentive was offered to participants for their participation in the NHBS survey. For participants who completed the HIV testing component of the study, an additional $25 cash incentive was offered (CDC, 2007a).

Informed Consent

In NHBS, participants took part in an informed consent process prior to beginning the survey. Consent information was read to each participant, as some participants might have had difficulty reading and comprehending a written consent form (CDC, 2007a).

DATA USE AGREEMENT

Remote access to NHBS data was not made accessible for this dissertation. NHBS data was only accessible at NYCDOHMH premises. Nonetheless, a contract had to be signed with the HIV Epidemiology Program of the NYCDOHMH. The contract specifically indicates that only the author of this dissertation would have access to the data and that it would only be used for the purpose of completing the dissertation. As with WHBS there was little concern over participant confidentiality in NHBS as it did not collect any personal identifying information. And as with WHBS, zip code was dropped from the data set to further de-identify the data.

DATA ANALYSIS PLAN

VARIABLE SELECTION

Drug use, number of sexual partners, use of performance enhancing drugs, and group sex participation are the primary variables selected for analysis. They were selected because though the medical community has established that the transmission of HIV can be facilitated by biological mechanisms including the concentration of HIV in body fluid, the susceptibility of mucous membranes in the anus, vagina, or mouth, and the strain of the virus transmitted (Smith, 2001) it is also possible that ease of access provided by the Internet to behaviors including drug use, number of sexual partners, use of performance enhancing drugs, and group sex participation may also play a role in risk (Cooper, Morahan-Martin, Mathy, & Maheu, 2002; Cooper et al., 1999; King, 1999).

MSM who use recreational drugs, including performance enhancing drugs for sustained sexual behavior, and MSM who have multiple sex partners, including those who engage in group sex events may be at increased risk not only for exposure to HIV but other STDs. Researchers have found that abrasions resulting from ulcerative/ inflammatory STDs such as syphilis or genital herpes can increase HIV shedding in the genital tract in HIV-infected individuals, increasing the likelihood of HIV transmission to their sex partners (Fleming & Wasserheit, 1999; Mimiaga et al., 2009; Smith, 2001). In HIV-negative individuals these STDs increase the susceptibility to HIV infection by disrupting the mucous membranes or by increasing the presence of inflammatory cells, including the cells HIV targets (Ciesielski, 2003). With repeated exposure, due to drug use, multiple sex partners, or even due to use of performance enhancing drugs that allow for extended and repeated exposure MSM may place themselves at risk to STDs that facilitate the transmission of HIV.

For MSM, the route of transmission may also help determine the individual's general risk. The level of risk can be determined by the frequency and type of sexual contact, with experts generally agreeing that the greatest risk is in sexual behavior that involves penetration of the anus and the lowest risk is in non-penetrative sexual behavior such as oral sex (Varghese, Maher, Peterman, Branson, & Steketee, 2002). These sexual roles are important as studies have found a relationship between sexual roles (identifying as top, bottom, or versatile) and HIV transmission (Tovanabutra et al., 2002). Given differences in HIV transmissions, versatile MSM—that is, MSM that engage in both insertive and receptive anal sex—are capable of becoming infected efficiently while assuming a receptive sexual role and then transmitting the virus while assuming an

insertive sexual role. Though sexual roles help identify levels of sexual risk, in all instances of sexual contact, the odds of HIV transmission increase with repeated exposure (Smith, 2001) and repeated exposure due to behaviors including drug use, number of sexual partners, use of performance enhancing drugs, and group sex participation may increase it.

Univariate Analysis

To begin addressing the proposed hypotheses, the initial phase of analysis included univariate statistics to describe all relevant variables in the WHBS and NHBS data sets. Univariate analysis helped develop to frequency distribution tables with the listing of possible values for each variable together with a tabulation of number of observations in each category. These distribution tables allowed the researcher to review the range of values, as well as the central tendency of the values (mean, median, and mode) and the dispersion of sociodemographic variables. In brief, these frequency distribution tables began to assess the first layer of WHBS and NHBS datasets by describing the age, race/ethnicity, and educational level of the sample. Other variables that address the hypothesis—using univariate statistics—included but are not limited to MSM who report meeting sex partners online, MSM who report attending offline venues for socialization, number of sex partners, use of drugs, use of performance enhancing drugs, and group sex participation.

Bivariate Analysis

Bivariate statistics, including crosstabs and odds ratios were used to explore the proposed hypothesis. Specifically it was used to explore the relationship between MSM who do and do not report meeting a sex partner online in the past 12 months and sexual

risk behaviors such as UAI, multiple sex partners, drug use including performance-enhancing drugs, and attendance of group sex events. This proposed was done for both the WHBS and NHBS datasets. Generally, the expectation is that the proposed analysis will yield findings that help inform the role the Internet plays in sexual risk. Specifically, the expectation is that the findings will support the proposed hypothesis.

Bivariate analysis also explored overlap—if any—between MSM who report having met a sex partner online in the past 12 months and MSM who report attending offline risk-associated social venues (RAVs)—that is, MSM who report attending circuit parties and sex establishments. The goal of this component of the analysis is to explore if there is an overlap between MSM who report online sex partnerships and who also attend offline RAVs. Are MSM who report online sex partnerships also attending RAVs? If so, how does this inform the sexual risk behaviors of these MSM? If not, how are the MSM who report online sex partnerships but who do not attend offline RAVs different? This analysis provided insight into the general discussion about MSM and the venues—online or offline—that they attend. In particular it offered insight into the larger question of whether the Internet functions as an independent source of risk or whether if functions as a medium that facilitates it.

Multivariate Analysis

The hypothesis was tested using multiple logistic regression analysis. Specifically, multiple regression analysis was used to measure the effects and magnitude of the effects of independent variables on the dependent variables. Age, race, and education are background factors that were used as controls.

Five primary regression models were used be used to test the hypothesis. They are listed below:

(1) Y1 (UAI) ~ $b_0 + b_1 *X_1 + b_2 *X_2 + b_3 *X_3 + b_4 *X_4 + u$

(2) Y2 (number of sex partners) ~ $b_0 + b_1 *X_1 + b_2 *X_2 + b_3 *X_3 + b_4 *X_4 + u$

(3) Y3 (drug use) ~ $b_0 + b_1 *X_1 + b_2 *X_2 + b_3 *X_3 + b_4 *X_4 + u$

(4) Y4 (use of performance enhancing drugs) ~ $b_0 + b_1 *X_1 + b_2 *X_2 + b_3 *X_3 + b_4*X_4 + u$

(5) Y6 (group sex participation) ~ $b_0 + b_1 *X_1 + b_2 *X_2 + b_3 *X_3 + b_4 *X_4 + u$

X1 = online partnership
X2 = age
X3 = race
X4 = education

Using the first model as an example, UAI was regressed on the independent variable of interest (online partnership) while controlling for age, race, and education. In this regression model the b1 coefficient will show how much more likely an individual who meets sex partners online is to engage in UAI, holding age, race, and education constant. The expectation is that this model, which includes online partnership as the independent variable of interest and age, race, and education as background factors, to explain a large proportion of the variance. The R-squared for the equations will be viewed after estimating them to get a sense of how much variation has been accounted for by the independent variables.

A second model (listed below) was tested that used attendance of risk associated venues as the dependent variable and online partnerships as the independent variable, while controlling for age, race, and education. For WHBS, this was done to get a better understanding of the association between MSM who report having met a sex partner online in the past 12 months but who also report attending offline RAVs. If MSM are

meeting sex partners online but also attending offline RAVs such circuit parties and sex establishments then it is possible that the Internet may function as a medium that facilitates sexual risk much like offline RAVs themselves function as mediums that facilitate sexual risk—that is, the Internet may not be an independent source of risk.

(1) $Y1 \text{ (attendance of RAVs)} \sim b_0 + b_1 *X_1 + b_2 *X_2 + b_3 *X_3 + b_4 *X_4 + u$

X1 = online partnership
X2 = age
X3 = race
X4 = education

MISSING DATA

Online questionnaires such as WHBS or in questionnaires done with hand-held devices, such as NHBS, it is not possible to skip a question. Many, if not all the questions, have "forced responses." A question must be answered otherwise one cannot continue to the next question; hence, missing values due to the participant are eliminated. WHBS and NHBS should therefore have little to no missing data.

However, if missing data becomes an issue the most common approach will be used, listwise deletion, also known as complete case analysis. This approach to missing data involves omitting those observations with missing data and running the analysis on what remains. Since it is known that WHBS and NHBS will have little to no missing data, concerns of a decrease in sample size and loss of power—often a result of the listwise approach—are minimized.

POWER ANALYSIS

WHBS

The sample size for WHBS was fixed at 1,700. The software package PASS^R was used to determine the power for each of the 5 primary models. For each model, an alpha

of .01 was used based on a Bonferroni correction. It was assumed that the R2 between the online variable and predictors in the model were 5%. PASS^R predicted that a logistic regression of a binary response variable (Y) on a binary independent variable (X) with a sample size of 1,700 observations (of which 40% are in the group X=0 and 60% are in the group X=1) achieved 100% power at a 0.01000 significance level to detect a change in Prob (Y=1) from the baseline value of 0.300 to 0.600.

NHBS

The sample size for NHBS was fixed at 550. PASS^R predicted that a logistic regression of a binary response variable (Y) on a binary independent variable (X) with a sample size of 550 observations (of which 40% are in the group X=0 and 60% are in the group X=1) achieved 100% power at a 0.01000 significance level to detect a change in Prob(Y=1) from the baseline value of 0.300 to 0.600.

