

# Ethnicity and HIV Risk in Guatemala

Tory M. Taylor, John Hembling, and Jane T. Bertrand



**MEASURE** Evaluation



# Ethnicity and HIV Risk in Guatemala

Tory M. Taylor, John Hembling, and Jane T. Bertrand



MEASURE Evaluation is funded by the U.S. Agency for International Development (USAID) under terms of Cooperative Agreement GHA-A-00-08-00003-00 and implemented by the Carolina Population Center, University of North Carolina at Chapel Hill in partnership with Futures Group, ICF International, John Snow, Inc., Management Sciences for Health, and Tulane University. The views expressed in this publication do not necessarily reflect the views of USAID or the United States government. TR-12-86 (July 2012).



# Table of Contents

<b>Executive Summary</b>	<b>7</b>
<b>Introduction</b>	<b>9</b>
HIV and ethnicity in Guatemala	9
Measuring ethnic identity	10
<b>Methods</b>	<b>13</b>
<b>Results</b>	<b>17</b>
Sociodemographics	17
HIV Knowledge, Attitudes and Practices (bivariate analysis)	22
HIV outcomes in a multivariate model	28
Women's Multivariate Results	28
Men's Multivariate Results	30
<b>Limitations</b>	<b>33</b>
<b>Discussion and Recommendations</b>	<b>35</b>
<b>References</b>	<b>39</b>
<b>Appendix: Full Multivariate Models</b>	<b>41</b>



# Executive Summary

Mayans and other indigenous groups make up approximately half of the population in Guatemala, and previous research shows them to be highly disadvantaged on nearly every indicator of health and well-being (Gragnotati and Marini, 2003). Little is known, however, about the HIV risk profile of these groups, or how it may differ from that of the non-indigenous population. Evidence of these differences could inform resource allocation and be used to improve HIV prevention intervention strategies in the country.

Data on 16,205 women aged 15–49 and 6,822 men aged 15–59 who participated in the 2008–2009 *Encuesta Nacional de Salud Materno Infantil* (ENSMI) were used to describe differences between ethnic groups on a variety of demographic and HIV variables. We then controlled for age, education, wealth and other background factors in a logistic regression model investigating the association between ethnicity and respondents' odds of early sexual debut, higher numbers of sexual partners, condom use, HIV testing, comprehensive HIV knowledge, and accepting attitudes towards people living with HIV (PLHIV).

The data show low reported levels of risky sexual behavior among indigenous women and men, compared to other respondents. However, the indigenous group also exhibited markedly less HIV awareness, more limited understanding of HIV transmission, lower prevention knowledge, and more negative attitudes toward PLHIV. When controlling for other socio-demographic factors, ethnicity was associated with women's early sexual debut, 3+ lifetime sexual partners, comprehensive HIV knowledge, accepting attitudes, and HIV testing. It was not associated with women's condom use at last sex. Among men, ethnicity was associated with early sexual debut, 10+ lifetime sexual partners, lifetime history of sex worker patronage, and comprehensive HIV knowledge. It was marginally associated with men's odds of having 3+ sexual partners in the past 12 months, using a condom during most recent sexual encounter, and HIV testing. Among men ethnicity was not associated with condom use at last sex with a sex worker, or with accepting attitudes towards PLHIV.

We conclude that the indigenous population in Guatemala, while broadly socially vulnerable, does not appear to be at elevated risk for HIV. We recommend that prevention efforts continue to focus on key populations at higher risk. Nonetheless, low rates of HIV testing coupled with limited prevention knowledge, particularly among the indigenous, are cause for concern. Programs working in indigenous communities may wish to focus on basic HIV education and address barriers to testing. Finally, while our analysis of risk factors strongly suggests that the epidemic in Guatemala remains concentrated in traditional key populations, the addition of HIV biomarker data to the next national health survey would provide definitive evidence. Researchers working with other health datasets from Guatemala should also be encouraged to present their results by ethnic group, so that programs and policies can be designed with indigenous communities' unique needs in mind.

The authors wish to acknowledge USAID/Guatemala whose generous support enabled the development of this report. In particular we'd like to thank Deborah Kaliel, Giovanni Meléndez, Lucrecia Castillo, Daniel Muralles, and Judith Timyan for offering their suggestions for the analyses and comments on report drafts. Thank you!



# Introduction

## HIV AND ETHNICITY IN GUATEMALA

Guatemala has a concentrated HIV epidemic, with general prevalence estimated at 0.8% from antenatal surveillance data and the country's case reporting system (UNAIDS, 2010). No national surveys in Guatemala have included HIV testing, but elevated prevalence rates have been reported in studies of sex workers (4.3%) and men who have sex with men (12.1%) (Soto et al, 2007; UNAIDS, 2010; García, EJ. 2011; Instituto Nacional de Estadísticas, 2002). Higher infection risk is also suspected in the country's small Garífuna population, but further research is needed to definitely establish the prevalence in this group. While other countries in the region show stable or declining prevalence, HIV rates in Guatemala have yet to plateau (World Bank, 2011). By 2009, 62,000 people were reported to be living with HIV in Guatemala, the majority in the country's urban centers (UNAIDS, 2010; USAID, 2010).

The government of Guatemala recognizes four major population groups, or *pueblos*: the *Pueblo Ladino*, *Pueblo Maya*, *Pueblo Xinca* and *Pueblo Garífuna*. The Maya, Xinca and Garífuna are all officially considered indigenous groups, but Mayans make up the vast majority of the indigenous population.

### *HIV in Guatemala*

*Guatemala has a concentrated HIV epidemic, with general prevalence estimated at 0.8% from antenatal surveillance data and the country's case reporting system. (UNAIDS, 2010)*

Twenty-three Mayan subgroups, the largest of which are K'iche, Kaqchikel, Mam, and Q'eqchi, are centered in the country's rural *altiplano*, or western highlands. Mayans represent 40–60% of the total population in Guatemala, although the exact percentage remains an elusive statistic for reasons described below. Many Mayans adhere to the idea of a *cosmovisión*, a worldview in which “all of nature is integrated, ordered and interrelated” (García, Curruchiche & Taquirá, 2009). Collective land ownership has also been cited as a factor that distinguishes Mayans from the non-indigenous in Guatemala. The conservative cultural norms and largely rural existence that characterize Mayan communities have led to a widely held belief that HIV risk in this group is especially low, but little systematic evidence exists to either support or refute that assumption.

Ladinos (the local term for non-indigenous individuals) represent the other major ethnic group, which has been politically, economically, and socially dominant in Guatemala for the past century. Typically those who identify as ladino are Spanish speakers, but Spanish language use is not a definitive marker. In fact no definitive marker exists. Although certain characteristics may be generally associated with Mayan or ladino identity, the distinction between the two is culturally constructed. Nearly all Mayans and most ladinos in Guatemala report having both Amerindian and Spanish ancestry (Adams, 1994).

The Garífuna and Xinca are present in Guatemala in much smaller numbers than Mayans or ladinos. Slightly more than 5,000 Garífuna speakers of West African descent were living

in Guatemala in 2002, most in the department of Izabal (*El Congreso de la Republica de Guatemala*, 2007). The *Pueblo Xinca*, with 16,214 members at last count, is concentrated in the department of Jutiapa (Richards, 2003; Adams, 1994). Xinca, an isolated family of languages, is spoken by few if any descendants today and the cultural traits of the group are no longer clearly distinguishable from those of ladinos in the region (Richards, 2003). Although health officials suspect an elevated HIV prevalence among the Garífuna based on studies in neighboring Honduras and Belize (Paz-Bailey et al, 2009; Bastos et al, 2008), we were unable to consider them as a separate group in this analysis because of the small numbers included in the ENSMI sample.

The objectives of this report are to:

1. Describe levels of HIV awareness, transmission and prevention knowledge, attitudes toward PLHIV, history of HIV testing, and risky sexual behavior among women and men in Guatemala, by ethnic group.
2. Identify associations between ethnicity and HIV outcomes controlling for other socio-demographic factors. Outcomes address sexual debut, number of sexual partners, HIV knowledge, HIV testing history, condom use, and sex worker patronage, among others.

We expect that the findings from these analyses will either lend support to current HIV program strategies focusing on key populations at higher risk in Guatemala (if indigenous men and women appear to be at no greater risk than their ladino counterparts) or suggest that changes to priority groups and/or prevention resource allocations may be necessary (if there is evidence of elevated risk in the country's indigenous population).

## MEASURING ETHNIC IDENTITY

Measuring ethnicity in Guatemala is challenging. Ethnic identity does not correspond to racial identity or language. A woman who wears a *huipil* (an embroidered blouse particular to Mayan cultures), speaks a Mayan language exclusively, and lives in a Mayan village in the western highlands of the country would seem to be unequivocally Mayan. On the other hand, her son who has moved to the capital city, speaks fluent Spanish, and does not wear Mayan-style dress might consider himself a ladino (or be perceived by others to be ladino). Other factors further cloud the picture. Spanish usage has become widespread, even in villages where members of the local population generally consider themselves to be Mayan. Ethnic self-identity may also fluctuate, with some Mayans assuming either "role" depending on the circumstances. A young Mayan woman from a rural village who goes to study at an urban university may wear jeans to class. Yet if chosen for a job conducting interviews with Mayan women in the *altiplano*, she is more likely to wear a *huipil* to communicate her sense of identification with and increase her acceptance by that community.

If ethnicity is so complicated to measure, why then do we accord importance to the metric? Simply stated, it is one of the most defining characteristics of daily life in Guatemala, with ramifications for every aspect of social development, economic progress, and health status. Guatemalans remain one of the most disadvantaged populations in Latin America, with 51% of the population living in poverty and high infant, child, and maternal mortality (World Bank, 2011). Decades of disenfranchisement, social prejudice, and political

violence paint an even bleaker picture among Guatemala's indigenous groups: while 70% of ladino women receive care from a physician or nurse during delivery, only 30% of Mayan women do (Haub and Gribble, 2011). Likewise, 66% of Mayan children are chronically undernourished, compared with 36% of ladino children (Haub and Gribble, 2011). This heightened vulnerability in so many areas of health and well-being has led public health officials to question if the group might also be especially vulnerable in terms of HIV. While there have been no signs of a "hidden epidemic," Mayans are assumed to be underrepresented in precisely the services from which estimates of HIV prevalence generally come—antenatal services and case surveillance.



# Methods

The *Encuesta Nacional de Salud Materno Infantil* (ENSMI) has been conducted in Guatemala at approximate five-year intervals since 1987, and now includes a number of questions addressing participants' HIV-related knowledge, attitudes, and practices (MSPAS, 2011). The women's and men's questionnaires are administered to a nationally representative, multi-stage probability sample of respondents between the ages of 15 and 49 years (women) or 15 and 59 years (men). Fieldwork for the fifth survey was conducted from October 2008 to June 2009 and yielded a household response rate of 94%, resulting in 16,844 completed women's interviews and 7,086 completed men's interviews (MSPAS, 2011). All estimates presented here are the results of weighted analyses performed in Stata version 12.0 using the `svyset` commands, which adjust for the differential probabilities of selection (sampling weights), the non-independence of individuals selected from sampling clusters, and the sampling stratification.

Interviews were conducted in Spanish or one of more than nine Mayan languages based on respondent preference. Participants were asked: "Do you consider yourself to be indigenous, ladino, or some other ethnicity?" Interviewers also recorded their own assessment of the respondent's ethnicity. At the time of this report, details regarding instructions to interviewers for making this determination were unavailable. Because the overwhelming majority of indigenous Guatemalans are Mayan, ENSMI participants classified as indigenous are nearly always Mayan rather than members of other indigenous groups.

Among women, ethnic classification was consistent in approximately 84% of cases: 37% were recorded as indigenous on both measures, and 47% as ladino on both measures. However, one in four female respondents who self-identified as indigenous (13% of the total sample) was classified as ladino by the interviewer. Far fewer female respondents (less than 2%) self-identified as ladino but were considered by the interviewer to be indigenous. Another 2% of cases were recorded as "Other" or had no response on one or both variables.

