Migration and HIV Risk Among Men Who Have Sex With Men, San Francisco, 2011.

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Scholarly Report submitted in partial fulfillment of the MD Degree at Harvard Medical School

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Scholarly Report Title: Migration and HIV Risk Among Men Who Have Sex With Men, San Francisco, 2011.

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Abstract

Migration and HIV Risk Among Men Who Have Sex With Men, San Francisco, 2011.

Tenzing Lama, May Sudhinaraset, Willi McFarland, Henry Raymond

In San Francisco, MSM account for nearly 90% of HIV infections. Studies have postulated increased risk for HIV faced by MSM who migrate, particularly to urban environments, yet empirical data are lacking. In this study we analyzed data from the National HIV Behavioral Surveillance System collected in 2011 to ascertain whether nativity (U.S. versus foreign born) was associated with HIV prevalence, risk behavior, and service use. Among 510 MSM enrolled, HIV prevalence was 23.0%. Multivariable analyses demonstrate that while nativity was not associated with increased risk for HIV infection, those who had lived in San Francisco for more than five years had higher HIV prevalence compared to those who had lived for less than a year even after adjusting for age, race, income, education, and location of birth.

Contributions

I co-designed the study with my mentors (MS, WM, HR).

I independently executed and analyzed the data. Mentors offered feedback.

I independently researched and wrote the paper. Mentors offered feedback.

HR submitted the paper to *AIDS Education and Prevention*.

Publication Link

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Appendix 1: The Published Manuscript

MIGRATION AND HIV RISK AMONG MEN WHO HAVE SEX WITH MEN, SAN FRANCISCO, 2011

T. T. Lama, M. Sudhinaraset, W. McFarland, and H. F. Raymond

In San Francisco, MSM account for nearly 90% of HIV infections. Studies have postulated increased risk for HIV faced by MSM who migrate, particularly to urban environments, yet empirical data are lacking. In this study we analyzed data from the National HIV Behavioral Surveillance System collected in 2011 to ascertain whether nativity (U.S. versus foreign born) was associated with HIV prevalence, risk behavior, and service use. Among 510 MSM enrolled, HIV prevalence was 23.0%. Multivariable analyses demonstrate that while nativity was not associated with increased risk for HIV infection, those who had lived in San Francisco for more than five years had higher HIV prevalence compared to those who had lived for less than a year even after adjusting for age, race, income, education, and location of birth.

Migration, broadly defined as changing one's place of residence for time-limited stays or permanent settlement, and crossing a geographically defined border, has been correlated with HIV acquisition in many contexts of the epidemic (Decosas & Adrien, 1997; Kane et al., 1993; Nunn, Wagner, Kamali, Kengeya-Kayondo, & Mulder, 1995). Migration-related structural factors such as poverty, limited education, and cultural or linguistic barriers to health care services have been hypothesized to have the potential to increase the likelihood of HIV infection (Ayala, Bingham, Kim, Wheeler, & Millett, 2012; Sanchez et al., 2004). However, migration's role in HIV risk for men who have sex with men (MSM) is under-studied.

Socio-structural factors in sending communities such as lack of jobs or educational opportunities are common reasons for migration. However, for MSM, migration can also be motivated by sexuality (Carrillo, 2004). Some MSM migrate to urban areas to escape familial or societal discrimination, social isolation, greater access to potential sexual partners, wider avenues for sexual expression, or sense of community (Bianchi et al., 2007; Chng, Wong, Park, Edberg, & Lai, 2003; Huang & Akhtar, 2005).

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However, the sexuality of a migrant is not necessarily a risk indicator for HIV infection because sexual behavior and risk are multifactorial and complex involving a confluence of social, cultural, and personality variables (Jarama, Kenamer, Poppen, Hendricks, & Bradford, 2005; Kalichman, Weinhardt, DiFonzo, Austin, & Luke, 2002; Tsui & Lau, 2010). Nonetheless, theoretical models exist that hypothesize that MSM migrants may be at increased vulnerability to high-risk sexual behaviors and HIV infection (Egan et al., 2011; Frye et al., 2006). MSM migrants may engage in high-risk sexual behaviors as a coping mechanism to deal with the alienating aspects of migration, fewer social constraints on behavior, greater anonymity, or precarious circumstances leading to exchange of sexual favors for food or money (Ayala et al., 2012; Díaz, Ayala, & Bein, 2004; Sanchez et al., 2004).

