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Peer Effects on Condom Use and Sexual Risk Behavior Among Mexican Migrants,
Returning Migrants and Non-Migrants

By

Rafael J. Veraza

Degree to be awarded: MPH

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Abstract Cover Page

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2008

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Abstract

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By Rafael J. Veraza

Background: Migration from Mexico to the U.S. is the largest sustained flow of immigrants anywhere in the world with 11% of Mexican-born people living as migrants in the U.S. International migrants have been identified as a vulnerable population for HIV and the migration process has been cited as a factor for HIV infection. Higher rates of HIV in Mexico have been linked to Mexican returning-migrants from the U.S. Although condom use among migrants has been identified at higher levels of use when compared with non-migrants, the determinants for greater condom use among migrants are not well defined. Social networks and peer effects have been shown to significantly improve health-related behaviors. **Objective:** The aim of this study was to understand the association between peer influences and condom use among Mexican migrants to the US, migrants who had returned to Mexico from the US and men who had never migrated. **Methods:** The data for this study were obtained from a mixed methods data collection study looking at different aspects of Mexican-migrant and non-migrant health and sexual risk behaviors. Bivariate logistic regression analysis was conducted to identify factors of interest associated with condom use. Multivariate logistic regression analysis was used to create two models that included peer effects as predictors of condom use. **Results:** The study sample included 224 male Mexican migrants, 318 returning migrants and 336 non-migrants. Age, migrant status, marital status, duration of peer's friendship, peer's condom use and peer's advise about condom use were potential independent predictors of condom use during last sex. This study did not show a significant difference between migrant group and condom use as previously shown by other studies. Multivariate logistic modeling showed that peer's condom use (OR= 7.52, 95% CI= 3.00, 18.87), and peer's advise about condom use (OR= 3.57, CI= 1.46, 8.72) were significant predictors of condom use during last sex. **Discussion:** This study suggests that peer influences may impact condom use and that this may partially explain the differences previously reported in condom use between Mexican migrant and non-migrant populations. Understanding the role of social networks among migrant and Mexican non-migrant populations may allow the design of novel effective and comprehensive HIV/AIDS prevention interventions.

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Table of Contents

Chapter 1. Introduction.....	1
1.1 Rationale	1
1.2 Problem Statement.....	1
1.2. Purpose Statement.....	2
1.3 Research Questions:.....	2
2.1. Importance of Comprehensive-Evidence-Based HIV/AIDS Prevention	1
2.2. The Magnitude and Intensity of Migration between Mexico and the U.S.....	3
2.3. Migration and Risk of HIV/AIDS:	5
2.4. Condom Use in Mexican Migrants.....	6
2.5. Justification for Studying Individual and Environmental Determinants of Condom Use in Mexican Migrants.....	8
2.6. Migrant’s Peer Effects and Health-Related Behavior.....	10
CHAPTER 3. Methods and Results	13
3.1 Methods:.....	13
Study Population:.....	13
Sampling Methodology:	14
First Stage Data Sampling:	15
Second Stage Data Sampling:.....	16
Sample Size:	16
Data Collection:	17
Recruitment and Study Interviews:	18
Human Subject Research Approval:	19
Data Analysis:.....	19
Overall Descriptive Statistics:	19
3.2. Results:	21
Overall Descriptive Statistics:	21
Descriptive Statistics by Migrant Status:	21
Bivariate Logistic Regression Modeling- Research Question 1:	22
Model 1- Research Question 2:	22
Model 2- Research Question 3:	23
CHAPTER 4. Discussion, Conclusions and Recommendations	25
4.1. Discussion:.....	25
4.2. Conclusions and Recommendations	28
Conclusions:	28
Recommendations:.....	28
APPENDIX A.....	30
APPENDIX B.....	37

References.....38

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Chapter 1. Introduction

1.1. Rationale

Migration between Mexico and the United States (U.S.) has been a major factor that defines the relationship between the two countries for many years. Mexico and the U.S. share a common border of approximately 2,000 miles in length and it is the most frequently crossed international border in the world with approximately 350,000,000 crossings per year with an estimated half a million unauthorized (also called illegal) entries into the U.S. each year. Efforts to control and manage the human flow have been made on both sides of the border; however no solution has been found and the Mexican unauthorized immigration to the U.S. remains a complex socio-political and human rights problem. HIV/AIDS and migration has been a great global public health problem since the beginning of the pandemic. Studying the implications of migration on the health of people in both receiving and sending communities is an important step to understand this complex problem as well as contribute to the development of appropriate comprehensive HIV/AIDS prevention programs targeting vulnerable populations such as migrants.

1.2 Problem Statement

Currently there is limited research regarding peer effects on sexual behavior among Mexican migrants and Non-migrants. Understanding environmental factors such as peer effects among Mexican migrants and Mexican non-migrants that influence sexual

behavior can be a promising strategy in program planning for HIV/AIDS prevention in the U.S., and in Mexico.

1.2. Purpose Statement

The overall aim of this study was to understand the relationship between environmental factors such as peer effects and condom use among Mexican migrants living in the U.S, among returning Mexicans who had migrated to the US and Mexicans who had never migrated to the US and lived in Mexico in communities where migration to the U.S. was common. In order to investigate the link between peer effects and condom use among migrants, returning migrants and non-migrants, the study looked at whether an association existed between an individual's condom use and knowledge about condom use with his peers. Furthermore this study also looked at whether this relationship predicted individual's condom use; how do these associations differed among migrants, returning migrants and non-migrants; and what other factors play a role on predicting condom use. Identifying peer effects on the influence of sexual behavior among Mexican migrants and non-migrants are an important part of program planning for HIV/AIDS prevention among vulnerable populations.

1.3 Research Questions:

The study sought to address three main research questions:

1. What factors predict condom use during the last sexual encounter among Mexican migrants, Mexican non-migrants, and Mexican returning-migrants?

2. Whether an individual (Mexican migrant, Mexican non-migrant and Mexican returning-migrant) that engages in conversation with his peers about condom use, used a condom in his last sexual encounter?
3. Does an individual (Mexican migrant, Mexican non-migrant, Mexican returning-migrant) whose peer reported using condoms, used a condom during his last sexual encounter?

Chapter 2. Literature Review

2.1. Importance of Comprehensive-Evidence-Based HIV/AIDS Prevention

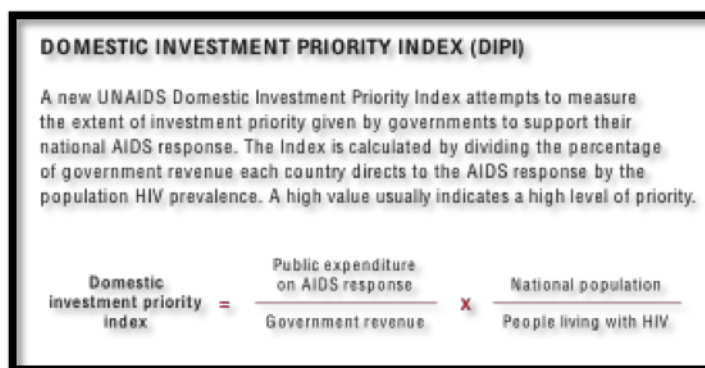
Although according to the UNAIDS Global Report 2010 the overall growth of the AIDS epidemic appears to have stabilized, the number of new infections still remains high. Every day in 2009 more than 7000 people became infected with the human immunodeficiency virus (HIV) worldwide, this is an important decline from the estimated 11,000 people newly infected every day in 2006 [1]. While the number of newly infections has declined, there were an estimated total of 2.6 million people newly infected in 2009 creating a great financial burden on countries battling the epidemic [1].

Given the 2008-2009 global financial crisis, UNAIDS reports that in 2009 a total of US\$15.9 billion was allocated for the global AIDS response, US\$10 billion short of what was needed in 2010[1].