STATISTICAL SOFTWARE

The statistical analysis proposed in this study will employ SAS 9.2 (SAS Institute, Cary, NC). SAS provides a range of procedures for analysis and interpretation of data and is capable of handling datasets such as WHBS and NHBS.

CHAPTER 3

FINDINGS

In this chapter, the results of the univariate analysis, describing the sociodemographic characteristics and prevalence of sexual risk behaviors and having met partners online in the past 12 months, are first presented. Next, bivariate relationships are examined, considering the differences between MSM who reported meeting sex partners online in the past 12 months and those who did not and sexual risk behaviors. In the last section, results of the multivariate analysis are presented.

Sociodemographic Characteristics of the Participants

The sociodemographic and background characteristics of WHBS and NHBS participants are displayed in Table 3.1. The mean age of WHBS participants was 28.95 years (SD=9.2). The majority of the sample identified their race as White (63.1%), followed by Hispanics (18.6), Blacks (12.7), and "other" (5.5%). Over two-thirds of the sample identified the U.S. as their birthplace (86.4%) with the remaining men identifying their birthplace as "other" (13.6%). Overall, the participants were well-educated, with 83.6% completing some college.

The mean age for NHBS participants was slightly greater than that of the WHBS participants (34.19 years; SD=11.5). Unlike WHBS participants, NHBS participants were largely Hispanic (35.1%), followed by Whites (31.1%), Blacks (26.9%), and "other" (6.9%). As with WHBS, most NHBS participants identified the U.S. as their birthplace (82.2%) with the remaining men identifying their birthplace as "other" (17.8%). Though NHBS were are largely well-educated, a smaller proportion (65.8%) had some college.

Table 3.1 Sociodemographic Characteristics of WHBS and NHBS Participants

	WHBS (N=1,700)				NHBS (N=550)			
	Mean	SD	n	%	Mean	SD	n	%
Race								
White			1,067	63.1			171	31.1
Black			215	12.7			148	26.9
Hispanic			315	18.6			193	35.1
Other			93	5.5			38	6.9
Age	28.95	9.24			34.19	11.55		
18 – 29			1,053	61.9			227	41.3
30 – 39			394	23.2			151	27.5
40 – 49			195	11.5			106	19.3
50+			58	3.4			66	12.0
Country of Birth								
United States			1,444	86.4			452	82.2
Other			228	13.6			98	17.8
Education								
High School Graduate			277	16.4			188	34.2
Some College			1,414	83.6			362	65.8

Prevalence of Risk Behaviors, Prevention Activities, and HIV Status

As is shown in Table 3.2, over three-fourths of WHBS participants identified as homosexual (85.3), while 12.9% identified as bisexual, 1.3% as other, and less than 1% as heterosexual. Slightly under two-thirds of the sample reported 4 or more sex partners in the past 12 months (61.0%) with a little under half the sample reporting non-injection drug use (44.9%). Though only a small proportion reported use of performance-enhancing drugs such Viagra, Levitra, Cialis (16.1%), a noticeable amount reported participation in group sex (40.0%). Over half the sample reported UAI (51.2%). Of the specific types of risk behaviors in WHBS, UAI had the highest prevalence (51.2%), followed by number of sexual partners (61.0%), and non-injection drug use (44.9%).

Two different variables captured prevention activities. The first captured offline prevention participation (only talk, only group, both, neither); the second captured online or offline participation (yes/no). In the former prevention category, 79.9% of WHBS participants reported no form of participation in prevention activities, followed by only talk (12.5%), only group (3.5%), and both (4.1%). In the later prevention category, which included online prevention, 53.9% of WHBS participants reported some form of participation in prevention activities (any online or any offline prevention) while 46.1% reported none.

HIV testing history results for WHBS participants show that 54.3% of participants reported having an HIV test in the past 12 months while a larger proportion (83.8%) reported ever having an HIV test. On the basis of self-report, 90.6% of the men were HIV-negative, 8.4% were HIV-positive, and 1% were of an unknown status.

In NHBS 79.8% of participants identified as homosexual, while 19.1% identified as bisexual, and 1.1% as heterosexual. As in WHBS, NHBS participants reported more multiple sex partners in the past 12 months (4 or more sex partners, 47.8%) with a little under half of the sample reporting non-injection drug use (48.4%). The use of performance-enhancing drugs in NHBS was almost identical to WHBS (16.0% vs. 16.1%). Participation in group sex activities was at 18.0%. Slightly over half the sample reported UAI (50.7%). Of the specific types of risk in NHBS, UAI had the highest prevalence (50.7%), followed by non-injection drug use (48.4%), and number of sexual partners (47.8%).

Unlike WHBS, the NHBS instrument did not ask specifically about any online or any offline prevention activities; it only asked about offline prevention (only talk, only group, both, neither) and the results followed a similar patterns to WHBS: approximately four-fifths of NHBS participants reported no form of participation in prevention activities (79.6), followed by only talk (11.1%), only group (5.1%), and both (4.2%).

HIV testing history in NHBS participants shows that 60.4 % reported having an HIV test in the past 12 months while a larger proportion (88.7%) reported ever having an HIV test. On the basis of self-report, 74.6% of the men were HIV-negative, 12.9% were HIV-positive, and 12.6% were of an unknown status.

Table 3.2 Prevalence of Risk Behaviors, HIV Status, and Prevention Activities

	WHBS (n=1,700)				NHBS (n=550)			
	Mean	SD	n	%	Mean	SD	n	%
Sexual Preference								
Heterosexual			9	.5			6	1.1
Homosexual			1,438	85.3			439	79.8
Bisexual			218	12.9			105	19.1
Other			21	1.3			-	-
Risk (Past 12 months)								
Number of Partners	12.8	25.5			7.97	20.73		
1			299	17.6			141	25.6
2-3			363	21.4			146	26.6
>=4			1038	61.0			263	47.8
Drug Use								
Yes			757	44.9			266	48.4
No			928	55.1			284	51.6
DPE5 Use								
Yes			274	16.1			88	16.0
No			1426	83.9			462	84.0
Group Sex								
Yes			680	40.0			99	18.0
No			1020	60.0			451	82.0
UAI								
Yes			871	51.2			279	50.7
No			829	48.8			271	49.3

Table Continues

	WHBS (N=1,700)				NHBS (N=550)			
	Mean	SD	n	%	Mean	SD	n	%
Prevention (Past 12 months)								
Only talk			209	12.5			61	11.1
Only group			59	3.5			28	5.1
Both			69	4.1			23	4.2
Neither			1341	79.9			438	79.6
Prevention (Past 12 months)								
None			784	46.1			-	-
Online or Offline			916	53.9			-	-
HIV Testing History (Past 12 months)								
Yes			924	54.3			332	60.4
No			776	45.7			218	39.6
HIV Testing History (Ever)								
Yes			1,424	83.8			488	88.7
No			276	16.2			62	11.3
Self-Report HIV Status								
HIV Negative			1.280	90.6			410	74.6
HIV Positive			118	8.4			71	12.9
Unknown			14	1			69	12.6

Bivariate Analysis. Association of Sociodemographic Variables with Online and Offline Partners of WHBS and NHBS Participants

Bivariate regression analysis was conducted to test for the significance of the relationship between MSM who did and did not report meeting a sex partner online in the past 12 months and sociodemographic characteristics of WHBS and NHBS participants (displayed in Table 3.3). Odds ratios were produced to compare whether the probability of race, age, country of birth, and education was the same for the two groups (meeting sex partners online vs. not meeting sex partners online). MSM who reported meeting any sex partners in the past 12 months were included in the analysis. For WHBS the sample size was 1,700 and 550 for NHBS. WHBS participants who reported at least one sex partner online were included in the "yes" category for having met a sex partner online; the remaining MSM were put in the "no" category. The same was done for NHBS.

In WHBS there were no significant differences between MSM who reported meeting sex partners online and those who reported that they did not meet sex partners online in terms of race, age, country of birth, and education.

Similarly, there were no significant differences in NHBS among MSM who reported meeting sex partners online and those who reported that they did not meet sex partners online in terms of race, age, and country of birth. However, in terms of education in the NHBS sample, MSM who met a sex partner online in the past 12 months were significantly more likely (OR = 1.5, CI = 1.00-2.24, p = .05) to have had some college education.

