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## Addressing Health Disparities among Men: Demographic, Behavioral and Clinical Characteristics of Men who have Sex with Men Living in Puerto Rico

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### Abstract

The objective of this study was to compare sociodemographic, behavioral and clinical characteristics associated with HIV among Men who have sex with Men (MSM) and men who have sex with women (MSW) in Puerto Rico. Data from a population-based cross-sectional study in PR (2005–2008) was analyzed. Descriptive statistics were used to describe the study sample and bivariate analyses were performed to identify differences of sociodemographic, behavioral and clinical characteristics between MSM and MSW. Exact logistic regression models adjusting for age were constructed for each risk behavior associated to MSM in bivariate analysis. Of the 674 men interviewed, 6.1% (n=41) reported ever having sex with men. Age-adjusted logistic regression models indicated that MSM were significantly more likely than MSW to have first sexual intercourse before the age of 15 (POR=2.6; 95%CI= 1.3, 5.3) and have at least 10 lifetime sex partners (POR=2.8; 95%CI= 1.4,5.9). Also, MSM were significantly more likely to report lifetime use of marihuana (POR=2.7; 95%CI= 1.3,5.8), cocaine (POR=2.5; 95%CI= 1.2,5.0), amphetamines (POR=3.8; 95%CI= 1.4,9.2) and sedatives or tranquilizers (POR=3.3; 95%CI= 1.4,7.2). Also, MSM were 13 times more likely to be HIV seropositive as compared to MSW (POR=13.3; 95%CI=1.7,102.0). In this population-based sample of men living in Puerto Rico, self-reported same-sex behavior is strongly associated with HIV, and other behavioral factors associated with HIV. Future targeted research is still necessary for the development of intervention programs among MSM in Puerto Rico.

### INTRODUCTION

Recent estimates of the number of new HIV infections highlight that men who have sex with men (MSM) constitute one of the most vulnerable groups for HIV infection globally (Centers for Disease Control and Prevention [CDC], 2010; Joint United Nations Programme

on HIV/AIDS [UNAIDS], 2012), which has led to a re-emerging emphasis of developing targeted interventions for MSM communities to decrease their burden of infection (Toro-Alfonso, Varas-Díaz & Andujar-Bello, 2002). Although there are limited sociobehavioral research studies about MSM in the Caribbean (Cáceres & Stall, 2003; Pando et al., 2003), epidemiological data illustrate that the prevalence of HIV infection among Caribbean MSM ranges between 6% and 31.8% (Figueroa, 2011; UNAIDS, 2010). This estimate is much higher than the estimated prevalence of HIV in the general adult population within the Caribbean region (usually under 3%). In other countries, such as in the United States, surveys have focused on small samples of MSM and have found a high prevalence of HIV and sexual risk behaviors (Goodreau & Golden, 2007), such as unprotected anal sex (Lemp et al., 1994; Marks et al., 2009) and drug use (Koblin et al., 2003), that contribute to the continuing HIV epidemic among this population.

Sexuality encompasses partnership, activity, behavior, attitudes, and function (Lindau, Laumann, Levinson, & Waite, 2003). The study and understanding of human sexuality have increased during the last decades, partly due to the emergence of sexually transmitted infections (STI). The HIV epidemic, for example, has helped in approaching the sexual health characteristics of diverse populations, including gay men and other MSM. In the Caribbean, while existing data in relation to the fact that HIV as well as other STIs have disproportionately affected this region, sociobehavioral and epidemiological studies which portray particular populations that might be at high-risk are scarce (Baral, Sifakis, Cleghorne, & Beyrer, 2007; Cáceres, Konda, Pecheny, Chattarjee, & Lyerla, 2006; Gomez, Fernandez, Otero, Miranda, & Hunter, 2000; Joint United Nations Programme on HIV AIDS [UNAIDS], 2010; Zoni, González, & Sjögren, 2012). Also, despite three decades into the epidemic, understanding of sexual practices among Caribbean MSM has been limited as well.