The new Domestic Investment Priority Index (DIPI) (See Figure 1) by UNAIDS explains that over 70%

of nations fall below the median level of priority spending on AIDS response[1]. Given the global financial burden and constrained spending on the HIV/AIDS response, it is of crucial importance that the funds allocated must be cost-effective, efficient and distributed to evidence-based strategies to prevent new HIV infections. However, there is limited research on the effectiveness of HIV prevention programs and more than 30 years after the pandemic started there is no sign of global comprehensive-effective

Figure 1: New UNAIDS Domestic Investment Priority Index for AIDS response [1]



HIV/AIDS prevention. As Pott's et al., (2008) pointed out in a paper analyzing global HIV prevention published in Science, the vast majority of funds spent on AIDS prevention "are being made in interventions for which evidence of large-scale impact is increasingly weak, whereas much lower priority is given to interventions for which the evidence of potential impact is greatest"[2]. HIV prevention should be focused on primary prevention that is evidence-based and that focuses on changing fundamental risk behaviors, not only risk reduction but also in addition risk avoidance [3]. Common ground for HIV/AIDS prevention is urgently needed in which each intervention provided must be culturally appropriate, evidence-based and designed specifically for the group being targeted[4]. According to the "common ground" statement by Halperin et al., (2004) published in the Lancet and endorsed by over 100 AIDS scientist and activists, when targeting vulnerable populations such as migrants, if sexually active, strategies for prevention should be aimed at promoting mutual fidelity with an uninfected partner, if at high risk of exposure to HIV (soliciting commercial sex, multiple partners, anal sex, or sex with infected HIV persons), strategies for prevention should be aimed at promoting correct and consistent condom use in addition to implementing prevention strategies that focus on risk-avoidance [4]. Understanding the determinants of sexual risk behaviors and condom use in vulnerable populations such as Mexican-migrants are of crucial importance for the implementation of comprehensive evidence-based HIV/AIDS prevention strategies.

2.2. The Magnitude and Intensity of Migration between Mexico and the U.S.

Current Picture:

Migration from Mexico to the U.S. is the largest sustained flow of immigrants anywhere in the world[5]. Although the number of Mexican-born migrants coming to the U.S. has declined sharply and stabilized during the last five years [6](See Figure 2 & 3 in Appendix A), the number of Mexican-born migrants living in the U.S. accounts for almost 11% of everyone born in Mexico[6, 7](See Figure 4 in Appendix A). In early 2009 there were an estimated 11.5 million Mexican-born people living in the U.S.[6] and Mexicans represent the largest immigrant group[6, 8] coming into the U.S. making up 32% of all foreign-born residents, and 66% of all Hispanic immigrants[6]. Measuring migration of Mexican-born individuals into the U.S. is a challenging task due to the fact that unauthorized migration dominates the exchange, with more than half (56%) of Mexican-born immigrants living in the U.S. unauthorized[9].

Where do Mexican-migrants go in the U.S.?

Despite the sharp decline influx of Mexican-migrants into the U.S. seen in the last five years, there has been an increased dispersion of Mexican-migrants in the U.S. and movement to states other than California and Texas, where they have traditionally settled[10]. Between 1990 and 2000, North Carolina, Arkansas, Georgia, Tennessee, South Carolina and Alabama registered an average increase in their Hispanic populations of 308%, the highest of any states in the U.S. except for Nevada[10].

Patterns of migration among Mexican-migrants:

The patterns of migration among Mexican-migrants into and out of the U.S. vary throughout the year. Migration patterns seen throughout the decades have been

classified by either *permanent migration* or *circular migration* in which the migrants travel to the U.S. stay for a few months and then go back to Mexico. The large majority of migrants are classified as migrating in a *circular migration* pattern[6]. Findings have also point out that Mexican migration into and out of the U.S., tends to be seasonal with high numbers emigrating out of the US into Mexico during the fall and winter months and immigrating into the U.S. during spring and summer months[6].

Given the current global economic crisis, employment among Latino immigrants has been greatly affected, with an unemployment rate increasing from 5.1% to 8.05% from the fourth quarter of 2007 to the fourth quarter of 2008[11]. Given the significant increase in unemployment among Latino immigrants, speculations were raised regarding whether there was an increase in Mexican-migrants returning back to Mexico due to the lack of employment opportunities in the U.S. However findings from the Hispanic Pew Research Center point out that there is no evidence of an increase number of Mexican-migrants returning back to Mexico[6]. Data from the U.S. and Mexican population surveys point out that the annual return flow of Mexican-migrants back to Mexico has remain stable since 2006 (2006-2007 return flow: 479,000 people; 2007-2008 return flow: 440,000 people; 2008-2009 return flow: 433,000 people)(See Figure 2 & 3 in Appendix A)[6]. On the other hand, data from population surveys in the U.S. and Mexico in conjunction with apprehension data from the U.S. Homeland Security Agency confirm that Mexican immigration into the U.S. has dropped by 40% since 2006; from 550,000 people from March 2003 - March 2006 to 350,000 people from March 2006 - March 2008 [6]. It is uncertain whether the sharp decline of Mexican-migrants into the U.S. has been caused by a major change in immigration patterns between the two

countries or a short-term effect due to the economic crisis in the US and/or the stricter border enforcement and stern immigrant law regulations in certain states.

Migration from Mexico to the U.S. also tends to be from a specific State or region in Mexico to a specific city or State in the U.S. through what has been called “migration channels”. For example, Aguililla, Michoacán and Redwood City, California can be considered “sister Cities” with almost as many Aguilillans in Redwood City as there are in the municipality of Aguililla, which has about 25,000 [12] .

2.3. Migration and Risk of HIV/AIDS:

Due to their socio-economic status and their constant exposure to risky contexts, since the beginning of the HIV/AIDS epidemic international migrants have been identified as a vulnerable population and the migratory process contributing to HIV infection [13-17]. As an example, one study using a mathematical model showed that HIV prevalence rates would be a quarter of what they are today in South Africa if rural to urban migration had been restricted as it was under apartheid[18]. In Mexico, research studies have found that in states that have the highest rates of immigration to the U.S., migration is a prominent source of new HIV infections[19]. Preliminary data from a government survey of migrants finds that the prevalence of HIV infection is 0.8%, which is double that of the general population in Mexico (0.4%) [20]. In the U.S., the California Department of Health Services reports that the percentage of Latino AIDS cases who are Mexican or Mexican-American has increased from 36.5% in 1995 to 47.7% since 2000[21]. Overall in the U.S., estimates from the Centers of Disease Control and Prevention (CDC)

point out that 17% of new HIV infections nationwide in 2006 were among Hispanic/Latinos, 2.5 times that of whites[22].

Mexico is classified as having a concentrated AIDS epidemic, whereby the disease is contained in certain high-risk groups primarily living in urban areas of the country. Most recent HIV seroprevalence estimates from 2010 show that, while the overall prevalence among adults between ages of 15-49 is of 0.38%, among male sex workers it is 15%, followed by men who have sex with men (MSM) who have an HIV seroprevalence rate of 11% and injection drug users (IDU) who have a seroprevalence of 5% [23]. Raising HIV rates among Mexican-migrants is worrisome because can bridge the infection to the general population and, in particular, to marginalized populations in rural communities where most of Mexican-migrants return. Studies have shown that around 25% of HIV/AIDS cases in rural areas in Mexico can be linked to Mexican returning-migrants from the U.S. as compared with 6% of HIV/AIDS cases in urban areas[24]. Further studies have shown significant associations between Mexican-migration to the U.S and higher vulnerability to HIV by high-risk behavior such as multiple concurrent partners, substance use, greater access to commercial sex workers, and low or no condom use[25-28]. Most recently Muñoz-Laboy et al., (2009) identified loneliness as a sexual risk factor for Mexican migrant workers, where higher levels of loneliness were strongly associated with higher frequency of sexual risk behavior ($r=0.64$, $p=.008$)[29]. As the evidence shows Mexican-migrants are an important target group when studying and preventing HIV/AIDS infections in Mexico and in the U.S.