Additionally, popular media portrayal of gay epicenters such as San Francisco and New York may also affect sexual behaviors and risk (Chauncey, 1994). While little on this matter has been studied, a qualitative study of Latino MSM migrants in New York City found that images of gay life in the U.S. was one of the drivers for migration and that the period immediately following migration was a particularly vulnerable time for engaging in risky behavior and contracting HIV (Bianchi et al., 2007; Oster et al., 2013). This study also found that new Latino MSM immigrants without enough money to go to commercial enterprises to meet sexual partners and those with limited English proficiency frequented public sex venues. Thus, socioeconomic status and linguistic ability to some extent affected the sexual risks of these immigrants (Bianchi et al., 2007).

There is limited empirical evidence of HIV prevalence, risk behavior, and other health factors for the MSM migrant population especially in a gay urban center such as San Francisco. The metropolitan San Francisco area is a well-known migration destination for MSM, with the highest percentage of reported same-sex households in the nation (Smith & Gates, 2001). San Francisco also has one of the highest prevalence of HIV among MSM at 23% (Raymond et al., 2013) and the largest proportion of the epidemic among MSM at about 90% of new HIV infections (San Francisco Department of Public Health, 2011). As such, migration to San Francisco may pose a higher risk of HIV acquisition among migrant MSM. Finally, the healthy migrant effect suggests that while migrants are healthier when they first arrive in a new country, cumulative stress and exposure to unhealthy factors may increase the risk of health behaviors over time.

The objective of this paper was to compare HIV prevalence, HIV risk taking and service use between U.S. born and foreign-born MSM living in San Francisco. We hypothesized based on the literature that foreign-born MSM would have less access to HIV-related services, potentially higher risk-taking behaviors and higher HIV prevalence; and that longer duration in San Francisco would result in higher risk-taking behaviors and HIV prevalence.

METHODS

NATIONAL HIV BEHAVIORAL SURVEILLANCE SYSTEM

This study used data from the National HIV Behavioral Surveillance System (NHBS) conducted in San Francisco in 2011. A description of the NHBS surveys and details of their methodology have been published (Gallagher, Sullivan, Lansky, & Onorato, 2007). Briefly, NHBS—a project coordinated by the Centers for Disease Control and Prevention (CDC)—conducts a series of cross-sectional surveys aimed

at understanding HIV-related behaviors, trends, and prevalence in 21 metropolitan statistical areas (MSA) across the United States, including the San Francisco Bay Area. The survey uses venue-based, time-space sampling methods to sample MSM frequenting venues presented in detail elsewhere (MacKellar et al., 2007).

Men were eligible to participate if they were 18 years or older, lived within the MSA, reported past male/male sexual behavior, able to provide verbal consent, and able to speak English or Spanish. Eligible participants completed a standardized interviewer-administered questionnaire covering demographics, sexual behaviors, HIV and STI test history, health coverage, and utilization of healthcare services. They were also offered an option to provide blood samples for HIV antibody testing, the results of which they could receive a week later in person or by telephone. Standard HIV antibody testing on serum samples collected by venipuncture was done at the San Francisco Public Health Laboratory. Initially reactive results were confirmed by standard laboratory methods.

The present study utilized anonymous secondary data from the NHBS and therefore did not require Institutional Review Board review. The parent NHBS studies received ethical approval from the University of California, San Francisco's Committee on Human Research. All participation was anonymous and as such no personal identifiers were collected at any point in the study.