Puerto Rico bears a disproportionate burden of the HIV cases in the Caribbean and the United States. (Centers for Disease Control and Prevention. [CDC], 2009a). Contrary to the HIV epidemic in the United States and most of the other Caribbean islands, injection drug use (IDU) practices account for more than half (53%) of the HIV cases in Puerto Rican men, whereas MSM accounts for 22% of new cases (Aceijas, Stimson, Hickman, Rhodes, & United Nations Reference Group on HIV/AIDS Prevention and Care among IDU in Developing and Transitional Countries, 2004; Merson, O'Malley, Serwadda, & Chantawipa, 2008; Puerto Rico Department of Health [PRDOH], 2012). However, during the period of 2005–2007, a 9.1% increase in the HIV prevalence among MSM was observed (Colón-López V et al., 2011). During the same time period, a decrease of 3.4% in the estimated number of HIV cases among IDU men in Puerto Rico was observed. Currently, MSM is the only group in which HIV incidence has been steadily increasing during the past three years (PRDOH, 2012). Recent publications describing sexual and drug use practices within MSM in Puerto Rico reported that this group engages in high-risk behaviors such as early onset of sexual activity, substance use, and unprotected sexual practices, factors that have consistently been reported as predictors of HIV infection (Colón-López, Rodríguez-Díaz, Ortiz, Soto-Salgado, Suárez & Pérez, 2011; Clatts, Rodríguez-Díaz, Garcia, Vargas-Molina, Jovet-Toledo, Goldsamt, 2012). Although estimates of HIV incidence in Puerto Rico in 2006 revealed an important contrast among the HIV epidemiology when compared to the Caribbean and the United States, the impact of HIV infection in Puerto Rico among MSM as compared to their non-MSM counterparts, including men who have sex with women only (MSW), is still poorly understood (Rivera-Colón & Rodríguez-Díaz, 2011). There is a lack of population-based studies that include MSM in Puerto Rico. On the other hand, an underrepresentation of MSM in research studies and the potential disparities within men in the Caribbean region might affect our ability to develop targeted interventions (Dolezal, Carballo-Diéguez, Nieves-Rosa, & Díaz, 2000). Therefore, the objective of this study is to

compare sociodemographic, behavioral and clinical characteristics of MSM and MSW aged 21 to 64 years who participated in the study “*Epidemiology of Hepatitis C in the Household, Adult Population of Puerto Rico*” conducted in 2005 through 2008 in Puerto Rico.

## METHODS

The sampling design and data collection procedures of this study have been described in detail elsewhere (Colón-López, et al., 2011; Ortiz, Soto-Salgado, Suárez, Santos-Ortiz, Tortolero-Luna, & Pérez, 2011; Pérez et al. 2010a; Pérez et al. 2010b). The focus of this population-based cross-sectional study was to study the prevalence of Hepatitis C and other viral infections (Pérez et al., 2010a). Biological specimens were collected as part of the study to estimate the prevalence of antibodies to hepatitis C virus (HCV) and other viral infections (hepatitis A [HAV], HBV, HIV and HSV-2) in the adult population of Puerto Rico using a stratified cluster probability sample of households. Three stages were done in order to achieve our sample. First, a systematic random selection of census block groups was made weighted by the estimated number of household segments that could be allocated. The second stage consisted of a random selection of one census block within each selected census block group. In the third stage, segments of approximately 25 consecutive households were numbered in each census block, and one was randomly selected. All persons residing in each household were enumerated, and one individual aged 21–64 years old was randomly selected in the final stage.

The study population consisted of 1,654 individuals aged 21–64 years randomly selected (721 males (43.6%) and 933 females (56.4%)), from which, 674 sexually active men were included in the present analysis. In brief, eligible individuals that agreed to participate were provided with appointments to visit a mobile examination unit located in the vicinity of their homes where they completed the informed consent procedures. Face-to-face interviews collected standard sociodemographic characteristics plus extensive information on medical history and other health-related habits. An Audio Computer-Assisted Self-Interview (ACASI) administered in Spanish was employed to collect sensitive information including sex-related behaviors and drug use practices. Questionnaires were modeled after those used in previous Spanish household surveys conducted in Puerto Rico (Pérez et al., 2010b). The overall participation rate of the study was 77.9% (Pérez et al., 2010a; Pérez et al., 2010b). Study procedures were reviewed and approved by the Institutional Review Board (IRB) of the University of Puerto Rico Medical Sciences Campus.

### Variables of Interest

A man was considered MSM if he reported having had sex (anal or oral sex) with another man in his lifetime. Measures of socioeconomic status included place of birth, marital status, year of education and self-reported annual household gross income. Lifetime cigarette use and lifetime use of marihuana, cocaine, opioids, sedatives or tranquilizers and amphetamines were collected as well. Laboratory test results of viral infections (HAV, HBV, HCV, HIV and HSV-2) as well as other covariates such as age of sexual initiation, lifetime number of sexual partners and sexual partnering with HIV+ or IDU men were accessed in this analysis.