Ethnic classification in the men's sample followed a similar pattern, with most respondents classified on both measures as either indigenous (45%) or ladino (44%). A total of 582 men (8% of the sample) identified themselves as indigenous but were classified by their interviewers as ladino. Again a much smaller number, 2% of all men, self-identified as ladino but were classified by the interviewer as indigenous. The remaining 1% of men had Other/ No Response on one or both ethnicity variables. See Table 1 below for details.

**Table 1: Distribution of Respondents by Ethnic Group, ENSMI 2008–2009**

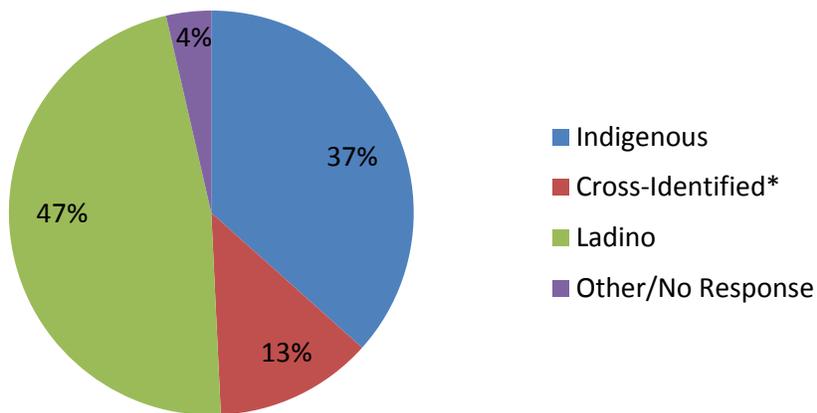
Self-Identification	Observer Classification	Women		Men	
		N	Weighted %	N	Weighted %
Ladino	Ladino	8,088	47.2	3,095	44.0
Ladino	Indigenous	233*	1.5	155*	2.0
Ladino	Other/No Response	8*	<0.1	4*	0.1
Indigenous	Ladino	2,217	12.6	582	7.8
Indigenous	Indigenous	5,900	36.6	3,145	44.6
Indigenous	Other/No Response	2*	<0.1	0*	0
Other/No Response	Ladino	298*	1.6	64*	0.9
Other/No Response	Indigenous	51*	0.3	24*	0.4
Other/No Response	Other/No Response	22*	0.1	17*	0.2
Total		16819	100%	7086	100%

\*cases omitted from analysis

The official report of the ENSMI 2008-09 (MSPAS, 2011) categorizes respondents by ethnicity based on the interviewer’s assessment alone, as was the case in previous survey rounds, in order to enable trend analyses (personal communication, CDC/Guatemala). However, the striking frequency with which self-identified indigenous respondents were classified as ladino by their interviewers led us to categorize ethnicity slightly differently. The research question that drives this analysis, “Are indigenous people in Guatemala at higher risk for HIV than ladinos?” is predicated on agreed-upon definitions of both ethnic groups. Lacking evidence of this agreement for a sizeable percentage of cases in both the women’s and men’s samples, and believing that analysis of the discrepant group may hold important lessons for risk assessment and prevention programming, we opted to incorporate both ethnicity variables.

For women, this yielded 16,205 cases for analysis in three mutually exclusive groups: women who self-identified as indigenous but whose interviewers classified them as ladino (“cross-identified,” 13%), women classified as indigenous on both measures (38%), and those classified as ladino on both measures (49%). Because of the small number of cases, we omitted from analysis the less than 2% of female respondents who self-identified as ladino but were classified as indigenous by their interviewers. We also omitted the approximately 2% of respondents with “Other/No response” on either ethnicity variable. Figure 1A illustrates these percent distributions in the ENSMI sample.

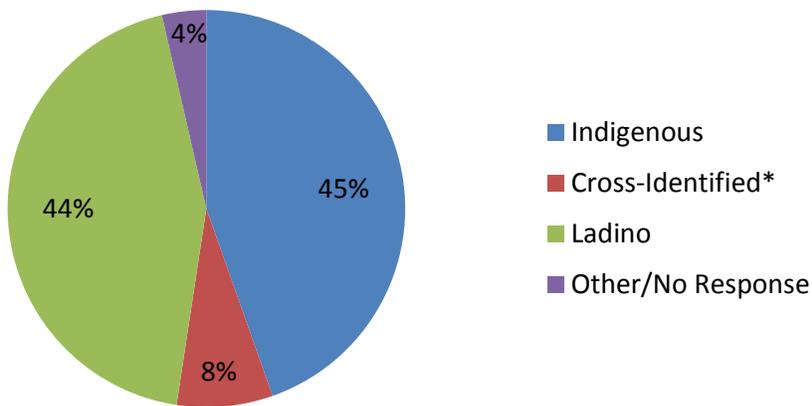
**Figure 1A: Ethnic Groups in the Guatemala 2008–2009 ENSMI Women’s Sample: Self-Identity Plus Interviewer’s Observation**



\* denotes respondents who self-identified as indigenous, but were designated ladino by the interviewer

For men, the same selection procedures yielded 6,831 cases for analysis, approximately 8% of whom were cross-identified, 46% identified as ladino, and 46% identified as indigenous. Two hundred fifty-five respondents, approximately 4% of the original sample, were omitted from the men’s subsample used in our analysis because of their classification outside of these three categories. See Figure 1B below for an illustration of the distribution of cases.

**Figure 1B: Ethnic Groups in the Guatemala 2008–2009 ENSMI Men’s Sample: Self-Identity Plus Interviewer’s Observation**



\* denotes respondents who self-identified as indigenous, but were designated ladino by the interviewer



# Results

## SOCIODEMOGRAPHICS

We first examined the sociodemographic characteristics of the respondents included in this analysis, noting a number of important differences between the indigenous, cross-identified, and ladino groups. Results generally confirmed ladinos' advantaged status, suggested clear regional divides, and showed the cross-identified group to resemble ladinos on many demographic measures. On other measure, cross-identified respondents were situated squarely between the indigenous and ladino groups. See Tables 2 and 3 for detailed demographic descriptions of the women's and men's samples by ethnic category.

Ladinos were more likely to live in urban areas (57% of women and 59% of men) versus the cross-identified group (41% of women and 50% of men) or the indigenous (33% of women and 31% of men). Virtually all ladino and cross-identified respondents reported that they could speak and understand Spanish and spoke it regularly at home. This contrasted notably with the indigenous group, especially for women. Only 78% of indigenous women indicated that they could understand Spanish and only 34% reported speaking it regularly at home. Among indigenous men, ability to understand Spanish was more common (94%), and 53% of indigenous men indicated that they spoke Spanish regularly at home. Asked if anyone in their household spoke a Mayan language, just 3% of ladino women and 14% of the cross-identified group responded affirmatively, compared to 87% of indigenous female respondents. Among men results were similar. Notably, 13% of indigenous women and 27% of indigenous men indicated that no one in their household had any ability to speak a Mayan language.

The data on education and wealth also supported well-established differences between ethnic groups. Whereas 90% of ladino women and 85% of the cross-identified group had ever attended school, only 65% of indigenous women had. Men reported higher levels of access to formal education, but ethnic group differences held constant: 93% of ladinos, 92% of cross-identified men and 79% of indigenous men had ever attended school. Forty-eight percent of women in the ladino group had any secondary or post-secondary education, compared to 31% of the cross-identified women and just 15% of indigenous women. More than half of men in both the ladino and the cross-identified groups had been educated beyond primary school, while only 22% of indigenous men had. Whereas nearly one-third of ladino men and women ranked in the highest wealth quintile for the sample overall, the same was true for only 14% of cross-identified women, 17% of cross-identified men, 6% of indigenous women, and 5% of indigenous men. Ladinos were also significantly more likely than men and women in other ethnic groups to be employed.

Differences in women's marital status were small and non-significant, and at least 62% of women in every ethnic group were either married or in a common-law

partnership at the time of interview. For men, however, the indigenous group showed a small but statistically higher prevalence of marriage/partnership (63%) versus the cross-identified (55%) and ladino (56%) groups.

### ***Ethnic Disparities***

*Whereas nearly one-third of ladino men and women ranked in the highest wealth quintile... the same was true for only 14% of cross-identified women, 17% of cross-identified men, 6% of indigenous women, and 5% of indigenous men.*

Age distributions, examined in 5-year categories, were largely similar among ethnic groups in both the men's and women's samples. Forty-three percent of women in the indigenous group, 44% in the cross-identified group, and 40% in the ladino group were between the ages of 19 and 24 at the time of interview. Among men, approximately 39% of the indigenous group, 45% of the cross-identified group, and 39% of ladinos were between 19 and 24 years old.

Region of residence showed a number of ethnic group differences. Thirty percent of ladino women, 20% of cross-identified women, and 7% of indigenous women resided in the Metropolitan region. Men showed similar results: 32% of ladinos, 19% of cross-identified men, and 8% of indigenous men were living in the Metropolitan region. Indigenous men and women were clustered in the Northern and Northwestern regions, which had only small percentages of ladino and cross-identified respondents. The Southwestern region showed very high concentrations of indigenous and cross-identified men and women, and was home to smaller but still relatively high proportions of ladinos.

**Table 2: Demographic Characteristics of Women Age 15–49, % by Ethnic Group, Guatemala, 2008–2009 (N=16,205)**

<b>Socio-demographic Characteristics</b>	<b>Indigenous % (IC) (n=5,900)</b>	<b>Cross-Identified % (IC) (n=2,217)</b>	<b>Ladino % (IC) (n=8,088)</b>
<b>Age group</b>			
15–19	24.0 (22.6–25.6)	25.4 (22.8–28.0)	22.2 (21.0–23.5)
20–24	18.5 (17.3–19.8)	18.7 (16.5–20.9)	17.6 (16.4–18.8)
25–29	15.5 (14.5–16.5)	17.0 (14.7–19.4)	15.8 (14.8–16.8)
30–34	13.1 (12.2–14.0)	12.0 (10.6–13.4)	14.2 (13.1–15.4)
35–39	12.3 (11.4–13.2)	11.1 (9.5–12.6)	11.3 (10.5–12.1)
40–44	8.5 (7.7–9.5)	8.4 (6.9–9.9)	9.7 (8.8–10.6)
45–49	7.9 (7.0–8.8)	7.3 (5.8–8.9)	9.0 (8.1–9.9)
<b>Residence</b>			
Urban	33.2 (28.7–37.7)	41.1 (36.3–45.9)	57.0 (53.1–60.8)
Rural	66.8 (62.3–71.3)	58.9 (54.1–63.7)	43.0 (39.2–46.9)
<b>Language</b>			
Speak Spanish	69.0 (64.7–73.2)	99.8 (99.7–100.0)	100.0
Understands Spanish	77.8 (74.2–81.4)	99.9 (99.8–100.0)	100.0
Spanish spoken regularly at home	33.5 (29.3–37.7)	98.6 (98.0–99.2)	99.8 (99.7–100.0)
Household member speaks Mayan language	87.1 (84.7–89.5)	14.3 (11.7–16.8)	3.3 (2.6–3.9)
<b>Education</b>			
None	35.0 (32.7–37.3)	14.6 (12.5–16.8)	10.0 (8.7–11.2)
Primary	50.2 (48.3–52.2)	54.0 (51.0–57.0)	42.4 (40.1–44.6)
Secondary	13.3 (11.6–15.0)	28.4 (25.2–31.5)	38.2 (36.1–40.3)
Post-secondary	1.5 (0.9–2.1)	3.0 (1.9–4.1)	9.4 (7.9–11.0)
<b>Wealth quintile</b>			
Lowest	35.4 (31.3–39.4)	16.0 (12.9–19.0)	8.0 (6.7–9.4)
Second	27.9 (25.6–30.1)	21.9 (18.9–25.0)	14.3 (12.7–15.9)
Middle	20.4 (18.2–22.6)	24.1 (21.3–27.0)	19.8 (17.7–22.0)
Fourth	10.7 (9.1–12.4)	24.0 (20.9–27.1)	26.7 (24.7–28.6)
Highest	5.6 (4.3–6.9)	14.0 (11.6–16.4)	31.2 (27.6–34.8)