MEASURES

Being a migrant was defined as being foreign born versus being born in the United States. We measured time lived in San Francisco with a continuous response variable "How many years have you live in San Francisco?" If participants responded less than a year the response was coded as 1 year or less. This measure was further dichotomized into a binary variable (<5 years and >5 years). Other predictors of interest included age, education, income, and sexual identity.

In terms of race, if men responded to being Latino/Hispanic (Are you Latino or Hispanic?), they were categorized as Latino regardless of their racial identification. The other participants were categorized into Black, White, Asian, or other according to their self-identifications. The other group includes Hawaiian or Pacific Islanders, Native Americans, and mixe-race individuals. Those identifying as straight were grouped together with those identifying as bisexual straight men comprised only 0.6% ($n = 3$) of the aggregate population.

The outcome variables tested included prevalent HIV infection, unprotected anal intercourse in the past six months (includes both receptive and insertive acts), recent HIV testing in the past six months (among those who did not report being HIV positive as HIV-positive men are not expected to test for HIV regularly), recent STD testing in the past twelve months, current health insurance or health coverage, and recent visit to a healthcare provider in the past twelve months. In this analysis, reported unprotected anal intercourse (UAI) acts were limited to the last five sexual partners in the last six months. This partner specific assessment collects detailed sexual behaviors on a majority of participant's entire sexual history in the past six months. We calculated prevalent HIV infection using the results of the serological tests. Unrecognized HIV infection was defined as anyone NOT self-reporting being HIV positive and subsequently tested HIV positive in the study. For our analyses, binary indicators for HIV status, UAI, and recent HIV or STD testing were constructed. Therefore, indeterminate responses such as "I don't know" and those missing were excluded from the analyses.

ANALYSES

We assessed differences in demographic characteristics between foreign-born MSM and those born in the United States by conducting χ^2 tests (all demographic characteristics were categorical variables). We also conducted bivariate and multivariate logistic regression analyses to estimate the associations between demographic characteristics and binary outcome variables associated with HIV risk, and health care service utilization. Each multivariable model included age, race, education, sexual identity, location of birth, and time lived in San Francisco as predictor variables. In the multivariate model of prevalent HIV infections, sexual identity was omitted as there were only three HIV infections among bisexual/straight men. We also tested an interaction between being foreign born (yes/no) and time living in San Francisco (5 years or less/more than 5 years). We also tested an interaction between nativity (U.S. versus foreign birth) and time spent in San Francisco (5 years or less versus more than 5 years). The interaction was not significant in the multivariable model, therefore it is not presented in tables; however, results are available upon request. All tests and confidence intervals are two-sided and based on the 5% level of significance. We analyzed all data using STATA version 9 (College Station, TX). Estimates are unweighted, consistent with national NHBS analyses (Gallagher et al., 2007; MacKellar et al., 2007).

RESULTS

A total of 1,007 men were intercepted at 45 randomly selected venues during 103 recruitment events conducted over six months in 2011, with 63.0% ($n = 634$) determined eligible. Of the eligible men, 80.4% ($n = 510$) agreed to participate and were consented, enrolled, interviewed, HIV tested, and identified as MSM by self-reported behavior or sexual identity.

Overall, 47.6% were between 31 and 50 years old, and 58.9% identified as being White (Table 1). Most (85.4%) had completed at least some college, and 49.2% were employed full-time, with 26.5% earning $\geq$ \$75,000 per annum. The vast majority (90.5%) identified as gay.

Overall, 20.7% ($n = 87$) of the MSM were foreign-born. There were significant differences between foreign-born and U.S.-born MSM in San Francisco. Foreign-born MSM were younger, with more U.S.-born MSM aged 51 or over, than foreign-born MSM (22.6% vs. 8%, respectively, $\chi^2 = 9.47$, $p = 0.009$). Compared to the U.S.-born, more foreign-born MSM identified as Asian (3.3% vs. 26.4%, respectively, $\chi^2 = 75.5$, $p < 0.001$) and Latino (17.7% vs. 28.7%, respectively, $\chi^2 = 75.5$, $p < 0.001$). There were no differences between the two subpopulations in terms of educational attainment, employment status, annual household income, and sexual identity; 55.4% of U.S.-born and 64.4% of foreign-born MSM had college or higher degrees, and 27.5% of U.S.-born and 22.1% of foreign-born MSM earned an annual income $\geq$ \$75,000 (Table 1).