2.4. Condom Use in Mexican Migrants

When targeting vulnerable populations at high risk of exposure to HIV such as Mexican-migrants who engage in the following high risk behaviors: soliciting commercial sex, multiple partners, anal sex, or sex with infected HIV persons, strategies for prevention should be aimed at promoting correct and consistent condom use[4] and or risk avoidance. Correct and consistent condom use has been shown to reduce the risk of HIV/AIDS transmission[30] but people often fail to use condoms consistently and correctly. In Mexico, a government survey from 2000 found that among sexually active 20-49 years olds; 11.9% of men and 6.6% of women, use condoms[31]. Also, national data from 2006 shows that condom use ranks third among methods of family planning where 14.9% of sexually active adults 20-49 years old report using it[32].

There is relatively little detailed information on condom use in Mexico, but studies indicate that it varies depending on demographics. Younger age is linked with greater use, with 44.7% of 15-19 year old Mexico City men reporting condom use compared to 25% of 25-30 year olds[33]. More recent data regarding sexually active adolescents (14.4% of all adolescents) 12-19 years old in Mexico shows that 63.5% of males and 38.0% of females report using condoms on their first sexual encounter[32]. Condom use is more prevalent in the U.S. than in Mexico, a CDC survey found that almost a third of men 15-44 years of age in the U.S. reported using a condom in their last sexual encounter[34]. Similarly, research shows that international migrants use condoms more frequently than non-migrants[13, 35, 36]. For example one study found that 57.6% of non-migrants reported using condoms with a commercial sex partner, compared to 76.9% of migrants having sex with a commercial partner and 41% of non-migrants reported using condoms with non-regular or non-commercial sex as compared to 68% of

migrants reporting using condoms, all results were statistically significant ($p < 0.05$)[13]. Other studies from the northern border of Mexico found that 47.3% of returning-migrants had unprotected vaginal sex compared to 80.1% of those departing[36].

It is difficult to explain why migrants tend to report higher condom use merely by demographics or sex partner type, which have generally been identified as important determinants of condom use. Although younger age is positively associated with greater use, Rangel et al., (2006) found that returning-migrants in Mexico were significantly older than those leaving for the USA, but nonetheless reported greater condom use[36]. Research shows that individuals are more likely to use condoms with occasional sex partners than with stable partners[27]. Furthermore while migrants have more sex partners than non-migrants, they use condoms in a higher proportion with all partner types compared to non-migrants[13]. For example, one study found that almost 40% of migrants used condoms with their wives, compared to less than 15% of non-migrants[13, 27] and the percentage increase in condom use was highest in the wife or habitual partner category (186%), compared to the commercial partner category (33.5%)[13]. As these data shows, the determinants of greater condom use among migrants are not well defined, and tend to vary by age and sex partner type. Therefore studying Mexican-migrants and condom use in a more precise way can shed light towards the design and implementation of comprehensive, culturally appropriate, evidence-based HIV/AIDS prevention interventions.

2.5. Justification for Studying Individual and Environmental Determinants of Condom Use in Mexican Migrants

Although international migrants have been identified as a vulnerable population worldwide, not enough research has been conducted on investigating the determinants of condom use among this specific population. The majority of publications related to migration and HIV/AIDS in the Mexico-U.S. context have studied the risks migrants take with their sexual health and little is known about the individual and environmental characteristics that determine safer sex behavior including condom use or risk avoidance. The few articles that have been written on Mexican-migrants and condom use have concentrated on farm laborers, but with increasing job diversification, they represent only 11% of employed migrants in the U.S. [37]. A literature review finds that no research has analyzed why Mexican migrants change their behavior and use condoms more than non-migrants. Comparing migrant to non-migrant behavior provides a “natural” experiment, which can pinpoint the key determinants of behavior change for this subgroup.

Studying condom use among Mexican-migrants may also be a step towards understanding the general health behavior of migrants. Research has focused on the so-called “Hispanic epidemiological paradox” first coined by Markides and Coreil in 1986, which shows that when migrants arrive in the USA, they arrive generally healthier and with equal or better mortality outcomes than non-Hispanic whites, even though they are more socio-economically disadvantaged and ranking lower in socioeconomic indicators[38, 39]. However, within a generation it appears that they lose these advantages quickly and they are significantly less healthy[40]. Higher HIV/AIDS prevalence rates in migrants in the U.S, compared to non-migrants in Mexico fits this general trend, but higher condom use then becomes a paradox. If, we can untangle the

puzzle, it may be possible to determine factors that could reverse this loss in general health in migrants: the inputs that drive greater condom use or risk avoidance may also apply to other health behaviors.

2.6. Migrant's Peer Effects and Health-Related Behavior

Recent research suggests that peer effects can be highly significant in different health-related behaviors ranging from human emotions, to the transmission of infectious diseases, including sexually transmitted diseases, to increased smoking behavior, to suicidal ideation, and even leading to obesity [41]. For example, a study by Christakis and Fowler (2007) published in the *New England Journal of Medicine* with a sample of more than 12,000 people found that an individual's chance of becoming obese increased 57% if he or she had a friend who became obese in a given interval[42]. Furthermore similar findings looking at alcohol consumption by Rosenquist et al., (2010) have shown that individuals who associate themselves with heavy drinkers at 1 degree of separation are 50% more likely to drink heavily themselves[43]. Moreover the researchers also found that being surrounded by heavy drinkers increased overall alcohol consumption of the individual by 70% in comparison with individuals that were not surrounded by heavy drinkers[43]. In addition, the most recent findings from the study of social networks have shown that positive and negative emotions can also spread across social networks like an infectious disease. In a study of social networks and emotions showed that the probability of becoming content among individuals in contact with content peers

increased by 0.02 per year, and the probability of an individual becoming discontent increased by 0.04 per year by each discontent peer that he or she had [44]. The main hypothesis behind the study of social networks and peer effects on health related behavior by Christakis and Fowler, states that “because persons are connected, their health is also connected”[43]. The study of social networks and peer effects is a promising field in which the understanding of influences such as peer effects on health related behavior, can lead to comprehensive health promotion strategies encouraging healthier behaviors among individuals.

Research regarding peer effects and social networks among Mexican-migrants is lacking or non-existent, very few articles have looked at peer effects, social norms and sex related behavior, specially looking at condom use or risk avoidance among Mexican-migrants. However in a study of predictors of condom use among Mexican-migrant laborers, pro-condom social norms were identified as a predictor of carrying condoms, and condom use with regular sex partners, but did not predict condom use with occasional sex partners [27]. More permissive cultural models in regard to sexuality and the greater risk of acquiring HIV/AIDS create a social environment in the U.S. where condoms are more accepted than in the traditional communities from which many migrants originate[27]. One study shows that greater number of trips to the U.S. increases condom use in migrants[35]. It is expected that high risk sexually active Mexican-migrants who have lived longer in the U.S will be more frequent users of condoms than those who are recent arrivals, because the host culture changes their values and availability of services[13]. However, what is unclear is whether this effect has a long term impact on behavior and whether the changes are maintained when

migrants return to their communities of origin. Furthermore it is unknown whether peer effects and social networks have an effect on Mexican-migrants condom use or even risk avoidance. This study aims to look at peer influences among Mexican-migrants, Mexican returning-migrants and Mexican non-migrants, on condom use. Understanding how social networks and peer effects influence migrant populations, such as Mexican-migrants, could aid in the planning of bi-national public health programs that can aim at reducing HIV/AIDS infection and promoting correct and consistent condom use and even risk avoidance.

CHAPTER 3. Methods and Results

3.1 Methods:

The data for this study were obtained from a mixed methods data collection study looking at different aspects of Mexican-migrant and non-migrant health and sexual risk behaviors including condom use. The study was conducted by Mexico's National Institute of Public Health (Instituto Nacional de Salud Pública) in Cuernavaca, Mexico in partnership with Emory University Rollins School of Public Health in Atlanta, Georgia, U.S.

The primary interest of this study within the data analysis was to determine peer effects on condom use and additional factors that may influence the use of condoms among migrant Mexican populations and non-migrants. Additional factors under consideration included: age, literacy, marital status, and various self-report measures concerning the preferences and influences of their closest peers.

