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## Prevalence Estimates of Health Risk Behaviors of Immigrant Latino Men Who Have Sex With Men

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### Abstract

**Purpose**—Little is known about the health status of rural immigrant Latino men who have sex with men (MSM). These MSM comprise a subpopulation that tends to remain “hidden” from both researchers and practitioners. This study was designed to estimate the prevalence of tobacco, alcohol, and drug use, and sexual risk behaviors of Latino MSM living in rural North Carolina.

**Methods**—A community-based participatory research (CBPR) partnership used respondent-driven sampling (RDS) to identify, recruit, and enroll Latino MSM to participate in an interviewer-administered behavioral assessment. RDS weighted prevalence of risk behaviors was estimated using the RDS Analysis Tool. Data collection occurred in 2008.

**Results**—A total of 190 Latino MSM was reached; the average age was 25.5 years old and nearly 80% reported being from Mexico. Prevalence estimates of smoking everyday and past 30-day heavy episodic drinking were 6.5% and 35.0%, respectively. Prevalence estimates of past 12-month marijuana and cocaine use were 56.0% and 27.1%, respectively. Past 3-month prevalence estimates of sex with at least one woman, multiple male partners, and inconsistent condom use were 21.2%, 88.9%, and 54.1%, respectively.

**Conclusions**—Respondents had low rates of tobacco use and club drug use, and high rates of sexual risk behaviors. Although this study represents an initial step in documenting the health risk behaviors of immigrant Latino MSM who are part of a new trend in Latino immigration to the southeastern US, a need exists for further research, including longitudinal studies to understand the trajectory of risk behavior among immigrant Latino MSM.

## Keywords

epidemiology; health disparities; health promotion; sexual behavior; substance abuse

Latinos are the fastest growing minority group in the United States (US).<sup>1</sup> However, the health status and needs of immigrant Latinos are poorly understood because of gaps in national databases, the heterogeneity of immigrant populations, and the fear of some Latinos to participate in epidemiologic studies because of their immigration status and/or perceived ethnic/racial discrimination.<sup>2-5</sup>

Even less is known about the health status of immigrant Latino men who have sex with men (MSM), who comprise a subpopulation that tends to remain “hidden” from both researchers and practitioners.<sup>6-9</sup> The limited existing data documenting the risks of Latino MSM are often based on convenience and venue-based sampling rather than representative sampling and on samples of urban Latino MSM. Furthermore, what is known about Latino MSM may not characterize those who are part of the current demographic trend of Latinos immigrating to the rural US.<sup>10</sup> Having accurate prevalence estimates of risk behaviors is key to understanding risks and developing research priorities to promote health and prevent disease within this population. The subsequent section outlines tobacco cigarette smoking, alcohol and drug use, and sexual risk behavior data that are currently available for Latino MSM.

## Tobacco Cigarette Smoking Rates

MSM have higher rates of cigarette smoking than the general US population; current smoking rates of MSM have been reported to range from 25% to nearly 50%.<sup>11-15</sup> However, little data exist on smoking among different racial/ethnic groups of MSM,<sup>16</sup> and these data are outdated. During the 1990s, smoking rates among urban Latino self-identified gay men were reported to range between 26.3% and 47.2%, based on convenience sampling.<sup>13</sup> A study based on random-digit-dialing of a sample of California (CA) households in 2001 estimated the prevalence of smoking to be 9% among Latino self-identified gay men.<sup>11</sup> These rates are likely to have changed since the enactment and enforcement of tobacco control regulations.<sup>17</sup>

## Alcohol and Drug Use

Data describing alcohol use among Latino MSM also are limited.<sup>18</sup> A recent respondent-driven (RDS) sample of Latino self-identified gay men identified the prevalence of drinking  $\geq 6$  drinks per occasion during the previous 6 months as ranging from 15.4% in a San Francisco, California, sample to 36.8% in a Chicago, Illinois, sample.<sup>19</sup> Another study of MSM recruited in public venues in Los Angeles, California, using venue-based, stratified probability sampling design, reported that 24% of Latino MSM reported drinking  $\geq 5$  drinks at least once per week during the past 30 days.<sup>20</sup>

