JOURNAL OF SEX RESEARCH
2007, Vol. 44, No. 1, 49–58

Religiosity, Denominational Affiliation, and Sexual Behaviors Among People With HIV in the United States

Frank H. Galvan
Charles R. Drew University of Medicine and Science

Rebecca L. Collins, David E. Kanouse, Philip Pantoja, and Daniela Golinelli
RAND Corporation

This study sought to describe religiosity and denominational affiliation among the U.S. population living with HIV and to test whether either is associated with HIV-related sexual risk behaviors. A nationally representative sample of 1,421 people in care for HIV, 932 of whom reported recent sexual activity, was used. Religiosity was associated with fewer sexual partners and a lower likelihood of engaging in unprotected sex and in high-risk sex. Catholics were less likely to report unprotected sex than were other Christians, adherents of non-Christian religions, and those reporting no religious affiliation. Catholics were also less likely than other Christians to report high-risk sex and reported fewer sexual partners compared to those of non-Christian religions. We did not observe a difference between Catholics and Evangelicals in the three sexual behaviors investigated. Results suggest that religiosity and some religious teachings may promote safer sex among people with HIV.

In order to effectively control the spread of HIV in the United States, prevention efforts need to target individuals already living with HIV (Baskin, Braithwaite, Eldred, & Glassman, 2005). This is consistent with the emphasis placed by the Centers for Disease Control (CDC) on the need to prevent new infections by working with people already diagnosed with HIV (CDC, 2003). This is important because some HIV-positive individuals continue to engage in behaviors that could transmit HIV infection. (Gordon, Forsyth, Stall, & Cheever, 2005).

There is reason to believe that religiosity may promote safer sex practices. The limited literature on this topic provides support for the inclusion in prevention programs of what have been described as "other-sensitive" motivators for practicing safe sex (Nimmons & Folkman, 1999). In a qualitative study of sexually active gay men, a large majority of both HIV-positive and HIV-negative individuals reported engaging in safer sexual practices because of their desire to protect others based on their own personal ethical or moral beliefs (Nimmons & Folkman, 1999). For many in the sample, their prosocial values were directly related to a reported spiritual commitment in their lives. Moreover, the importance of concern for others' welfare is stressed by virtually all of the world's major religions (Koenig, McCullough, & Larson, 2001), providing a basis for an association between religiosity and prosocial behaviors like protecting one's sexual partners from HIV infection.

Studies examining the relationship between religiosity and sexual behaviors more generally (i.e., outside the HIV-risk context) have found that individuals who attend religious services more often are less likely to be sexually active, and if active, have fewer sexual partners and less frequent sexual intercourse (Lefkowitz, Gillen, Shearer, & Boone, 2004). Other studies that use different measures of religiosity have found similar results. For example, individuals who report having a religious affiliation have fewer sexual partners than those with no affiliation (Rowatt & Schmitt, 2003). These results suggest that religiosity may deter individuals from engaging in behaviors that could transmit HIV infection.

Religion is a dominant force in the lives of people in the United States (Fuller, 2001), including populations at risk for HIV. For example, data from the 1991–2000 General Social Surveys indicate that gay men (a major group affected by HIV in the United States) report a similar frequency of church attendance as male heterosexuals (3.21 and 3.28, respectively, with 0 signifying *neve*r and 8 signifying *almost every day*). Attendance among female heterosexuals was higher (3.90). In addition, gay men do not differ in their frequency of prayer from female heterosexuals (the most devout

This article was supported by grants from the National Institute of Child Health and Human Development (R01HD044260) and the National Institute on Alcohol Abuse and Alcoholism (R01AA015838). Data collection for the Risk & Prevention survey was supported by grant R01HD35040 from the National Institute of Child Health and Human Development. The HIV Cost and Services Utilization Study (HCSUS) was conducted under cooperative agreement U-01HS08578 between RAND and the Agency for Healthcare Research and Quality. Support for Dr. Galvan also was provided by the NIMH-funded UCLA/RAND/Drew Center for HIV Identification, Prevention and Treatment Services (CHIPTS) (5P30MH58107) and the University-wide AIDS Research Program-funded Los Angeles Collaborative HIV/AIDS Public Health Research Center (CH05-DREW-616).

Correspondence should be addressed to Frank H. Galvan, Charles R. Drew University of Medicine and Science, 1731 East 120th Street, Los Angeles, CA 90059. E-mail: frankgalvan@cdrewu.edu

group; 4.76 and 4.80, respectively, with 1 signifying *never* and 6 signifying *several times a day*), whereas male heterosexuals (4.48) do not differ from gay males but have lower rates than female heterosexuals (Sherkat, 2002).

Among African Americans, a population disproportionately affected by HIV/AIDS (CDC, 2005), high levels of both church attendance and prayer are reported. Data from the National Survey of Black Americans found that, among the more than 90% of African Americans who report attending religious services as an adult (in addition to weddings and funerals), about 70% state that they attend services at least a few times a month (Taylor, Chatters, & Levin, 2004). Several national surveys have also consistently found that overall 80% of African Americans report praying several times a week (Taylor et al., 2004). Similarly, among Latinos religion plays an important role, although the level of religious involvement (such as church attendance or membership in church groups) by Latinos does vary, depending on their specific denominational affiliation (Hunt, 2000).

Given the role that religion plays in the lives of so many people, including major subgroups infected with HIV, and religion's potential in motivating prosocial behavior, it is important to examine how religiosity is related to HIV risk behaviors. Moderate to high levels of religiosity among people with HIV, together with an association between religiosity and risk, would suggest largely untapped methods of promoting safer sexual behavior among people with HIV. Possibilities include linking such behavior to religious values or promoting sexual safety through churches.