Socio-demographic Characteristics	Indigenous % (IC) (n=5,900)	Cross-Identified % (IC) (n=2,217)	Ladino % (IC) (n=8,088)
<b>Marital status</b>			
Married/partnered	62.3 (60.5–64.2)	60.6 (57.7–63.4)	58.5 (56.8–60.1)
Single/never married	6.9 (6.0–7.8)	8.6 (7.0–10.2)	9.6 (8.7–10.4)
Separated/widow/divorced	30.8 (29.0–32.5)	30.8 (28.0–33.6)	32.0 (30.3–33.7)
<b>Region</b>			
Metropolitan	7.0 (4.3–9.8)	19.5 (14.1–24.9)	30.3 (24.7–36.0)
Northern	20.8 (15.1–26.4)	3.0 (1.2–4.7)	2.8 (1.6–4.0)
Northeastern	2.8 (1.3–4.4)	11.4 (8.4–14.3)	12.5 (9.9–15.1)
Southeastern	0.8 (0.4–1.2)	16.5 (12.1–20.9)	14.2 (11.0–17.4)
Central	9.9 (6.7–13.1)	10.8 (7.5–14.2)	13.7 (9.9–17.4)
Northwestern	27.5 (21.4–33.6)	4.4 (1.9–6.8)	5.6 (3.1–8.3)
Southwestern	29.0 (23.9–34.1)	32.3 (26.0–38.5)	16.7 (13.1–20.4)
Petén	2.2 (0.8–3.6)	2.1 (0.9–3.3)	4.1 (2.4–5.8)

**Table 3: Demographic Characteristics of Men Age 15–59, % by Ethnic Group, Guatemala, 2008–2009 (N=6,822)**

Socio-demographic Characteristics	Indigenous % (IC) (n=3,145)	Cross-Identified % (IC) (n=582)	Ladino % (IC) (n=3,095)
<b>Age group</b>			
15–19	25.5 (23.3–27.7)	30.2 (24.9–35.6)	23.7 (21.1–26.3)
20–24	13.0 (11.5–14.5)	15.1 (10.7–19.4)	15.7 (13.8–17.6)
25–29	12.8 (10.9–14.7)	14.3 (10.0–18.6)	11.9 (10.4–13.5)
30–34	12.2 (11.1–13.4)	9.1 (6.8–11.4)	13.1 (11.6–14.5)
35–39	9.9 (8.8–11.0)	9.8 (7.1–12.6)	9.3 (8.2–10.4)
40–44	8.2 (7.2–9.3)	5.2 (3.5–7.0)	7.6 (6.4–8.7)
45–49	7.9 (6.7–9.1)	6.8 (4.5–9.1)	6.9 (5.7–8.1)
50–54	6.2 (5.2–7.3)	4.7 (2.4–6.9)	6.5 (5.2–7.8)
55–59	4.2 (3.3–5.0)	4.8 (2.0–7.5)	5.3 (4.3–6.3)
<b>Residence</b>			
Urban	31.6 (27.7–35.5)	50.0 (42.0–58.0)	58.8(54.3–63.2)
Rural	68.4 (64.5–72.3)	50.0 (42.0–58.0)	41.2 (36.8–45.7)

<b>Socio-demographic Characteristics</b>	<b>Indigenous % (IC) (n=3,145)</b>	<b>Cross-Identified % (IC) (n=582)</b>	<b>Ladino % (IC) (n=3,095)</b>
<b>Language</b>			
Speak Spanish	91.8 (89.4–94.1)	99.7 (99.2–100.0)	100.0
Understands Spanish	94.2 (92.5–95.9)	99.8 (99.5–100.0)	100.0
Spanish spoken regularly at home	53.3 (48.0–58.5)	98.0 (96.3–99.6)	99.8 (99.7–100.0)
Household member speaks Mayan language	73.0 (69.0–77.0)	13.3 (9.1–17.6)	4.0 (3.0–5.0)
<b>Education</b>			
None	20.6 (18.4–22.7)	8.0 (5.6–10.3)	7.4 (5.0–8.8)
Primary	57.3 (54.6–60.5)	42.1 (36.1–48.1)	39.1 (35.7–42.4)
Secondary	20.4 (17.8–22.9)	44.6 (38.4–50.7)	41.9 (39.0–44.8)
Post-secondary	1.8 (1.2–2.3)	5.3 (2.3–8.3)	11.6 (9.7–13.6)
<b>Wealth quintile</b>			
Lowest	33.8 (29.8–37.8)	9.9 (7.0–12.7)	6.0 (4.8–7.2)
Second	27.9 (25.1–30.6)	19.6 (14.7–24.6)	13.9 (11.9–15.9)
Middle	20.5 (18.0–22.9)	24.1 (19.0–29.3)	20.7 (18.3–23.2)
Fourth	13.3 (10.8–15.8)	29.1 (22.9–35.4)	27.1 (24.6–29.7)
Highest	4.6 (3.4–5.8)	17.2 (8.9–25.5)	32.2 (28.4–36.0)
<b>Marital status</b>			
Married/partnered	62.7 (60.3–65.1)	54.7 (49.4–59.9)	55.7 (53.2–58.1)
Single/never married	2.7 (1.9–3.4)	5.4 (3.2–7.7)	4.3 (3.3–5.3)
Separated/widow/divorced	34.6 (32.2–37.1)	39.9 (34.7–45.1)	40.1 (37.6–42.5)
<b>Region</b>			
Metropolitan	7.6 (4.3–10.8)	18.8 (12.1–25.4)	32.1 (25.9–38.3)
Northern	17.6 (12.6–22.6)	4.3 (1.5–7.1)	2.3 (1.2–3.4)
Northeastern	5.6 (3.5–7.6)	13.6 (9.2–17.9)	12.1 (9.4–14.8)
Southeastern	2.8 (1.7–3.9)	13.8 (9.5–18.0)	14.4 (11.0–17.8)
Central	10.7 (7.8–13.5)	10.1 (5.0–15.2)	15.0 (10.5–19.4)
Northwestern	21.2 (16.1–26.2)	6.0 (2.3–9.8)	5.9 (3.1–8.7)
Southwestern	31.9 (26.8–37.0)	30.8 (21.2–40.3)	13.4 (10.2–16.8)
Petén	2.7 (1.4–2.9)	2.6 (0.9–4.4)	4.7 (2.6–6.8)

## HIV KNOWLEDGE, ATTITUDES AND PRACTICES (BIVARIATE ANALYSIS)

Results suggest important differences among indigenous, cross-identified, and ladino women in terms of HIV knowledge and attitudes, sexual behavior, history of HIV testing, and other factors. See Table 4 for details of the women's analysis, and Table 5 for men's results. Most ladino (98%) or cross-identified women (95%) had heard of HIV, compared to approximately three-quarters of the indigenous group. Men showed higher levels of awareness but the ethnic pattern was the same: 99% of ladino and cross-identified men had heard of HIV, compared with 93% of indigenous men. Ladino and cross-identified women were also far more likely than indigenous women to have been tested for HIV (21%, 18%, and 5%, respectively). Differences in HIV testing were apparent among all three groups for men: while 18% of ladinos had been tested, only 11% of cross-identified men and 6% of indigenous men had.

For women, HIV risk perception was similar across the three groups; between 21% and 23% of those who had heard of HIV indicated that they considered themselves to be at risk. For men, the ladino and cross-identified groups were similar – 27% and 29% respectively considered themselves at risk. Indigenous men showed a slightly but significantly lower prevalence of personal risk perception (21%).

Misconceptions about transmission, among those who had heard of HIV, were common in all three groups but most common among the indigenous. Fully one in four indigenous women answered 'yes' when asked if a person could contract HIV by shaking hands with someone who has AIDS, compared with 10% of the cross-identified women and 7% of ladino women. The most commonly cited misconception, that HIV could be transmitted by mosquito bite, was equally common in the women's indigenous and cross-identified groups (61% and 62%, respectively). It was significantly less common among ladinos in the women's sample (53%). This misperception was most common of all (70%) among indigenous men, but rates for men in other ethnic groups were close to those for women. Approximately 46% of indigenous women, 29% of cross-identified women, and 25% of ladino women held at least two of the five misconceptions. The trend for men was similar; 48% of indigenous men held two or more misconceptions, compared with approximately one in four cross-identified and ladino men.

Respondents who had ever heard of HIV were also asked if they knew any ways to prevent HIV, and their unprompted responses were recorded. If these unprompted responses did not include abstinence, fidelity to one partner, or condom use specifically, the interviewer then asked the respondent if these behaviors could prevent HIV. The unprompted and prompted responses are combined in Table 3.

The percentage of ladino women who agreed that abstinence could prevent HIV (92%) was marginally higher than the percentage of indigenous women (89%). Indigenous women were also slightly but significantly less likely (94%) than either cross-identified or ladino women (both 97%) to agree that fidelity was an effective at preventing HIV. Condom use was cited by even fewer indigenous women – 70% – as an effective prevention method, and significantly greater percentages of both cross-identified (87%) and ladino women (90%) identified it correctly. Among men, knowledge of prevention methods was generally higher (between 84% and 99% overall) and more uniform between ethnic groups. A slightly smaller percentage of indigenous men viewed condom use as an effective prevention strategy (84%) compared to ladinos (91%).

Among those who had heard of HIV, accepting attitudes towards people living with HIV (PLHIV) were far from universal. We found relatively similar results in the cross-identified and ladino groups, and the lowest levels of accepting attitudes among indigenous respondents. Asked “If you knew that a colleague had HIV, would you agree to work with him/her?” 74% of ladino women, 67% of cross-identified women, and 40% of indigenous women said yes (all differences statistically significant). Significantly fewer indigenous men (54%) versus ladinos (75%) and men in the cross-identified group (77%) indicated that they would agree to work with someone who had HIV.

### ***Common Misconceptions***

*Approximately 46% of indigenous women, 29% of cross-identified women, and 25% of ladino women held at least two of the five misconceptions.*

On questions about whether the respondent would buy vegetables or food from someone with HIV/AIDS, allow his/her children to attend school with a child who had HIV, and whether teachers with HIV should be allowed to continue teaching, response patterns were similar. Indigenous respondents showed the lowest acceptance levels. Among men, the ladino and cross-identified group were statistically indistinguishable, whereas among women the cross-identified group showed slightly lower levels of accepting attitudes. Response patterns were different for “If a person in your family were infected with HIV, would you prefer that it be kept secret?” Similar percentages of indigenous and cross-identified women disagreed with this statement (55% and 53%, respectively), while a significantly smaller percentage (48%) of ladinos did. Sixty-six percent of indigenous men, and slightly lower but statistically equivalent percentages of men in the two other groups, disagreed with this statement.

Although 79% of cross-identified women and 85% of ladino women agreed that a person with HIV could look healthy, only 61% of indigenous women did. The pattern held for men as well: 88% of ladinos and 87% of cross-identified men, versus 76% of indigenous men, knew this to be true.

We also looked at the percentage of each group that exhibited comprehensive knowledge of HIV, defined as: rejects the two most common transmission misconceptions, correctly identifies fidelity and condom use as effective methods of HIV prevention, and answers yes when asked if a person with HIV can look healthy. For women, significant differences were apparent among all three groups: 15% of indigenous, 21% of cross-identified, and 33% of ladino women demonstrated comprehensive knowledge. Among men, 16% of indigenous, 29% of cross-identified, and 33% of the ladino group had comprehensive knowledge; confidence intervals for the cross-identified and ladino groups’ estimates overlapped, but knowledge was significantly less prevalent in the indigenous group.

Among women who had ever had sex, the mean age at sexual debut was similar between the indigenous (17.5 years) and cross-identified (17.3 years) groups, and higher for ladinos (18.1 years). Ladino and cross-identified men, on the other hand, showed similar mean ages of sexual debut –16.1 and 16.2 years, respectively – while the mean for the indigenous group was higher (17.9 years). The percentage of women who were younger than 15 at sexual debut was relatively low overall and showed only non-significant differences between the groups: 15% for indigenous women, 17% for cross-identified women, and 14% for ladinos. Among men, however, a significantly smaller percentage of the indigenous group reported early sexual debut (16%, versus 28% and 31% in the other groups).