Table 3.3 Bivariate analysis. Association of Sociodemographic Variables with Online and Offline Partners of WHBS and NHBS Participants

	WHBS (n = 1,700)						NHBS (n = 550)					
	Met sex partner online in the past 12 months						Met sex partner online in the past 12 months					
	n	Yes (%)	No (%)	OR	95% CI	P	n	Yes (%)	No (%)	OR	95% CI	P
Race						.52						.21
White	1,067	71.2	28.8	(ref)			171	34.5	65.5	(ref)		
Black	215	74.0	26	1.15	.82-1.60	.42	148	27.0	73.0	0.70	0.44-1.14	0.15
Hispanic	315	75.2	24.8	1.23	.92-1.64	.16	193	25.4	74.6	0.65	0.41-1.02	0.06
Other	93	73.1	26.9	1.10	.68-1.77	.70	38	34.2	65.8	0.99	0.47-2.07	0.97
Age						.17						.74
18 – 29	1,053	72.0	28.0	(ref)			227	31.7	68.3	(ref)		
30 – 39	394	74.4	25.6	1.13	.87-1.47	.37	151	28.5	71.5	0.86	0.55-1.35	0.50
40 – 49	195	73.3	26.7	1.07	.76-1.51	.70	106	26.4	73.6	0.77	0.46-1.29	0.33
50+	58	60.3	39.7	.59	.34-1.02	.06	66	27.3	72.7	0.81	0.44-1.49	0.49
Country of Birth												
United States	1,444	71.8	28.2	.85	.62-1.17	.32	452	28.7	71.2	0.87	0.54-1.40	0.57
Other	228	75.0	25.0	(ref)			98	31.6	68.4	(ref)		
Education												
High School Graduate	277	70.4	29.6	(ref)			188	23.9	76.1	(ref)		
Some College	1,414	72.6	27.4	1.12	.84-1.48	.45	362	32.0	68.0	1.50	1.00-2.24	0.05

Association of Risk Behaviors, Prevention Activities, and HIV Status with online and offline partners of WHBS and NHBS Participants

As displayed in Table 3.4, in WHBS there was a significant relationship between having met a sex partners online in the past 12 months and the following risk behaviors: four or more sex partners (OR = 13.0, CI = 9.60-17.50, p = <.0001), use of performance enhancing drugs (OR = 1.88, CI = 1.35-2.60, p = .0002), group sex (OR = 3.02, CI = 2.37-3.90, p = .0001), and UAI (OR = 1.50, CI = 1.21-1.86, p = .0002). There was also a significant relationship between having met a sex partners online and the variable that captured offline prevention participation (only talk, only group, both, neither). Participants who met sex partners online were significantly more likely to participate in "only talk" prevention (OR = 1.51, CI = 1.06-2.15, p = .02) and also significantly less likely to participate in "only group" prevention (OR = .53, CI = .31-.9, p = .02) compared to those who had not met a sex partner online. The prevention variable that focused on online or offline participation (yes/no) also showed a significant relationship between participants who met a sex partner online and participating in either online or offline prevention (OR = 1.34, CI = 1.08-1.66, p = .007).

WHBS participants that met a sex partner online were significantly more likely to report having an HIV test in the past 12 months (OR = 1.43, CI = 1.15-1.76, p =.001) and they were more likely to self-report being HIV positive (OR = 2.15, CI = 1.28-3.60, p = .004) compared to those who did not meet a sex partner online. There was no significant relationship between having an online partnership and sexual preference, drug use, and HIV testing history (ever).

In NHBS there was a significant relationship between having met a sex partners online in the past 12 months and the following risk behaviors: four or more sex partners

(OR = 10.66, CI = 5.36-21.20, p = <.001), group sex (OR = 3.13, CI = 2.00-4.89, p = <.001), and UAI (OR = 1.79, CI = 1.23-2.60, p = <.01). Use of performance enhancing drugs was only marginally significant (OR = 1.57, CI = 0.97-2.52, p = .06).

As with WHBS, there was no significant relationship in NHBS between having an online partnership and sexual preference, drug use, and HIV testing history (ever). Further, there was no significant relationship between having an online partnership and HIV testing history (past 12 months), offline prevention, and self-report HIV status.

Table 3.4 Bivariate analysis. Association of Risk Behaviors, Prevention Activities, and HIV Status with online and offline partners of WHBS and NHBS Participants

	WHBS (n = 1,700)						NHBS (n = 550)					
	Met sex partner online in the past 12 months						Met sex partner online in the past 12 months					
	n	Yes (%)	No (%)	OR	95% CI	P	n	Yes (%)	No (%)	OR	95% CI	P
Sexual Preference						.43						0.07
Heterosexual	9	66.7	33.3	.76	.19-3.05	.70	6	33.3	66.6	1.09	0.20-6.03	
Homosexual	1,438	72.5	27.5	(ref)			439	31.4	68.6	(ref)		
Bisexual	218	69.7	30.3	.88	.64-1.20	.40	105	20.0	80.0	0.55	0.33-0.92	
Other	35	82.9	17.1	1.84	.76-4.46	.18	-	-	-	-	-	-
Number of Partners						<.0001						<0.001
1	299	33.1	66.9	(ref)			141	7.1	92.9	(ref)		
2-3	363	63.9	36.1	3.59	2.60-4.94	<.0001	146	22.6	77.4	3.83	1.81-8.11	<0.001
>=4	1,038	86.5	13.5	13.0	9.60-17.50	<.0001	263	44.9	55.1	10.66	5.36-21.20	<0.001
Drug Use												
Yes	757	74.2	25.8	1.19	.96-1.48	.12	284	31.7	68.3	1.27	0.88-1.84	.20
No	928	70.8	29.2	(ref)			266	26.7	73.3	(ref)		
DPE5 Use												
Yes	274	81.8	18.2	1.88	1.35-2.60	.0002	88	37.5	62.5	1.57	0.97-2.52	0.06
No	1,426	70.5	29.5	(ref)			462	27.7	72.3	(ref)		
Group Sex												
Yes	680	84.4	15.6	3.02	2.37-3.90	.0001	99	50.5	49.5	3.13	2.00-4.89	<0.001
No	1,020	64.2	35.8	(ref)			451	24.6	75.4	(ref)		
Past 12 months												
UAI												
Yes	871	76.2	23.8	1.50	1.21-1.86	.0002	279	35.1	64.9	1.79	1.23-2.60	<0.01
No	829	68.2	31.8	(ref)			271	23.3	76.8	(ref)		

Table Continues

	WHBS						NHBS					
	Met sex partner online in the past 12 months						Met sex partner online in the past 12 months					
	n	Yes (%)	No (%)	OR	95% CI	P	n	Yes (%)	No (%)	OR	95% CI	P
Prevention (Past 12 months)						.009						.32
Only talk	209	79.4	20.2	1.51	1.06-2.15	.02	61	37.7	62.3	1.55	0.89-2.71	0.12
Only group	59	57.6	42.4	.53	.31-.9	.02	28	35.7	64.3	1.42	0.64-3.17	0.39
Both	69	73.9	26.1	1.11	.64-1.92	.71	23	21.7	78.3	0.71	0.26-1.96	0.51
Neither	1,341	71.9	28.1	(ref)			438	28.1	71.9	(ref)		
Prevention (Past 12 months)												
None	784	69.1	30.9	(ref)			-	-	-	-	-	-
Online or Offline	916	75.0	25.0	1.34	1.08-1.66	.007	-	-	-	-	-	-
HIV Testing History												
Yes	924	75.5	24.5	1.43	1.15-1.76	.001	332	28.3	71.7	0.89	0.61-1.29	.54
No	776	68.4	31.6	(ref)			218	30.7	69.3	(ref)		
HIV Testing History (Ever)												
Yes	1,424	73.2	26.8	1.30	.98-1.72	.07	62	30.7	69.4	0.93	0.52-1.65	0.80
No	276	67.8	32.2	(ref)			488	29.1	70.9	(ref)		
Self-Report HIV Status						.004						0.46
HIV Negative	1,280	72.1	27.9	(ref)			410	28.1	71.9	(ref)		
HIV Positive	118	84.8	15.2	2.15	1.28-3.60	.004	71	35.2	64.8	1.39	0.82-2.38	.22
Unknown	302	68.2	31.8	.83	.63-1.09	.18	69	30.4	69.6	1.12	0.64-1.96	.68

The hypothesis that MSM who report meeting sex partners online are more likely to engage in risk behaviors was examined using 5 multiple linear logistic regression models that used 5 dependent variables (UAI, number of sex partners, drug use, use of performance enhancing drugs, and group sex) and Internet partnership in the past 12 months (yes/no) as the independent variable while controlling for age, race, and education. This analysis was done for both WHBS and NHBS for a total of 10 regression models used to test the hypothesis. The results of the logistic regression analysis are displayed in Table 3.5.

Model 1

The logistic regression analysis for WHBS in Model 1 suggest that there is a strong association between meeting a sex partner online and UAI (AOR = 1.52, CI = 1.22-1.88, p =.0002). Age was also associated with UAI (AOR = .99, CI = 0.98-1.00, p =.04). In NHBS the logistic regression analysis in Model 1 also suggest that there is a strong association—though not as strong as in WHBS—between meeting a sex partner online and UAI (OR = 1.85, CI = 1.27-2.72, p =.002). Similarly, age is associated with UAI (OR = .98, CI = 0.97-0.99, p = .03).

Model 2

Model 2 for both WHBS and NHBS suggest that there is a strong association between meeting a sex partner online and having more than 1 sex partner in the past 12 months (WHBS: OR = 8.76, CI = 6.62-11.59, p = <.0001; NHBS: OR = 7.62, CI = 3.86-15.01, p = <.0001). In NHBS age is associated with having more than 1 sex partner in the past 12 months (OR = .98, CI = 0.96-0.99, p = .01).

Model 3

Model 3 for both WHBS and NHBS indicates that there is no association between meeting a sex partner online and non-injection drug use; however, for both WHBS and NHBS there is an association between age and non-injection drug use, though the association is stronger for WHBS (WHBS: OR = .98, CI = 0.97-0.99, p = <.0001; NHBS: OR = .0.98, CI = 0.96-0.99, p = .004). Model 3 for WHBS and NHBS also indicates that there is an association between being White and non-injection drug use (WHBS: OR = 1.66, CI = 1.22-2.26, p = .001; NHBS: OR = 1.76, CI = 1.11-2.81, p = .02).