In addition to examining religiosity's relation to HIV-related risk behaviors, it is also important to examine how these behaviors may be associated with particular religious denominational affiliations. Religiosity and denominational affiliation need to be examined separately because they measure different constructs. An individual's denominational affiliation usually provides limited information about that person's religiosity because denominations include people with markedly different levels of devotion (Koenig et al., 2001).

Both sexual attitudes and sexual behavior have been found to differ by denominational affiliation in prior research. For example, Cochran and Beeghley (1991), by using data from the National Organization for Research and Computing General Social Survey, found church membership to be inversely related to permissive attitudes toward premarital sex. This inverse association was strongest among Baptists and nonmainline Protestants and weakest among Jews and those with no religious affiliation. Regarding sexual behavior comparing "conservative Protestants," "other Protestants," "Catholics" and those with "other or no religious affiliation," data from a national probability sample of adult men revealed that men with non-Christian backgrounds or no religious affiliation report more sexual partners than conservative Protestants (Billy, Tanfer, Grady, & Klepinger, 1993).

It is not surprising that sexual attitudes and behaviors would vary by religious affiliation since religious traditions draw upon different sources of guidance in moral decision making. For example, among evangelical Christians, the Bible is the only authoritative source of guidance for ethical decisions. Insights can be obtained from other sources; however, they must be rejected if they conflict with Scripture (Stassen & Gushee, 2003).

In contrast, among Catholics, various sources can be used for moral decision making. Thus, in the area of HIV/AIDS, the National Conference of Catholic Bishops officially endorses only HIV-related educational efforts that exclude the promotion of condoms. In this group's view, condom promotion encourages behaviors that are morally unacceptable (National Conference of Catholic Bishops, 1990). Nevertheless some Catholic moral theologians argue that accommodations can be made that protect the teachings of the Church while also protecting those at risk for HIV (Keenan, 1999). In doing so, they draw upon the Church's centuries-old moral tradition of casuistry, the focus of which is to make accommodation for cases that are not covered by general principles (Keenan, 1999). Others look for support to the documents of the Second Vatican Council dealing with the primacy of conscience in moral decision making (Bretzke, 2004). Thus, the source(s) upon which a particular denomination draws for guidance can dramatically affect its teachings regarding sexual behavior. As a consequence, denominational affiliation might potentially be related to HIV risk behaviors. However, surprisingly little attention has been given to the role that denominational affiliation or religiosity might play in HIV-related risk behaviors.

One primary aim of this research was to describe religiosity and denominational affiliation among people with HIV, taking into consideration other characteristics of the infected population, such as sexual orientation and gender. As noted above, the primary infected subgroups appear to differ somewhat in their levels of religiosity, but this has been little studied.

This study also sought to test whether religiosity and denominational affiliation are associated with behaviors that affect the risk of producing new HIV infections: number of recent partners, unprotected sex, and unprotected sex with seronegative partners or those of unknown HIV status. For this purpose, we used a nationally representative sample of people living with HIV in the United States. Results may be useful for the development of interventions for HIV-positive individuals.

Method

Study Design

The sample for this study was drawn from the HIV Cost and Services Utilization Study (HCSUS; Frankel et al., 1999; Shapiro et al., 1999). The HCSUS is a nationally representative probability sample of 2,864 HIV-positive adults receiving care for HIV in the continental United States. The reference population is all HIV-positive people, 18 years of age or older, who had at least one visit to a nonprison, nonmilitary

medical provider, other than an emergency room, beginning in January 1996 and ending 15 months later. The HCSUS sampled metropolitan and rural geographical areas, providers of HIV care within selected areas, and patients within selected providers. Information on the study design is available in Frankel et al. (1999) and Shapiro et al. (1999). Participants were interviewed in person by using computer-assisted personal interview techniques (CAPI). After their initial interview, participants were reinterviewed approximately 8 months later (Follow-Up 1) and again 7 months later (Follow-Up 2).

The Risk and Prevention study used a subsample of 1,421 individuals in HCSUS. Eligible participants were English speakers who had participated in the second follow-up and whose gender was unambiguous at baseline (n = 2,205). A random sample of 1,794 was drawn from this group, after stratifying by primary sampling unit, type of healthcare provider, age, ethnicity, and sexual orientation. Sampling occurred at different rates in different strata in order to optimize the sample composition for purposes of comparing subgroups defined by gender, sexual orientation, and ethnicity while still preserving the ability to represent the overall population. White men-who-have-sex-with-men (MSM) aged 40 and older (the largest subgroup in the HCSUS sample) were sampled with a probability of 1:3, and White MSM under 40 (the next largest) were sampled with a probability of 4:9. All other individuals who met the eligibility criteria were automatically included in the study. Interviews were conducted from September through December 1998. The completion rate was 79%, and the response rate after allowing for known mortality was 84%.

The subsample was weighted to correct for the undersample of MSM, attrition for reasons other than mortality, and the original HCSUS sample design. It represented a population of 199,613 HIV-positive adults receiving medical care in the continental United States in 1996 and surviving to late 1998. Risk and Prevention interviews were conducted in person by using a computer-assisted instrument administered by an interviewer for most questions and self-administered for the questions related to sexual behavior.

Measures

The religiosity questions were adapted from the MIDI (The Midlife Development Inventory) developed by the MacArthur Foundation Research Network on Successful Midlife Development (1996). One question each asked about self-reported degree of religiosity, the importance of religion in one's life, identification with one's own religious group, preference for being with other people of the same religion, and frequency of attending religious or spiritual services. Potential responses to the first four items varied from 1 (*very*) to 4 (*not at all*). The question about identification with one's own religious group had an additional option (*does not apply*). The responses to the last question ranged from 1 (*more than once a week*) to 5 (*never*). Twelve people (0.84%) had a single missing response across these items. Missing values were imputed by using the modal value for a given item across the whole sample.