Among women who had sex in the 12 months prior to interview, the proportion who reported having 3 or more sexual partners in her lifetime was statistically similar in the cross-identified and ladino groups (6% and 8%, respectively) and lower for indigenous women (3%). Condom use was relatively infrequent – among women who had sex in the past 12 months just 3% of indigenous, 6% of cross-identified, and 8% of ladino respondents said they had used a condom during their most recent sexual encounter. Only the difference between the indigenous and ladino groups was statistically significant. Among never-married women, condom use was higher overall but still significantly lower among the indigenous (14%) versus ladinos (36%).

Men reported higher numbers of sex partners than women did, both over their lifetimes and in the past year. Differences between ethnic groups were similar to those for women. Ten percent of ladino men, 9% of cross-identified, and 4% of indigenous men indicated having at least 3 sexual partners in the past 12 months. Twenty-nine percent of indigenous men, 24% of cross-identified, and 12% of indigenous men indicated that they had used a condom during their most recent sexual encounter in the past 12 months. On both variables, the differences were only significant for indigenous respondents versus the other two groups. Frequency of condom use was also markedly lower among indigenous men, only 12% of whom said they “always” or “almost always” use a condom, compared to 24% of cross-identified and 29% of ladino men. Indigenous men were less likely than other men to report that they had ever had sex with a sex worker (19% versus 34% of ladinos and 35% of cross-identified men). They were also slightly but significantly less likely than ladino men to have had sex with a sex worker in the past 30 days (2% versus 4%).

**Table 4: Percentage of Women 15–49 with Selected HIV Knowledge, Attitudes, and Risk Behaviors by Ethnic Group, Guatemala, 2008–2009 N=16205**

Characteristic	Indigenous % (IC)	Cross-identified % (IC)	Ladino % (IC)
<b>Among all women</b>	<b>(n=5,900)</b>	<b>(n=2,217)</b>	<b>(n=8,088)</b>
Ever heard of HIV	75.5 (72.6–78.4)	94.6 (93.1–96.1)	97.7 (97.1–98.2)
<b>Among women who have ever heard of HIV</b>	<b>(n=4,473)</b>	<b>(n=2,080)</b>	<b>(n=7,878)</b>
Ever had an HIV test <sup>1</sup>	5.3 (4.3–6.2)	17.7 (15.0–20.3)	21.3 (19.8–22.8)
Perceived self to be at risk of HIV	22.1 (20.4–23.8)	22.5 (19.7–25.4)	21.3 (19.9–22.6)
Agreed that HIV can be transmitted by:			
Shaking hands with someone who has AIDS	24.5 (22.2–26.8)	10.0 (7.8–12.2)	6.6 (5.4–7.7)
Kissing a person with AIDS on the forehead	29.5 (27.1–31.9)	12.5 (10.0–14.9)	8.8 (7.5–10.1)
Mosquito bite	60.9 (58.8–63.0)	62.2 (59.4–65.0)	53.0 (51.3–54.9)
Sharing plates/silverware w/ person who has AIDS	45.4 (43.2–47.7)	30.6 (27.6–33.6)	27.1 (25.4–28.8)
Working with someone who has AIDS	27.8 (25.5–30.0)	14.0 (11.6–16.4)	10.0 (9.0–11.4)
Held 2+ misconceptions about transmission	45.8 (43.3–48.3)	28.8 (25.8–31.7)	24.7 (22.9–26.4)
Correctly identified ways to prevent HIV:			
Abstinence can prevent HIV	88.9 (87.5–90.2)	90.6 (88.9–92.3)	91.8 (90.9–92.7)
Being faithful can prevent HIV	93.5 (92.5–94.6)	96.9 (96.0–97.8)	97.2 (96.6–97.7)
Using a condom can prevent HIV	69.8 (67.3–72.3)	86.7 (84.6–88.8)	89.9 (88.8–90.9)
Held accepting attitudes towards PLHIV:			
Would buy vegetables or food from PLHIV	25.6 (23.5–27.7)	42.3 (38.7–45.9)	48.8 (46.7–50.9)
Would work with an HIV-infected person	40.2 (37.3–43.0)	66.7 (63.1–70.2)	74.3 (72.4–76.1)
Would let an HIV-infected teacher give class	33.8 (31.2–36.4)	50.7 (47.1–54.4)	59.1 (56.9–61.2)
Would <u>not</u> keep it a secret if a family member was HIV+	55.2 (53.1–57.2)	53.0 (49.8–56.3)	48.0 (46.4–49.6)
Would be ok if an HIV+ child went to school with child	33.0 (30.4–35.7)	52.1 (48.6–55.6)	60.9 (58.9–63.0)
Held all 5 accepting attitudes	6.0 (5.0–7.1)	13.6 (11.8–15.5)	15.7 (14.4–17.0)
Knows that a PLHIV can look healthy	61.3 (58.9–63.7)	79.1 (76.6–81.5)	84.7 (83.4–85.9)
Has comprehensive knowledge of HIV <sup>2</sup>	14.7 (13.1–16.4)	21.3 (18.8–23.9)	33.2 (31.3–35.1)
<b>Among women who had ever had sex</b>	<b>(n=4,772)</b>	<b>(n=1,820)</b>	<b>(n=6,623)</b>
Mean age in years at sexual debut (S.D.) <sup>3</sup>	17.5 (3.63)	17.3 (3.57)	18.1 (3.88)
Sexual debut <15 years old <sup>3</sup>	15.3 (13.9–16.7)	17.0 (14.6–19.5)	13.6 (12.3–14.9)

Characteristic	Indigenous % (IC)	Cross-identified % (IC)	Ladino % (IC)
<b>Among women who had sex in the past 12 months</b>	<b>(n=4,052)</b>	<b>(n=1,531)</b>	<b>(n=5,629)</b>
Has had 3 or more lifetime sex partners <sup>1</sup>	2.6 (1.8–3.4)	5.7 (4.0–7.3)	7.8 (6.7–8.9)
Used a condom at last sexual encounter	3.4 (2.5–4.2)	5.9 (4.1–7.8)	8.3 (7.2–9.4)
<b>Among never-married women who had sex in past 12 months</b>	<b>(n=55)</b>	<b>(n=49)</b>	<b>(n=246)</b>
Used a condom at last sexual encounter	14.3 (3.2–25.4)	22.3 (8.6–36.1)	36.4 (28.2–44.6)

<sup>1</sup> 32 missing cases

<sup>2</sup> Comprehensive knowledge is defined as: rejects the two most common misconceptions about HIV transmission, identifies condom use and fidelity as ways to prevent HIV, and knows that a person with HIV can look healthy

<sup>3</sup> 19 missing cases

<sup>4</sup> 49 missing cases

**Table 5: Percentage of Men 15–59 with Selected HIV Knowledge, Attitudes, and Risk Behaviors by Ethnic Group, Guatemala, 2008–2009 (N=6822)**

Characteristic	Indigenous % (IC)	Cross-identified % (IC)	Ladino % (IC)
<b>Among all men</b>	<b>(n=3,145)</b>	<b>(n=582)</b>	<b>(n=3,095)</b>
Ever heard of HIV	92.7 (90.3–93.9)	98.8 (97.8–99.8)	99.1 (98.7–99.5)
<b>Among men who have ever heard of HIV</b>	<b>(n=2,925)</b>	<b>(n=571)</b>	<b>(n=3,069)</b>
Ever had an HIV test	5.5 (3.8–7.3)	10.7 (7.3–14.2)	17.9 (15.8–20.1)
Perceived self to be at risk of HIV	20.8 (18.3–23.4)	29.4 (23.7–35.0)	26.7 (24.2–29.3)
Agreed that HIV can be transmitted by:			
Shaking hands with someone who has AIDS	20.5 (18.2–22.8)	6.9 (4.1–9.8)	5.1 (4.0–6.2)
Kissing a person with AIDS on the forehead	30.1 (27.0–33.3)	9.5 (6.5–12.5)	8.6 (7.4–9.9)
Mosquito bite	69.8 (67.2–72.4)	58.0 (50.4–65.7)	54.8 (52.0–57.6)
Sharing plates/silverware w/ person who has AIDS	47.1 (43.9–50.2)	25.1 (19.9–30.4)	26.2 (24.0–28.5)
Working with someone who has AIDS	23.8 (21.1–26.4)	8.6 (5.7–11.5)	8.6 (7.1–10.0)
Held 2+ misconceptions about transmission	48.2 (45.1–51.3)	25.2 (19.9–30.5)	24.1 (21.7–26.4)
Correctly identified ways to prevent HIV:			
Abstinence can prevent HIV	89.8 (88.1–91.5)	93.1 (90.4–95.8)	92.7 (91.3–94.1)
Being faithful can prevent HIV	97.8 (97.1–98.5)	97.6 (96.2–99.0)	98.5 (97.9–99.1)
Using a condom can prevent HIV	84.4 (82.3–86.4)	88.1 (84.1–92.1)	91.0 (89.4–92.6)

Characteristic	Indigenous % (IC)	Cross-identified % (IC)	Ladino % (IC)
Held accepting attitudes towards PLHIV:			
Would buy vegetables or food from PLHIV	26.5 (24.0–28.9)	49.0 (41.8–56.3)	44.9 (42.2–47.7)
Would work with an HIV-infected person	54.0 (50.7–57.3)	77.0 (72.2–81.7)	74.5 (71.9–77.1)
Would let an HIV-infected teacher give class	34.4 (31.5–37.2)	58.6 (52.0–65.1)	56.6 (53.8–59.4)
Would <u>not</u> keep it a secret if a family member was HIV+	65.4 (63.0–67.9)	59.5 (52.9–66.2)	55.5 (52.9–58.0)
Would be ok if an HIV+ child went to school with child	33.6 (30.8–36.3)	59.8 (53.4–66.1)	59.8 (53.4–66.1)
Held all 5 accepting attitudes	7.6 (6.3–8.9)	18.2 (14.1–22.3)	17.4 (15.4–19.4)
Knows that a PLHIV can look healthy	75.9 (73.5–78.3)	86.6 (82.6–90.7)	87.8 (85.9–89.8)
Has comprehensive knowledge of HIV <sup>1</sup>	15.5 (13.4–17.6)	28.5 (20.0–37.1)	32.9 (30.4–35.4)
<b>Among men who had ever had sex</b>	<b>(n=2,732)</b>	<b>(n=507)</b>	<b>(n=2,646)</b>
Mean age in years at sexual debut <sup>2</sup>	17.9 (3.68)	16.2 (3.00)	16.1 (3.21)
Sexual debut <15 years old <sup>2</sup>	15.5 (13.0–18.1)	28.1 (22.6–33.5)	31.2 (28.3–34.1)
10+ lifetime sex partners <sup>3</sup>	11.1 (9.3–13.0)	23.9 (18.0–29.7)	28.6 (26.0–31.2)
Ever had sex with a sex worker	18.9 (16.5–21.3)	34.5 (28.3–40.7)	34.4 (31.5–37.2)
Had sex with a sex worker in the last 30 days <sup>4</sup>	1.9 (1.2–2.6)	1.7 (0.5–2.8)	4.0 (2.9–5.0)
<b>Among men who ever had sex with a sex worker</b>	<b>(n=460)</b>	<b>(n=157)</b>	<b>(n=901)</b>
Used a condom at last sex with a sex worker	60.4 (55.0–65.8)	64.1 (54.6–73.7)	67.4 (63.7–71.1)
<b>Among men who had sex in the past 12 months</b>	<b>(n=2,487)</b>	<b>(n=474)</b>	<b>(n=2,579)</b>
3+ sex partners in the last 12 months <sup>5</sup>	3.8 (2.6–4.9)	9.3 (6.4–12.2)	10.3 (8.4–12.1)
Condom use at last sex	12.1 (9.5–14.7)	24.0 (18.2–29.8)	29.3 (26.6–32.0)

<sup>1</sup> Comprehensive knowledge is defined as: rejects the two most common misconceptions about HIV transmission, identifies condom use and fidelity as ways to prevent HIV, and knows that a person with HIV can look healthy

<sup>2</sup> 22 missing cases

<sup>3</sup> 28 missing cases

<sup>4</sup> 14 missing cases

<sup>5</sup> 1 missing case

## HIV OUTCOMES IN A MULTIVARIATE MODEL

Health outcomes are usually influenced by a number of related factors. For example, ladino men and women showed a higher prevalence of comprehensive HIV knowledge than their indigenous counterparts; we might therefore conclude that ethnicity is related to HIV knowledge. However, this bivariate analysis fails to address the effects of other differences between ethnic groups. Ladinos were wealthier and better educated than their indigenous peers, for example, factors which are also likely to affect the outcome. Through multivariate analysis, we can estimate the importance of an individual variable (ethnicity) on a given outcome (HIV knowledge) holding other factors (education, wealth quintile) constant. If ladinos' greater knowledge is only the result of better education and higher wealth, ethnicity will “drop out” in such an analysis, becoming non-significant. If, on the other hand, HIV knowledge is still higher amongst ladinos in a wealth-and-education adjusted model, we can conclude that ethnicity is associated with the outcome controlling for other factors.