### Statistical Analysis

Frequency distributions and summary measures were used to describe the sample population. Differences in sociodemographic, behavioral and clinical characteristics between MSM and MSW were compared using the Chi-Square test statistic or Fisher’s exact test where any expected frequency was less than five. Due to the limited sample size, separate exact logistic regression models adjusting for age were constructed for each risk

behavior associated to MSM in bivariate analysis. All statistical analyses were performed using Stata 11.0 (StataCorp LP, College Station, TX).

## RESULTS

Of the 674 men interviewed, 41 (6.1%) reported having had sex with another man on at least one occasion. Table 1 shows the results of the sociodemographic characteristics according to sexual behavior. In this sample, both groups were comparable in all the sociodemographic characteristics studied ( $p>0.05$ ). On the other hand, significant differences were observed when exploring sexual and drug use practices between groups (Table 2). For example, MSM were more likely to report sexual practices at an early age as compared with MSW ( $p=0.007$ ). Also, a significant higher number of lifetime sexual partners was observed among MSM ( $p=0.005$ ). MSM were also significantly more likely to report sexual practices with an IDU ( $p<0.0001$ ) and having had sex with an HIV+ partner ( $p=0.007$ ) during their lifetime when compared to their MSW counterparts.

A higher prevalence of licit and illicit drugs was also observed in MSM as compared to MSW (Table 2). For example, a significantly higher prevalence of cigarette and marijuana use was reported in MSM ( $p=0.01$ ). Similarly, MSM were significantly more likely than MSW to report the use of cocaine ( $p=0.007$ ), sedatives or tranquilizers ( $p=0.004$ ) and amphetamines ( $p=0.001$ ).

The crude prevalence of viral infections according to sexual behavior is presented in Table 3. The seroprevalence of HIV and HSV-2 among MSM in this sample was 7.3% and 32.4%, respectively. Significant higher prevalence was observed for both HIV and for HSV-2 in MSM as compared to MSW ( $p<0.05$ ).

The age-adjusted POR for risk behaviors is presented in Table 4. MSM were 2.6 times more likely to engage in sexual practices before age 15 years as compared to their MSW counterparts (POR=2.6; 95% CI=1.3, 5.3). MSM were nearly 3 times more likely to have more than 10 sexual partners in their lifetime as compared with their sexual counterparts. (POR=2.8; 95% CI=1.4, 5.9). MSM were also more likely to report a sexual relationship with an IDU (POR=3.7; 95% CI=1.3, 9.1). Regarding lifetime substance use, MSM were significantly more likely to report cigarette (POR=3.0; 95% CI=1.2, 9.0), marijuana (POR=2.7; 95% CI=1.3, 5.8), cocaine (POR=2.5; 95% CI=1.2, 5.0), sedative or tranquilizers (POR=3.3; 95% CI=1.4, 7.2) and amphetamines (POR=3.8; 95% CI=1.4, 9.2) as compared to MSW. Regarding HIV infection, MSM were 13 times more likely to be HIV seropositive as compared to their non-MSM counterparts (POR=13.3; 95% CI=1.7, 102.0) (Table 4).

## DISCUSSION

Although the main mode of HIV transmission in Puerto Rican men continues to be drug injection (PRDOH, 2012), after 30 years of the AIDS epidemic (De Cock, Jaffe, & Curran, 2011), this study indicated that MSM living in Puerto Rico reported behavioral factors that might put them at higher risk of HIV infection. This is an important finding within the HIV epidemic in the Caribbean, indicating that adequate response needs to be done in order to decrease risks behaviors for infection among MSM in Puerto Rico. Consistent with other studies (Xu, Sternberg, & Markowitz, 2010); MSM reported having first sex at younger age and having had larger number of lifetime sex partners as compared to MSW. Also, as reported in other studies in Latin America (Balán, et al., 2011), a higher prevalence of illicit drugs assessed in this study were reported among MSM.

The prevalence of HIV among MSM was 7.3%. Although comparisons needs to be done with caution due to the limited sample size of our study, HIV prevalence is higher than the

prevalence of HIV in a population-based study among men older than 18 years in the US (Xu et al., 2010), but lower than estimates from the MSM population in the Dominican Republic (Halperin, de Moya, Pérez-Then, Pappas, & Garcia Calleja, 2009; Rojas, Malow, Ruffin, Rothe, & Rosenberg, 2011) as well as Jamaica (Figueroa, 2011). Therefore, due to the significant high prevalence of HIV infection suggested in this study, future research should explore the sociobehavioral risk and protective factors for HIV among MSM in Puerto Rico, especially the impact of sexual networks and partner choice on HIV risk.