Factor analysis of the five items yielded a single factor, with each item having a factor loading of 0.70 or higher. To create the religiosity scale, each of the five items was reverse scored so that higher scores indicated greater levels of religiosity, transformed so that scores ranged from 0 to 10, and their average taken. Cronbach's alpha was 0.83. In some analyses, religiosity was treated as a continuous variable. In others, it was categorized on the basis of religiosity's quartile scores resulting in four groups: 0–25% (those reporting the lowest religiosity scores), 26–50%, 51–75%, and 76–100% (those reporting the highest religiosity scores).

Respondents were given a choice among 46 denominational affiliations, as well as categories of being agnostic/atheist, having no religious preference, or having a religious preference not mentioned in the list provided. The reported affiliations were then reclassified as follows: "Catholic," "Evangelical," "Other Christian," "Non-Christian Religion" and "No Religion/Agnostic/ Atheist." "Catholic" included the subcategories of Roman and Other Catholic. "Evangelical" included Apostolic, Assemblies of God, Baptist (all types), born-again Christian, Christian Reformed, Church of God, Evangelical, Holiness, Jehovah's Witness, Pentecostal, Salvation Army, Sanctified, and Seventh Day Adventist. "Other Christian" included Disciples of Christ, Congregational/United Church of Christ, Episcopalian, Lutheran, Methodist (all types), Mormon, Orthodox (Russian, Greek, and Serbian), Presbyterian, Protestant (interdenominational, no denomination, and other), and Quaker. "Non-Christian religion" included Buddhist (all types), Hindu, Jewish (Conservative, Reform, and all others), Muslim, Spiritual, Unitarian, and other. The final category grouped together agnostic, atheist, and no religious preference. The Protestant denominations were classified following the guidelines of Hunt (2000), with minor modifications. Both religiosity and religious affiliation were assessed at HCSUS Follow-Up 2.

Questions on sexual behavior were administered as part of the subsequent risk and prevention study. In reference to the period of 6 months prior to the interview, each participant was asked about his or her total number of sexual partners and about sexual activities, including unprotected sex, with the five most recent partners. The number of sexual partners was treated both as a continuous variable and as a categorical variable (one vs. more than one sexual partner). *Unprotected sex* refers to any anal or vaginal sex without a condom. An indicator variable was constructed on the basis of responses to the questions, "In the past six months, when you had anal (vaginal) sex, how often did you or (name of partner) use a condom?" Any response other than "always" resulted in a code of unprotected sex for that partnership. The respondent was classified as engaging in unprotected sex if he or she reported any unprotected sex with one or more partners. *High-risk sex* was defined as unprotected anal or vaginal sex between a respondent and a potentially serodiscordant partner (one who was either HIV-negative or of unknown HIV serostatus). Respondents were coded as engaging in

high-risk sex if any of their partnerships involved high-risk sex. Information on unprotected sex or high-risk sex was obtained only for the five most recent sexual partnerships and for the person's primary relationship partner (see below) if that person was among the respondent's sexual partners in the past 6 months but not mentioned as one of the five most recent partnerships.

Demographic information was obtained from the HCSUS baseline survey on a respondent's age, gender, ethnicity, education, and income. Sexual orientation was measured by self-reported identification at the time of the risk and prevention survey and was combined with gender, measured at the HCSUS baseline, to create three gender/sexual orientation groups: women, heterosexual males, and gay/bisexual males. Information was also obtained on whether the respondent had a primary relationship partner (either a spouse or someone who was defined as a "primary relationship partner" by the respondent) and whether the respondent had had sex with that individual in the previous 6 months. Information on lowest-ever cluster of differentiation 4 (CD4) count was obtained by self-report at all interviews and the lowest value used in analysis. Self-reported CD4 measures have been found to provide estimates highly correlated with actual CD4 counts (Cunningham, Rana, Shapiro, & Hays, 1997).

We controlled for variables previously found to be associated with high-risk sexual behaviors. For example, gay men are more likely to report having multiple sexual partners than heterosexual men and women (Weinhardt et al., 2004). In addition, HIV-positive gay or bisexual men are more likely to report unprotected anal or vaginal sex without disclosing their HIV status than are HIV-positive heterosexual men or women (Ciccarone et al., 2003). More sexual partners are also reported by African Americans compared with Whites, those with less education compared with those with more education, and younger individuals compared with older (Smith, 1998).

In addition, individuals who report having sex with a primary partner report a higher frequency of sex with that person than individuals who report having sex with casual or commercial partners (Williams et al., 2001). Hence, we might expect individuals who report having sex with a primary partner would likely have fewer sexual partners than those without a primary partner. Finally, CD4 count, as a proxy measure for HIV progression, could be related to physical ability to have sex. Thus, individuals with low CD4 counts would not be expected to have as many sexual partners compared with those with high CD4 counts.

Data Analysis

Weighted proportions were estimated for the categorical variables of interest. Multivariate Poisson regression analysis was used to test for the predictors of the number of sexual partners reported in the previous 6 months because of the highly skewed distribution of this outcome. Multivariate logistic regression analysis was used to estimate the independent association between each variable of interest and the likelihood of a respondent's reporting having had any unprotected sex or any high-risk sex in the previous 6 months. Descriptive statistics concerning religion were calculated for the entire risk and prevention sample. The multivariate analyses were run only with those individuals who reported having been sexually active in the previous 6 months ($n = 932$).

Dataset creation and management and variable derivation were performed in SAS (Version 8.2, SAS Institute, Cary, NC). To conduct statistical tests and to adjust standard errors for the differential weighting and complex sample design, we used STATA (Release 7.0, Stata Corporation, College Station, TX).

Results

Population Characteristics

The characteristics of the estimated reference population are shown in Table 1. Over three quarters are male, and about half are either African American or Latino. Almost half are between the ages of 36 and 45 years. The overwhelming majority report an income of less than $25,000. Over half are gay or bisexual men, and almost 1 in 4 has less education than a high school diploma. Sixty percent reported having a primary relationship partner. Over half reported a CD4 count of less than 200. On average, they had been aware of their HIV-positive status for 7.3 years. Evangelicals represent about one third of the population. Catholics and those reporting no religious affiliation each represent about one fifth of the population. In addition, the mean weighted religiosity score was 4.78 ($SD = 0.18$; range: 0–10).