### *Sexual Debut*

*“Compared to indigenous women, those in both the cross-identified and ladino groups had higher odds of early sexual debut—nearly 1.5 times higher.”*

We used logistic regression models to conduct this kind of multivariate analysis addressing the question: is ethnicity related to HIV knowledge, attitudes, or sexual practices when other demographic characteristics are held constant? The full models and a description of the effects of each control factor can be found in Tables A1 and A2 in the Appendix. Below we focus on the effects of ethnicity, beginning with an investigation of six outcomes among women: early sexual debut, three or more lifetime sexual partners, comprehensive HIV knowledge, accepting attitudes towards PLHIV, ever tested for HIV, and condom use at last sexual encounter. Results suggest that ethnicity is an important predictor of five of these variables even controlling for education, wealth, and other demographic differences between ethnic groups.

## WOMEN'S MULTIVARIATE RESULTS

Ethnicity affected women's odds of early sexual debut (age at first sex <15 years), three or more lifetime sexual partners, comprehensive HIV knowledge, and exhibiting accepting attitudes towards PLHIV. In general, outcomes suggested lower behavioral risk among indigenous women, but also less knowledge about how to prevent infection. Ethnicity was unrelated to women's odds of condom use during their most recent sexual encounter.

Compared to indigenous women, those in both the cross-identified and ladino groups had higher odds of early sexual debut—nearly 1.5 times higher. Ladinos had nearly twice the odds of having three or more lifetime sexual partners, versus the indigenous group. Odds among members of the cross-identified group did not differ significantly from those of indigenous women.

### *Ethnicity Matters*

*Results suggest that ethnicity is an important predictor of several HIV outcomes even controlling for education, wealth, and other demographic differences.*

Ladinos had 1.6 times the odds of exhibiting comprehensive HIV knowledge, compared with indigenous women. The odds for the cross-identified group did not differ significantly from those of indigenous respondents. Those in the cross-identified and ladino groups had odds of exhibiting accepting attitudes that were twice as high as indigenous women's odds. Cross-identified and ladino respondents also had nearly two and half times the odds of ever having been tested for HIV. See Table 6 below for details and the adjusted odds ratios.<sup>1</sup>

**Table 6: Adjusted Odds Ratios (AOR) for Selected HIV Risk Outcomes Among Women 15–49, by Ethnic Group<sup>+</sup>**

Sexual Behaviors	N	Indigenous	Cross-Identified	Ladino
Early sexual debut <sup>1</sup>	13,196	Reference	1.48 (1.16–1.88)***	1.41 (1.17–1.71)***
3+ lifetime sex partners <sup>2</sup>	11,163	Reference	1.65 (1.06–2.58)**	1.87 (1.30–2.71)***
Condom use at last sex <sup>3</sup>	11,212	Reference	0.87 (0.55–1.36)	0.86 (0.59–1.25)
HIV knowledge, attitudes, practices				
Comprehensive HIV knowledge <sup>4</sup>	14,431	Reference	1.17 (0.95–1.43)	1.63 (1.40–1.89)***
Accepting attitudes towards PLHIV <sup>4</sup>	14,431	Reference	1.86 (1.44–2.40)***	1.89 (1.53–2.34)***
Ever tested for HIV <sup>5</sup>	14,399	Reference	2.46 (1.93–3.13)***	2.25 (1.98–3.03)***

<sup>+</sup> Controlling for socio-demographic factors (age, urban/rural residence, education, wealth quintile, marital status, and region)

<sup>1</sup> Among women who have ever had sex, 23 missing cases

<sup>2</sup> Among women who have had sex in the last 12 months, 29 missing cases

<sup>3</sup> Among women who have had sex in the last 12 month

<sup>4</sup> Among women who have heard of HIV

<sup>5</sup> Among women who have heard of HIV, 32 missing cases

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$

<sup>1</sup> Logistic regression yields odds ratios, allowing us to compare the odds of a given outcome for a reference category versus a comparison category on any variable, such as ethnicity. The odds ratio for a reference category is always 1.00; it equals the odds of an outcome in that group divided by the same number. For example, if the odds of rain in a reference city are 1 in 4 (0.25), and the odds of rain in a comparison city are 2 in 4 (0.50) then the odds ratio for the comparison city is 0.50/0.25, or 2. The odds ratio for the reference group is 0.25/0.25, or 1.00. The comparison category in this case has twice the odds of the outcome of interest.

Including other variables in a regression model holds them constant. These covariates may also be said to be “controlled for” or “accounted for” in the analysis. In the fourth column of Table 4, for example, we see that ladinos had on average 1.58 times higher odds than the reference group, indigenous respondents, of exhibiting comprehensive HIV knowledge—holding age, urban/rural residence, education, wealth quintile, marital status, and region of residence constant. Removing covariates from this model would change the ethnic groups’ relative odds of comprehensive HIV knowledge by failing to account for these other factors. Odds ratios of less than one suggest that a group has lower odds than the reference group of exhibiting the outcome, and odds ratios are considered significant if the confidence interval around the estimate does not include 1.

## MEN'S MULTIVARIATE RESULTS

Separate multivariate analysis of the men's sample included nine outcome variables, several of which were not asked about as part of the women's survey. Men's outcomes included: early sexual debut, 10+ lifetime sexual partners, 3+ sexual partners in the past 12 months, condom use at last sex, sex worker patronage (ever), condom use at last sex with a sex worker, comprehensive HIV knowledge, accepting attitudes towards PLHIV, and ever tested for HIV. Results suggest that ethnicity is an important predictor of at least four of these outcomes, controlling for education, wealth, and other demographic differences.

Compared to indigenous men, those in the cross-identified group had one and a half times the odds of early sexual debut; ladinos had nearly twice the odds. Cross-identified and ladino men also had higher odds than indigenous men of having had at least 10 sexual partners—1.7 and 2.0 times higher, on average. They were similarly more likely to have ever had sex with a sex worker. Cross-identified and ladino men also had higher odds of exhibiting comprehensive HIV knowledge (1.5 and 1.6 times higher, respectively) and holding accepting attitudes towards PLHIV (1.92 and 1.53 times higher respectively).

Marginally statistically significant effects of ethnicity ( $P < 0.1$ ) were evident for three other factors: 3+ sex partners in the past 12 months, condom use at last sex, and ever tested for HIV. Cross-identified men did not differ from the indigenous group, but ladinos had higher odds on all three variables. Ethnicity was not associated with men's odds of condom use at last sex with a sex worker. See Table 7 for details and the adjusted odds ratios.

**Table 7: Adjusted Odds Ratios (AOR) for Selected HIV Risk Outcomes Among Men 15–59, by Ethnic Group<sup>+</sup>**

Sexual Behaviors	N	Indigenous	Cross-Identified	Ladino
Early sexual debut <sup>1</sup>	5,863	Reference	1.50 (1.07–2.10)**	1.83 (1.44–2.32)***
10+ lifetime sex partners <sup>2</sup>	5,857	Reference	1.71 (1.20–2.43)***	1.95 (1.48–2.57)***
Sex worker patronage (ever) <sup>3</sup>	5,885	Reference	1.70 (1.21–2.38)***	1.62 (1.29–2.03)***
Condom use with last sex worker <sup>4</sup>	1,642	Reference	0.76 (0.45–1.31)	0.82 (0.60–1.13)
3+ sex partners in the last 12 months <sup>5</sup>	5,539	Reference	1.44 (0.83–2.51)	1.50 (0.97–2.31)*
Condom use at last sex <sup>6</sup>	5,540	Reference	0.85 (0.52–1.41)	1.33 (0.95–1.86)*
HIV knowledge, attitudes, practices				
Comprehensive HIV knowledge <sup>1</sup>	6,565	Reference	1.46 (0.97–2.22)*	1.58 (1.27–1.97)***
Accepting attitudes towards PLHIV <sup>1</sup>	6,565	Reference	1.92 (1.35–2.73)***	1.53 (1.13–2.07)***
Ever tested for HIV <sup>1</sup>	6,565	Reference	1.18 (0.64–2.16)	1.57 (0.95–2.59)*

<sup>+</sup> Controlling for socio-demographic factors (age, urban/rural residence, education, wealth quintile, marital status, and region)

<sup>1</sup> Among men who have ever had sex, 22 missing cases

<sup>2</sup> Among men who have ever had sex, 28 missing cases

<sup>3</sup> Among men who have ever had sex

<sup>4</sup> Among men who have ever had sex with a sex worker

<sup>5</sup> Among men who have had sex in the last 12 months, 1 missing case

<sup>6</sup> Among men who have had sex in the last 12 months

<sup>7</sup> Among men who have heard of HIV

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$



## Limitations

Our ability to draw definitive conclusions about these outcomes in different ethnic groups in Guatemala is subject to several limitations. First, the 2008/2009 ENSMI did not include HIV testing. This study cannot compare the HIV prevalence among the indigenous, cross-identified, and ladino groups. Second, the ENSMI uses a cross-sectional study design, which limits our ability to assess causality.

While the authors are unaware of studies investigating response bias specifically in measures of sexual behavior among Mayans or other indigenous groups, in face-to-face interviews underreporting due to social desirability bias is probably common. In culturally conservative Mayan communities, it may have a substantial effect on estimates. The implications of this for the present analysis are two-fold: 1) rates of risky and/or stigmatized behavior are likely underestimated, and 2) underestimation may be more (or less) serious among indigenous respondents relative to other groups, affecting not only overall prevalence estimates but also conclusions about differences in HIV risk based on ethnicity.

In addition, as previously described, a substantial percentage of women and men in this national sample self-identified as indigenous yet were considered by their interviewers to be ladino. Ethnic identity in Guatemala almost certainly comprises a set of interrelated domains rather than just one, and the validity and reliability of survey questions about ethnicity has been infrequently addressed in the literature from developing countries. This analysis calls attention to our limited understanding of the topic, and the need for further research.



## Discussion and Recommendations

Ethnicity emerges as a strong correlate of several HIV outcomes, primarily serving to distinguish the indigenous group from the cross-identified and ladino groups in both the men's and women's samples. Behavioral risk factors for HIV were relatively uncommon in all three groups, but especially so among indigenous women and men.

Even when we controlled for rural/urban residence, age group, education level, wealth quintile, and marital status, indigenous women had the lowest adjusted odds of early sexual debut and of having three or more lifetime sexual partnerships. Compared with their ladino counterparts, however, indigenous women exhibited lower levels of HIV awareness, more limited knowledge of effective prevention methods, heightened misconceptions regarding transmission, and more negative attitudes toward PLHIV. These differences did not appear to be simply the result of indigenous women's comparatively rural existence and lesser access to schooling and other resources. For men in the study, being indigenous was associated with later sexual debut, lower propensity for high numbers of sexual partners, and lower odds of sex worker patronage. Like indigenous women, indigenous men were less likely than those in other ethnic groups to exhibit comprehensive HIV knowledge. Men's odds of holding accepting attitudes towards PLHIV were unrelated to ethnicity.

### *Defining 'indigenous'*

*Thirteen percent of women and 8% of men in this national survey self-identified as indigenous yet were classified by the interviewer as ladino – a clear indication of bias on a critically important measure.*

Other findings confirm many of the relationships we expected, such as that married men and women tend not to use condoms, and better-educated individuals have higher levels of knowledge about HIV. The consistency of relationships between the demographic variables and HIV outcomes reinforces the face validity of the findings. For each increase in respondents' level of wealth or education, for example, a stepwise increase in many HIV outcomes (knowledge, accepting attitudes, having been tested, or using a condom at last sex) is apparent. This suggests that the data in fact have captured an underlying reality about HIV knowledge, attitudes and behaviors among Guatemalans. Further, the results support earlier evidence from national HIV case surveillance suggesting lower HIV risk in indigenous groups.