Study Population:

The study population consisted of three different groups: **Mexican migrants**, **Mexican returning migrants** and **Mexican non-migrants**. The selection criteria for each group was as follows: **migrants** were classified as being Mexican-born men between the ages of 18-49, who had been living in Georgia for work during or at least 2 months prior to the interview. The participants must have had sex in the U.S at least once since their arrival or in the last 12 months if they arrived more than a year ago; **Mexican returning-migrants** were Mexican-born men between the ages of 18-49, who have lived in the U.S. more than 6 months but had returned to their home communities in Mexico during the last six months to five years and they must have reported having sex at least once since

they returned or in the last 12 months, if they had returned to their communities more than a year ago. **Mexican non-migrants** were selected if they were Mexican-born men between the ages of 18-49 who had never migrated to the U.S and expressed no intention to do so in the following 2 years and they must have reported having sex in the last 12 months.

Sampling Methodology:

The selection of subjects for the three different groups of interest (Mexican migrants, Mexican non-migrants and Mexican returning-migrants) was conducted in a way that ensured as much comparability as possible between the three different groups of interest. Traditional probability sampling techniques are usually very difficult and not necessarily feasible when studying migrant populations given the mobile nature of migrant groups and often-large undocumented status[28, 45]. The study sampling strategy was conducted in two stages. The first stage was to identify communities in Mexico from which the highest proportion of Mexican migrants living in Atlanta originated. During the second stage a random sample of migrants, non-migrant and returning migrants from the Mexican communities identified during the first stage, was selected. The sample was stratified at the community level in order to ensure a balance in terms of community of origin (for migrants) and community of residence (for non-migrants and returning migrants). Although the specific stratification helped balance the sample, did not imply that the research questions could be answered at the community level.

First Stage Data Sampling:

During the first stage, the research team obtained the cooperation of officials at the Mexican Consulate in Atlanta, which they provided a list of communities and number of migrants per community who had registered with the consulate during the past 12 months. Their reasons for registering at the consulate vary, but one of the most common reasons was to obtain an identity card called the *matricula consular*. Mexican Consulate officials provide the *matricula consular* without asking individuals of their immigration status and as such it is not accepted as proof that the holder has the right to reside in the U.S. However the *matricula consular* is accepted as an identity document by many municipal and other local agencies in the U.S. It is of particular use for Mexicans who do not have legal status and as such cannot apply for other identity cards. From the information obtained from the Mexican Consulate in Atlanta, the research team obtained information regarding state and place of origin of migrants. The research team only asked for the number of migrants per locality (for the 5 localities with more migrants visiting the Consulate) that have visited the Consulate in last 12 months. No individual-level information was collected. This information collected from the Consulate helped identify the Mexican communities of origin that were considered for the sample.

Followed the data sampling conducted in Atlanta, study sites in Mexico were identified as follows. Respondents from the fieldwork in Atlanta provided the name of their hometown of origin in Mexico, which allowed the research team to identify the localities for the second stage of the data collection in Mexico. According to the Consulate, the vast majority of Mexican migrants arriving to Atlanta were from the states of Guerrero, Hidalgo and Guanajuato. Once the specific localities were identified,

local authorities in those Mexican states were informed regarding the objectives of the project and the protocol of recruitment of participants. IRB and official permission from the local authorities for the collection of data was approved.

Second Stage Data Sampling:

The selection of group status for the three different categories was conducted as follows. For the group status **migrants**: subjects living in Atlanta at the Mexican Consulate were randomly selected in order to complete the interview. The selection of **non-migrants** and **returning migrants** was conducted by using Mexican census data in order to identify households in the communities selected during the first stage of the data collection, stratified by the presence of members in the same sex-age group of the migrants selected in stage 1. Next, a random sample of households was selected and then individuals who passed the criteria to be included in the non-migrant or return migrant groups were interviewed.

Sample Size:

The assumptions used to make these calculations were that non-migrants use condoms 41.1% of the time compared with migrants who use them 68% of the time, which is based on a study by Magis-Rodriguez et al (2004)[13].

Data Collection:

Investigators partnered with consulate officials in Atlanta, Georgia, as well as community-based organizations like migrant clubs that have cooperation agreements with the Mexican Consulate in Atlanta. The data were collected by applying 100 questionnaires with each of the three groups of subjects defined in the sample methodology section above. A first set of questions was asked by an interviewer in order to establish inclusion of the respondents and the second set of questions was self-administered by participants using the audio computer assisted self interview (ACASI) system. With the use of the ACASI system, participants were able to simultaneously see the questions in written form on the computer screen, while with earphones able to listen to an audio recording reading the same questions. The individuals used a touch screen computer monitor that collected all the answers. All of the questions were previously tested in other populations and some were applied to migrant Mexicans or Hispanic American populations. Furthermore the research team carried out a small pilot study with 5 Mexican non-migrants and 5 returning migrants in Mexico. No collection of protected health information from the participants was carried out other than the state of origin in Mexico and state of residence in the U.S. for Mexican-migrants. Such information was collected only to identify place of origin in hand written form only with the purpose to determine major migrant-sending communities in Mexico. The paper formats were loaded in databases and destroyed at the end of every data collection day. These data were not analyzed at the individual level. Informed consent was given orally.

Recruitment and Study Interviews:

Recruitment and interviews during the 1st stage were held at the Mexican Consulate in Atlanta. In this stage, research study staff from Emory University as well as INSP conducted the data collection. After identifying themselves accordingly, staff approached men waiting in the queue to explain briefly (5 minutes) the objective of the study and invited them to participate. If the individual assented to participate, the interviewer asked him to go to the stand at the parking area where the interviews were taking place. The interviewer then proceeded to obtain informed consent from the participant, explained the study objectives, time of the interview, provided information on the measures that were taken to ensure confidentiality and explained the a gift certificate will be provided at the end of the interview. The gift certificate had a value of \$10. The stands where all the interviews took place were equipped with proper space to ensure privacy during the time of the interview.

A brief explanation of the structure of the questionnaire as well as specific instructions to respond the computer-based, audio-assisted interview (ACASI) were provided to the interviewee and research personnel were present during the time of the interview if any concerns or problems came up during the interview process. All members of the research team were carefully located to avoid any visual contact with the screen of the computer while the respondents were answering the questionnaire with the only exception of the times when the interviewee asks for help. The interview took approximately 1-hour to be completed.

Human Subject Research Approval:

The primary study was approved by the INSP's IRB which has an FWA as well as the IRB of Emory University. Investigators were trained regarding the use appropriate informed consent procedures in Social and Behavioral Science research using CITI. The data analysis conducted for this research thesis did not need IRB approval given that it was secondary data analysis.

Data Analysis:

Data analysis for this study focused exclusively on questions in the **peer effects** section of the questionnaire from both countries and the question regarding **individual's condom use during last sexual encounter** plus basic demographics. (A description of the primary questions of interest used for the data analysis can be found in Appendix B).

Overall Descriptive Statistics:

Overall descriptive statistics were calculated, reported as mean \pm standard deviation and number/percent for continuous and categorical variables, respectively. Subjects were then stratified by migrant status, and descriptive statistics for the remaining factors were reported by each group. Simple hypothesis tests were performed to identify potential factors that were associated with migrant status; ANOVA testing was used for age, while chi-squared testing was used for the remaining categorical factors.

Modeling Strategy:

The study sought to answer the three following questions:

- 1. What factors predict condom use during an individual's (Mexican migrant, Mexican non-migrant, Mexican returning-migrant) last sexual encounter?*
- 2. Does an individual (Mexican migrant, Mexican non-migrant, Mexican returning-migrant) whose peer reported using condoms, used a condom during his last sexual encounter?*
- 3. Whether an individual (Mexican migrant, Mexican non-migrant and Mexican returning-migrant) that engages in conversation with his peers about condom use, used a condom in his last sexual encounter?*

In order to answering the first research questions, a bivariate logistic regression modeling approach was employed. Each factor was modeled against the logit probability of using a condom during the most recent sexual encounter, independently of all other potential factors. Unadjusted odds ratios and corresponding 95 percent confidence intervals were constructed. Factors significant at the 0.1 level (unadjusted) were included in the initial multivariable model. Regardless of significance, migrant status was forced into the multivariate model at all times using *returning-migrants* as the group of reference. A p-value driven combination of forward and backwards selection (at the $\alpha=.05$ level) was used to determine a final main effect model. All possible interactions terms were then introduced into the model, and a backwards selection procedure was used to reduce the model, such that only those interactions significant at the .05 level were included. Adjusted odds ratios and corresponding 95% confidence intervals were reported. The Hosmer-Lemeshow test was used to verify the fit of the final model, and ROC curves and corresponding area under the curve (AUC) estimates were calculated to assess the predictive power of the model.