Model 4

In Model 4 for both WHBS and NHBS there is an association between meeting a sex partner online and use of performance enhancing drugs, though the association is much stronger for WHBS (WHBS: OR = 2.28, CI = 1.59-3.28, p =<.0001; NHBS: OR = 1.61, CI = 0.98-2.66, p = .06). And as in Models 1 and 3—for WHBS—and in Models 1, 2 and 3—for NHBS—age continued to be associated with the outcome variable, in this case with use of performance enhancing drugs. In NBHS being White is associated with use of performance enhancing drugs (OR = 2.35, CI = 1.17-4.73, p = .02).

Model 5

The 5th logistic regression model for both WHBS and NHBS suggests that there is an association between meeting a sex partner online and participation in group sex (WHBS: OR 3.12, CI = 2.43-3.99, p = <.0001; NHBS: OR 3.14, CI = 1.99-4.94, p = <.0001). Again, as in Models 1, 3, and 4—for WHBS—age is associated with the outcome variable, in this case with participation in group sex.

Table 3.5 Logistic Regression. Association of Past-Year Online Partnerships with Past-Year Sexual Risk Factors and Drug Use in WHBS and NHBS

	Model 1		Model 2		Model 3		Model 4		Model 5	
	UAI		>1 Sex Partner		Non-Injection Drug Use		PDE5 Use		Group Sex	
	WHBS AOR (95% CI)	NHBS AOR (95% CI)	WHBS AOR (95% CI)	NHBS AOR (95% CI)	WHBS AOR (95% CI)	NHBS AOR (95% CI)	WHBS AOR (95% CI)	NHBS AOR (95% CI)	WHBS AOR (95% CI)	NHBS AOR (95% CI)
Online Partners										
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.52 (1.22-1.88) **p = .0002**	1.85 (1.27-2.72) **p = .002**	8.76 (6.62-11.59) **p = <.0001**	7.62 (3.86-15.01) **p = <.0001**	1.20 (0.96-1.49)	1.23 (0.84-1.79)	2.28 (1.59-3.28) **p = <.0001**	1.61 (0.98-2.66) **p = .06**	3.12 (2.43-3.99) **p = <.0001**	3.14 (1.99-4.94) **p = <.0001**
Age										
Continuous	0.99 (0.98-1.00) **p = .04**	0.98 (0.97-0.99) **p = .03**	0.99 (0.97-1.00)	0.98 (0.96-0.99) **p = .01**	0.98 (0.97-0.99) **p = <.0001**	0.98 (0.96-0.99) **p = .004**	1.11 (1.09-1.12) **p = <.0001**	1.05 (1.03-1.07) **p = <.0001**	1.02 (1.01-1.03) **p = .003**	1.00 (0.98-1.02)
Race/Ethnicity										
Black	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hispanic	1.33 (0.94-1.90)	1.26 (0.81-1.95)	0.79 (0.47-1.34)	0.94 (0.57-1.57)	1.17 (0.81-1.64)	1.22 (0.79-1.89)	1.71 (0.97-3.00)	2.16 (1.06-4.40) **p = .03**	1.25 (0.86-1.82)	1.57 (0.85-2.87)
White	1.51 (1.12-2.05)	1.14 (0.72-1.83)	0.76 (0.49-1.20)	1.32 (0.76-2.29)	1.66 (1.22-2.26) **p = .001**	1.76 (1.11-2.81) **p = .02**	1.42 (0.88-2.30)	2.35 (1.17-4.73) **p = .02**	1.41 (1.02-1.94)	1.73 (0.92-3.26)
Other	1.22 (0.74-1.99)	0.51 (0.24-1.08)	0.48 (0.24-0.95) **p = .04**	1.08 (0.45-2.60)	1.33 (0.81-2.20)	1.14 (0.55-2.35)	0.55 (0.21-1.45)	2.20 (0.76-6.38)	1.07 (.64-1.82)	0.89 (0.30-2.62)
Education										
H.S. or Less	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Some College	0.90 (0.68-1.18)	0.77 (0.52-1.13)	2.19 (1.51-3.17) **p = <.0001**	0.80 (0.51-1.26)	1.20 (0.91-1.59)	0.86 (0.59-1.26)	1.37 (0.82-2.27)	1.22 (0.69-2.16)	1.07 (0.80-1.44)	0.91 (0.55-1.53)

To further examine the hypothesis that MSM who report meeting sex partners online are more likely to engage in risk behaviors bivariate analysis explored overlap between MSM who report having met a sex partner online in the past 12 months and MSM who report attending offline risk-associated social venues (RAVs)—that is, MSM who report attending circuit parties and sex establishments. Finally, a logistic model was tested that uses attendance of RAVs as the dependent variable and online partnerships as the independent variable, while controlling for age, race, and education. This bivariate analysis and a multivariate logistic regression model discussed above was done only for WHBS, as there is no comparable question for analysis in the NHBS instrument.

Association of Risk Associated Venues (RAVs) with Online and Offline Partners of WHBS Participants

Table 3.6 shows that though there is over lap between MSM who meet sex partners online and attended RAVs (73.31%), there is no significant associations between having met a sex partner online and attending RAVs (OR = 1.12, CI = 0.91-1.39, p = .28).

Table 3.6 Bivariate analysis. Association of Risk Associated Venues (RAVs) with Online and Offline Partners of WHBS Participants

	WHBS (n = 1,700)						NHBS* (n = 550)					
	Met sex partner online in the past 12 months						Met sex partner online in the past 12 months					
	n	Yes (%)	No (%)	OR	95% CI	P	n	Yes (%)	No (%)	OR	95% CI	P
RAVs												
Yes	963	73.31	26.69	1.12	0.91-1.39	.28	-	-	-	-	-	-
No	737	70.96	29.04	(ref)			-	-	-	-	-	-

* no comparable question for analysis in NHBS instrument

Finally, Table 3.7 indicates that there is no association between meeting a sex partner online and RAVs. However, there was an association between age (OR = 1.02, CI = 1.00-1.03, p = .006), being Hispanic (OR = 1.42, CI = 0.99-2.03, p = .05), and having some college education (OR = 1.33, CI = 1.01-1.75, p = .05).

Table 3.7 Logistic Regression. Association of Past-Year Online Partnerships with Risk Associated Venues (RAVS) in WHBS

	Risk-Associated Venues WHBS			Risk-Associated Venues NHBS*		
	AOR	95% CI	P	AOR	95% CI	P
Online Partners						
Yes	1.00			-	-	-
No	1.13	0.91-1.41		-	-	-
Age						
Continuous	1.02	1.00-1.03	.006	-	-	-
Race/Ethnicity						
Black	1.00			-	-	-
Hispanic	1.42	0.99-2.03	.05	-	-	-
White	1.17	0.87-1.58		-	-	-
Other	0.84	0.51-1.37		-	-	-
Education						
H.S. or Less	1.00			-	-	-
Some College	1.33	1.01-1.75	.05	-	-	-

* no comparable question for analysis in NHBS instrument

CHAPTER 4

DISCUSSION

Purpose of Study

This is one of the first studies in a large HIV epicenter such as NYC to look at the sexual risk behaviors of MSM who meet sex partners over the Internet using different recruitment methodologies. The focus of this study is to examine the association between sexual risk behaviors including UAI, drug use, number of sexual partners, use of performance enhancing drugs, group sex participation, RAVs, and meeting sex partners over the Internet among WHBS MSM recruited online and NHBS MSM recruited offline. This discussion will highlight the major findings of the study in relationship to the proposed hypothesis. The implications of the findings for social work policy, practice, and research are then discussed and followed by the study limitations and conclusions.

The study examined the following questions:

1. What are the socidemographic characteristics of the WHBS and NHBS participants?

2. What is the prevalence of sexual risk behaviors among WHBS and NHBS participants?

3. What differences in socidemographic characteristics and sexual risk behaviors emerged between MSM who reported meeting sex partners over the Internet and MSM who did not in WHBS and NHBS?

4. Are WHBS MSM who reported meeting sex partners online also attending offline risk-associated social venues such as circuit parties and sex establishments (no comparable variable available in the NHBS questionnaire for analysis)?

Hypothesis

MSM who report meeting sex partners online are more likely to engage in risk behaviors even after controlling for differences in age, race/ethnicity, and education.

Discussion of the Findings: Research Questions

Sociodemographic Characteristics of WHBS and NHBS Participants

Though the average age of WHBS participants was 28.95 years almost 15% of the sample was 40 years of age or older. Most of the sample was White (63.1%); however, combined, Hispanics and Blacks accounted for 31.3% of the sample. Over two-thirds of the sample identified the U.S. as their country of birth (86.4%). The WHBS participants were well educated with 83.6% completing some college. The sociodemographic characteristics of WHBS participants are comparable to other Internet-based studies of MSM (Chiasson et al., 2007; Hooper et al., 2008; Raymond et al., 2010).

The mean age for NHBS participants was slightly greater than that of the WHBS participants (34.19 vs. 28.95). Unlike WHBS participants, NHBS participants were largely Hispanic (35.1%), followed by Whites (31.1%), Blacks (26.9%), and "other" (6.9%). As with WHBS, over two-thirds of NHBS participants identified the U.S. as their birthplace (82.2%). Similarly, the NHBS sample was well-educated with 65.8% having had some college. The sociodemographic characteristics of NHBS participants are comparable to other venue-based studies of MSM (Benotsch et al., 2002; Raymond et al., 2010).