It has been suggested that MSM in the US are as much as 7 times more likely to report illicit drug use than their non-MSM male peers.<sup>21</sup> Despite this high rate of illicit drug use among MSM, little is known about use rates by race/ethnicity.<sup>18</sup> A community-based assessment in North Carolina found 7% of Latino self-identified gay men reported illicit drug use (including methamphetamine, cocaine, and ecstasy) during the past 30 days.<sup>22</sup>

However, prevalence of drug use ranges depending on the type of drug. Past 6-month use of marijuana has been found to range from about 26% to 33% during the past 6 months among Latino self-identified gay men in Chicago and San Francisco.<sup>19</sup> A study of Latino MSM recruited using time-location sampling in San Francisco found that 62% reported the use of

marijuana; 50%, methamphetamine; 42%, cocaine; 24%, ecstasy; and 12%, Viagra (generic name: Sildenafil citrate) during the past 6 months.<sup>23</sup>

In another venue-based study that included urban MSM in 7 large US cities, lifetime rates of use of cocaine, crack, and speed were 35.8%, 10.0%, and 44.0%, respectively.<sup>24</sup> Rates of use of other types of drugs, such as “club drugs” (eg, ecstasy, methamphetamines, gamma-hydroxybutyrate [GHB], and ketamine) have been estimated to be as high as 49% among Latino MSM recruited from the Internet in Miami, Florida.<sup>25,26</sup>

## Sexual Behavior

Latino MSM are disproportionately affected by HIV, AIDS, and sexually transmitted diseases (STDs) compared to their non-MSM Latino male peers and some other MSM.<sup>27</sup> Latino MSM are at risk for HIV and STDs through sexual risk behaviors, such as inconsistent condom use.<sup>22,28,29</sup> However, most of these studies are not based on representative samples. One study of urban Latino self-identified gay men reported unprotected anal sex during the past 2 months to be about 14%.<sup>19</sup> Convenience samples of Latino MSM in Miami and North Carolina found that 34% to 40% reported unprotected sex during the past 3 months.<sup>22,30</sup>

Clearly Latino MSM are at risk, and for some behaviors they are at increased risk, for tobacco cigarette smoking, alcohol and drug use, and HIV and STDs. However, much of the available data are outdated, based on nonrandom samples, or focused on urban samples of Latino MSM.

## Immigrant Latinos in the Southeastern US

Nowhere has the recent growth of the Latino community been more profound than in the southeastern US,<sup>1</sup> and North Carolina is typical of many southeastern US states with a rapidly growing immigrant Latino population.<sup>2,31</sup> However, little is known about the health of these Latinos who tend to be from southern rural Mexico and Central America, have lower educational attainment, and have arrived more recently compared to those who traditionally immigrated to Arizona, California, New York, and Texas.<sup>4,32-34</sup> Furthermore, many of these immigrant Latinos are coming to rural communities that lack histories of immigration and infrastructures to meet their needs.<sup>10,34</sup>

This study was designed by a community-based participatory research (CBPR) partnership to establish prevalence estimates of risk behaviors among immigrant Latino MSM living in rural North Carolina, a population considered “hard to reach” given the stigma associated with same sex behavior, the fear of deportation, and perceived discrimination and racism associated with being an immigrant and Latino.

## METHODS

This study was guided by a CBPR partnership in North Carolina comprising representatives from public health departments, AIDS service organizations (ASOs), universities, and the local Latino community (including immigrant Latino gay men) and Latino-serving community-based organizations (CBOs), all of whom have been working together for a decade to improve the health of vulnerable populations. Partners developed and adhere to an established mission and partnership principles previously outlined.<sup>35</sup> This ongoing partnership is committed to CBPR because blending lived experiences with sound science may have the potential to develop deeper understandings of phenomena. Deeper understanding of phenomena can lead to the development of interventions that are more likely to be culturally congruent and effective, thereby reducing health disparities.<sup>36-38</sup>

## Respondent-Driven Sampling (RDS)

RDS methods were used. RDS is an extension of chain-referral methods but provides a basis to calculate unbiased estimates of population parameters. RDS relies on respondents to recruit a limited number of subsequent respondents who are part of their social networks. The limitation of the number of respondents throughout RDS recruitment has a practical rather than theoretical rationale.<sup>39-43</sup>