In comparison to the overall reference population, the sexually active population included more Whites and Latinos, individuals aged 26 to 35 years, higher income individuals, gay/bisexual men, individuals in the middle ranges of CD4 counts, college graduates, "other Christians," and individuals from non-Christian religions or with no denominational affiliation. A greater percentage of those who are sexually active reported having a primary relationship partner. They had known of their serostatus for approximately the same length of time as the full sample. The active group reported an average of 3.9 sex partners over the prior 6 months.

Differences in religiosity were found among the different denominations and among the different gender/sexual orientation groups (Table 2). Evangelicals reported significantly higher levels of religiosity than all the other categories (all comparisons to Evangelicals were significant at the $p < .0001$ level). By comparison, Catholics were found to differ from only one group apart from the Evangelicals; those who described themselves as agnostic, atheist, or having no religious preference reported significantly lower levels of religiosity when compared with Catholics ($p < .0001$). Gay/bisexual men had significantly lower levels of religiosity compared with the heterosexual men and the women, who were approximately equivalent in their devotion (both comparisons were significant as the $p < .0001$ level).

Table 1. *Characteristics of Total Sample and Sexually Active Subsample*

Characteristic	Total Sample[a]		Sexually Active Subsample[b]	
	N	Weighted Percentage	*N*	Weighted Percentage
Gender				
Male	917	78	611	78
Female	504	23	321	22
Ethnicity				
White	590	51	399	53
African American	561	33	349	30
Latino	216	13	152	14
Other	54	3	32	3
Age				
20–25[c]	24	1	19	1
26–35	378	25	301	31
36–45	630	46	422	46
>45	389	28	190	22
Income ($)				
0–5,000	314	19	172	15
5,001–10,000	394	26	251	26
10,001–25,000	379	25	260	27
>25,000	334	31	249	34
Gender/Sexual Orientation				
Gay/bisexual men	625	56	439	59
Heterosexual men	291	22	172	20
Women	504	23	321	22
CD4 Count				
0–49	354	25	199	21
50–199	465	33	301	34
200–499	536	37	382	40
≥500	66	5	50	5
Education				
Some high school or less	378	24	240	22
High school diploma	423	28	279	28
Some college	394	27	256	27
Bachelor's degree	226	21	157	23
Primary Relationship Partner				
Yes	742	60	742	76
No	679	40	190	24
Any Unprotected Sex				
Yes	—	—	359	40
No			564	61
Any High-Risk Sex	—	—		
Yes			210	22
No			711	78
Denominational Affiliation[d]				
Catholic	327	22	205	20
Evangelical	509	31	313	29
Other Christian	199	15	133	16
Non-Christian religion	133	10	92	11
No Religion/Agnostic/Atheist	252	23	188	25

Note. Percentages do not always add up to 100% because of rounding. Also, the total numbers in various cells differ because of missing data.
[a]$n = 1,421$. [b]$n = 932$. [c]There were no participants aged 18 and 19 years. [d]One person declined to state a religious preference.

Differences in denominational affiliation were also found among the different gender/sexual orientation groups. The largest category for the gay and bisexual men was the one signifying no religious affiliation (almost one third). Among both the heterosexual men and the women, the largest denominational affiliation was Evangelical, with over 40% of the heterosexual men and over half of the women reporting this affiliation. The second largest denominational affiliation for all three groups was Catholic (ranging from about one fifth among both male groups to about one quarter for the women).

Descriptive bivariate analyses suggest that sexual risk behavior varied according to a number of different respondent characteristics, including religiosity and denominational affiliation. Table 3 provides information on the sexual behaviors of the sexually active population by various sociodemographic characteristics. Weighted percentages of those who had more than one sexual partner, engaged in any unprotected sex, and engaged in any high-risk sex are given for each category. Because risk behavior appears to differ by sociodemographics as well as by religiosity and denomination, it is important to test for independent associations among these factors by using multivariate models.

Multivariate Analyses

In all three models predicting sexual behaviors, religiosity was found to be a significant predictor after controlling for relevant covariates (Table 4). Religiosity was associated with fewer sexual partners and a lower likelihood of engaging in unprotected sex and in high-risk sex. In addition, fewer sexual partners were reported by heterosexual men and women compared with gay/bisexual men, those with some college education or a bachelor's degree compared with those with less than a high school diploma, and those who reported having sex with a primary relationship partner compared with whose with no such partner. A lower likelihood of unprotected sex was reported by heterosexual men compared with gay/bisexual men, and higher likelihoods of both unprotected sex and high-risk sex were reported by African Americans compared with Whites. Latinos also were more likely to report high-risk sex than were Whites.

Further analysis was conducted to examine whether denominational affiliation might have a relationship with sexual risk behaviors independent of religiosity and whether it might account for religiosity's association with lower risk. To do so, we constructed models that predicted the number of sexual partners and the likelihood of engaging in unprotected sex or high-risk sex, after controlling for religiosity and other relevant covariates (Table 5). After adjusting for religiosity, Catholics reported fewer partners, less unprotected sex, and less high-risk sex than other groups; they were used as the comparison group for these analyses. Rates of unprotected sex among Catholics were lower than those for all other groups, except Evangelicals (with whom rates were statistically equivalent). The number of partners for Catholics was significantly lower compared with only one denominational category, "non-Christian religion," and the rates of high-risk sex for Catholics were lower compared only with "other Christians."