Overall, 42.7% and 56.7% of participants had lived in San Francisco for five years or less and over five years, respectively. The same pattern held true among U.S.-born and foreign-born MSM. In terms of HIV infection, overall 78.8% were HIV negative, 19.2% were HIV positive and knew that they were infected, and 1.6% were HIV positive and did not know they were infected. Fewer foreign-born MSM were HIV infected (whether known or unrecognized infections) but the difference compared to U.S.-born MSM was not significant (Table 1). An effect modifier

TABLE 1. Demographic Characteristics of Men Who Have Sex With Men by U.S. vs. Foreign Birth, San Francisco, 2011 (N = 510)

Characteristic	Total (n = 510)		U.S. born (n = 421)		Foreign born (n = 87)		χ^2	p-value
	n	%	n	%	n	%		
Age group, years							9.47	0.009
18–30	164	32.3	132	31.4	32	36.8		
31–50	242	47.6	194	46.1	48	55.2		
≥ 51	102	20.1	95	22.6	7	8		
Race/ethnicity							75.5	< 0.001
White	298	58.9	270	64.4	28	32.2		
Asian	37	7.3	14	3.3	23	26.4		
Black	31	6.1	30	7.2	1	1.1		
Latino	99	19.6	74	17.7	25	28.7		
Other	41	8.1	31	7.4	10	11.5		
Education							3.45	0.327
≤ High school	74	14.6	66	15.7	8	9.2		
Some college	145	28.5	122	29	23	26.4		
College	179	35.2	143	34	36	41.4		
Postgraduate	110	21.7	90	21.4	20	23		
Employment							5.7	0.127
Full-time	250	49.2	200	47.5	50	57.5		
Part-time	90	17.7	78	18.5	12	13.8		
Unemployed	74	14.6	67	15.9	7	8		
Other	94	18.5	76	18.1	18	20.7		
Annual Household Income, USD							1.09	0.579
≤ 29,999	183	36.5	149	35.9	34	39.5		
30,000–74,999	185	36.9	152	36.6	33	38.4		
≥ 75,000	133	26.5	114	27.5	19	22.1		
Sexual Identity							1.6	0.212
Gay	457	90.5	377	89.8	80	94.1		
Bisexual or Straight	48	9.5	43	10.2	5	5.9		
Time in San Francisco							0.00	1.0
≤ 5 years	218	42.7	181	42.9	37	42.5		
> 5 years	289	56.7	240	57.1	49	56.3		
HIV status							2.23	0.33
Known HIV infection	98	19.2	86	20.4	12	13.8		
Unrecognized HIV infection	8	1.6	7	1.7	1	1.1		
Not HIV infected	402	78.8	328	77.9	74	85.1		

Note. Not all categories sum to 100% due to missing data.

testing foreign birth and duration of time in the U.S. was also included, but was nonsignificant (data not shown, but available upon request).

There were no significant differences between foreign-born and U.S.-born MSM in terms of unprotected anal intercourse in the past six months, recent HIV testing in the past six months, recent STI testing in the past twelve months, current health coverage and visit to a healthcare provider in the past year (Table 2).