Our findings also point to the need for a more systematic consideration of ethnicity measurement in population research. Anthropologists and other social scientists have long sought to interpret the effects of decades of dramatic social, political and economic upheaval on ethnic definition and re-definition among Guatemala's indigenous communities. To the extent that estimates of HIV and related risk factors influence how, and to whom, prevention resources are directed, the question "who is indigenous?" is also crucial for HIV and other health research. Thirteen percent of women and 8% of men in this national survey self-identified as indigenous yet were classified by their interviewers as ladino – a clear indication of bias on a critically important measure. We had initially planned to determine whether these "cross-identified" respondents should be counted as ladino or indigenous, to simplify

the analysis. In discussions, however, we encountered competing arguments for each, and for keeping these respondents as a separate group:

Reasons to classify the cross-identified group as ladino:

- » As shown in Tables 2 through 5, on both demographic and HIV measures the cross-identified group tend to more closely resemble the ladino group than the indigenous group; and
- » This was the classification type used in the final report for the ENSMI 2008-09 (MSPAS, 2011).

Reasons to classify the cross-identified group as indigenous:

- » These respondents classified themselves as indigenous, arguably a more reliable measure than any second party's non-standardized assessment; and
- » This classification seems consistent with the policy of the Guatemalan government to recognize the self-identity of its citizens (Instituto Nacional de Estadística, 2009).

Reasons to retain the cross-identified group as a separate group for comparison:

- » Although they were generally more similar to ladinos than to the indigenous group, on many measures, cross-identified respondents appeared squarely positioned between the two; and
- » Members of the cross-identified group had a self-concept that was at odds with others' view of them. Understanding this difference might help improve the effectiveness of targeted health programming.

Ultimately, the decision to present ethnic identity in three distinct categories proved to increase the richness of the findings and yielded new insights into ethnicity and HIV risk in Guatemala. However, the vast majority of analyses, including others using ENSMI data, reduce ethnicity to two categories: indigenous and non-indigenous. We hope that the findings from this paper will spur additional examination of what motivates people in Guatemala to describe themselves or others as “indigenous” or “ladino,” and to examine the assumptions that underlie statistics presented by ethnic group. Future research should focus on identifying the components of ethnic identity that best enable meaningful comparison on important health outcomes, including HIV.

Since the 2008–2009 ENSMI did not collect biomarker data, our analysis was limited to likely risk factors, and we are unable to draw any conclusions about the prevalence of HIV in Guatemala's indigenous population or evaluate relationships between risk factors and HIV status. Adding HIV testing to the survey would provide reliable prevalence estimates but may only be urgently needed if other evidence suggests that the epidemic is becoming more generalized.

We recommend that questions be added to enable analysis of respondents' concurrency in sexual partnerships, an important behavioral risk factor that was not included in the 2008–2009 survey. Continued research focus on men who have sex with men, as an identified higher risk population, is also clearly warranted. Adding same-sex sexual behavior questions to the ENSMI could provide national estimates of the size of this population, while studies using sampling methods designed for small and hard-to-reach groups might in addition offer information on risk factors among MSM with lower rates of reporting bias.

More research is also needed on population mobility among residents of Guatemala, and we recommend that mobility questions be added to the ENSMI. A recent review of the literature on mobility and HIV in Central America and Mexico noted associations between mobility and risk behavior among indigenous groups in the region, and the importance of addressing mobility-related risk in the early stages of an epidemic (Goldenberg et. al, 2011). Studies among Mexican migrants in the United States and in communities of origin also indicate that compared to non-migrants, Mexicans with US migration experience were more likely to have reported sex worker patronage, multiple sex partners, and illicit non-injection drug use (Parrado and Flippen, 2010; Magis-Rodriguez et al., 2009).

Finally, more work is necessary to increase our understanding of risk behavior in other indigenous groups in Guatemala, such as the Garífuna, whose small population size means they are not well represented in standard national surveys and calls instead for targeted sampling strategies. Previous studies in neighboring countries have demonstrated an elevated HIV prevalence among the Garífuna (Paz-Bailey et al., 2009).

Overall, our results offer a detailed profile of differences between Guatemala's largest ethnic groups on a variety of demographic and HIV variables, and indicate low levels of risky sexual behavior in the indigenous population. We conclude that HIV prevalence among the indigenous is also likely to be low. These results provide little reason to redirect limited HIV prevention resources from key populations at higher risk to indigenous men and women. However, because indigenous respondents exhibited low HIV awareness and limited access to testing, and remain highly vulnerable to poor health by most other measures, continued HIV risk monitoring is warranted. Programs working in indigenous communities may wish to focus their efforts on increasing HIV awareness and knowledge of basic prevention strategies, and on identifying and eliminating barriers to HIV testing.



# References

- Adams, Richard N. (1994). *Guatemalan Ladinization and History*. The American Academy of American Franciscan History. (4) 527–543.
- Bastos, Francisco I.; Caceres, Carlos; Galvao, Jane; Veras, Maria Amelia; Castilho, Euclides Ayres. (2008). AIDS in Latin America: assessing the current status of the epidemic and the ongoing response. *International Journal of Epidemiology*. (37) 729–737.
- Early, D. John. (1975). The Changing Proportion of Maya Indian and Ladino in the Population of Guatemala, 1945–1969. *American Ethnologist*. 2(2).
- El Congreso de la República de Guatemala. (2003) “Ley de Idiomas Nacionales, Decreto Numero 19—2003”. Retrieved from <http://www.congreso.gob.gt/index.php> on 10/31/2011.
- García, EJ. (2010). *Estimaciones y proyecciones de VIH para Guatemala 2009*. Centro Nacional de Epidemiología.
- Goldenberg, S.M., Strathdee, S.A., Perez-Rosales, M.D., Sued, O. (2012). Mobility and HIV in Central America and Mexico: A Critical Review. *J Immigrant Minority Health*.14:48–64. DOI 10.1007/s10903-011-9505-2.
- Gragnotati, M. and A. Marini. (2003). *Health and Poverty in Guatemala*. World Bank. Retrieved from [http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2003/02/22/000094946\\_0302070416252/Rendered/PDF/multi0page.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2003/02/22/000094946_0302070416252/Rendered/PDF/multi0page.pdf) on 05/01/2012.
- Haub, Carl and James Gribble, “The World at 7 Billion,” Population Bulletin 66, no. 2. (2011). Retrieved from <http://www.prb.org/pdf11/world-at-7-billion.pdf> on 29/11/2011.
- Instituto Nacional de Estadística. (2006). Encuesta Nacional de Condiciones de Vida.
- Instituto Nacional de Estadística. (2009). Marco Conceptual para Enfocar Estadísticas de Pueblos Indígenas.
- Magis-Rodriguez, C; Lemp, G; Hernandez, MT; Sanchez, MA, Estrada, A, Bravo-García, E. (2009). Going North: Mexican Migrants and their Vulnerability to HIV. *Journal of the Acquired Immune Deficiency Syndromes*. 51 (S1): S21–S25.
- MSPAS. *Encuesta Nacional de Salud Materno Infantil 2008 (ENSMI-2008/09)*. Ministerio de Salud Pública y Asistencial Social (MSPAS)/Instituto Nacional de Estadística (INE)/Centros de Control y Prevención de Enfermedades (CDC). Guatemala (2011).

- Parrado, E. and Flippen, C. (2010). *Community attachment, neighborhood context, and sex worker use among Hispanic migrants in Durham, North Carolina, USA*. *Social Science and Medicine*. 70: 1059–1069
- Paz-Bailey, G., Morales-Mirand, M., Jacobson, J.O., Gupta, S.K., Sabin, K., Mendoz, S., Paredes, M., Alvarez, B., Monterroso, E. (2009). High Rates of STD and Sexual Risk Behaviors Among Garifunas in Honduras. *Journal of Acquired Immune Deficiency Syndrome*. 51(S1), S26–S34.
- Pierre L. van den Berghe. (1968). *Ethnic Membership and Cultural Change in Guatemala*. 46(4).
- Pinzon Z, Soto RJ, Aguilar S. (2003) *Estudio Multicéntrico de Prevalencia de VIH/ITS y Comportamientos en Trabajadoras Comerciales del Sexo en Guatemala*.
- Richards, M. Atlas Lingüístico de Guatemala. (2003). *SEPAZ, UVG, URL, USAID/G-CAP*. Editorial Serviprensa, S.A. Guatemala.
- Soto, R.J., Ghee, A.E., Nuñez, C.A., Mayorga, R., Tapia, K.A., Astete, S.G., Hughes, J.P., Buffardi, A.L., Holte, S.E., Holmes, K.K. and the Estudio Multicéntrico Study Team. (2007). Sentinel Surveillance of Sexually Transmitted Infections/HIV and Risk Behaviors in Vulnerable Populations in 5 Central American Countries. *Journal of Acquired Immune Deficiency Syndromes*. 46(1), 101–111.
- The World Bank. (2011). *Prevalence of HIV, total (% of population ages 15–49)*. Graph retrieved from <http://data.worldbank.org/indicator/SH.DYN.AIDS.ZS/countries/GT-MX-HN-SV-NI-BZ-CR?display=graph&cid=> on 6/10/2011.
- The World Bank. (2011). *Data Guatemala*. Retrieved from [www.worldbank.org](http://www.worldbank.org) on 6/10/2011.
- The World Bank: Latin America and Caribbean Region and Global HIV/AIDS Program. (2006). *Reducing HIV/AIDS Vulnerability in Central America. Guatemala: HIV/AIDS Situation and Response to the Epidemic*. Retrieved from [www.worldbank.org](http://www.worldbank.org) on 29/10/2011.
- ONUSIDA. (2008). *Report on the global AIDS epidemic*. Retrieved from <http://www.onusida.org/en/> on 10/10/2011.
- ONUSIDA. (2010). *Global Report: ONUSIDA Report on the Global AIDS Epidemic*. Retrieved from [www.onusida.org](http://www.onusida.org) on 29/10/11.
- USAID. (2010). *USAID/Guatemala: HIV/AIDS Health Profile*. Retrieved from [www.usaid.gov](http://www.usaid.gov) on 31/10/2011.

# Appendix: Full Multivariate Models

## EFFECTS OF COVARIATES IN THE WOMEN'S MODEL (SEE TABLE A1)

### **Early sexual debut**

High relative odds of early sexual debut were found among women age 25–59, those in lower wealth quintiles, women who were separated/widowed/divorced, and those living in Petén versus the Metropolitan region. Education had the largest single effect on this outcome. Women who attained any secondary education showed only one quarter the odds of early sexual debut versus those with no education, and women with post-secondary education exhibited less than one-tenth the odds.

### **Three or more lifetime sexual partners**

The odds of having three or more lifetime sexual partners for the cross-identified group did not differ significantly from those of indigenous female respondents. Marital status had the largest average effect on odds of this outcome; single/never married respondents' odds of having had three or more partners was more than eight times than of married/partnered women, and the odds for separated/widowed/divorced women were over 3 times higher. Women who were 25–49, those living in urban areas, and those in the Northern (versus Metropolitan) region also exhibited higher odds relative to reference categories on this outcome.

### **Condom used at last sexual encounter**

Age group, education level, wealth quintile, marital status, and region all showed effects on women's odds of condom use at last sexual encounter. Those with the lowest relative odds of condom use were older, less wealthy, married/partnered, and living in the Northwestern or Southwestern regions (versus the Metropolitan region).

### **Comprehensive HIV knowledge**

The odds for the cross-identified group of exhibiting comprehensive HIV knowledge did not differ significantly from those of indigenous respondents. Large effects were evident for education level and wealth quintile—increases in either also increased a woman's relative odds of having comprehensive HIV knowledge. Rural (versus urban) residence and living in Petén (versus the Metropolitan region) was putatively associated with HIV knowledge.

