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Predictors of the Existence of Congregational HIV Programs: Similarities and Differences Compared with Other Health Programs

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Abstract

Purpose—Identify and compare predictors of the existence of congregational HIV and other health programs.

Design—Cross-sectional study.

Setting—United States.

Participants—A nationally-representative sample of 1,506 U.S. congregations surveyed in the National Congregations Study (2006-07).

Measures—Key informants at each congregation completed in-person and telephone interviews on congregational HIV and other health programs and various congregation characteristics (response rate = 78%). County-level HIV prevalence and population health data from the Robert Wood Johnson Foundation's 2007 County Health Rankings were linked to the congregational data.

Analysis—Multinomial logistic regression was used to assess factors that predict congregational health programs relative to no health programs; and of HIV programs relative to other health activities.

Results—Most congregations (57.5%) had at least one health-related program; many fewer (5.7%) had an HIV program. Predictors of health vs. HIV programs differed. The number of adults in the congregation was a key predictor of health programs, while having an official statement welcoming gay persons was a significant predictor of HIV programs ($p < .05$). Other significant characteristics varied by size of congregation and type of program (HIV vs. other health).

Conclusion—Organizations interested in partnering with congregations to promote health or prevent HIV should consider congregational size as well as other factors that predict involvement. Results of this study can inform policy interventions to increase the capacity of religious congregations to address HIV and health.

PURPOSE

Religious congregations (which may include churches, synagogues, mosques, or other communities of worship) are particularly well suited for promoting healthy behaviors among parishioners and in local communities. Many congregations have a commitment to social justice and a track record of community involvement and providing social and spiritual support.¹⁻⁴ African-American churches in particular have a longstanding history of addressing social issues.^{1,2,5-8} In general, congregations are trusted institutions in their communities, and often have the resources needed to create and sustain health programs.^{1,3,9,10}

Over the last several decades, a range of congregation-based programs have been implemented to address health issues such as cardiovascular disease, cancer, and mental health; and to encourage preventive measures such as dietary change, physical activity, weight loss, cancer screening, smoking cessation, and cholesterol reduction.^{1,2,11-13} However, congregational activities related to HIV are relatively rare.^{10,14}

HIV has a broad impact nationally and disproportionately affects African Americans and Latinos.¹⁵ As a result, it is receiving increased attention among organizations working to improve the public's health, especially in minority communities, and congregations might play a greater role in such efforts. Research is needed to identify factors that influence congregational involvement in HIV programs in order to inform strategies that public health organizations might use to form successful HIV and other health-related partnerships with congregations.

Conceptualizing Congregational Involvement in Health and HIV Programs

In this study, we examined predictors of congregational involvement in health and HIV programs. We adapted a conceptual framework developed by our team^{10,16} to describe congregational decisions to engage in HIV programs and extend this framework to include health programs more broadly. Under the framework, congregational involvement in health and HIV programs is affected by the following factors.

Congregational composition and community context, which includes congregational norms and beliefs, including specific attitudes about whether congregation-based HIV activities are needed.¹⁶⁻²² ***Congregational doctrine and policy*** include a congregation's theological or political orientation (i.e., conservative, liberal), which can affect whether the congregation engages in any type of social service or health activities including whether the congregation might address HIV. Also, doctrines and policies may be related to stigmatized congregational attitudes toward persons who are at risk for HIV or who have the disease.^{18,21,23} ***Congregational resources*** are also important and may help determine the scope of congregational activities.^{20,24} ***External engagement of congregation*** describes the

interaction between the congregations and other organizations and how this relationship may affect the development of HIV activities. The link between engagement and development of health programs may occur because engaged congregations are better positioned to address social issues.²⁵⁻²⁷

While previous research has identified a number of factors that may be related to the development of congregational HIV or other health program,^{14,28-30} it is not clear from these separate analyses how predictors of congregational health programs in general are similar to or different from predictors of HIV-specific programs. Although HIV programs may simply be a special type of congregational health activity, factors that affect congregational decisions to address HIV may differ from those related to other health issues. For example, HIV disease may be more salient to congregations located in communities with higher HIV rates; in turn, these congregations may be more likely to have HIV programs. In addition, HIV carries with it the weight of stigma related to homosexuality and drug use, which may affect whether and how congregations choose to address this disease.^{17-20,31} It is not clear how the other characteristics described in our conceptual framework (e.g. congregational composition and community context, congregational doctrine and policy, congregational resources, and the external engagement of the congregation) may differentially predict congregational involvement in HIV programs compared to other types of health programs. As a result, further understanding of these factors may inform those considering how to partner with congregations to address HIV. This information might identify types of congregations to engage or highlight facilitators and barriers that might be addressed jointly with potential partners. The purpose of our research was to identify the independent factors that predict congregational involvement in HIV programs as compared to those factors that affect congregational involvement in other types of health programs.

METHODS

Design

This was a cross-sectional study.

Sample

We use data from the 2006-2007 wave of the NCS³² and the 2011 Robert Wood Johnson Foundation County Health Rankings (<http://www.countyhealthrankings.org/our-approach>). The NCS is a nationally representative survey of congregations in the US that collects a broad array of congregation characteristics, including data on congregants, congregation resources, and detailed information on congregation activities. Data were collected from key informants at 1,506 congregations; the response rate was 78%.³³ To control for community-level factors in our analyses, we integrated county-level data on HIV prevalence and health status (measured as a composite of mortality and morbidity) from the RWJF County Health Index. The study was approved by the RAND Human Subjects Protection Committee.