It is important to note that religiosity was still found to be associated with a lower likelihood of high-risk sex (and mar-

Table 2. *Religious Characteristics of HIV-Positive Population*[a]

	Religiosity		Percent Distribution by Gender/Sexual Orientation					
			Gay/Bisexual Men		Heterosexual Men		Women	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Religiosity			3.93	0.21	5.73	0.23	5.99	.19
			Weighted Percentage					
Denomination								
Catholic	5.13	0.17	20.2		21.2		25.1	
Evangelical	6.49	0.16	18.1		43.3		52.3	
Other Christian	5.06	0.23	17.5		15.4		9.1	
Non-Christian Religion	5.01	0.30	11.9		6.6		6.2	
No Religion/Agnostic/Atheist	1.79	0.11	32.4		13.4		7.3	
Total			100.1		99.9		100	

Note. Percentages do not always add up to 100% because of rounding.
[a]n = 1,420.

ginally associated with having fewer sexual partners and a lower likelihood of unprotected sex) even after controlling for religious denomination. Indeed, the strength of these associations for religiosity was virtually unchanged relative to those in the models that did not include denomination, indicating that the relationship between religiosity and sexual safety is fully independent of denomination. The results for the covariates were also largely unchanged after controlling for denomination.

Discussion

This study examined levels of religiosity and denominational affiliations among HIV-positive adults and tested whether religiosity and denominational affiliation are associated with behaviors that could transmit new HIV infections.

Despite the fact that the data were collected in 1998, a time when antiretroviral therapies had been available for only a short period, the findings presented here are still significant for two important reasons. First, ours is the only random sample of people receiving medical care for HIV in the United States and thus remains the most representative of a wider, HIV-positive population of interest. Second, we have no reason to believe that the associations found in our study (e.g., between religiosity and behaviors associated with a risk of spreading the HIV virus to others) would change with the passage of time or the introduction of antiretroviral therapies in the medical treatment of HIV. Our findings are consistent with other research that has found religiosity to be inversely associated with risk behaviors (Rowatt & Schmitt, 2003).

We found some religious differences between the HIV-positive population and the general U.S. population. In particular, the infected population appears more likely to be Evangelical, and more likely to be nonreligious, but less likely to come from Christian religions other than Evangelical or Catholic (Kosmin & Mayer, 2001). The specific comparisons are as follows: Catholic—21.5% among HIV-positive individuals versus 24.5% among the general U.S. population, Evangelical—31.3% versus 22.6%, Other Christian—15.2% versus 29.4%, Non-Christian Religion—9.5% versus 3.7%, and No Religion—22.6% versus 14.1%.

Some of the denominational affiliation differences between HIV-positive individuals and the general U.S. population may result from differences in ethnic composition. For example, African Americans constituted almost 33% of the reference population of HIV-positive people, whereas they make up only 13% of the U.S. population (U.S. Census Bureau, 2003). African Americans also have higher rates of membership in Evangelical religious denominations such as Baptists, Pentecostals, and Jehovah's Witnesses than they do in denominations such as Catholics and mainline Protestant congregations (e.g., Lutherans, Presbyterians, Episcopalians; Kosmin & Mayer, 2001).

Other denominational differences may be the result of the marginalized status of certain groups most affected by HIV. Thus, the larger percentage of HIV-positive individuals reporting no religious affiliation compared with the general U.S. population may be partly a result of the large percentage of gay/bisexual men (almost one third) who report no religious denominational affiliation. This is not surprising given that, of the more than 2,500 American religious denominations, only a few regard homosexuality as a morally acceptable lifestyle (Sherkat, 2002). As a result, people who are gay or bisexual may be less inclined to affiliate with most religious denominations than are others who do not experience such condemnation. Evangelicals reported being more religious than any of the other denominational affiliations. In contrast, Catholics, although significantly more religious than those with no denominational affiliation, did not differ in religiosity from any denominational group other than Evangelicals.

Religiosity was associated with reduced risk for engaging in each of the three sexual behaviors that we examined, after other variables were controlled. This is consistent with other research that has found religiosity associated with fewer life-

Table 3. *Sexual Behaviors by Sociodemographic Characteristics for the Sexually Active Subsample*

Characteristic	Sexual Behaviors (Weighted Percentage)		
	More Than One Sexual Partner[a]	Any Unprotected Sex[b]	Any High-Risk Sex[c]
Ethnicity			
White	50.8	39.4	20.7
African American	38.0	38.9	23.1
Latino	29.2	37.0	24.1
Other	65.2	55.8	35.0
Age			
20–25	52.9	55.8	34.6
26–35	40.7	42.1	26.4
36–45	46.5	39.2	20.0
>45	45.0	35.6	21.0
Income ($)			
0–5,000	43.0	43.3	23.7
5,001–10,000	40.3	37.7	23.6
10,001–25,000	41.6	43.0	20.0
>25,000	50.5	36.4	22.7
Gender/Sexual Orientation			
Gay/bisexual men	59.9	43.4	24.3
Heterosexual men	22.8	25.0	12.2
Women	22.3	42.0	26.3
CD4 Count			
0–49	46.9	39.6	17.3
50–199	45.3	39.8	22.2
200–499	41.6	39.2	24.8
≥500	51.5	39.2	26.1
Education			
Some high school or less	25.9	38.4	20.0
High school diploma	37.4	40.5	22.2
Some college	50.5	36.8	18.8
Bachelor's degree	64.2	42.5	29.2
Primary Relationship Partner (PRP)			
No PRP	75.0	34.6	22.4
No sex with PRP	65.6	45.9	40.7
Sex with PRP	35.9	39.9	20.6
Religiosity (%)			
0–25	60.7	46.5	26.4
26–50	36.4	38.7	22.1
51–75	40.4	38.1	22.2
76–100	31.3	29.9	15.9
Denomination			
Catholic	34.1	28.2	18.1
Evangelical	33.6	34.4	18.8
Other Christian	46.7	45.3	28.3
Non-Christian Religion	52.1	48.8	23.1
No Religion/Agnostic/Atheist	60.5	47.2	26.1

[a]$n = 932$. [b]$n = 923$. [c]$n = 921$.

time sexual partners (Lefkowitz et al., 2004). It is also consistent with studies that have found an inverse association between religiosity and other risk behaviors, such as cigarette smoking and substance use and abuse (Koenig et al., 2001). It is important to note, however, that those risk behaviors studied previously involve risk to one's own health, whereas risky sexual behaviors in the HIV-positive population involve potential risk to others' health.