### **Accepting attitudes towards PLHIV**

Large effects on women's odds of exhibiting accepting attitudes were apparent for both education and wealth quintile. Women with post-secondary education also showed two and a half times the odds of having accepting attitudes towards people with HIV, relative to those with no education. Women in the highest wealth quintile had nearly four times the odds of exhibiting accepting attitudes, versus those in the lowest quintile.

### **Ever tested for HIV**

Increases in education and wealth were associated with higher odds of having been tested for HIV. The odds of ever having been tested, for a woman with post-secondary education, were more than 7 times higher than for a woman with no education. Residence in the Northern,

Northeastern, or Northwestern regions (compared to the Metropolitan) was associated with lower relative odds of testing. Being single/never married also had a putative effect, while urban residence was protective.

**Table A1: Adjusted Odds Ratios (AOR) for Selected HIV Risk Outcomes Among Women 15–49, by Ethnic Group**

Socio-demographic characteristics	Early sexual debut <15 years old <sup>1</sup> AOR (95% CI) n=13,196	3+ lifetime sexual partners <sup>2</sup> AOR (95% CI) n=11,163	Condom use at last sex <sup>3</sup> AOR (95% CI) n=11,212
<b>Ethnic group</b>			
Indigenous	Reference	Reference	Reference
Cross-Identified	1.48 (1.16–1.88)***	1.65 (1.06–2.58)**	0.87 (0.55–1.36)
Ladino	1.41 (1.17–1.71)***	1.87 (1.30–2.71)***	0.86 (0.59–1.25)
<b>Ethnic group</b>			
Youth (15–24)	Reference	Reference	Reference
Adult (25–49)	0.64 (0.55–0.74)***	2.22 (1.61–3.06)***	0.55 (0.41–0.74)***
<b>Residence</b>			
Rural	Reference	Reference	Reference
Urban	1.10 (0.92–1.33)	1.38 (1.03–1.85)**	1.21 (0.88–1.67)
<b>Education</b>			
None	Reference	Reference	Reference
Primary	0.62 (0.53–0.73)***	0.94 (0.68–1.30)	1.42 (0.85–2.35)
Secondary	0.26 (0.20–0.35)***	1.03 (0.67–1.56)	1.97 (1.09–3.56)*
Post-secondary	0.08 (0.04–0.16)***	1.24 (0.73–2.11)	2.52 (1.31–4.80)**
<b>Wealth quintile</b>			
Lowest	Reference	Reference	Reference
Second	0.80 (0.67–0.97)**	1.26 (0.79–2.00)	0.94(0.52–1.68)
Middle	0.74 (0.59–0.93)**	1.26 (0.82–1.92)	1.50 (0.82–2.73)
Fourth	0.60 (0.47–0.73)***	1.12 (0.69–1.84)	2.36 (1.23–4.49)***
Highest	0.66 (0.46–0.94)**		2.64 (1.28–5.45)***
<b>Marital status</b>			
Married/Partnered	Reference	Reference	Reference
Single/Never Married	1.02 (0.74–1.42)	8.27 (5.29–12.91)***	5.07 (3.47–7.42)***
Separated/Widow/Divorced	1.33 (1.09–1.64)***	10.04 (7.14–14.12)***	2.50 (1.60–3.91)***

Socio-demographic characteristics	Early sexual debut <15 years old <sup>1</sup> AOR (95% CI) n=13,196	3+ lifetime sexual partners <sup>2</sup> AOR (95% CI) n=11,163	Condom use at last sex <sup>3</sup> AOR (95% CI) n=11,212
<b>Region</b>			
Metropolitan	Reference	Reference	Reference
Northern	1.02 (0.72–1.46)	0.51 (0.26–1.00)*	0.86 (0.53–1.41)
Northeastern	1.24 (0.89–1.72)	1.09 (0.74–1.60)	0.73 (0.50–1.05)*
Southeastern	1.05 (0.76–1.44)	0.76 (0.49–1.17)	0.89 (0.61–1.29)
Central	0.99 (0.71–1.37)	1.41 (0.91–2.18)	0.70 (0.48–1.03)*
Northwestern	0.90 (0.62–1.31)	0.56 (0.27–1.18)	0.25 (0.11–0.58)***
Southwestern	0.96 (0.71–1.31)	0.93 (0.63–1.37)	0.65 (0.43–0.97)**
Petén	1.84 (1.27–2.67)***	1.10 (0.63–1.93)	0.85 (0.44–1.63)

<sup>1</sup> Among women who have ever-had sex, 23 missing cases;

<sup>2</sup> Among women who have had sex in the last 12 months; 29 missing cases;

<sup>3</sup> Among women who have had sex in the last 12 months

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$

**Table A1: Adjusted Odds Ratios (AOR) for Select HIV Risk Outcomes Among Women 15–49, by Ethnic Group (continued)**

Socio-demographic characteristics	Comprehensive HIV knowledge <sup>1</sup> AOR (95% CI) n=14,431	Accepting attitudes towards PLHIV <sup>1</sup> AOR (95% CI) n=14,431	Ever tested for HIV <sup>2</sup> AOR (95% CI) n=14,399
<b>Ethnic group</b>			
Indigenous	Reference	Reference	Reference
Cross-Identified	1.17 (0.95–1.43)	1.86 (1.44–2.40)***	2.46 (1.93–3.13)***
Ladino	1.63 (1.40–1.89)***	1.89 (1.53–2.34)***	2.25 (1.98–3.03)***
<b>Age group</b>			
Youth (15–24)	Reference	Reference	Reference
Adult (25–49)	1.09 (0.95–1.25)	1.22 (1.03–1.44)**	0.96 (0.82–1.14)
<b>Residence</b>			
Rural	Reference	Reference	Reference
Urban	1.20 (1.03–0.40)**	0.88 (0.75–1.04)	1.27 (1.–1.55)**

Socio-demographic characteristics	Comprehensive HIV knowledge <sup>1</sup> AOR (95% CI) n=14,431	Accepting attitudes towards PLHIV <sup>1</sup> AOR (95% CI) n=14,431	Ever tested for HIV <sup>2</sup> AOR (95% CI) n=14,399
<b>Education</b>			
None	Reference	Reference	Reference
Primary	1.48 (1.19–1.85)***	1.55 (1.18–2.04)***	2.05 (1.61–2.60)***
Secondary	3.09 (2.42–3.95)***	2.24 (1.64–3.05)***	4.50 (3.48–5.82)***
Post-secondary	4.77 (3.55–6.41)***	2.55 (1.69–3.84)***	7.51 (5.32–10.59)***
<b>Wealth quintile</b>			
Lowest	Reference	Reference	Reference
Second	1.42 (1.14–1.78)***	2.28 (1.64–3.16)***	1.55 (1.10–2.18)**
Middle	1.75 (1.41–2.17)***	2.93 (2.17–3.96)***	2.01 (1.42–2.82)***
Fourth	2.33 (1.86–2.93)***	3.31 (2.62–5.59)***	2.68 (1.84–3.89)***
Highest	2.45 (1.90–3.15)***	3.83 (2.62–5.59)***	2.66 (1.79–3.95)***
<b>Marital status</b>			
Married/Partnered	Reference	Reference	Reference
Single/Never Married	1.03 (0.89–1.20)	0.87 (0.72–1.05)	0.13 (0.11–0.16)
Separated/Widow/Divorced	1.08 (0.90–1.28)	1.01 (0.80–1.23)	0.98 (0.80–1.20)
<b>Region</b>			
Metropolitan	Reference	Reference	Reference
Northern	0.91 (0.65–1.27)	1.11 (0.77–1.59)	0.39 (0.25–0.60)***
Northeastern	1.18 (0.95–1.46)	1.01 (0.81–1.26)	0.91 (0.71–1.17)
Southeastern	0.87 (0.69–1.10)	1.22 (0.96–1.56)	0.48 (0.36–0.64)***
Central	1.17 (0.93–1.46)	1.14 (0.90–1.45)	0.82 (0.65–1.03)*
Northwestern	1.06(0.80–1.42)	0.96 (0.70–1.32)	0.38 (0.24–0.53)***
Southwestern	1.05 (0.85–1.30)	1.22 (1.00–1.61)**	0.82 (0.64–1.06)
Petén	1.22 (0.96–1.57)	1.27 (0.87–1.85)	0.73 (0.50–1.08)

<sup>1</sup> Among women who have heard of HIV;

<sup>2</sup> Among women who have heard of HIV, 32 missing cases

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$

## DISCUSSION: EFFECTS OF COVARIATES IN THE MEN'S MODEL (SEE TABLE A2)

### **Comprehensive HIV Knowledge**

Men in the cross-identified group were statistically indistinguishable on this variable from indigenous men, although the tendency was towards higher odds of comprehensive knowledge. Secondary education increased a man's odds of comprehensive HIV knowledge by 330% relative to those with no education. Post-secondary education increased these odds by more than 500%. Higher levels of wealth also tended to increase men's odds of having comprehensive knowledge about HIV; in the highest wealth quintile these odds more than doubled relative to the poorest respondents.

### **Accepting attitudes towards PLHIV**

Separated/widowed/divorced men had only one-quarter the odds of holding accepting attitudes, versus those of those in the married/partnered and never-married groups. A marginally significant effect was also found for men in the Southeastern region, who exhibited just half the odds of holding accepting attitudes versus men in the Metropolitan region.

### **Ever tested for HIV**

Men 25–59 years old had three times the odds of having been tested for HIV, versus younger men in the sample. Education level and wealth quintile exerted large independent effects on this outcome variable. Compared with men who had no formal education, those with any secondary education had four times higher odds of having been tested. Those with post-secondary education had six times higher odds. Each wealth quintile above the lowest also conferred a greater likelihood of HIV testing, from nearly twice the odds to nearly five times the odds. Men in the Metropolitan region had the highest odds of HIV testing; those in the Northern, Southeastern, Northwestern and Southwestern regions exhibited odds that were lower, on average.

### **Early sexual debut**

Ladino men's odds of early sexual debut were nearly twice as high as indigenous men's odds. Age 25–59 and membership in any wealth quintile above the lowest one also reduced men's odds of early sexual debut, and men who resided in the Northwestern region were less likely than Metropolitan region residents to have sex for the first time before age 15.

### **Ten or more lifetime sexual partners**

The odds of having ten or more lifetime sexual partners were higher among men in the older (25–59) of two age groups, among those in higher wealth quintiles versus the lowest one, and among those who were not married or partnered at the time of interview. Men in the Southwestern and Petén regions were more than twice as likely as those in the Metropolitan region to have had 10+ lifetime partners; those in the Northwestern region were only half as likely.

### **Three or more sexual partners in the past 12 months**

Only wealth quintile, marital status, and region showed clear effects on men's odds of having 3+ sexual partners in the past 12 months. Ethnicity was largely unrelated to this outcome in the multivariate model. Marital status exhibited the largest effects by far: single and never-

married men had 10 times higher odds of having had at least three sexual partners in the 12 months prior to interview, while separated, widowed, or divorced men's odds were nearly twelve times higher.

#### **Condom use at last sex (in the past 12 months)**

Age group, urban/rural residence, education level, and region tended not to show independent effects on condom use at most recent sexual encounter. Membership in higher wealth quintiles conferred 1.7 to 3.4 times higher odds of condom use, relative to the lowest quintile. Compared to men who were married or living in a common-law partnership, single, never-married men had forty-seven times greater odds of condom use; respondents who were separated, widowed or divorced had more than seventeen times greater odds.

#### **Sex worker patronage (ever)**

Ladino men had 1.6 times higher odds than the indigenous group of having had sex with a sex worker. Unsurprisingly, older age increased men's odds of ever having had sex with a sex worker. Men in the middle wealth quintile also showed slightly but significantly higher odds versus those in the lowest quintile. Never-married men had one and one half times the odds of married/partnered men, and separated/widowed/divorced men had nearly three times the odds. Residence in the Southeastern region (relative to the Metropolitan) doubled a man's odds of ever having slept with a sex worker. Residence in the Northwestern region more than halved the odds.