Study data collection began by recruiting 8 group members (known as RDS “seeds”<sup>43</sup>) who met eligibility requirements and enrolling them. Nine additional seeds were recruited to expedite recruitment in accordance with RDS standard procedures, for a total of 17 seeds. Seed recruitment was facilitated by CBPR partners with existing strong ties to the Latino community. Although the characteristics of seeds in RDS are independent of those of the final sample, diversity among seeds accelerates the rate at which the sample reaches equilibrium.<sup>39</sup> Thus, seeds were selected to represent the diversity of the Latino MSM community, including level of “outness” about their sexual behavior and sexual identity, age, country of origin, and HIV status. Each seed also reported being from 1 of 7 rural counties in central North Carolina. These counties were selected *a priori* given that each had population densities < 1,000 per square mile.<sup>44</sup> When compared to other counties in North Carolina, these counties had higher percentages of persons self-identifying as Latino, had more rapid Latino community growth rates,<sup>1</sup> and disproportionate HIV and STD infection rates.<sup>2</sup>

Eligibility criteria for participation in this study included self-identifying as Latino or Hispanic, being ≥ 18 years of age, reporting MSM behavior since age ≥ 18, and providing informed consent. Two seeds reported being HIV+ and 2 reported being male-to-female transgender. After participating in the assessment, each seed was trained in the RDS recruitment protocol, which included how to recruit peers, study inclusion criteria, amount of compensation for participation and recruitment, how peer recruits contact the study coordinator, and the ethical treatment of peer recruits. Thus, the seeds initiated the chain-referral process.

After recruits contacted study staff via a study toll-free telephone number and were found to be eligible, they were enrolled and their data were collected using the same assessment as was used with seeds. Immediately after completing the assessment, each respondent also was trained in the RDS training recruitment protocol outlined above.

Each seed and subsequent respondent received 3 recruitment coupons (each the size of a dollar bill) to give recruits (potential respondents). The coupons included low-literacy Spanish-language information on the study, including the study's toll-free telephone number. The coupons were coded to match the recruiter to the respondent, a necessary component to generate sample weights for RDS prevalence estimates in analysis; a coupon was collected by the interviewer from each respondent.

This chain-referral process continued until the desired *a priori* sample size was obtained. Each respondent was compensated \$50 for participation in the assessment and received \$20 (for a maximum total of \$60) for each recruited peer who met eligibility criteria and participated in the assessment.

## Measurement

The CBPR partnership developed the assessment iteratively based on formative studies<sup>4,22,45,46</sup> and thorough literature review. Partners brainstormed constructs, compiled and developed items, and reviewed, revised, and approved the final version. Validated Spanish-language scales were used when available. The assessment was interviewer-

administered to overcome poor literacy and vision status, and was based on self-report. Most items had predefined response options with binary, categorical, or Likert-scale response options. The assessment took 45-90 minutes to complete, depending on the skip patterns of the respondent. Demographic characteristics were assessed, including age in years, country of origin, length of time living in North Carolina, educational attainment, employment status, health insurance coverage, annual income, gender, and sexual identity.

Type of employment was assessed by asking, “What types of paid work have you done in the past 12 months in the US?”<sup>47</sup> Acculturation was measured using the Short Acculturation Scale for Hispanics, a 12-item scale with 3 subscales.<sup>48</sup> Each subscale had excellent internal reliability: respondent language use ( $\alpha = 0.92$ ); respondent media use ( $\alpha = 0.94$ ); and respondent ethnic social relations ( $\alpha = 0.93$ ).