3.2. Results:

Overall Descriptive Statistics:

Although a sample size of 100 subjects in each of the three groups had an estimated power of 0.96 to detect a difference in any two-group means at the 5-percent level of significance, in the study the sample size collected exceeded 100 participants in each group given. A total of 878 men participated in the study, with a roughly equal distribution of Mexican-migrants (n=224, 25.5%), Mexican non-migrants (n=336, 38.3%) and Mexican returning-migrants (n=318, 36.2%)(Table 1 Appendix A). The average age of the participants was 29.8 years (\pm 8.85), and the majority was literate in Spanish (n=840, 95.7%). Approximately 37% (n = 284) used a condom during their last sexual encounter. It is important to point out that not all participants answered every question, and thus the sample size was reduced for those factors in question (see Table 1 for details in Appendix A).

Descriptive Statistics by Migrant Status:

Stratification by migrant status reveals some differences with respect to the various factors of interest (Table 2, Appendix A). Of specific interest, there appear to be differences with respect to condom use during the last three sexual encounters ($p = .034$, $p = .001$, and $p = .007$ for the last time, second to last time, and third to last time, respectively)(See Figure 5, Appendix A). As the trend remains relatively stable across migrant status, we focus only on the most recent sexual encounter for the purposes of multivariable logistic modeling.

Bivariate Logistic Regression Modeling- Research Question 1:

What factors predict condom use during an individual's last sexual encounter?

Bivariate modeling revealed potentially important predictors of condom use as: age ($p < .001$), migrant status ($p = .035$), marital status ($p < .001$), duration of friendship with closest peer ($p = .041$), closest peer's condom use ($p < .001$), and closest peer's advise about condom use ($p < .001$). Note that 8 'separated' individuals with common migrant status were removed from the analysis due to estimability issues. Model selection was performed as described above, where migrant status was forced into the model regardless of its significance. No interactions were detected. In order to answer research questions 1 and 2, two separate final models were created. It is important to note that while these models differ in both sample size and the included factors, they both suggest similar conclusions and answer the main research questions of interest.

Model 1- Research Question 2:

Does an individual whose closest peer reported using condoms, used a condom during his last sexual encounter

Model 1 was a fit on 247 subjects, and included the factors of: age, migrant status, marital status, and the closest peer's condom use (Table 3 Appendix A). The Hosmer-Lemeshow test indicated that the model was a good fit to the data ($p = .980$), and the prediction power of the model appeared to be moderate ($AUC = .833$) For each one year increase in age, we expect the odds of using condoms during the most recent sexual encounter to decrease by 5% ($OR = 0.95$, $95\% CI = (0.91, 1.00)$). The odds of using condoms during the most recent sexual encounter for single men is more than five times that of married men ($OR = 5.42$, $95\% CI = (2.36, 12.44)$). The model also suggests that if an individual's closest peer always uses condoms, then they have more than 7 times the

odds of using a condom during their most recent sexual encounter, relative to someone who's closest peer never used condoms (OR = 7.52, 95% CI = (3.00, 18.87)). After adjusting for these covariates, migrant status was not significantly associated with condom use during the most recent sexual encounter ($p = .674$). Although not significant, the data do suggest that there may be differences, specifically non-migrants appear to have the largest odds of using a condom during their most recent sexual encounter, followed by migrants and then returning migrants have the lowest odds of using a condom. For example non-migrants were 1.39 times more likely to use condoms in their most recent sexual encounter than returning migrants, and migrants were 1.36 times more likely than returning migrants. However these results were not statistically significant.

Model 2- Research Question 3:

If closest peer advices about condom use, does that predict individual's condom use?

Final model 2 was a fit on 477 subjects, and included the factors: age, migrant status, marital status, and the closest peer's advise about condom use. The Hosmer-Lemeshow test suggests a good fit ($p=.801$), and the prediction power is slightly lower than model 1 (AUC=.787). However, we consider this model valuable because it uses almost twice as many observations from the complete data set as model 1 (although still only slightly more than half of the total number of observations in the data set). The conclusions largely remain the same relative to model 1 for factors age, marital status, and migrant group, with the latter still not having a significant association with condom use during the most recent sexual encounter, after controlling for covariates ($p = .209$) (See Table 5, Appendix A). Finally, the odds of using a condom during the most recent

sexual encounter for individual's who's closest peer suggests the use of condoms is 3.57 times that of an individual who's closest peer suggests against the use of condoms (95% CI = (1.46, 8.72)).

CHAPTER 4. Discussion, Conclusions and Recommendations

4.1. Discussion:

The primary objective of this study was to investigate the association between peer effects together with other cofactors and condom use among Mexican migrants living in the U.S., returning migrants and non-migrants living in Mexico. This study has identified a number of factors that appear to be associated with condom use among the specific population studied.

First, independent factors such as age, migrant status, marital status, duration of friendship with closest peer, closest peer condom use and closest peer's advise about condom use, appear to be independent predictors of individual's condom use during the last sexual encounter. However when investigating the overall effect through multivariate logistic regression modeling controlling for all factors independently influencing individual's condom use; age, marital status, closest peer condom use and advise about condom use from closest peer were found to be significant predictors of condom use during last sex among the study population.

The study showed that as men get older, they tend to have a reduced probability of using condoms. These findings correlate with other research studies where age has been found to be a predictor of condom use among Mexican migrants. A study by Caballero-Hoyos et al., (2008) found that adolescents and younger age migrants (ages 15 to 25 years) showed greater likelihood of condom use than older migrants[46]. Possible explanations for this event can rely on the fact that younger migrants might have higher knowledge about condom use. Furthermore, the findings of this study regarding marital

status as a predictor of condom use have also been shown in previous studies. In this study married men appear to have the lowest probability of condom use and these findings match with previous studies where migrants tend to show lower condom use with spousal partners[13, 35, 46]. This effect has been explained before in terms of trustworthiness between married individuals, in which in a spousal relationship there is the idea of complete trust and condom use might be seen as a sign of the infidelity and used only with informal or unknown sex partners[27, 47-49].

Overall in this study there does not appear to be a significant association between migrant status and condom use during the last sexual encounter. In addition our findings although not significant show that non-migrants tend to have higher condom use than migrants. These findings are contrary of what others have shown regarding higher condom use among Mexican migrants [13, 35, 36]. However it has been hypothesized that if migrant status is defined in a more precise way, the differences between condom use among migrants versus non-migrants might disappear. This hypothesis is based on the assumption that a more precise definition of those who are migrants and those who do not take the risk to migrate (non-migrants), allows to better distinguish the effect caused by migrant's self selection of risk-taking behavior and the perceived risk of acquiring HIV between the U.S and Mexico [50].

Peer Effects

This study shows novel results pertaining to peer influences on condom use. Research question two asked whether an individual's closest peer condom use predicted condom use and research question three asked whether closest peer advice to use condoms predicted condom use. Our findings showed that peer's condom use and

peer's advice to use condoms, significantly predicts condom use. These findings are promising given that no other study to our knowledge has looked at the relationship between direct peer effects and condom use or any other sexual behavior among Mexican migrants and non-migrants. Social network theory has been shown to be a promising way to understand how group structure influences HIV infection either by promoting it or preventing it[51]. The majority of studies looking at social networks and HIV infection have focused on sexual networks as a source of infection[52-54] but to our knowledge there is lack of research looking at the influence of social networks to encourage positive behavior to prevent HIV infection among Mexican migrants, returning-migrants or non-migrants.