Prevalence of Risk Behaviors, Prevention Activities, and HIV Status of WHBS and NHBS Participants

Number of Partners

One of this study's important finding is that slightly under two-thirds (61.0%) of the WHBS sample and almost half (47.8%) of the NHBS sample reported 4 or more sex partners in the past 12 months. This finding is consistent with findings from previous research. A study at a Denver Public Health HIV Counseling and Testing Site found that 68.9% of their sample reported multiple sex partners in the past 12 months (McFarlane et al., 2000). And in their online study of MSM, Hirshfield et al. (2006) found that the majority of MSM in their study sample reported more than one sex partner during the past six months. Similar findings have been found in other countries (Leobon & Frigault, 2008).

Non-injection Drug Use

Almost 45% of the WHBS sample reported non-injection drug use, which is higher than what Chiasson et al. (2007), Horvath et al. (2008), and Rosser et al. (2009) found in each of their online studies of MSM (25%, 11%, 23.7%, respectively). The high prevalence of non-injection drug use in this study may partly be explained by the number and type of completed surveys in WHBS. In WHBS 25% of the completed surveys were from manhunt.net, an explicitly "hook up" website where MSM willing to "party" might be more accessible or available whereas surveys completed by participants in studies by Horvath et al. study and Rosser et al. (also known as the MINTS: Men's INTernet Sex Study) were from gay.com, a social networking site for the gay, lesbian, bisexual, and transgender community that unlike manhunt.net also covers news and local events. Chiasson's study included MSM from the U.S. and Canada while MSM in WHBS were only from NYC, a city with a denser population of drug users, which may partly explain the higher prevalence of drug use.

The NHBS MSM sample reported slightly more drug use (48.4%) in the past 12 months than the WHBS sample. This finding is consistent with previous venue-based research (Raymond et al., 2010; Taylor et al., 2004).

Performance Enhancing Drugs (Viagra, Levitra, Cialis)

Use of performance-enhancing drugs such as Viagra, Levitra, Cialis by both the WHBS and NHBS sample were nearly identical (16.1% and 16.0%, respectively) These findings are comparable to what others have found (Chiasson et al., 2007; Hirshfield, Remien, Walavalkar, & Chiasson, 2004).

Group Sex

Participation in group sex was reported by 40% of the WHBS participants and less than half of that in NHBS participants (18%). Findings in WHBS and NBHS MSM are lower than the 59.8% who reported group sex within the last month in the Three or More Study (TOMS) by Prestage et al. (2009). It should be noted, however, that group sex participation in the TOMS study was significantly higher because it was a requirement for eligibility. There are offline studies that report findings on group sex among MSM and heterosexuals (Crosby, DiClemente, & Mettey, 2003; Friedman et al., 2008) but online studies reporting this activity are scarce.

Unprotected Anal Intercourse

Over half the WHBS (51.2%) and NHBS MSM (50.7%) reported UAI in the past 12 months, which is higher than the 36% of MSM who reported UAI (past 3 months) in Horvath et al.'s online study (2008) and higher than the 31% of MSM who reported UAI (past 3 months) in Bolding et al.'s study (2005). It was considerably lower, however,

than the 66.2% of MSM who reported UAI (past 12 months) in Rosser et al.'s (2009) MINTS study.

Though this is difficult to explain with certainty why MSM in this study had a higher proportion of MSM reporting UAI than that found by Horvath et al. (2008) and Bolding et al. (2005), it should be noted that Horvath et al. (2008) and Bolding et al. (2005) studied a 3-month sexual history of MSM and not a 12-month sexual history, as did both WHBS and NBHS.

Participation in Prevention Activities

Participation in prevention activities (online: visited a website on STD prevention; offline: visited a website on STD prevention) among WHBS MSM was 53%. In the Smart Sex Quest Project, a study of MSM and HIV prevention, Bolding et al. (2005) found that 82% of their sample was willing to go to an STD prevention website to obtain information on disease prevention. Findings in WHBS are not as high as that found in the Smart Sex Quest Project, however, findings in WHBS report *actual* participation in online or offline prevention activities while the Smart Sex Quest Project only reports participants' *willingness* to go to an STD prevention website. Unlike WHBS, the NHBS questionnaire did not ask about online or offline participation; hence, there is no data for comparison.

HIV Testing History

Findings in WHBS suggest that MSM are somewhat agreeable to getting an HIV test with 54.3% indicating that they had tested in the past 12 months. Over three-quarters (83.8%) of WHBS MSM indicated that they had ever had an HIV test. This figure is somewhat comparable to a Dutch study by Mikolajczak, Hospers, & Kok (2006). In their

sample of 2,205 MSM they found that 57% had ever had an HIV test. It is unclear why the finding in WHBS is higher, especially since a larger proportion of MSM of Mikolajczak et al. (2006) study reported UAI (57% vs 51.2%). One would expect that a sample of MSM with riskier behavior would test more often. One possible explanation is that WHBS MSM in NYC find it easier to test for HIV while Dutch MSM may find it more difficult to do so.

The findings on HIV testing of NHBS MSM were somewhat similar to those of WHBS MSM: 60.4% indicated they tested for HIV in the past 12 months and 88.7% indicated that they had ever had an HIV test. An offline study by Schwarcz et al. (2007) found a slightly higher proportion (94%) of MSM who had tested for HIV in the past.

Self-Report HIV Status

WHBS findings show that most of the MSM were HIV negative (90.6%) followed by HIV positive MSM (8.4%) and MSM of an unknown HIV status (1%). These figures are almost identical to what Hirshfield et al. (2004) found in their study.

In NHBS the self-report HIV status of MSM differed slightly from those of WHBS MSM. Almost three-quarters (74.6%) reported they were HIV negative, 12.9% indicated they were HIV positive, and 12.6% reported an unknown HIV status.

Comparison of sociodemographic characteristics between WHBS and NHBS participants

Overall, in the bivariate analysis there were no significant associations between WHBS MSM who reported meeting a sex partner over the Internet in the past 12 months and those who did not in terms race, age, country of birth, and education. This is comparable to what others have found (Elford et al., 2001; Kim, Kent, McFarland, & Klausner, 2001). And as with WHBS, there were no significant associations in the

bivariate analysis between NHBS MSM who reported meeting a sex partner over the Internet in the past 12 months and those who did not in terms of race, age, and country of birth. This is comparable to what others have found (Elford et al., 2001; Kim et al., 2001); however, it should be noted that some studies have found differences in sociodemographics (Bull & McFarlane, 2000; Taylor et al., 2004).

While no significant associations in sociodemographic characteristics were found between WHBS MSM who reported meeting a sex partner over the Internet in the past 12 months and those who did not, significant associations were found in number of sex partners, use of performance-enhancing drugs, group sex, UAI, participation in prevention, HIV testing history, and self-report HIV status. There were also significant associations between NHBS MSM who reported meeting a sex partner over the Internet in the past 12 months and number of sex partners, use of performance-enhancing drug (though only marginally), group sex, and UAI.

Number of Partners

WHBS MSM who reported meeting sex partners over the Internet were significantly more likely to report having multiple sex partners in the past 12 months than those who did not report meeting sex partners over the Internet. Specifically, they were 13 times as likely to have four or more partners. This finding is also particularly noteworthy because the risk of exposure to HIV (and potential infection) increases with a greater number of sex partners. Though the odds ratio in this finding is high, it is difficult to claim with certainty that the Internet enhances sexual risk behaviors such as having multiple sex partners. What can be stated with some certainty is that the accessibility of the Internet may increase the availability of MSM willing to engage in

similar behaviors which may lead to sexual risk behaviors such as having multiple sex partners.

The findings in NHBS MSM were similar to those found in WHBS MSM. Compared to MSM with only one sex partner in the past 12 months, MSM who reported 4 or more partners were over 10 times as likely to have met sex partners over the Internet during the same time period. A study by Horvath et al. (2008) also found that meeting sex partners over the Internet was associated with a greater number of sex partners.

The findings in both WHBS and NHBS indicate that despite the type of recruitment—online or offline—in these two samples, MSM who met sex partners over the Internet were significantly more likely to have multiple sex partners. This by no means proves that the Internet accentuates sexual risk behaviors such as having multiple sex partners; however, it does suggest that the Internet may be an environment that affords MSM the possibility to participate in this type of behavior.

Now, other studies reporting number of sex partners over the Internet or in venue-based setting have given results on both sides of the spectrum. For instance, on one end an offline study by Grov, Parsons, & Bimbi (2007) found that 96% of their sample (n=886) reported 30 or fewer partners in the last 3 months while on the opposite end another study found no significant difference in the number of sex partners between the sample recruited over the Internet and the sample recruited in venue-based settings (Rhodes, DiClemente, Cecil, Hergenrather, & Yee, 2002).

It is unclear why Rhodes et al. (2002) found no significant differences in the number of sex partners between their Internet sample and their venue-based sample; however, key to drawing some meaning from their findings which could provide insight

into the present study can be found in their recruitment methodology. Unlike WHBS, Rhodes et al. (2002) did not recruit directly from multiple MSM websites but rather they recruited MSM through electronic mailing lists "announcements"—that is, they did not use banner advertisements. Further, unlike NHBS, who recruited participants from bars, clubs, parks, and community based organizations Rhodes et al. (2002) recruited their sample from two bars in Birmingham, Alabama. It is possible that these recruitment differences reflect the differences between the current study and that of Rhodes et al. (2002). Finally, the number and type of websites catering to MSM have likely increased and changed from a decade ago. Fewer websites and a less diverse Internet environment could have influenced findings by Rhodes et al. (2002) a decade ago; inversely, a greater number of websites and a more diverse Internet environment that caters to varying interests of MSM could have influenced the findings of the current study.