Further analysis would be necessary in order to determine the particular mechanisms through which religiosity affected these outcome variables, but altruism and concern for others may play a role. For example, it is possible that components of personality such as moral reasoning or conformism could serve as mediating variables for the observed effects. Support for this possibility is found in the literature on religiosity. Intrinsic religiosity (a religious orientation that serves as the primary motive for an individual and gives meaning to all aspects of that person's life) has been found to be positively associated with moral reasoning (Maclean, Walker, & Matsuba, 2004). Intrinsic religiosity has also been found to be correlated with more conservative sexual attitudes and behaviors, such as desiring fewer sexual partners across various

Table 4. *Effects of Religiosity on Specific Sexual Behaviors in the Sexually Active Population*

	Poisson Regression Results	Logistic Regression Results	
	Total Number of Partners[a]	Any Unprotected Sex[b]	Any High-Risk Sex[c]
Variable	**Coefficient 95% CI**	**OR 95% CI**	**OR 95% CI**
Religiosity	–.07** (–.14, .00)	.91*** (.85, .98)	.91*** (.85, .97)
Gender/Sexual Orientation			
Gay/bisexual men	—	—	—
Heterosexual men	–.82**** (–1.13, –.50)	.42** (.21, .83)	.52* (.27, 1.00)
Women	–.84**** (–1.18, –.50)	.93 (.61, 1.42)	1.35 (.80, 2.28)
Ethnicity			
White	—	—	—
African American	–.05 (–.46, .35)	1.51** (1.05, 2.18)	1.72*** (1.15, 2.58)
Latino	–.36 (–.96, .24)	1.08 (.73, 1.61)	1.65** (1.06, 2.56)
Other	–.04 (–.66, .57)	2.16* (.91, 5.16)	2.33* (.90, 6.03)
Education			
Some high school or less	.25 (–.09, .59)	.98 (.60, 1.60)	.81 (.48, 1.38)
High school diploma	—	—	—
Some college	.88*** (.33, 1.42)	.82 (.50, 1.33)	.85 (.48, 1.50)
Bachelor's Degree	.75*** (.30, 1.20)	.99 (.50, 1.95)	1.56 (.83, 2.93)
CD4 Count			
≥500	1.15 (–.29, 2.59)	1.00 (.44, 2.27)	1.14 (.53, 2.48)
200–499	—	—	—
50–199	.17 (–.28, .61)	1.10 (.71, 1.70)	.94 (.63, 1.42)
0–49	–.04 (–.33, .26)	1.05 (.67, 1.63)	.65 (.38, 1.11)
Age			
20–25[d]	–.18 (–1.06,.70)	1.62 (.55, 4.80)	1.70 (.43, 6.73)
26–35	.01 (–.56, .58)	1.02 (.71, 1.47)	1.33 (.80, 2.21)
36–45	—	—	—
>45	.04 (–.49, .57)	.95 (.59, 1.52)	1.00 (.47, 2.12)
Primary Relationship Partner (PRP)			
No PRP	—	—	—
No sex with PRP	–.24 (–.81, .33)	1.83 (.62, 5.43)	2.82* (.87, 9.13)
Sex with PRP	–.43** (–.86, –.01)	1.50 (.65, 3.47)	1.02 (.55–1.89)
Constant	1.55 (1.12, 1.98)	—	—

Note. The subpopulation sample size varies in the analyses because of missing data on two of the outcome variables.
[a]$n = 932$. [b]$n = 923$. [c]$n = 921$. [d]There were no participants aged 18 and 19 years.
*$p \leq 0.10$. **$p \leq 0.05$. ***$p \leq 0.01$. ****$p \leq 0.001$.

time frames (Rowatt & Schmitt, 2003). Given that moral reasoning has been found to be inversely related to sexual risk taking (Hubbs-Tait & Garmon, 1995), it is possible that some of the association between religiosity and sexual behaviors could be explained by this factor.

Even after controlling for differences in religiosity, some denominational differences were found in engagement in risky sexual behaviors. Sexually active Catholics were less likely to report unprotected sex than all other groups, apart from Evangelicals. Catholics were also less likely than other Christians (apart from Evangelicals) to report high-risk sex, and they reported fewer sexual partners compared with those of non-Christian religions.

It is not immediately clear why Catholics would use condoms more frequently than people with other denominational affiliations. It is clear, nonetheless, that a new mode of moral decision making has developed among Catholics as a result of the Second Vatican Council. On a variety of issues having to do with sex, an "essentially dialogic view of Church authority" has been adopted (Tentler, 2004). Although the Pope may issue a proclamation on some aspect of sexual behavior, Catholics increasingly are inclined to consider their individual consciences as sources of moral authority. What role this may play in the sexual behaviors of Catholics and how this may differ from other religious groups warrants further investigation.

Our data suggest that religiosity is more important than denominational affiliation as a predictor of sexual behaviors. Religiosity predicted lower levels of all three risky sexual behaviors. We were not able to examine an interaction between religiosity and denominational affiliation because of small cell sizes, but we suspect there may be one. However, future studies should examine the extent to which the associations between religiosity and various sexual behaviors are moderated by denominational affiliation.