Limitations:

This study has a number of clear limitations. First, data collection was done via self-report, which raises questions about the validity of the data. Some questions had confusing wording associated with them and coding of questions in the system had an error of continuity, which may explain why many questions were ignored by the participants or missing. With regard to the statistical analysis, there are some concerns with bias induced by non-response. Specifically, we do not know the reason why individuals chose not to respond to certain questions. It is also important to note that at each step of the model selection procedure, a logistic model is potentially fit to a unique data set. This is due to the varying missingness across factors, and as a result the final models may be influenced by this bias.

4.2. Conclusions and Recommendations

Conclusions:

This study is a first step towards understanding the under-researched association of peer effects and sexual behavior among Mexican men (migrants, returning migrants, and non-migrants) in order to prevent HIV infection. Our study shows exciting results that could provide some insight for current public health programs that focus on increasing positive sexual behavior among Mexican migrants, returning migrants and non-migrants, using social network theory. However further studies looking at social networks and peer effects should be conducted in order to confirm these findings.

Recommendations:

Migrant populations are a very difficult group to target through public health interventions given the mobile nature of migration. Given that migration has been shown to be a risk factor for HIV infection between Mexico and the U.S, it is of crucial importance that public health interventions and studies aim at targeting migrant's sexual risk behaviors. The use of social networks has been a promising new field in order to understand and to change social health behavior. This study showed how peer effects influence condom use, a type of sexual behavior, among Mexican migrants, returning-migrants and non-migrants. Furtherer research should be aimed at using actual social network theory methodology to study migrant populations in the U.S. and returning migrants into Mexico, and the association with sexual behaviors not only condom use but also risk avoidance. The goal of a public health intervention should be focused on evidence-based, and culturally appropriate strategies that would use social network

theory as means to improve positive safe sexual behavior. Since migrants tend to live among clusters of friends or relatives, social network theory makes it a promising method of studying and creating public health interventions that in the end can safeguard people's health and prevent HIV infections across both countries.

APPENDIX A

Figure 2: Migration of Mexicans Into and Out of Mexico: Mexico National Survey of Occupation and Employment, 2006-2009 (thousands) [6]

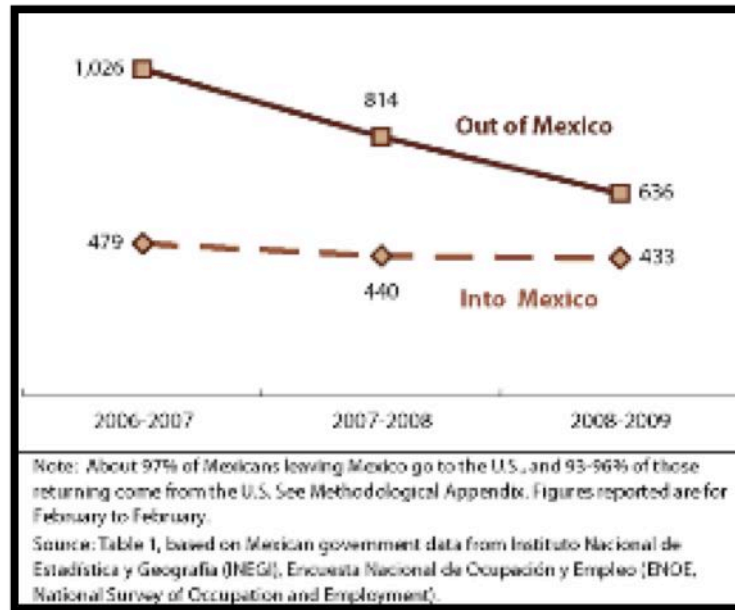


Figure 3: Migration of Mexicans Into and Out of the United States: U.S. Current Population Survey, 2000-2009 (thousands) [6]

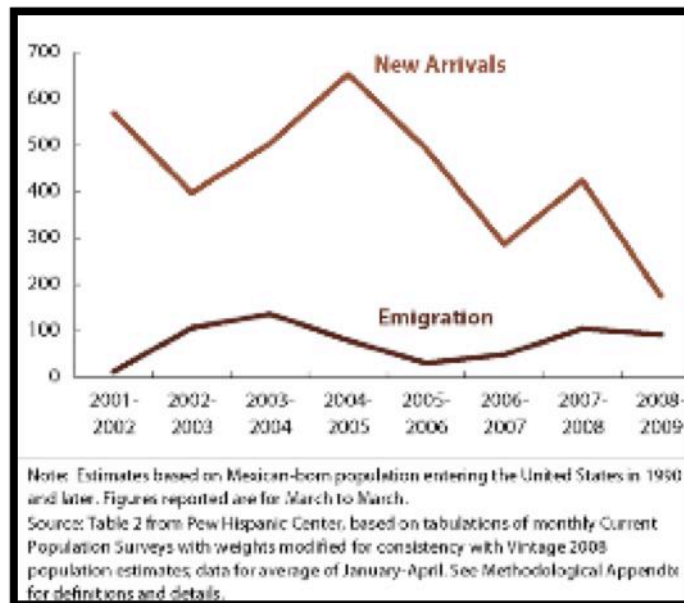
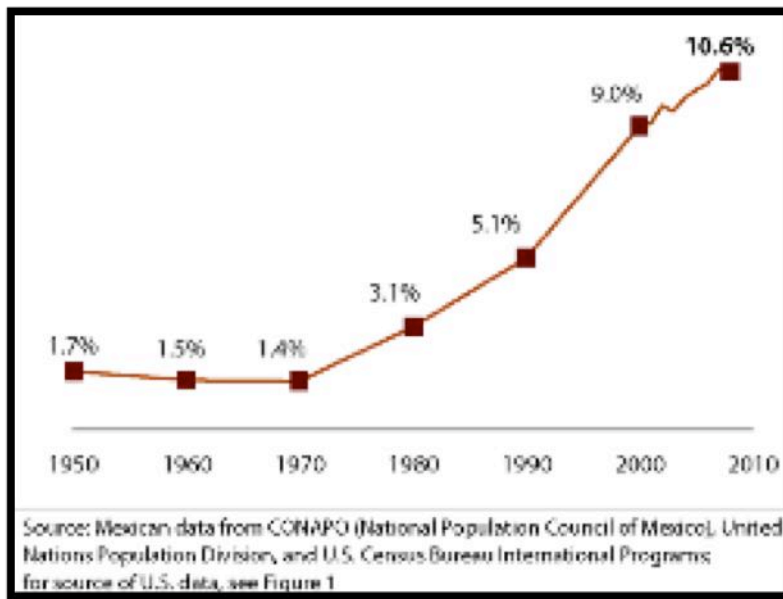


Figure 4: Mexican-Born Population in the US. as Share of Mexicans in the U.S. and Mexico(%) [7]



[7][7][7]

Table 1: Overall Descriptive Statistics

Variables	(n = 878)	
	Mean ± SD	
Age	29.84 ± 8.85	
	Number	Percent
Migrant Status		
Non-Migrant (0)	336/878	38.27
Returning Migrant (1)	318/878	36.22
Migrant (2)	224/878	25.51
Literate	840/878	95.67
Marital Status		
Live-in Significant Other (1)	203/878	23.12
Married (2)	368/878	41.91
Separated (3)	23/878	2.62
Divorced (4)	7/878	0.8
Widower (5)	3/878	0.34
Single (6)	274/878	31.21
Used Condom During Sex		
Last time	284/772	36.79
2nd to Last Time	284/772	36.79
3rd to Last Time	289/758	38.13
Peer's Gender		
1 (Male)	473/738	64.09
2 (Female)	265/738	35.91
Duration of Friendship with Peer		
Less than 6 months (1)	29/738	3.93
6 months - 1 year (2)	45/738	6.1
1 year - 5 years (3)	165/738	22.36
5 years - 15 years (4)	187/738	25.34
More than 15 years (5)	312/738	42.28
Peer 1 Condom Use		
Always (1)	91/482	18.88
Sometimes (2)	88/482	18.26
Almost Never (3)	12/482	2.49
Never (4)	59/482	12.24
I don't know (5)	232/482	48.13
Peer 1 Advise about Condom Use		
Suggests I use one (1)	501/738	67.89
Doesn't care (2)	168/738	22.76
Suggests I not use one (3)	69/738	9.35
Importance of Friendship with Peer		
Very Important (1)	404/738	54.74
Somewhat Important (2)	158/738	21.41
Little Importance (3)	66/738	8.94
I don't care (4)	110/738	14.91