Non-injection Drug Use

Contrary to what was expected, there was no significant association between MSM who met sex partners over the Internet and non-injection drug use in either WHBS or NHBS. The findings in this study, however, are not unique. Ogilvie et al. (2008) in their 'Sex Now' study, conducted at Gay Pride events, also found that there was no association between drug use and meeting sex partners over the Internet.

A non-significant finding in WHBS, though difficult to interpret, suggests two things: first, drug-using MSM may have been using the Internet to find sex partners but were located in sites that were not part of WHBS recruitment; second, drug-using MSM may have been using the Internet to find sex partners and were within websites sampled by WHBS but because of impairment due to drug use may have simply ignored WHBS

banner ads and not participated in the study. Similarly, a non-significant finding in NHBS is difficult to interpret given that other venue-based studies (Benotsch et al., 2002; Taylor et al., 2004) have found associations between MSM who met sex partners over the Internet and non-injection drug use. Though impossible to know for sure, it is possible that recruitment venues of NHBS, of which 58% were from bars, simply differed systematically from the MSM study of Taylor et al. (MSM diagnosed with early syphilis in Los Angeles) and from the MSM study of Benotsch et al. (MSM at a gay pride festival).

Despite the lack of a significant association between MSM who met sex partners over the Internet and non-injection drug use in either WHBS or NHBS, a large proportion of WHBS MSM (74.2%) and almost a third NHBS MSM (31.7%) who met sex partners over the Internet did reported drug use suggesting that regardless of where recruitment occurred—over the Internet (WHBS) or in venue-based settings (NHBS)—drug use is fairly common.

Performance-enhancing Drugs

Compared to MSM who did not use performance-enhancing drugs in the past 12 months, WHBS MSM who used these drugs were almost twice as likely to have met sex partners over the Internet during the same time period. These results are supported by the 'Sex Now' study (Ogilvie et al., 2008) and by Schwarcz et al. (2007) that also showed a statistically significant association between use of performance-enhancing drugs and meeting sex partners over the Internet. The findings in WHBS MSM are important because the prolonged physical sexual arousal that these drugs provide may not only increase sexual activity but also the stamina necessary to engage in penetrative sex with

multiple partners. This analysis found only a marginal association between NHBS MSM who met sex partners online and performance-enhancing drugs ($p = .06$).

Group Sex

As with number of sex partners, group sex was significantly associated with meeting sex partners over the Internet in both WHBS and NBHS MSM. Similarly, a study by Mettey et al. (2003) found that compared to MSM who do not meet sex partners over the Internet, MSM who meet sex partners over the Internet are more likely to report having group sex in the past 3 months. And just as the finding on the number of sex partners is of importance, so too is group sex because group sex, by definition, allows for multiple sex partners at one time and with increased number of partners there maybe be an increased likelihood of exposure to HIV and other STDs. Again, these findings do not prove that the Internet somehow accentuates group sex activities but it does seem to indicate that the Internet may provide an easily accessible forum that allows MSM to find like-minded men.

Unprotected Anal Intercourse

As predicted, UAI in the past 12 months was also associated with meeting sex partners over the Internet in both WHBS and NHBS. While prior research has established this association as well (Benotsch et al., 2002; Hospers et al., 2002) other research has not. A study of MSM attending a sex resort (Mettey et al., 2003) and a study of MSM attending an STD clinic (Taylor et al., 2004) found no difference in condom use between those who met sex partners over the Internet and those who did not.

Studies like that of Benotsch et al. (2002) and the current study that have found an association between meeting sex partners over the Internet and UAI and studies like those

of Taylor et al. (2004) and Mettey et al. (2003) that did not make it difficult to asses whether the Internet accentuates UAI or whether it draws in those who already engage in this risky behavior. The sexual behavior of MSM in the studies by Taylor et al. (2004) and Mettey et al. (2003), however, may not be representative of the sexual behavior of MSM who meet sex partners over the Internet. The sexual behavior of MSM in a sex resort or an STD clinic may be the same regardless of the context (within the Internet or outside it). But regardless, the association between UAI and meeting sex partners over the Internet in conjunction with the finding on group sex, use of performance-enhancing drugs, and number of sex partners seem to indicate that the Internet—in some yet undefined capacity—may somehow foster or at the very least not discourage MSM from this behavior.

Participation in Prevention Activities

Participation in prevention activities among WHBS MSM was also associated with meeting sex partners over the Internet. Finding an association between meeting sex partners over the Internet and participation in prevention activities was unexpected in light of the previously noted associations between meeting online sex partners and number of sex partners, performance-enhancing drugs, group sex, and UAI among WHBS MSM. This finding illustrates the problem with the sexual risk behaviors of MSM in general.

On one hand, as the current analysis suggests, MSM report participating in either Internet or venue-based prevention activities, which seems to suggests that they recognize their behavior as high risk. This is important since recognition of one's risky behavior can be an important element in changing behavior. On the other hand, as the current

analysis also suggests, MSM continue to engage in risk behaviors despite their participation in prevention activities. The key to decreasing sexual risk behaviors among this population of MSM, who self report participation in prevention activities, is precisely to continue to focus on their willingness to participate in such activities. An association between meeting sex partners over the Internet and participation in prevention activities should be viewed as promising news as it suggests two things. First, it suggests that MSM who meet sex partners over the Internet may access prevention differently than MSM who do not meet sex partners over the Internet. As Table 3.4 indicates, the proportion of MSM who participated in online prevention activities and who use the Internet to meet sex partners is greater than those who do not. Second, it may indicate that MSM who meet sex partners over the Internet may be open to other innovative forms of prevention activities. A recent study by Chiasson, Shaw, Humberstone, Hirshfield, & Hartel (2009) accomplished this. In their study Chiasson et al. (2009) used an online video targeted to MSM "to promote critical thinking about HIV risk." The researchers found that MSM at high risk for HIV were willing to participate in an online video intervention. Further, they found that after the video intervention MSM were less likely to report a casual partner or UAI in their most recent sexual encounter.

Self-Report HIV Status

Being HIV positive was associated with meeting sex partners online in WHBS MSM. This finding is consistent with previous research (Kalichman, Cherry, Cain, Pope, & Kalichman, 2005) which showed that 37% of sexually active HIV-positive men had used the Internet to meet sex partners.

A study by Ogilvie et al. (2008) found no association between meeting sex partners over the Internet and being HIV positive. It should be noted that this may be due to the type of recruitment method. Unlike WHBS, MSM in a study by Ogilvie et al. (2008) were recruited at gay pride events and though the questionnaire was self-administered it still required face-to-face interaction which may have influenced the decision of MSM to disclose their HIV status. Notwithstanding the findings by Ogilvie et al. (2008), the findings in WHBS MSM are important. An association between meeting sex partners over the Internet and being HIV positive suggests that there may be an increased potential of HIV infection among HIV negative MSM who use the Internet to meet sex partners. However, it could also mean that HIV positive MSM are serosorting—that is, it may mean that HIV positive MSM are going online to meet other HIV positive MSM.

Being HIV positive was not associated with meeting sex partners over the Internet in NHBS MSM. Again, this finding may partly be due also to the recruitment method. NHBS MSM were recruited at offline venues and completed questionnaires face-to-face, which may have influenced their decision of disclose their HIV status.

Risk Associated Venues

There was no significant association between MSM who met sex partners over the Internet and offline RAVs in WHBS. This finding does not indicate that MSM who meet sex partners over the Internet are not also meeting sex partners in venue-based setting; however, it highlights the fact the MSM who meet sex partners over the Internet were no more likely to report meeting sex partners at offline RAVs. They may in fact be meeting sex partners in both settings but this analysis showed no significant association.

In contrast, Garofalo et al. (2007) found that sexual activity at offline venues such as sex clubs or bathhouses was associated with meeting sex partners over the Internet. Findings of Garofalo et al. (2007) and that of the present study contribute to the difficultly in discerning whether the Internet increases behavioral risk or whether it draws men who are predisposed to engage in risky behavior. However, it does suggest that sexual risk behavior that is occurring online might be no different that risk behavior that is occurring offline. A multivariate model further addresses RAVs in the section that follows. As previously noted, a comparable analysis of RAVs was not possible in NHBS.

Discussion of the findings: Hypothesis

The hypothesis was examined using 5 logistic regression models that used 5 dependent variables (UAI, number of sex partners, drug use, use of performance enhancing drugs, and group sex) and Internet partnership in the past 12 months (yes/no) as the independent variable while controlling for age, race, and education. Each of these 5 models was used to examine the hypothesis in both WHBS and NHBS. A final logistic regression model was tested that uses attendance of risk associated venues (RAVs) as the dependent variable and online partnerships as the independent variable, while controlling for age, race, and education.

Model 1: UAI

In this study, MSM in both WHBS and NHBS were significantly more likely to report UAI with sex partners met over the Internet in the past 12 months. Findings in this study are consistent with other studies. A venue-based study by McKirnan et al. (2007) had similar results. In their sample of MSM recruited at venues in Chicago, they found

that MSM who met sex partners over the Internet were more likely to report UAI. And in a study by Benotsch et al (2002), they found that MSM who reported meeting sex partners over the Internet were more likely to engage in UAI compared to those who did not report meeting sex partners over the Internet.