Besides the higher prevalence of HIV among MSM as well as high-risk sexual practices, a high lifetime prevalence of licit and illicit drugs was reported among MSM. High prevalence of substance use has also been reported among MSM living in Argentina (Balán, et al., 2011). As has been previously argued in several studies, substance use is significantly associated with sexual risk behaviors in the general population, but also among MSM (Balán et al., 2012; Guilamo-Ramos, Jaccard, Lushin, Martinez, Gonzalez, & McCarthy, 2011; Myers, Maiorana, Chapman, Lall, Kassie, & Persaud, 2011; Reid, Malow, & Rosenberg, 2011). This same trend has been reported in other studies in which high prevalence estimates of cigarette smoking (Berg, et al., 2011) and cocaine use has been reported among MSM (Balán, et al., 2012). Since illicit drug use has been repeatedly associated with high-risk sexual behaviors and increased HIV incidence among MSM (Finlinson, et al., 2006), studies in Puerto Rico have explored drug use practices among this group (Finlinson, et al., 2006; Clatts, et al., 2012). Therefore, it is expected that substance use, especially in the context of sexual activity, should further explored.

Data from Puerto Rico (Ortiz et al., 2010), other places in the Caribbean (Yu et al., 2007), and from Latino/Hispanics in the United States (Dodge, Reece, Herbenick, Schick, Sanders, & Fortenberry, 2010) demonstrate that MSW are also engaging in risky sexual practices traditionally associated to the sexual practices driving the HIV epidemic among MSM, such as multiple sexual partners and unprotected anal intercourse. Therefore, more research is needed to better understand the reasons that may explain sociobehavioral differences in risk for HIV infection between MSM and MSW. A better understanding of the social determinants of health of MSM in Puerto Rico and the Caribbean may better illustrate their disproportional risk for HIV.

The findings of this study need to be interpreted with caution because of its inherent limitations. In this study, MSM was defined as having sex (anal or oral sex) with a man during their lifetime, due to the small sample size, opportunities to determine and explore MSM recently (i.e. last 3 months) was not possible. The small sample size among MSM also limited the opportunity to conduct multivariable analyses. Other limitations include the lack of data regarding the use of condoms and other variables which could help us understand sexual partnering and preventive practices among MSM. Since the focus of this study was to determine the epidemiology of HCV and other viral infections, this study did not target sexual identity and other factors such as violence, stigma, homophobia, social networks, and the construction of gender identities. This limitation highlight also the necessity presented previously by the Institute of Medicine in the report *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding* in enhancing research efforts in MSM. These future efforts for research among MSM will also help in targeting specific evidence-based efforts in public health policy and sexual health promotion.

In summary, significant disparities among MSM were observed when compared to MSW. A significant higher prevalence of high-risk sexual practices as well as a higher seroprevalence of HIV was observed among MSM. Since data among MSM in Puerto Rico is limited and mostly identified as a subgroup of larger studies, these findings may support future



initiatives to develop specific studies on sexuality, sexual partnering and preventive practices among MSM in Puerto Rico. In terms of health promotion, comprehensive approach to sexual health promotion among MSM is encouraged. That implies inclusive sexual health education that encompasses attention to the sexual diversities and their particular needs to engage in safer sexual practices.

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**Table 1**

Sociodemographic Characteristics of MSM and non-MSM in Puerto Rico

Characteristic	MSM (n=41) n (%)	MSW (n=633) n (%)	P-value
<b>Age group in years</b>			0.15
21–29	4 (9.8)	152 (24.0)	
30–39	11 (26.8)	159 (25.1)	
40–49	12 (29.3)	163 (25.8)	
50–64	14 (34.1)	159 (25.1)	
<b>Place of birth</b>			0.99
Puerto Rico	37 (90.2)	565 (89.2)	
United States	3 (7.3)	53 (8.4)	
Other	1 (2.5)	15 (2.4)	
<b>Marital status</b>			0.16
Never married	13 (31.7)	128 (20.2)	
Married/consensual partner	20 (48.8)	395 (62.4)	
Divorced, separated or Widowed	8 (19.5)	110 (17.4)	
<b>Years of education</b>			0.93
12	30 (73.2)	459 (72.5)	
<12	11 (26.8)	174 (27.5)	
<b>Annual family income</b>			0.67
<20,000	26 (63.4)	352 (60.1)	
20,000	15 (36.6)	234 (39.9)	