Behaviors assessed included tobacco, alcohol, and drug use, and sexual behaviors. Ever smoking, defined as smoking at least 100 cigarettes in one's lifetime, and frequency of current smoking (“not at all,” “some days,” or “every day”) were measured.<sup>16</sup> Heavy episodic drinking (ie,  $\geq 5$  drinks in a single drinking occasion during the past 30 days) and drunkenness were assessed.<sup>49,50</sup>

Past 12-month use of substances, such as marijuana, cocaine, crack, opium, heroin, and club drugs such as hallucinogens (including lysergide acid diethylamide [LSD], Psilocybin, and mushrooms), ecstasy, GHB, ketamine, methamphetamines, and speed, was assessed. Past 12-month non-prescription use of prescription drugs, such as valium, xanax, ativan, oxycotin, Percocet, and medications used for sexual enhancement or erectile dysfunction (eg, Viagra, Cialis and Levitra), also was assessed.

Lifetime non-medical use of needles was assessed using the item: “Have you or someone else ever used a needle, even one time, outside of a medical setting to inject vitamins, medicines, drugs, or any other substances into your body?”

Sexual behaviors were assessed, including experiencing forced sex as a child or adolescent; age at sexual initiation; number of male sexual partners; condom use during vaginal and insertive anal sex with women, and during insertive and receptive anal sex with men during the past 3 months; and sex while drunk and while “high on drugs” during the past 3 months. These items have been successfully used with immigrant Latinos in rural North Carolina.<sup>22,34</sup>

RDS-specific measures for weighting prevalence estimates included personal network size, how many persons the respondent knew who fit the inclusion criteria, and how well the respondent knew his recruiter.<sup>39</sup>

Most items had been previously validated with populations of Latinos and/or Latino MSM.<sup>22,34</sup> Items that did not already exist in Spanish were translated into Spanish using a “committee approach” to translation. This innovative approach to translation addresses weaknesses of traditional translation/back-translation approaches by using a team, whose members have skill sets beyond those of a translator. A group of individuals, including translators, a translation reviewer, content specialists, a questionnaire design expert, and an adjudicator with complementary skills, was convened. The translation was completed by multiple translators independently. The committee met to discuss versions of the translation, and the reconciled, Spanish-language version was created and reviewed by an adjudicator prior to final approval by the partnership and its implementation.<sup>4,45,51,52</sup> Prior to administration, the assessment was pre-tested and revised for comprehension, personal relevance, and acceptability. Human subject review and study oversight were provided by the Institutional Review Board (IRB) of Wake Forest University Health Sciences.

## Data Collection

Data were collected by 3 native Spanish-speaking male interviewers. These interviewers had cellular telephones and a toll-free number for potential respondents to call to schedule screening and interviewing. Data collection took 9 months.

## Data Analysis

Descriptive statistics, including frequencies and percentages or means, standard deviations (SD), and ranges, were calculated. Unadjusted prevalence and 95% Wilson confidence intervals (CI)<sup>53</sup> were estimated. RDS-weighted prevalence was estimated using sampling weights computed using the RDS Analysis Tool (RDSAT).<sup>54</sup> These sampling weights accounted for network effects of respondents recruiting other respondents captured by coupon tracking data collection and clustering of network characteristics captured by survey data collection (ie, the tendency of recruiters to recruit others like themselves).<sup>39,40</sup>

Design effects also were calculated. Design effects represent the cumulative effect of stratification, unequal weighting, and clustering.

## RESULTS

After seed recruitment, 3 waves of data collection were completed for a total of 190 Latino MSM respondents (including the seeds). Two seeds did not “germinate;” they did not recruit an eligible respondent. Select demographic characteristics are presented in Table 1. The average age of respondents was 25.5 years old ( $\pm 5.4$ ; range: 18-48). The average number of years living in the US was about 10 years with a range from a few months to 25 years, and > 60% of participants lived in the US fewer than 10 years. Over three-fourths reported Mexico as their country of origin. A substantial proportion (16.3%) self-identified as male-to-female transgender. Although all reported oral and/or anal sex with a male in the previous 3 months, 3 (1.6%) respondents self-identified themselves as heterosexual; 88.8% self-identified as “gay” or “homosexual,” and nearly 10% as “bisexual.” Acculturation was low.

Over four-fifths of the sample reported having a high school diploma (or equivalent) or less. Most reported being employed year round, and construction work was the most frequently reported job. Nearly half of the sample reported living with a biological family member.

Table 2 provides the number of respondents in the sample reporting specific risk behaviors, the unadjusted percentage and corresponding 95% CIs, and the RDS-weighted prevalence estimates and corresponding 95% CIs.