Table 3 shows bivariate and multivariate associations with HIV infection. HIV infection was bivariately positively associated with ages 31–50 (odds ratio [OR] 3.4, confidence interval [CI] [1.6, 6.2]) and 51 or older (OR 4.2, CI [2.1, 8.3]), and living in San Francisco for more than 5 years (OR 2.86, CI [1.98, 5.47]). HIV infection was negatively associated with earning more than \$75,000 per annum (OR 0.49, CI [0.23, 0.75]), being a college graduate (OR 0.36, [CI 0.19, 0.68]), and having post graduate studies (OR 0.48, CI [0.25–0.95]). In multivariable analysis, HIV prevalence was positively correlated with being aged 31–50 years (AOR, 3.29; 95% CI

TABLE 2. Unprotected Anal Intercourse and Access to Health Care by U.S. vs. Foreign Birth, Men Who Have Sex With Men, San Francisco, 2011 (*N* = 510)

Characteristic	Total* (<i>n</i> = 510)		U.S. born (<i>n</i> = 421)		Foreign born (<i>n</i> = 87)		χ^2	<i>p</i> -value
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Unprotected anal intercourse	238	46.9	194	46.1	44	50.6	0.58	0.444
Recent HIV testing, past 6 months	246	48.4	204	48.5	42	48.3	0.0009	0.976
Recent STI testing, past 12 months	293	58.4	243	58.4	50	58.1	0.0022	0.963
Currently have health insurance	388	76.4	320	76.0	68	78.2	0.1850	0.667
Visited healthcare provider, past 12 months	441	86.8	367	87.2	74	85.1	0.2819	0.595

Note. *Percent for category based on nonmissing total.

[1.64, 6.62]) and > 51 years (AOR, 3.04; 95% CI [1.31, 7.08]), and negatively correlated with having an annual income $\geq$ \$75,000 (AOR, 0.31; 95% CI [0.16, 0.60]) and having a college degree (AOR, 0.35; 95% CI [0.18, 0.71]). While foreign birth was not associated with HIV, time living in San Francisco was, with those living there more than 5 years having over twice the odds of infection (AOR, 1.89; 95% CI [1.06, 3.35]), even after controlling for age, income, and education. Of note, HIV prevalence was not associated with race/ethnicity in this survey of MSM in San Francisco in 2011.

DISCUSSION

Our analyses suggest that foreign-born MSM are not inherently at risk for HIV infection but that with increased duration of residency in San Francisco, there is a substantial and significantly increased odds of infection for all MSM. This finding held even after controlling for age. Consistent with other reports, HIV infection was higher among men in older age groups, with lower income, and lower education (Ayala et al., 2012; Wejnert et al., 2013).

In terms of migration, similar results have been observed in studies of MSM in South Florida and Latino MSM, where established migrants who have resided in the area for more than five years had higher HIV prevalence than their recent counterparts who had been present for less than one year (Egan et al., 2011; Oster et al., 2013). Qualitative interviews of Latino migrant MSM in New York City found that their new social environment allowed them some release from the structural homonegativity and social contexts of their home countries to explore greater sexual freedom in the anonymity and bounty of sexual partners in a gay epicenter such as New York City (Bianchi et al., 2007). These results are also in line with larger migration literature which suggests that newly arrived migrants are healthier compared to native populations and that this healthy migrant effect attenuates over time with the health of the migrant deteriorating over increasing time spent in the new place (McDonald & Kennedy, 2004; Singh & Siahpush, 2002). How this hypothesis might manifest, be it through acculturation stresses, adoption of American socio-cultural norms, unavailability of coping resources, or lack of social capital, is outside the scope of this study and a future avenue for research (Berry, 1997; Chng et al., 2003; Fennelly, 2007).

TABLE 3. Correlates of HIV Infection, Men Who Have Sex With Men, San Francisco, 2011 (N = 510)