In contrast, some previous research has shown no association between meeting sex partners over the Internet and UAI. In their Internet survey, Chiasson et al. (2007) found that the same proportion of men reported UAI with partners met over the Internet or offline. Similarly, Bolding et al. (2005) and Hospers et al. (2005) found that MSM who met partners over the Internet were no more likely to report UAI.

Findings from the present study and finding like those of Chiasson et al. (2007), Bolding et al. (2005), and Hospers et al. (2005) show the complex nature of the Internet. It is impossible to say that the Internet functions as a medium that facilitates sexual encounters that result in sexual risk behaviors; however, what can be said with certainty is that in this study the findings suggest that the Internet may provide a setting where MSM can meet and engage in these behaviors. Further research into the role the Internet plays in sexual behavior is warranted.

Model 2: Multiple Sex Partners

WHBS and NHBS MSM who reported meeting sex partners over the Internet were significantly more likely to report having multiple sex partners in the past 12 months than those who did not report meeting sex partners over the Internet. This is consistent with what other studies have found. A venue-based study in Atlanta, GA. of MSM attending a gay pride event found an association between MSM who met sex partners over the Internet and a greater number of sex partners in the previous six months

(Benotsch et al., 2002). A venue-based study at the Denver Public Health HIV Counseling and Testing Site also found an association between MSM who met sex partners over the Internet and a greater number of sex partners (McFarlane et al., 2000).

Similarly, studies in other countries have also found this association. An Internet and venue-based study in Sweden (Ross, Tikkanen, & Mansson, 2000) found—where female sex partners where included—that their Internet sample reported a greater number of partners. And a study in Hong Kong of Chinese men (Lau, Kim, Lau, & Tsui, 2003) found that meeting sex partners over the Internet was associated with having a greater number of partners.

But while previous research, including this study, has found that MSM who reported meeting sex partners over the Internet were significantly more likely to report having multiple sex partners it also confirms the need for further investigation as other previous research has also found no difference in the number of reported sex partners between MSM who meet sex partners over the Internet and those who do not (Mettey et al., 2003; Rhodes et al., 2002). Findings from the current analysis illustrate the complex overlay between MSM and the Internet while suggesting that the Internet might be an environment where MSM can go and increase their likelihood of meeting multiple sex partners.

Model 3: Non-Injection Drug Use

Contrary to what was expected, there was no significant association between MSM who met sex partners over the Internet and non-injection drug use in either WHBS or NHBS MSM. And while the relationship between drug use and UAI are well established (Drumright et al., 2006; Halkitis, Green, & Mourgues, 2005; Halkitis,

Palamar, & Mukherjee, 2007; Halkitis, Shrem, & Martin, 2005; Hirshfield et al., 2004; Semple, Zians, Strathdee, & Patterson, 2009) the relationship between MSM who met sex partners over the Internet and non-injection drug is not as clear, as findings have been mixed.

A study of MSM attending a sex resort found that compared to those not seeking sex partners over the Internet, MSM using the Internet to meet sex partners were more likely to use non-injection drugs (Mettey et al., 2003). The same was found in a Los Angeles County study of MSM who had been diagnosed with early syphilis (Taylor et al., 2004). It found that MSM who met sex partners over the Internet were more likely to use non-injection drugs compared to MSM who did not meet sex partners over the Internet.

While the studies by Mettey et al. (2003), Taylor et al. (2004), and Benotsch et al. (2002) found significant associations between MSM who had met sex partners over the Internet and non-injection drug use, a study by Elford et al. (2001) found no significant difference in the use of non-injection drugs and MSM who had or had not used the Internet to find a sex partner.

Although the present study did not show a significant association between online sex partnerships and non-injection drug use, non-injection drug was high among MSM who meet sex partners in WHBS (74.2%). It was much lower among NHBS MSM (31.7%). Again, the findings from this study add to the growing literature on the Internet and MSM and illustrate the difficultly in fully understanding the role the Internet may play in non-injection drug use. At most, what can be said from this analysis is that a large proportion of WHBS MSM who met sex partners over the Internet use non-

injection drugs. At a minimum, what can be inferred from this analysis is that MSM—at least in WHBS—appear to use the Internet as an environment for such activities.

Finally, it is very possible that there is in fact a relationship between MSM and non-injection drug use but it simply wasn't captured in this analysis. It is possible, for instance, that MSM under the influence of non-injection drugs simply ignored WHBS banner ads that appeared in websites they were visiting. Equally likely is the possibility that MSM under the influence of non-injection drugs simply ignored NHBS interviewers or, if in fact they were high and got interviewed, lied about their drug use out fear of unforeseen repercussions or fear of not receiving their $25 incentive. This topic warrants further review.

Model 4: Performance-Enhancing Drugs

When compared to MSM who do not use the Internet to meet sex partners, WHBS and NHBS MSM who used the Internet to meet sex partners were more likely to report use of performance-enhancing drugs, though only marginally so for NHBS MSM. And while studies have shown an association between use of these drugs with sexual risk behaviors (Hirshfield et al., 2004; Spindler et al., 2007) only a few studies have looked at the association of these drugs with meeting sex partners over the Internet. Benotsch et al. (2002) and Taylor et al. (2004) found a significant association between MSM who reported using the Internet to meet sex partners and use of Viagra.

The association found in this study between performance-enhancing drugs and meeting sex partners over the Internet is notable for two reasons. First, use of these drugs could increase exposure to HIV infection and other STDs by increasing sexual activity

with prolonged erections. Second, use of these drugs in combination with other recreational drugs could compound that effect.

Model 5: Group Sex

When compared to MSM who do not use the Internet to meet sex partners, WHBS and NHBS MSM who used the Internet to meet sex partners were more likely to report having participated in group sex in the past 12 months. Other studies have found similar results (Mettey et al., 2003). These finding are particularly important because the Health in Men Study (HIM) by Prestage et al. (2009) found that UAI events were significantly associated with group sex. Further, Friedman et al.'s (2008) study showed that group sex participants were more likely to be heavy drug users. Since group sex, by definition, allows for multiple sex partners at one time participation in this activity increases the possibility of exposure to acquiring sexually transmitted diseases, including HIV.

Studies on this topic have shown that MSM who engage in group sex represent an important population that needs targeted HIV prevention (Crosby et al., 2003; Friedman et al., 2008; Prestage et al., 2009). Findings in the present study indicate the same. Findings from the present study also seem to suggest that the Internet might be an environment where MSM can meet others interested in similar activities.

Model for Risk Associated Venues

When compared to MSM who do not use the Internet to meet sex partners, WHBS MSM who used the Internet to meet sex partners were not significantly more likely to attend RAVs though they were more likely to have had some college, be Hispanic, and be of an older age. In contrast, Mettey et al. (2003) found in their study of

MSM attending a sex resort that MSM meeting sex partners over the Internet were more likely to attend RAVs such as bathhouses and circuit parties. Similarly, Garofalo et al. (2007) found that sexual activity at offline venues such as a sex club or a bathhouse was associated with meeting sex partners over the Internet.

This raises an obvious question, are the differences found between WHBS MSM who meet sex partners over the Internet and the MSM of Mettey et al. (2003) study due to recruitment methods? Simply stated, did Mettey et al. find an association between meeting sex partners over the Internet and attending RAVs precisely because their study was based in such a setting? It seems likely that this is the case but, regardless, research that has found an association between MSM who meet sex partners over the Internet and attend RAVs and studies like this one, which have not found such an association, make it difficult in distinguish the Internet from an environment that increases behavioral risks and from an environment that draws MSM who already engage in these behaviors. What can be said in respect to findings from this study is that MSM recruited over the Internet who are looking to meet sex partners are possibly looking for like-minded men via the Internet and not offline RAVs.

The findings in WHBS and NHBS are notable given the similarities in findings across the two recruitment methods. In summary, the findings for both WHBS and NHBS demonstrate an association between having met a sex partner over the Internet in the past 12 months and UAI, number of sex partners, use of performance-enhancing drugs (though only marginally for NHBS), and group sex after controlling for age, race, and education. Non-injection drug use was not associated with having met online partners in either WHBS or NBHS MSM.

Findings from both WHBS and NHBS add to the growing literature of the sexual risk behavior of MSM who meet sex partners over the Internet in Internet-based studies such as WHBS and in venue-based studies such as NHBS. The findings presented here suggest that the Internet at the very least may function for MSM as a medium that affords them sexual encounters that result in risk behaviors such as group sex, having a greater number of sex partners, use of performance-enhancing drugs, and UAI. These findings underscore the importance of continued HIV prevention to this high-risk population and can help inform future direction in social work practice, policy, and research.

SOCIAL WORK IMPLICATIONS

In this study, exploring differences in sex risk among MSM recruited using different recruitment methods yielded findings that have implications for social work practice, policy, and research. With the Escape Model as a lens through which behavior can be understood, continued work on the associations between the sexual risk behaviors of MSM and the Internet using different recruitment methods may enhance the understanding of how the Internet affects sexual risk behaviors among this population and it may inform the prevention strategies of national, state, and local health agencies in their effort to monitor the HIV epidemic and to curb its effects on MSM.