The RDS-weighted prevalence estimate of ever smoking, defined as a lifetime history of smoking at least 100 tobacco cigarettes, was 43.8% (95% CI = 31.0, 50.1). However, fewer respondents reported smoking regularly; the prevalence estimate of smoking everyday was 6.4% (95% CI = 2.0, 9.8). The prevalence estimate of heavy episodic drinking was 35.0% (95% CI = 25.5, 44.6). Nearly one-fifth of the sample reported getting drunk in a typical week (18.2%, 95% CI = 10.9, 25.0).

Prevalence estimates of past 12-month substance use ranged from 4.6% (95% CI = 1.6, 9.0) for crack to 56.0% (95% CI = 50.2, 65.8) for marijuana. The prevalence estimate of cocaine use was 27.1% (95% CI = 17.2, 31.6). The prevalence estimate of drugs used for sexual enhancement or erectile dysfunction (ie, Viagra, Cialis, and Levitra) was 7.7% (95% CI = 4.1, 12.0). No respondents reported past 12-month use of opium, heroin, hallucinogens, ecstasy, GHB, ketamine, methamphetamine, speed, valium, xanax, ativan, oxycotin, or Percocet. The prevalence estimate of ever non-medical use of injecting needles was 13.6% (95% CI = 9.7, 20.3).

Prevalence of sexual risk behaviors also was estimated. The prevalence estimate of having been forced to have sex as a child or adolescent was 1.6% (95% CI = 1.0, 4.5). The prevalence estimate of sexual initiation at 16 years old or younger with either a male or a female was 45.6% (95% CI = 42.8, 59.3). The prevalence estimate of having had sex with a woman during the past 3 months was 21.2% (95% CI = 11.1, 28.4). The prevalence estimate of having had multiple male sex partners during the past 3 months was 88.9% (95% CI = 88.3, 98.3). The prevalence estimate of inconsistent condom use during insertive and/or receptive sex with a male partner during the past 3 months was 54.1% (95% CI=43.4, 60.8). The prevalence estimates of having had anal sex while drunk or high on drugs during the past 3 months were 8.0% (95% CI = 4.6, 13.4) and 6.9% (95% CI = 3.8, 13.0), respectively.

Design effects also are presented in Table 2. The mean design effect across outcomes reported in Table 2 was 1.68 (median=1.51), indicating that the mean variance of the RDS estimates was 1.68 times that of the variance of estimates from simple random sampling.

## DISCUSSION

This study provides prevalence estimates of health risk behaviors of Latino MSM living in North Carolina, a state that like much of the southeastern US is experiencing a burgeoning immigrant Latino population. Prevalence of health behaviors among MSM populations is extremely limited, and this study provides estimates based on weighted data collected using RDS and analyzed using RDSAT. RDS is an increasingly employed strategy used to improve the prevalence estimates of data collected from populations for whom no sampling frame exists.<sup>35,45,55-58</sup>

Respondents recruited in this study were young immigrant Latino MSM predominately from rural communities in Mexico. Most had arrived in the US within the past 10 years; they tended to be non-English speaking and unacculturated. They worked primarily in construction, factories, and service industry jobs. A proportion self-identified as male-to-female transgender, and nearly 10% self-identified as bisexual.

Findings suggest that tobacco use is not common among immigrant Latino MSM. Although over 40% reported ever smoking tobacco cigarettes, only about 6% smoked every day. This percentage is lower than other samples of Latino adult men that suggest that over 20% are current smokers<sup>16</sup> and is more in line with the random sample of California households in 2001 which identified 9% of Latino gay men as smokers.<sup>11</sup> However, despite the low rates of current smoking among immigrant Latino MSM, smoking rates should be followed longitudinally in future studies given that increased smoking has been associated with increased acculturation and increased time in the US.<sup>59</sup> Furthermore, gay<sup>60</sup> and Latino<sup>61</sup> communities have been targeted by tobacco marketing; thus, Latino MSM may be increasingly influenced by tobacco marketing.