Table 2: Overall Descriptive Statistics by Migrant Group

By Migrant Group Variables	Migrant Group						Hypothesis Testing		
	Non-Migrant (n = 336)		Returning Migrant (n = 318)		Migrant (n = 224)		ANOVA		
	Mean ± SD		Mean ± SD		Mean ± SD		N	Test Statistic	p-value
Age	29.26 ± 9.39		30.27 ± 8.89		29.95 ± 7.90		878	1.13	0.271
	Number	Percent	Number	Percent	Number	Percent	CHI-SQUARED		
Literate	323	96.1	302	95.0	215	96.0	878	0.60	0.740
Marital Status							878	35.06	0.000
	<i>Live-in Significant Other (1)</i>		63		19.8				
	72		21.4		68		30.4		
	<i>Married (2)</i>		158		49.7		81		
	129		38.4		81		36.2		
	<i>Separated (3)</i>		7		2.2		10		
	6		1.8		4		1.8		
	<i>Divorced (4)</i>		1		0.3		0		
	2		0.6		0		0.0		
	<i>Widower (5)</i>		3		0.9		0		
	0		0.0		61		27.2		
	<i>Single (6)</i>		86		27.0				
	127		37.8						
Used Condom During Sex							772	6.76	0.034
	<i>Last time</i>		96/301		31.9		68/187		
	120/284		42.3		36.4		772		
	<i>2nd to Last Time</i>		88/301		29.2		72/187		
	124/284		43.7		38.5		772		
	<i>3rd to Last Time</i>		94/300		31.3		71/174		
	124/284		43.7		40.8		758		
							10.09		
							0.007		
Peer's Gender							738	0.48	0.786
	<i>1 (Male)</i>		184/290		63.5		104/166		
	185/282		65.6		62.7		738		
	<i>2 (Female)</i>		106/290		36.6		62/166		
	97/282		34.4		37.4		738		
							11.00		
							0.202		
Duration of Friendship with Peer							738	11.00	0.202
	<i>Less than 6 months (1)</i>		13/290		4.5		4/166		
	12/282		4.3		6.0		10/166		
	<i>6 months - 1 year (2)</i>		20/290		6.9		10/166		
	15/282		5.3		19.0		51/166		
	<i>1 year - 5 years (3)</i>		55/290		19.0		34/166		
	59/282		20.9		26.9		20.5		
	<i>5 years - 15 years (4)</i>		78/290		26.9		67/166		
	75/282		26.6		40.4		738		
	<i>More than 15 years (5)</i>		124/290		42.8		14.69		
	121/282		42.9		54.8		0.066		
Peer 1 Condom Use							482	14.69	0.066
	<i>Always (1)</i>		26/166		15.7		28/166		
	37/150		24.7		18.1		738		
	<i>Sometimes (2)</i>		26/166		15.7		30/166		
	32/150		21.3		2.4		3/166		
	<i>Almost Never (3)</i>		4/166		2.4		14/166		
	5/150		3.3		16.3		8.4		
	<i>Never (4)</i>		27/166		16.3		91/166		
	18/150		12.0		54.8		738		
	<i>I don't know (5)</i>		83/166		50.0		8.01		
	58/150		38.7		6.0		0.091		
Peer 1 Advise about Condom Use							738	8.01	0.091
	<i>Suggests I use one (1)</i>		203/290		70.0		120/166		
	178/282		63.1		21.7		738		
	<i>Doesn't care (2)</i>		56/290		19.3		36/166		
	76/282		27.0		6.0		738		
	<i>Suggests I not use one (3)</i>		31/290		10.7		10/166		
	28/282		9.9		6.0		738		
							6.14		
							0.408		
Importance of Friendship with Peer							738	6.14	0.408
	<i>Very Important (1)</i>		166/290		57.2		98/166		
	140/282		49.7		19.3		738		
	<i>Somewhat Important (2)</i>		61/290		21.0		32/166		
	65/282		23.1		8.4		738		
	<i>Little Importance (3)</i>		26/290		9.0		14/166		
	26/282		9.2		13.3		738		
	<i>I don't care (4)</i>		37/290		12.8		22/166		
	51/282		18.1						

* significance at the .05 level

† assumptions not met, exact test may be more appropriate

Figure 5: Percentage of people who use a condom during the last three sexual encounters stratified by migrant group

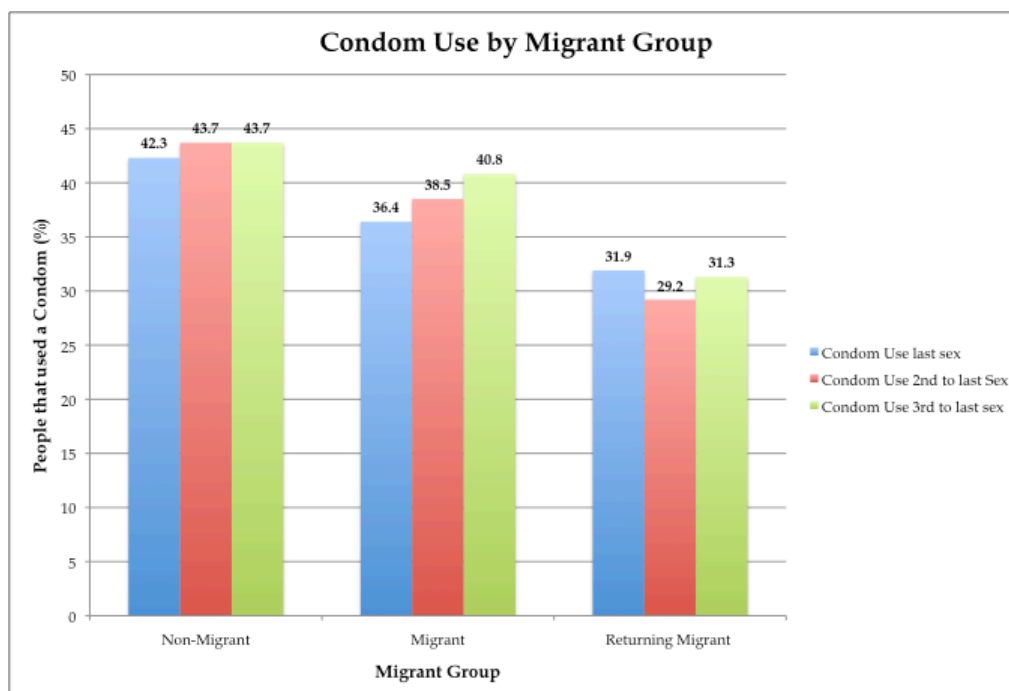


Table 3. Univariate Logistic Modeling: Research Question 1:
What factors predict condom use during an individual's last sexual encounter?