Practice

In general, this analysis has shown that MSM who engage in sexual risk behaviors are not lacking in information about good sexual health with almost 85% of WHBS MSM and 65% of NHBS MSM having some college education nor are they ill-informed about strategies to avoid transmission and acquisition of HIV (condom use helps prevent transmission/infection of disease, helps prevent other STDs, etc.) Further, busy

organizations in New York City like the Gay Men's Health Crisis, Callen-Lorde Community Health Center, and the Lesbian, Gay, Bisexual, Transgender Community Center, and many others through each of the 5 NYC boroughs suggest that MSM are well connected to the community in NYC.

Therefore there must be increased awareness and understanding among social work practitioners in these and other setting regarding the role the Internet may play in the lives of some MSM. As previously noted, the Escape Model (McKirnan et al., 1996) can be used as a lens through which the sexual risk behaviors in the Internet of WHBS and NHBS MSM are viewed and understood. The Escape Model is one of many that can be used to gain a better understanding of the findings of this study. The model in and of itself does not include a component on the Internet per se, but as with all models or theories, it is one of many existing models that can help explain sexual risk behavior.

In the framework of the Escape Model, knowledge and attitudes toward safer sex (not investigated in WHBS and NBHS), though important, may not always guide behavior in an actual sexual encounter because internal states such as moods (influenced by drug use; investigated in WHBS and NHBS) and personal vulnerabilities, and settings such as bars, clubs, or the Internet (investigated in WHBS and NBHS) may lead some MSM to cognitively escape and engage in unsafe sex. The Internet's accessibility may afford MSM looking for sexual hook ups the opportunity to engage in unsafe sex by allowing them to remove themselves—'cognitively escape'—from the reality of their day lives. Practitioners should become familiar with this model and others that help explain the sexual risk behavior of MSM so that contextual factors, such as the Internet, are properly addressed in prevention interventions.

Specifically, McKirnan's suggestions should be taken into account when developing prevention interventions. McKirnan's suggests "broad-based community-level interventions" that would make self-awareness of HIV risk less aversive and therefore less likely to result in cognitive escape (McKirnan et al., 1996) which would include a marketing approach to prevention such as making HIV testing routine at health care settings and health clubs. While the former suggestion has become law in New York City, the latter could be developed, as all one mostly sees in gym settings are promotions for other gyms services or advertising for gym gear or beverages. Suggestions like these in McKirnan's Escape Model may reduce anxiety and the cognitive escape that could occur with behavioral interventions that are more direct. Equipped with insight from the Escape Model, practitioners and others can develop HIV prevention programs that can normalize HIV awareness which can result in reducing anxiety and consequently avoiding, if not reducing, cognitive escape which can lead to risky behavior.

Policy

The findings from this analysis indicate that there are policy implications that should be taken into account. First among these is the feasibility of conducting Internet-based and venue-based studies. The advantages of online studies like WHBS include the ability to recruit participants easily, the opportunity to enroll participants anonymously, and the ability to capture and analyze data relatively quickly. But the biggest advantage is the low cost by which all this can be accomplished. This is unlike venues-based studies such NHBS where recruiting participants is more difficult, where enrolling participants anonymously, though still possible, may increase attrition rates due to the face-to-face contact, and where the ability to capture and analyze data is more time

consuming. Further, venue-based studies have a high cost requiring both time and staff resources.

The sound data collected from WHBS and NHBS that resulted in the present analysis indicates that there should be policies that increase funding to enhance national surveillance studies like WHBS and NHBS. For instance, Internet-based studies like WHBS could work on strengthening recruitment methods such as RDS, which as explained in the opening chapter, was not a success in WHBS due to its cumbersome nature (too many steps in the process of recruiting seeds, etc.). Similarly, venue-based studies like NHBS could work on strengthening the questionnaire including questions that address factors that impact access to prevention services (something the questionnaire currently does not do).

Finally, there should be increased funding to monitor the surveillance efforts that currently guide prevention programs for MSM. Federal funding for HIV/AIDS represents <1% of the overall federal budget of the United States. And though funding for HIV/AIDS has increased by $7 billion since 2007 to $28.3 billion for 2012 (33% increase) it has largely gone to care and treatment programs and not prevention (Kaiser, 2011). In fact, of the five general federal HIV/AIDS budget categories (care, cash and housing assistance, prevention, research, and global aid) prevention accounts for only 4% of federal funding with more than half (53%) going to care and treatment . Of the 4% in prevention funding, most goes to the CDC and National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP) (Kaiser, 2011). It is hoped that findings like those found in the present study will highlight the importance of making policy changes that increase funding for prevention among MSM.

Also, it is hoped that findings from the present study inform future editions of the *National HIV/AIDS Strategy* (NHAS) released in 2010, which presently lacks content about the impact the Internet has on current sexual behavior and the potential impact online prevention might have in curbing that behavior. NHAS was released by the White House in an effort to fight the epidemic in the US. Its main goals include reducing new HIV infections, increasing access to HIV care, and reducing HIV-related disparities. Currently the *National HIV/AIDS Strategy* and it's accompanying *National HIV/AIDS Strategy*, *Federal Implementation Plan* (2010) include a single paragraph about the use of network media, such as online websites, to educate Americans about HIV/AIDS.

Research

A study like this, in an HIV epicenter such as New York City, emerges as a signpost that notwithstanding the great efforts of the social work profession, MSM continue to engage in sexual risk behaviors that place themselves at risk for HIV and other STDs. The findings in WHBS and NHBS MSM demonstrate that the immediate challenge of the social work profession is to find ways of engaging MSM who engage in sexual risk behaviors and the contexts in which those behaviors occur. Online prevention has the potential to reach MSM who may be less accessible through traditional venues such as bars, clubs, or community-based organizations. In addition to offline prevention activities it may be an important component of a multi-pronged approach to reducing sexual risk-taking among MSM. The reach and effectiveness of online prevention are not fully known and should be further investigated.

Further, a study like this also emerges as a signpost that continued research is needed to fully understand if the Internet is an environment that increases the behavioral

risks of MSM or if in fact the Internet is merely an environment that draws MSM who already engage in risky behaviors. Future research could develop survey instruments that directly address the Internet and sexual risk. Such instruments could specifically ask why MSM use the Internet (to find others engaging in similar risk behaviors, to explore aspects of one's own sexual self, to deal with depression, etc). Further, future studies like WHBS and NHBS could benefit from including questions that specifically address the knowledge, attitude, and beliefs MSM have about sexual risk.

Ultimately, to truly get at an answer regarding the Internet as a risk environment a cohort study could be developed. In an ideal world a study like this would involve following two groups of MSM prospectively (one group that used the Internet to meet sex partners and one group that didn't use the Internet to meet sex partners) and then determining their risk factors over time. One could then measure the outcome (UAI, drug use, group sex, etc) from participants in each cohort and the relationships with Internet use. Conducting such a cohort study would be difficult given the universality of the Internet but not impossible.

Limitations

While findings from this study show significant associations between MSM who meet sex partner over the Internet and certain risk behaviors in both WHBS and NHBS MSM, these findings should be interpreted in light of the study limitations.

WHBS

Since cross-sectional studies capture a subset of a population at one particular point, findings can only be generalized to MSM who completed the survey among the WHBS-participating websites and makes it difficult to determine how the Internet affects

risk over time among MSM. Further, WHBS data are self-report and therefore subject to bias and judgment and recollection error. Notwithstanding the anonymity of the survey, the nature of some of the questions asked—illicit drug use, number of sex partners, group sex participation—might have made responses prone to social desirability leading to underreporting, which could partly explain the absence of an association between meeting sex partners over the Internet and drug use. It should also be noted that there was under representation of non-White MSM, which may be related to differential access to the Internet, types of WHBS-participating websites (only 1 WHBS-participating website catered specifically to MSM of color), and types of models used in the recruitment banner advertisements (limited racial diversity). Further, the survey was only available in English which precluded Spanish-speaking only MSM from participating. Finally, as with all cross-sectional studies, WHBS can only indicate associations between variables and not causality.

NHBS

The limitations of NHBS are very similar to those of WHBS. As with WHBS, NHBS is a cross-sectional study that captured a subset of a population at one particular point; hence, findings can only be generalized to MSM who completed the survey among the NHBS-participating venues. NHBS data are self-report and subject to bias. And, as with WHBS, the nature of some of the questions asked—illicit drug use, number of sex partners—might have made responses prone to social desirability leading to underreporting. This might be especially true with NHBS, where participant interviews were conducted face-to-face. Finally, NHBS cannot infer causal relationships between variables; it can only indicate associations between them.

WHBS AND NHBS COMPARISONS

It is important to understand that WHBS and NHBS have an inherent limitation—that is, they were developed by the CDC for purely behavioral surveillance purposes. WHBS and NHBS do not address the knowledge MSM have about sexual risk, it does not address their attitudes about sexual risk, nor does it address beliefs about sexual risk. The foregoing must be kept in mind when interpreting results from the analysis of WHBS and NHBS.

Conclusion

This study makes a significant contribution to the existing literature on the sexual risk behavior of MSM who meet sex partners over the Internet. It not only describes the associations between MSM who meet sex partners over the Internet and sexual risk behaviors but also compares differences between MSM who meet sex partners over the Internet and sexual risk behaviors from studies using different recruitment methodologies. In doing so it provides more knowledge on the role the Internet may play in sexual risk. Findings from this study make impossible to claim that the Internet accentuates the sexual risk behavior of MSM or inversely that risky MSM are drawn to the Internet. However, the findings presented here suggest that the Internet may be an efficient way for some MSM to meet sex partners that creates opportunities to engage in sexual risk behaviors such as group sex, having a greater number of sex partners, use of performance enhancing drugs, and UAI.

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