Over one-third of the sample reported heavy episodic drinking during the past 30 days and nearly 20% of the sample reporting getting drunk in a typical week. Other studies have found lower rates of heavy episodic drinking among Latino MSM.<sup>20</sup> A review of alcohol use among immigrant Latino men in the US suggested that although Latino men may not be more likely to use alcohol, it may be that they drink heavily when they do drink.<sup>62</sup> More research is needed to understand alcohol use among immigrant Latino groups, particularly Latino MSM.

Marijuana, cocaine, drugs used for sexual enhancement or erectile dysfunction, pain killers (eg, oxycotin and Percocet), and crack were identified as being used by respondents during the past 12 months. Use of club drugs was not reported by respondents. Although the absence of club drug use among Latino MSM does not mirror the higher use identified in

other parts of the US (eg, urban areas), use may increase as Latino MSM are exposed to socio-cultural contexts that might increase rates of use. Thus, low rates of use do not imply that drug use is not a concern; it may be an opportunity for prevention as drug use may increase over time.

Clearly, Latino MSM are at increased risk for HIV and STDs; nearly 90% of the sample reported having multiple male sexual partners during the past 3 months and over half of the sample reported inconsistent condom use during anal sex during the past 3 months. Intervention research is needed to research Latino MSM, a population for whom no well-tested and effective sexual risk reduction intervention currently exists.<sup>56</sup>

Overall, prevalence was similar for unadjusted and RDS-weighted estimates. However, among the 21 estimates calculated, RDS-weighted estimates were higher and their 95% confidence intervals were wider for 16 of the estimates. These differences indicate that after adjustment for design effects due to RDS sampling, the RDS-weighted estimates were less precise. Furthermore, these design effects can be used to determine sufficient sample size needed in subsequent studies of Latino MSM.

### Limitations

Although it has been suggested that self-identifying bisexual Latino MSM are separate and distinct from their exclusively homosexual MSM peers,<sup>63,64</sup> the small number of bisexual MSM precluded the identification of potential differences in prevalence estimates between these 2 groups of MSM. Furthermore, the transgender participants also may constitute a different population worthy of a distinct study; however, given the established relationships identified between immigrant Latino MSM and transgender individuals,<sup>45</sup> the inclusion of transgender individuals in studies of MSM is standard.<sup>19</sup> Future studies may benefit from narrowing inclusion criteria in order to identify prevalence estimates by subgroup.

Respondent age and time living in the US varied as well. Clearly, those who have been in the US for a shorter time period would differ from those who have been in the US longer. Thus, studies that want to explore differences among immigrant Latino MSM based on these variables will need to recruit a larger number of respondents.

Moreover, these prevalence estimates are based on Latino MSM recruited in rural North Carolina. Generalization of the findings to other Latino populations or contexts may not be appropriate. Although the demographics of Latinos immigrating to North Carolina tend to represent those coming to the southeastern US more broadly, these assumptions have not been well tested, particularly given the heterogeneity within some Latino communities.

Furthermore, the counties from which the seeds were selected were considered rural;<sup>44</sup> however, in *post hoc* analysis most respondents (including the seeds) reported living within counties that were located  $\leq 50$  miles from a town of  $> 35,000$  persons. This relative “closeness” to small- and medium-sized cities may not imply access given the lack of public transportation in North Carolina and the fear of both undocumented and documented immigrant Latinos to drive distances and risk police check points. In fact, immigrant Latino MSM in the same rural North Carolina communities have reported feeling geographically isolated from one another, gay communities more generally, and cities.<sup>35,45</sup>

Finally, simple random sampling would have provided more precise estimates of study outcomes. Given that this study was designed to calculate prevalence estimates among Latino MSM, door-to-door sampling, as an example, may have been difficult given the large numbers of potential respondents who would require screening to identify 190 respondents who met inclusion criteria and consented to participate. Furthermore, at least some of the



success of the RDS approach is based on initial respondents successfully participating and sharing their positive experiences with those who may otherwise be less likely to participate. Likewise, venue-based sampling of Latino MSM may miss MSM who are not found in known locations and may be less out about their orientation and/or behavior.