Characteristic	N	Parameter Estimate	Standard Error	Odds Ratio	95% Confidence Interval for OR		p-value
					Lower	Upper	
Age	772	-0.0749	0.2902	0.928	0.91	0.946	< 0.001 *
Migrant Status (ref='Returning Migrant')	772						0.035
<i>Non-Migrant</i>		0.45	0.172	1.56	1.11	2.19	0.010
<i>Migrant</i>		0.20	0.196	1.22	0.83	1.79	0.310
Literate	772	-0.22	0.347	0.81	0.41	1.59	0.535
Marital Status (ref='Married')	772						< 0.001 *
<i>Live-in Significant Other (1)</i>		0.56	0.213	1.74	1.15	2.64	0.009
<i>Separated (3)</i>		2.33	0.550	10.26	3.49	30.11	< 0.001
<i>Divorced (4)</i>		-12.85	737.000	<0.01	<0.01	>999.99	0.986
<i>Widower (5)</i>		0.76	1.232	2.14	0.19	23.91	0.538
<i>Single (6)</i>		2.29	0.201	9.84	6.64	14.59	< 0.001
Used Condom During 2nd to Last Sexual Encounter	772	4.86	0.270	129.23	76.16	219.28	< 0.001 *
Used Condom During 3rd to Last Sexual Encounter	755	4.20	0.239	66.39	41.59	105.97	< 0.001 *
Peer's Gender (Male vs. Female)	735	0.15	0.160	1.16	0.84	1.58	0.365
Duration of Friendship with Peer (ref='< 6 months')	735						0.041 *
<i>6 months - 1 year (2)</i>		-0.11	0.488	0.89	0.34	2.32	0.815
<i>1 year - 5 years (3)</i>		0.23	0.408	1.25	0.56	2.79	0.580
<i>5 years - 15 years (4)</i>		-0.27	0.407	0.76	0.34	1.69	0.502
<i>More than 15 years (5)</i>		-0.37	0.396	0.69	0.32	1.50	0.345
Peer 1 Condom Use (ref='Never')	247						< 0.001 *
<i>Always (1)</i>		2.29	0.424	9.89	4.31	22.72	< 0.001
<i>Sometimes (2)</i>		0.69	0.436	2.00	0.85	4.69	0.113
<i>Almost Never (3)</i>		1.02	0.711	2.78	0.69	11.20	0.151
Peer 1 Advise about Condom Use (ref='Suggests against condom use')	735						< 0.001 *
<i>Suggests I use one (1)</i>		0.92	0.307	2.51	1.38	4.58	0.003
<i>Doesn't care (2)</i>		0.33	0.339	1.39	0.71	2.70	0.335
Importance of Friendship with Peer (ref='Does not care')	735						0.688
<i>Very Important (1)</i>		-0.16	0.220	0.85	0.56	1.31	0.473
<i>Somewhat Important (2)</i>		-0.18	0.255	0.84	0.51	1.38	0.487
<i>Little Importance (3)</i>		-0.39	0.328	0.67	0.36	1.28	0.229

*Denotes significance at 0.5 level

Table 4. Model 1- Research Question 2:				
<i>Does an individual whose closest peer reported using condoms, used a condom during his last sexual encounter?</i>				
Factor (N = 247)	Odds Ratio	95% Confidence Interval		p-value
		Lower	Upper	
Age	0.95	0.91	0.99	0.031
Migrant Group Ref (Returning Migrant)				0.674
Non-Migrant vs. Returning Migrant	1.39	0.63	3.04	
Migrant vs. Returning Migrant	1.36	0.60	3.06	
Marital Status				< 0.001
Live-in Significant Other vs. Married	1.06	0.46	2.44	
Separated vs. Married	3.77	0.51	27.98	
Single vs. Married	5.42	2.36	12.44	
Peer 1 Condom Use				< 0.001
Always vs. Never	7.52	3.00	18.87	
Sometimes vs. Never	1.79	0.70	4.61	
Almost Never vs. Never	2.37	0.49	11.38	

Figure 6. ROC Curve for Model 1:

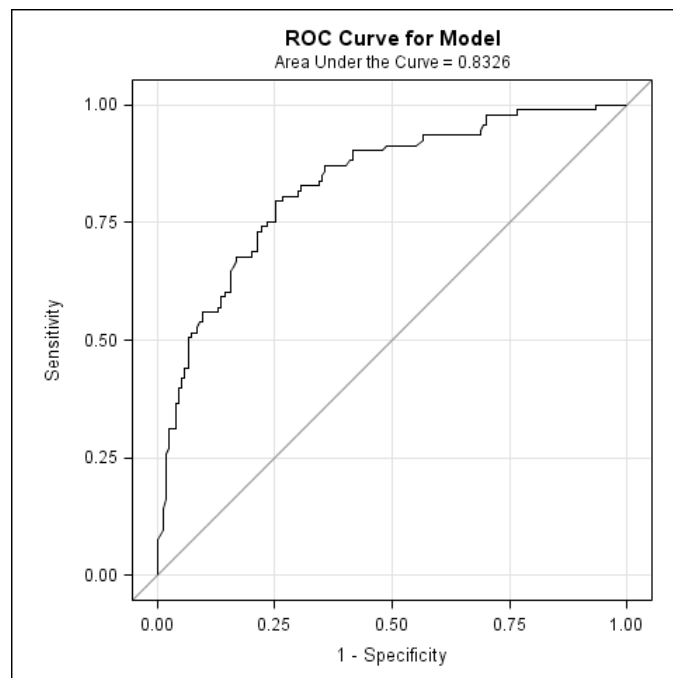
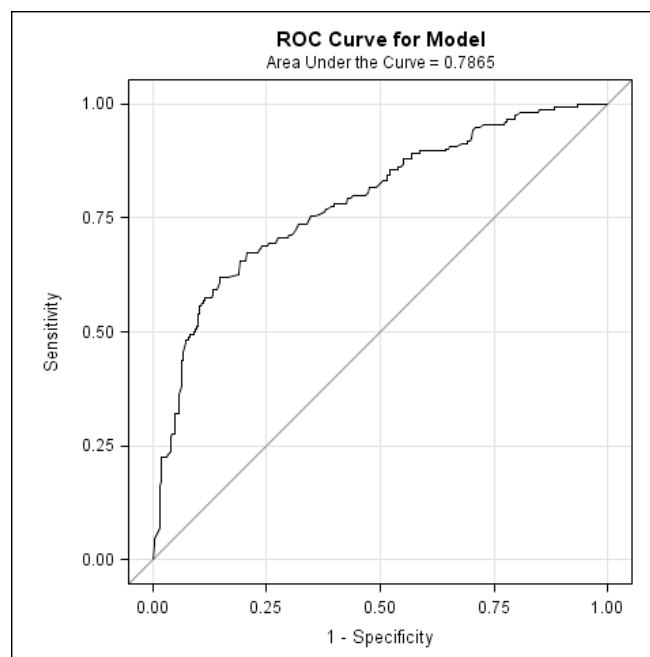


Table 5. Model 2: Research Question 3:					
<i>If closest peer advices about condom use, does that predict individual's condom use?</i>					
Factor	(N =477)	Odds Ratio	95% Confidence Interval		p-value
			Lower	Upper	
<i>Age</i>		0.97	0.94	1.00	0.026
<i>Migrant Group Ref (Returning Migrant)</i>					0.209
	Non-Migrant vs. Returning Migrant	1.58	0.91	2.74	0.10
	Migrant vs. Returning Migrant	1.50	0.87	2.58	0.15
<i>Marital Status</i>					< 0.001
	Live-in Significant Other vs. Married	1.17	0.66	2.08	
	Separated vs. Married	8.25	2.40	28.44	
	Single vs. Married	8.85	4.91	15.95	
<i>Peer 1 Advise about Condom Use</i>					0.014
	Suggests Use vs. Suggests Not Use	3.57	1.46	8.72	
	Doesn't Care vs. Suggests Not Use	2.50	0.96	6.50	

Figure 7. ROC Curve for Model 2:



APPENDIX B

Questions of interest used for data analysis:

Condom use during last sexual encounter:

¿Esa última vez que tuviste relaciones, usaste condón? / **During your last sexual encounter did you use a condom?**

Sí / **Yes**

No / **No**

Peer Effects:

¿Sabes si [PERSONA 1] usa condón cuando tiene relaciones sexuales? / **Do you know if [Peer 1] used condoms when he/she has sex ?**

Siempre / **Always**

A veces / **Sometimes**

Casi nunca / **Almost never**

Nunca / **Never**

No sé / **I don't know**

¿Alguna vez [PERSONA 1] te ha aconsejado que deberías usar condón cuando tienes relaciones sexuales? / **Has [Peer 1] ever given you advice about using condoms when you have sex?**

Me ha dicho que debo usar condón / **Has told me to use condoms**

No le importa / **Doesn't care**

Me ha dicho que no debo usar condón / **Has told me not to use condoms**

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