	HIV negative		HIV positive (N = 106)					
Demographic characteristics	<i>n</i>	%	<i>n</i>	%	OR	95% CI	AOR	95% CI
Age group, years								
18–30	151	90.9	15	9.0				
31–50	181	74.8	61	25.2	3.4***	[1.6, 6.2]	3.29**	[1.64, 6.62]
> 51	72	70.6	30	29.4	4.2***	[2.1, 8.3]	3.04**	[1.31, 7.08]
Race/ethnicity								
White	228	46.0	72	24.0				
Asian	33	89.2	4	10.8	0.38	[0.13, 1.12]	0.64	[0.20, 2.07]
Black	26	83.8	5	16.1	0.61	[0.23, 1.64]	0.66	[0.23, 1.95]
Latino	89	83.8	16	16.2	0.61	[0.34, 1.11]	0.69	[0.36, 1.35]
Others	34	79.1	9	20.9	0.78	[0.39, 1.54]	0.74	[0.32, 1.70]
Annual Household Income, USD								
<= 29,999	137	74.1	48	25.9				
30,000–74,999	144	77.8	41	22.2	0.81	[0.53, 1.36]	0.80	[0.48, 1.37]
>= 75, 000	129	87.9	17	12.1	0.49**	[0.23, 0.75]	0.31***	[0.16, 0.60]
Education								
High school or less	51	67.1	25	32.9				
Some college	11	77.2	33	22.8	0.60	[0.33, 1.11]	0.53	[0.27, 1.03]
College graduate	152	84.9	27	16.1	0.36**	[0.19, 0.68]	0.35**	[0.18, 0.71]
Postgraduate	89	80.9	21	19.1	0.48*	[0.25, 0.95]	0.47	[0.22, 1.04]
Location of birth								
U.S.-born	328	77.9	93	22.1				
Foreign-born	74	85.1	13	14.9	0.62	[0.33, 1.17]	0.73	[0.36, 1.49]
Time lived in San Francisco, years								
<= 5	194	88.2	26	11.8				
> 5	209	72.3	87	27.7	2.86***	[1.98, 5.47]	1.89*	[1.06, 3.35]

Note. Percent for total nonmissing data. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Nonetheless, we hypothesize that increased duration of residency may imply an accumulated risk or higher HIV-transmission probabilities due to the high background prevalence of HIV in San Francisco coupled with on-going if not higher levels of risk behavior, especially if proper prevention methods are not employed (Lasry et al., 2014). Our findings of HIV associated with lower income, lower education, and time in San Francisco suggest the need for interventions that focus on the potentially disadvantaged lower socioeconomic status MSM regardless of whether they are foreign-born or U.S.-born.

Our study also found that there were no differences in health insurance or coverage at the time of the survey between foreign-born and U.S.-born MSM. This is in stark contrast from the general migrant where discrepancies in healthcare coverage have been observed when comparing U.S.-born, documented and undocumented immigrants in California (Pourat, Wallace, Hadler, & Ponce, 2014). This might be explained by the demographic differences—or lack thereof—observed between U.S.-born and foreign-born MSM populations from our analyses, where we observed no differences in terms of income, education, sexual identity, and duration of residency

in San Francisco between the two groups although the NHBS does not collect information regarding immigration status. Whether this holds in cities other than San Francisco where social norms may differ significantly should be further examined.

The analysis presented here is subject to several limitations. First, the cross-sectional nature of the NHBS does not allow for directly assessing when infection occurred. Therefore, it is not possible to determine causal associations between nativity, and HIV prevalence and behaviors. The study did ask about timing of migration; however, and this study attempts to capture timing and duration in San Francisco. Second, the small sample size limits stratified analyses to analyze HIV prevalence and risk behaviors by race/ethnicity of the migrant. Third, this study presents data from the San Francisco/Bay Area. Further analyses should be explored in other cities, with varying degrees of foreign-born and different social milieu to assess how context may influence these relationships. Lastly, our behavioral measures are all self-reported and therefore, may be subject to reporting and recall biases.

Despite these limitations, our study suggests that further investigation into different migrant communities in other geographic locations within the United States is warranted. San Francisco represents a unique location, and understanding community level influences such as levels of stigma, discrimination, and health services may modify the relationships that we found between time in residence and incidence of HIV. Migrant MSM are also a heterogeneous group thus we need to better understand subpopulations of migrants. Moreover, framing further investigations in terms of transnational experiences could provide insights into how originating locations shape sexual attitudes that may carry over to behaviors in receiving locations. Finally, our analysis contributes to a better understanding of HIV infection among migrant MSM and suggests more effective ways of potentiating HIV prevention strategies for all MSM in San Francisco and possibly elsewhere.

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