### RDS and CBPR

Using both RDS and CBPR, this study was successful in recruiting a sample of 190 immigrant Latino MSM within communities in which publicity over partnerships between local law enforcement and US Immigration and Customs Enforcement and recent allegations that public health department records had been used in deportation proceedings have contributed to fears and general distrust among many immigrant Latinos. Within this socio-political environment, this population is even more difficult to access and suspicious of research.<sup>4,65</sup> However, the initial trust that the CBPR partnership had in the local community, combined with the RDS recruitment approach, enabled this study to overcome these challenges. RDS also was a culturally congruent approach to recruitment; Latino MSM were accustomed to referring one another to local resources. For example, Latino MSM have reported that they commonly provide guidance to social network members (their peers) about job and housing opportunities, buying a car, and getting other needs met.<sup>35,45</sup> Harnessing these naturally existing networks for recruitment was easily understood and implemented by respondents.

Furthermore, it is important to note that RDS has been primarily applied in urban settings; however, Wang and colleagues<sup>66</sup> published the first study that applied RDS in a non-urban setting, finding that RDS can be a useful method of sampling hidden populations in rural communities. They reported that the identification of productive seeds can be challenging. In this study, CBPR partners were able to identify productive seeds; in fact, nearly 90% of the seeds recruited at least one respondent who was eligible and agreed to participate. However, because recruitment went slower than the timeline allowed, seeds were added; RDS is especially flexible in terms of recruitment because enrolling more seeds after the study has been initiated is possible.<sup>39-43</sup> It has been suggested that seeds be “socio-metric stars” committed to the aims of the study;<sup>40</sup> CBPR partnership members had insiders’ perspectives into the community and were able to identify motivated seeds who were committed to the goals of the study.

### Conclusions

This study represents a step in documenting the health risk behaviors of immigrant Latino MSM who are part of a new trend in immigration to the southeastern US. Clearly a need exists for further research, including longitudinal studies to understand the trajectory of risk behavior among immigrant Latino MSM. Furthermore, future RDS studies may benefit from collecting biomedical data to further document the health and well-being of immigrant Latino populations, eg, blood pressure, glucose, electrolyte, and hemoglobin levels, or fecal occult blood tests. Cortisol levels may be useful to explore the impact of stress related to being an immigrant Latino MSM.

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**Table 1**

Demographic and Other Select Characteristics of Respondents (N=190)

Characteristic	Mean $\pm$ SD (min-max) or n (%), as appropriate
Age (years; n=188)	25.5 $\pm$ 5.4 (18-48)
Country of origin (n=188)	
Mexico	149 (79.2)
Guatemala	4 (2.1)
El Salvador	3 (1.6)
Honduras	3 (1.6)
Other	29 (15.5)
Length of time in NC in years	6.3 $\pm$ 3.5 (0.3-22.8)
Length of time in US in years	9.6 $\pm$ 5.6 (0.3-25)
Gender	
Male	159 (83.7)
Male-to-female transgender	31 (16.3)
Sexual identity (n=188)	
Gay/Homosexual	167 (88.8)
Bisexual	18 (9.6)
Heterosexual	3 (1.6)
Acculturation	
Language use ( $\alpha=0.92$ )	2.2 $\pm$ 0.75 (1.0-3.8)
Media use ( $\alpha=0.94$ )	2.6 $\pm$ 0.93 (1.0-5.0)
Ethnic/social relations ( $\alpha=0.93$ )	2.3 $\pm$ 0.58 (1.0-3.7)
Education (n=178)	
Less than high school diploma or equivalent (GED)	24 (13.5)
High school diploma or equivalent (GED)	122 (68.5)
Some college	23 (12.9)
2-year college degree	5(2.8)
4-year college degree	4 (2.3)
Employment status (n=187)	