#### **Condom use at last sex with a sex worker**

Men in the 25–59 year age group had only one third the odds of condom use at last sex with a sex worker, compared to younger men. Compared to having no education, primary education nearly tripled a man's odds of condom use during most recent sex with a sex worker. Secondary education more than quintupled them, and post-secondary education increased the odds ten times. Men in marriages or partnerships were far less likely than others to have used a condom at last sex with a sex worker: on average, their odds were 2–3 times lower. Relative to men in the Metropolitan region, those in Central and Southwestern areas had half the odds of condom use.

**Table A2: Adjusted Odds Ratios (AOR) for Selected HIV Risk Outcomes Among Men 15–59, by Ethnic Group**

<b>Socio-demographic characteristics</b>	<b>Comprehensive HIV knowledge<sup>1</sup> AOR (95% CI) n=6,565</b>	<b>Accepting attitudes towards PLHIV<sup>1</sup> AOR (95% CI) n=6,565</b>	<b>Ever tested for HIV<sup>1</sup> AOR (95% CI) n=6,565</b>
<b>Ethnic group</b>			
Indigenous	Reference	Reference	Reference
Cross-identified	1.46 (0.97–2.22)*	1.92 (1.35–2.73)***	1.18 (0.64–2.16)
Ladino	1.58 (1.27–1.97)***	1.53 (1.13–2.07)***	1.57 (0.95–2.59)*
<b>Age group</b>			
Youth (15–24)	Reference	Reference	Reference
Adult (25–59)	1.16 (0.92–1.47)	0.79 (0.38–1.62)	2.76 (1.50–5.09)**
<b>Residence</b>			
Rural	Reference	Reference	Reference
Urban	1.15 (0.94–1.41)	0.76 (0.44–1.30)	0.88 (0.65–1.18)
<b>Education</b>			
None	Reference	Reference	Reference
Primary	1.35 (0.97–1.88)*	0.67 (0.35–1.28)	1.72 (0.87–3.39)
Secondary	3.32 (2.30–4.79)***	1.45 (0.58–3.62)	3.73 (1.78–7.84)***
Post-secondary	5.25 (3.29–8.38)***	0.98 (0.31–3.04)	5.65 (2.53–12.64)***
<b>Wealth quintile</b>			
Lowest	Reference	Reference	Reference
Second	0.99 (0.72–1.36)	0.65 (0.30–1.40)	1.78 (1.04–3.06)**
Middle	1.39 (1.03–1.87)**	0.70 (0.32–1.57)	2.11 (1.24–3.61)***
Fourth	1.51 (1.09–2.10)**	0.71 (0.22–2.28)	3.79 (2.03–7.08)***
Highest	1.83 *1.22–2.73)***	0.65 (0.21–2.04)	4.62 (2.54–8.40)***
<b>Marital status</b>			
Married/Partnered	Reference	Reference	Reference
Single/Never Married	1.08 (0.86–1.35)	0.90 (0.39–2.07)	0.52 (0.25–1.07)*
Separated/Widow/Divorced	1.44 (0.94–2.21)*	0.24 (0.06–0.91)**	1.31 (0.86–2.00)

Socio-demographic characteristics	Comprehensive HIV knowledge <sup>1</sup> AOR (95% CI) n=6,565	Accepting attitudes towards PLHIV <sup>1</sup> AOR (95% CI) n=6,565	Ever tested for HIV <sup>1</sup> AOR (95% CI) n=6,565
<b>Region</b>			
Metropolitan	Reference	Reference	Reference
Northern	1.35 (0.88–2.08)	0.27 (0.07–1.01)*	0.42 (0.23–0.74)***
Northeastern	0.92 (0.69–1.24)	0.48 (0.23–1.02)*	0.79 (0.54–1.16)
Southeastern	0.88 (0.65–1.18)	0.42 (0.18–0.96)**	0.56 (0.37–0.84)***
Central	1.08 (0.79–1.47)	0.60 (0.29–1.22)	0.85 (0.52–1.38)
Northwestern	0.85 (0.57–1.27)	0.78 (0.27–2.25)	0.62 (0.42–0.92)**
Southwestern	1.07 (0.79–1.45)	0.73 (0.39–1.37)	0.47 (0.27–0.84)**
Petén	1.09 (0.73–1.65)	0.62 (0.17–2.26)	0.75 (0.43–1.29)

<sup>1</sup> Among men who have heard of HIV

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$

**Tabla A2: Razones de probabilidades ajustadas (Adjusted Odds Ratio–AOR) correspondientes a ciertos resultados de riesgo al VIH entre hombres de 15 a 59 años, por grupo étnico (cont.)**

Socio-demographic characteristics	Early sexual debut <15 years old <sup>1</sup> AOR (95% CI) n=5,863	10+ lifetime sexual partners <sup>2</sup> AOR (95% CI) n=5,857	3+ sexual partners (past 12 months) <sup>3</sup> AOR (95% CI) n=5,539	Condom use at last sex <sup>4</sup> AOR (95% CI) n=5,540
<b>Ethnic group</b>				
Indigenous	Reference	Reference	Reference	Reference
Cross-identified	1.50 (1.07–2.10)**	1.71 (1.20–2.43)***	1.44 (0.83–2.51)	0.85 (0.52–1.41)
Ladino	1.83 (1.44–2.32)***	1.95 (1.48–2.57)***	1.50 (0.97–2.31)*	1.33 (0.95–1.86)*
<b>Age group</b>				
Youth (15–24)	Reference	Reference	Reference	Reference
Adult (25–59)	0.70 (0.55–0.90)***	2.46 (1.71–3.53)***	0.78 (0.48–1.26)	0.82 (0.58–1.18)
<b>Residence</b>				
Rural	Reference	Reference	Reference	Reference
Urban	1.07 (0.85–1.35)	1.15 (0.90–1.47)	1.22 (0.85–1.76)	1.30 (0.92–1.82)

Socio-demographic characteristics	Early sexual debut <15 years old <sup>1</sup> AOR (95% CI) n=5,863	10+ lifetime sexual partners <sup>2</sup> AOR (95% CI) n=5,857	3+ sexual partners (past 12 months) <sup>3</sup> AOR (95% CI) n=5,539	Condom use at last sex <sup>4</sup> AOR (95% CI) n=5,540
-----------------------------------	--	--	---	--

### Education

None	Reference	Reference	Reference	Reference
Primary	0.89 (0.69–1.15)	1.21 (0.79–1.85)	0.73 (0.33–1.58)	1.06 (0.67–1.66)
Secondary	0.63 (0.45–0.88)***	1.05 (0.62–1.79)	0.44 (0.18–1.07)*	1.24 (0.72–2.15)
Post-secondary	0.51 (0.33–0.79)***	1.35 (0.83–2.21)	0.67 (0.25–1.78)	0.88 (0.46–1.69)

### Wealth quintile

Lowest	Reference	Reference	Reference	Reference
Second	1.37 (1.05–1.79)**	1.56 (1.07–2.25)**	2.00 (1.11–3.65)*	1.70 (1.05–2.77)**
Middle	1.58 (1.17–2.14)***	1.95 (1.31–2.89)***	2.11 (1.16–3.84)*	2.33 (1.36–4.00)***
Fourth	2.16 (1.53–3.06)***	2.10 (1.38–3.20)***	1.37 (0.75–2.50)	3.50 (2.02–6.06)***
Highest	1.65 (1.08–2.51)**	2.53 (1.57–4.08)***	2.51 (1.32–4.78)**	3.39 (1.88–6.12)***

### Marital status

Married/Partnered	Reference	Reference	Reference	Reference
Single/Never Married	1.19 (0.82–1.72)	1.56 (1.18–2.06)***	10.1(6.34–16.1)***	47.6 (31.2–72.6)***
Separated/Widow/ Divorced	1.45 (0.98–2.16)*	2.93 (2.03–4.22)***	11.5 (6.85–19.4)***	17.3 (10.7–27.9)***

### Region

Metropolitan	Reference	Reference	Reference	Reference
Northern	0.54 (0.29–1.03)	0.72 (0.41–1.26)	0.81 (0.33–1.96)	0.66 (0.38–1.13)
Northeastern	1.11 (0.69–1.79)	1.30 (0.93–1.81)	2.54 (1.43–4.53)***	0.86 (0.56–1.31)
Southeastern	1.58 (0.99–2.54)*	2.11 (1.47–3.03)***	3.25 (1.79–5.90)***	1.16 (0.76–1.79)
Central	0.98 (0.59–1.62)	1.07 (0.71–1.59)	1.95 (1.05–3.61)**	1.28 (0.75–2.19)
Northwestern	0.50 (0.27–0.91)**	0.50 (0.30–0.81)***	1.40 (0.78–2.50)	0.34 (0.19–0.62)***
Southwestern	1.09 (0.66–2.07)	1.16 (0.81–1.67)	0.99 (0.46–2.15)	0.79 (0.52–1.22)
Petén	1.19 (0.69–2.07)	2.30 (1.41–3.75)***	2.85 (1.32–6.14)***	0.74 (0.40–1.38)

<sup>1</sup> Among men who have ever had sex, 22 missing cases

<sup>2</sup> Among men who have ever had sex, 28 missing cases

<sup>3</sup> Among men who had sex in the last 12 months, 1 missing case

<sup>4</sup> Among men who had sex in the last 12 months

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$

**Table A2: Adjusted Odds Ratios (AOR) for Selected HIV Risk Outcomes Among Men 15–59, by Ethnic Group (continued)**

Socio-demographic characteristics	Sex worker patronage (ever) <sup>1</sup> AOR (95% CI) N=5,885	Condom used at last sex with a sex worker <sup>2</sup> AOR (95% CI) N=1642
<b>Ethnic group</b>		
Indigenous	Reference	Reference
Cross-identified	1.70 (1.21–2.38)***	0.76 (0.45–1.31)
Ladino	1.62 (1.29–2.03)***	0.82 (0.60–1.13)
<b>Age group</b>		
Youth (15–24)	Reference	Reference
Adult (25–59)	2.44 (1.89–3.16)***	0.34 (0.21–0.57)***
<b>Residence</b>		
Rural	Reference	Reference
Urban	1.23 (0.98–1.55)*	0.78 (0.57–1.09)
<b>Education</b>		
None	Reference	Reference
Primary	1.79 (1.40–2.30)***	2.65 (1.70–4.13)***
Secondary	1.20 (0.86–1.68)	4.82 (2.82–8.22)***
Post-secondary	0.86 (0.55–1.33)	10.1 (4.72–21.8)***
<b>Wealth quintile</b>		
Lowest	Reference	Reference
Second	1.16 (0.89–1.52)	0.81 (0.50–1.30)
Middle	1.49 (1.11–2.00)***	1.43 (0.89–2.41)
Fourth	1.46 (1.05–2.04)**	1.45 (0.85–2.48)
Highest	1.43 (0.95–2.17)*	1.26 (0.68–2.32)
<b>Marital status</b>		
Married/Partnered	Reference	Reference
Single/Never Married	1.51 (1.12–2.04)***	3.36 (2.18–5.18)***
Separated/Widow/Divorced	2.83 (2.00–4.01)***	1.91 (1.21–3.00)***

Socio-demographic characteristics	Sex worker patronage (ever) <sup>1</sup> AOR (95% CI) N=5,885	Condom used at last sex with a sex worker <sup>2</sup> AOR (95% CI) N=1642
-----------------------------------	---	--

**Region**

Metropolitan	Reference	Reference
Northern	0.68 (0.43–1.09)	0.75 (0.37–1.56)
Northeastern	1.05 (0.75–1.48)	0.61 (0.37–1.01)*
Southeastern	2.04 (1.42–2.94)***	0.80 (0.49–1.31)
Central	1.10 (0.74–1.63)	0.55 (0.33–0.82)**
Northwestern	0.40 (0.25–0.64)***	0.61 (0.33–1.12)
Southwestern	0.96 (0.66–1.38)	0.48 (0.30–0.79)***
Petén	1.15 (0.60–2.20)	0.52 (0.24–1.09)*

<sup>1</sup> Among men who ever had sex

<sup>2</sup> Among men who ever had sex with a sex worker

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.01$

## **MEASURE** Evaluation

Carolina Population Center  
University of North Carolina at Chapel Hill  
206 W. Franklin Street  
Chapel Hill, NC 27516

**[www.measureevaluation.org](http://www.measureevaluation.org)**