Some groups use religious arguments to promote sexual abstinence. The effectiveness of such a tack is unknown. However, our data suggest that religious arguments can be

Table 5. *Effects of Religiosity and Denominational Affiliation on Specific Sexual Behaviors in the Sexually Active Population*

	Poisson Regression Results	Logistic Regression Results	
	Total Number of Partners[a]	Any Unprotected Sex[b]	Any High-Risk Sex[c]
Variable	**Coefficient 95% CI**	**OR 95% CI**	**OR 95% CI**
Religiosity	–.08* (–.17, .01)	.92* (.85, 1.01)	.90*** (.84, .97)
Denomination			
Catholic	—	—	—
Evangelical	.12 (–.21, .45)	1.34 (.90, 1.99)	1.07 (.58, 1.95)
Other Christian	.35 (–.30, 1.0)	2.46*** (1.31, 4.62)	2.32** (1.09, 4.96)
Non-Christian religion	.82*** (.23, 1.42)	2.59**** (1.52, 4.39)	1.65 (.86, 3.16)
No religion/agnostic/atheist	.20 (–.25, .66)	1.91*** (1.25, 2.91)	1.29 (.76, 2.18)
Gender/Sexual Orientation			
Gay/bisexual men	—	—	—
Heterosexual men	–.73**** (–1.02, –.44)	.46** (.24, .89)	.56* (.30, 1.04)
Women	–.78**** (–1.12, –.44)	1.03 (.66, 1.61)	1.46 (.87, 2.46)
Ethnicity			
White	—	—	—
African American	.00 (–.44, .45)	1.54** (1.04, 2.28)	1.91**** (1.31, 2.78)
Latino	–.22 (–.80, .36)	1.39 (.91, 2.13)	2.03*** (1.32, 3.13)
Other	–.01 (–.65, .63)	2.46** (1.01, 6.03)	2.74** (1.07, 7.01)
Education			
Some high school or less	.26* (–.05, .56)	1.03 (.63, 1.68)	.84 (.49, 1.44)
High school diploma	—	—	—
Some college	.82**** (.38, 1.25)	.79 (.48, 1.30)	.80 (.46, 1.40)
Bachelor's Degree	.72**** (.34, 1.10)	.91 (.48, 1.74)	1.46 (.78, 2.70)
CD4 Count			
≥500	1.11 (–.25, 2.46)	1.07 (.47, 2.40)	1.20 (.54, 2.65)
200–499	—	—	—
50–199	0.12 (–.26, .49)	1.03 (.65, 1.61)	.88 (.59, 1.31)
0–49	–.06 (–.35, .23)	1.03 (.65, 1.62)	.63* (.37, 1.07)
Age			
20–25[d]	–.07 (–.91, .76)	1.88 (.54, 6.57)	1.79 (.39, 8.11)
26–35	.03 (–.49, .55)	1.04 (.72, 1.49)	1.36 (.83, 2.25)
36–45	—	—	—
>45	–.06 (–.55, .44)	.88 (.54, 1.44)	.96 (.45, 2.04)
Primary Relationship Partner (PRP)			
No PRP	—	—	—
No sex with PRP	–.25 (–.80, .30)	1.87 (.64, 5.48)	2.81* (.86, 9.16)
Sex with PRP	–.54*** (–.86, –.22)	1.44 (.62, 3.38)	.97 (.54, 1.78)
Constant	1.39 (.88, 1.90)	—	—

Note. The subpopulation sample size varies in the analyses because of missing data on two of the outcome variables.
[a]$n = 932$. [b]$n = 923$. [c]$n = 921$. [d]There were no participants aged 18 and 19 years.
*p ≤ 0.10. **$p \leq 0.05$. ***$p \leq 0.01$. ****$p \leq 0.001$.

used to promote condom use and safer sex among sexually active individuals. Thus there is value in exploring the development of HIV prevention interventions that allow for and incorporate the religious beliefs of individuals. For example, prevention messages that emphasize an ethical and moral concern for others could allow for an individual's consideration of his or her own religious beliefs as a motivator for engaging in safer sexual practices. This could be especially the case for prevention interventions directed toward members of ethnic groups for whom religion is very important. Such interventions also could be developed in partnership with religious institutions or congregations, some of whom are already addressing HIV-prevention in their communities.

Interventions that focus on an individual's most deeply held values, regardless of whether these are religious or not, might plausibly lead individuals to avoid engaging in high-risk sexual behaviors. Developing HIV prevention programs that incorporate religiosity or a concern for these values could draw upon heretofore untapped resources in the fight against AIDS.

It should be noted that our study focused on religiosity's association with risk to others (engaging in behaviors that place others at risk for HIV infection) and not with risk to self (engaging in behaviors that place oneself at risk of becoming HIV-infected). In addition, our sample consisted entirely of people who were already infected with HIV. We did not include a sample of uninfected individuals. Thus we are not

able to assess from our data whether religiosity is associated with risk to oneself of HIV infection.

One limitation of our study is the fact that only English-speaking individuals were interviewed, and thus the findings may not generalize to Latino monolingual Spanish-speaking HIV-positive people. Another limitation is that we did not specifically examine associations between religiosity and sexual behavior within other subpopulations of HIV-positive people, such as injection drug users, although members of these subpopulations were represented in the groups we studied. Despite these limitations, this study found support for the importance of religiosity in reducing risk behaviors associated with the transmission of HIV and for exploring ways of incorporating value-oriented motivators (such as religiosity) for practicing safer sex into HIV prevention programs.

References

Baskin, M. L., Braithwaite, R. L., Eldred, L., & Glassman, M.(2005). Introduction to the special supplement: Prevention with persons living with HIV. *AIDS Education and Prevention, 17*(Suppl. A), 1–5.

Billy, J. O. G., Tanfer, K., Grady, W. R., & Klepinger, D. H. (1993). The sexual behavior of men in the United States. *Family Planning Perspectives, 25*, 52–60.

Bretzke, J. T. (2004). *A morally complex world: Engaging contemporary moral theology.* Collegeville, MN: Liturgical Press.