Characteristic	Mean $\pm$ SD (min-max) or <i>n</i> (%), as appropriate
Employed year round	170 (90.9)
Employed in seasonal work but not year round	13 (7.0)
Unemployed	4 (2.1)
Employment type (n=176)	
Construction	43 (24.4)
Restaurant	37 (21.0)
Factory	21 (11.9)
Furniture manufacturing	20 (11.4)
Hairstylist/barber	10 (5.7)
Janitor/industrial cleaning	8 (4.6)
Animal slaughtering/processing	7 (4.0)
Cashier	7 (4.0)
Lawncare/landscaping	7 (4.0)
Other (e.g., Farmwork)	16 (9.1)
Income (n=181)	
< \$20,000	56 (30.9)
\$20,000 - \$29,999	94 (51.9)
\$30,000- \$39,999	26 (14.4)
\$40,000 - \$49,999	5 (2.8)
Insurance (n=188)	42 (22.3)
Current living situation (n=188)	
Biological family member's house or apartment	83 (44.1)
House or apartment	65 (34.6)
Someone else's house or apartment	38 (20.2)
Other	2 (1.1)

**Table 2**

Prevalence Estimates of Risk Behaviors of Immigrant Latino MSM Living in the Southeastern US (N=190)

Risk behavior	N	Unadjusted % (95% CI)	RDS weighted % (95% CI)	Design effect
<b>Cigarette smoking</b>				
Ever smoked	69	36.3% (29.8, 43.4)	43.8% (31.0, 50.1)	1.96
Smoke sometimes	59	31.1% (24.9, 38.0)	36.6% (29.8, 48.3)	2.03
Smoke everyday	15	7.9% (4.8, 12.6)	6.4% (2.0, 9.8)	1.04
<b>Alcohol use</b>				
Heavy episodic drinking past 30 days	57	30.0% (23.9, 36.9)	35.0% (25.5, 44.6)	2.07
Gets drunk in typical week	33	17.4% (12.6, 23.4)	18.2% (10.9, 25.0)	1.71
<b>Substance use during past 12 months</b>				
Marijuana	100	52.6% (45.6, 59.6)	56.0% (50.2, 65.8)	1.15
Cocaine	42	22.1% (16.8, 28.5)	27.1% (17.2, 31.6)	1.50
Viagra, Cialis, or Levitra	14	7.4% (4.4, 12.0)	7.7% (4.1, 12.0)	1.11
Pain killers (e.g., Oxycotin and Percocet)	13	6.8% (4.0, 11.4)	Cannot calculate estimate <sup>c</sup>	n.a.
Crack	8	4.2% (2.1, 8.1)	4.6% (1.6, 9.0)	1.52
Ever non-medical use of needles	25	13.2% (9.1, 18.7)	13.6% (9.7, 20.3)	1.21
<b>Sexual behavior</b>				
Forced to have sex as child/adolescent	6	3.2% (1.5, 6.7)	1.6% (1.0, 4.5)	0.50
Age at sexual initiation ≤ 16 years old with either female or male	80	42.1% (35.3, 49.2)	45.6% (42.8, 59.3)	1.43
Having had sex with woman, past 3 months	32	16.8% (12.2, 22.8)	21.2% (11.1, 28.4)	2.86
Multiple male sex partners, past 3 months	124	65.3% (60.3, 73.7)	88.9% (88.3, 98.3)	0.56
Inconsistent condom use during vaginal sex, past 3 months	11 of 32 <sup>a</sup>	34.4% (20.4, 51.7)	Cannot calculate estimate <sup>c</sup>	n.a.
Inconsistent condom use with men, either insertive or receptive anal, past 3 months	94 of 184 <sup>b</sup>	51.1% (44.2, 58.5)	54.1% (43.4, 60.8)	1.55
Inconsistent condom use with men as insertive anal partner, past 3 months	50 of 184 <sup>b</sup>	27.2% (21.3, 34.0)	33.7% (19.9, 48.2)	4.53
Inconsistent condom use with men as receptive anal partner, past 3 months	51 of 184 <sup>b</sup>	27.7% (21.8, 34.6)	34.0% (20.8, 42.3)	2.76
Anal sex while drunk, past 3 months	16	8.4% (5.2, 13.2)	8.0% (4.6, 13.4)	1.19
Anal sex while high on drugs, past 3 months	13	6.8% (4.0, 11.4)	6.9% (3.8, 13.0)	1.57

<sup>a</sup> 32 respondents reported sex with women during the past 3 months<sup>b</sup> 184 respondents reported anal sex with men during past 3 months<sup>c</sup> Respondents may have recruited non-users; however, only users participated