**Table 2**

Sexual and Drug Use Practices of MSM and MSW, Puerto Rico

Characteristics	MSM n (%)	MSW n (%)	P-value
<b>Age at first sexual encounter in years</b>			0.007
< 15	17 (41.5)	143 (22.9)	
15	24 (58.5)	481 (77.1)	
<b>Lifetime number of sexual partners</b>			0.005
1	1 (2.6)	67 (11.0)	
2–9	14 (36.8)	333 (54.5)	
10	23 (60.5)	211 (34.5)	
<b>Lifetime number of female sex partners</b>			0.04
0–1	8 (21.1)	64 (10.3)	
2	30 (78.9)	558 (89.7)	
<b>Sexual relationship with an IDU</b>			<0.0001
Never	32 (80.0)	597 (94.6)	
Ever	8 (20.0)	34 (5.4)	
<b>Sexual relationship with HIV+ partner</b>			0.007
Never	33 (89.2)	616 (98.3)	
Ever	4 (10.8)	11 (1.8)	
<b>Lifetime substance use</b>			
<b>Cigarettes</b>			0.01
Never	6 (14.6)	210 (33.2)	
Ever	35 (85.4)	423 (66.8)	
<b>Marihuana</b>			0.01
Never	15 (36.6)	359 (56.7)	
Ever	26 (63.4)	274 (43.3)	
<b>Cocaine</b>			0.007
Never	22 (53.7)	463 (73.1)	
Ever	19 (46.3)	170 (26.9)	
<b>Opioids<sup>1</sup></b>			0.06
Never	36 (87.8)	602 (95.1)	
Ever	5 (12.2)	31 (4.9)	
<b>Sedatives or tranquilizers<sup>2</sup></b>			0.004
Never	30 (73.2)	561 (88.6)	
Ever	11 (26.8)	72 (11.4)	
<b>Amphetamines<sup>3</sup></b>			0.001
Never	33 (80.5)	595 (94.0)	
Ever	8 (19.5)	38 (6.0)	

<sup>1</sup> Demerol, Codeine, Percodan, Davon, Darvocet, Nubain, Lortab, Vicodin

<sup>2</sup>Xanax, Ubrax, Valium, Seconal, Ativan, Rastoril, Ambien, Prosom, Ketamina, Special K

<sup>3</sup>Ritalin, Adipex, Adderal, Decedine

**Table 3**

Seroprevalence (%) of viral infections among Non-MSM and MSM

	MSM	MSW	P-value
HAV	46.3	41.7	0.558
HBV	4.9	3.8	0.668
HCV	4.9	3.7	0.660
HIV	7.3	0.5	0.004
HSV-2	32.4	16.4	0.017

**Table 4**

Age-adjusted prevalence odds ratio for high-risk behaviors and serostatus of viral infections associated with MSM among Puerto Rican adult men, 2005–2008.

Practices	POR (95% CI)
Age at first sexual encounter in years	
<15	2.6 (1.3–5.3)
15	1.0
Lifetime number of sexual partners	
1–9	1.0
10	2.8 (1.4–5.9)
Sexual relationship with an IDU	
Never	1.0
Ever	3.7 (1.3–9.1)
Sexual relationships with partners having HIV	
Never	1.0
Ever	6.0 (1.3–21.9)
<b>Lifetime Substance Use</b>	
Cigarette	
Ever	3.0 (1.2–9.0)
Never	1.0
Marijuana	
Ever	2.7 (1.3–5.8)
Never	1.0
Cocaine	
Ever	2.5 (1.2–5.0)
Never	1.0
Opioids <sup>1</sup>	
Ever	3.2 (0.9–9.3)
Never	1.0
Sedative or tranquilizers <sup>2</sup>	
Ever	3.3 (1.4–7.2)
Never	1.0
Amphetamines <sup>3</sup>	
Ever	3.8 (1.4–9.2)
Never	1.0
<b>Serostatus of Viral Infections</b>	
HIV	
Yes	13.3 (1.7–102.0)
No	1.0



Practices	POR (95% CI)
HSV-2	
Yes	2.2 (0.9–5.0)
No	1.0

<sup>1</sup>Demerol, Codeine, Percodan, Davon, Darvocet, Nubain, Lortab, Vicodin

<sup>2</sup>Xanax, Ubrax, Valium, Seconal, Ativan, Rastoril, Ambien, Prosom, Ketamina, Special K

<sup>3</sup>Ritalin, Adipex, Adderal, Decedine