Centers for Disease Control. (2003). Advancing HIV prevention: New strategies for a changing epidemic—United States, 2003. *Morbidity and Mortality Weekly Report, 52*, 329–332.

Centers for Disease Control. (2005). *HIV/AIDS among African Americans.* Retrieved July 21, 2005, from http://www.cdc.gov/hiv/pubs/Facts/afam.pdf

Ciccarone, D. H., Kanouse, D. E., Collins, R. L., Miu, A., Chen, J. L., Morton, S. C., & Stall, R. (2003). Sex without disclosure of positive HIV serostatus in a US probability sample of persons receiving medical care for HIV infection. *American Journal of Public Health, 93,* 949–954.

Cochran, J. K., & Beeghley, L. (1991). The influence of religion on attitudes toward nonmarital sexuality: A preliminary assessment of reference group theory. *Journal for the Scientific Study of Religion, 30,* 45–62.

Cunningham, W. E., Rana, H. M., Shapiro, M. F., & Hays, R. D. 1997). Reliability and validity of self-report CD4 counts in persons hospitalized with HIV disease. *Journal of Clinical Epidemiology, 50,* 829–835.

Frankel, M. R., Shapiro, M.F., Duan, N., Morton, S. C., Berry, S. H., Brown, J. A., et al. (1999). National probability samples in studies of low-prevalence diseases. Part II: Designing and implementing the HIV Cost and Services Utilization Study. *Health Services Research, 34,* 969–992.

Fuller, R. C. (2001). *Spiritual but not religious:Understanding unchurched America.* Oxford, Enlgand: Oxford University Press.

Gordon, C. M., Forsyth, A. D., Stall, R., & Cheever, L. W. (2005). Prevention interventions with persons living with HIV/AIDS: State of the science and future directions. *AIDS Education and Prevention, 17*(Suppl. A), 6–20.

Hubbs-Tait, L., & Garmon, L. C. (1995). The relationship of moral reasoning and AIDS knowledge to risky sexual behavior. *Adolescence, 30,* 549–564.

Hunt, L. L. (2000). Religion and secular status among Hispanics in the United States: Catholicism and the varieties of Hispanic Protestantism. *Social Science Quarterly, 81,* 344–362.

Keenan, J. F. (1999). Applying the seventeenth-century casuistry of accommodation to HIV prevention. *Theological Studies, 60,* 492–512.

Koenig, H. G., McCullough, M. E., & Larson, D. B. (2001). *Handbook of religion and health.* Oxford, England: Oxford University Press.

Kosmin, B. A., & Mayer, E. (2001). *American Religious Identification Survey.* Retrieved February 28, 2005, from http://www.gc.cuny.edu/studies/aris_index.htm

Lefkowitz, E. S., Gillen, M. M., Shearer, C. L., & Boone, T. L. (2004). Religiosity, sexual behaviors, and sexual attitudes during emerging adulthood. *The Journal of Sex Research, 41,* 105–159.

MacArthur Foundation Research Network on Successful Midlife Development. (1996). *The Midlife Development Inventory (MIDI).* Retrieved July 9, 2004, from http://webapp.icpsr.umich.edu/cocoon/ICPSRSTUDY02760.xml

Maclean, A. M, Walker, L. J., & Matsuba, M. K. (2004). Transcendence and the moral self: Identity integration, religion, and the moral life. *Journal for the Scientific Study of Religion, 43,* 429–437.

National Conference of Catholic Bishops. (1990). *Called to compassion and responsibility: A response to the HIV/AIDS crisis.* Washington, DC: United States Catholic Conference.

Nimmons, D., & Folkman, S. (1999). Other-sensitive motivation for safer sex among gay men: Expanding paradigms for HIV prevention. *AIDS and Behavior, 3,* 313–324.

Rowatt, W. C., & Schmitt, D. P. (2003). Associations between religious orientation and varieties of sexual experience. *Journal for the Scientific Study of Religion, 42,* 455–465.

Shapiro, M. F., Berk, M. L., Berry, S. H., Emmons, C. A., Athey, L. A., Hsia, D. C., et al. (1999). National probability samples in studies of low-prevalence diseases. Part I: Perspectives and lessons from the HIV Cost and Services Utilization Study. *Health Services Research, 34,* 951–968.

Sherkat, D. E. (2002). Sexuality and religious commitment in the United States: An empirical examination. *Journal for the Scientific Study of Religion, 41,* 313–323.

Smith, T. W. (1998). *American sexual behavior: Trends, Sociodemographic differences, and risk behavior.* Retrieved March 7, 2005, from http://cloud9.norc.uchicago.edu/dlib/t-25.htm

Stassen, G. H., & Gushee, D. P. (2003). *Kingdom ethics: Following Jesus in contemporary context.* Downers Grove, IL: InterVarsity Press.

Taylor, R. J., Chatters, L. M., & Levin, J. (2004). *Religion in the lives of African Americans: Social, psychological, and health perspectives.* Thousand Oaks, CA: Sage.

Tentler, L. W. (2004). *Catholics and contraception: An American history.* Ithaca, NY: Cornell University Press.

U. S. Census Bureau. (2004). Annual estimates of the population by sex, race and Hispanic or Latino origin for the United States: April 1, 2000 to July 1, 2003. Retrieved March 18, 2005, from http://www.census.gov/popest/estimates.php

Weinhardt, L. S., Kelly, J. A., Brondino, M. J., Rotheram-Borus, M. J., Kirshenbaum, S. B., Chesney, M. A., et al. (2004). HIV transmission risk behavior among men and women living with HIV in 4 cities in the United States. *Journal of Acquired Immune Deficiency Syndromes, 36,* 1057–1066.

Williams, M., Ross, M. W., Bowen, A. M., Timpson, S., McCoy, H. V., Perkins, K., et al. (2001). An investigation of condom use by frequency of sex. *Sexually Transmitted Infections 77,* 433–435.