Measures

Outcome Variables—The NCS includes four items about the health and HIV activities conducted at the congregation.

1. [Within the past 12 months] what projects or programs have you [congregation] sponsored or participated in?
2. Does your congregation have any organized effort, designated person, or committee whose purpose is to provide your members with health-focused programs such as blood pressure checks, health education classes, or disease prevention information?
3. Does your congregation currently have any program or activity specifically intended to serve persons with HIV or AIDS?
4. Does your congregation have any other groups meetings or classes besides those you've already mentioned?

We classified each congregation into one of three outcome categories:

- has HIV program: if the respondent answered ‘yes’ to item (3) above or if any of the congregation's programs, group meetings, or classes targeted individuals with HIV in items (1) or (4) (regardless of whether the congregation also sponsored other types of health programs).
- has non-HIV health program: if the respondent replied “yes” to item (2) or, if for items (1) or (4), the respondent identified programs with health (but not HIV) as a primary component
- has no health program: all remaining congregations.

Predictor Variables—We divided covariates into the four domains highlighted in our conceptual framework. The first domain, on congregational composition and community context, includes the core set of control variables for our analytic models, and the remaining three represent areas of particular interest in this study: resources, external engagement, and doctrine and policy. All variables and their definitions are detailed in Table 1. All of the variables except the County Health Index and County HIV Rate were drawn from NCS.

We used the RWJF *County Health Index* to measure overall health outcomes in the community of each congregation. This index is a weighted mean of county-level mean years of potential life lost; mean self-reported health status, the mean physically unhealthy days per month for an adult, the mean mentally unhealthy days per month for an adult, and the percentage of live births with low birth weight. Higher values of the composite measure indicate worse health. We modified the RWJF algorithm so that each component measure was standardized against all counties in the US rather than by state. We also included *HIV rate* per 1,000 county residents in 2006, as compiled by the County Health Rankings. We filled in missing data for 11 counties using contemporaneous state or local surveillance data.

Analysis

We weighted the sample to the attendee level, which has been identified in prior analyses as being more appropriate for studies concerned with the social impact of congregational activity.^{27,30,34} In our first set of analyses, we used attendee-level weighted multinomial logistic regression models to characterize the adjusted association between program status (HIV program, other non-HIV health program, no health program) and all predictors in a single model. We tested the independence of irrelevant alternatives (IIA) assumption using the *suest*-based Hausman test in Stata.³⁵

After determining that the size of a congregation significantly moderated the effects of many predictors in our attendee-level weighted multinomial logistic model, we fit unweighted models with the same predictors as above within each of three non-overlapping strata defined as small (120 and fewer regular adult participants), medium (121-500), and large (501 and more) congregations. These models are unweighted since the primary purpose of the weights is to adjust for the varying size of congregations in the NCS sample.

Predictive Margins—To help interpret magnitude of our results and compare results among different sized congregations, we calculated predictive margins from each size-based strata.³⁶⁻³⁹ Predictive margins calculate the average incremental effect of moving covariates from one set of values to another on the predicted probabilities of our outcomes. We examined the incremental effect of turning from “off” to “on” variables that are either mutable predictors (i.e., all of the variables under resources and external engagement); or affected by changes in congregation attitudes (doctrine and policy) and that differed significantly ($p < 0.05$; results not shown) in the full weighted model with all congregations. We began by setting all significant predictors to the value associated with a lower probability of having any health program for all congregations; for continuous variables, this was the 25th or 75th sample percentile within that size-based stratum. We kept non-significant resource, engagement, and doctrine and policy predictors and the composition and context variables at their observed values. We then calculated the predicted probability that each congregation fell into each of the three outcome categories, and took the average of those predictions. Next, we set the significant resource, engagement, and doctrine and policy predictors to the value associated with a higher probability of having any health program, and for each calculated the mean predicted probabilities. We repeated this method to estimate the combined effects of significant predictors in the resources and external engagement domains, and then in all domains together, for each size-based stratum.

Missing values and imputation—We multiply imputed missing data using the Imputation by Chained Equations (ICE) package in STATA 11.2.⁴⁰ Results from the 30 complete imputed datasets were pooled using Rubin's combination rules.⁴¹ The outcome and the county-level health measures were included as predictors for the other variables, but imputed versions of these variables were not used in analyses. The sample size for modeling was 1,422 congregations.

RESULTS

Weighted descriptive statistics of the covariates are shown in Table 2, overall and by the 3-level outcome (HIV program, other health program, or no program). Most attendees (70.2%) were in a congregation with at least one health-related program but no program specific to HIV, while 10.2% of attendees belonged to a congregation that had an HIV program. Weighted to the congregation level, 36.8 % of congregations had no health programs; 57.5 % had a health (but not HIV) program; and 5.7 % had an HIV program. Congregations varied considerably with respect to their compositional and contextual, resource, external engagement, and doctrine/policy variables. Generally in bivariate analyses, congregations with non-HIV health programs or HIV programs had more resources and external engagement and were less conservative and had more inclusive policies than congregations with no health programs.

Attendee-Level Weighted Multinomial Model

The first columns of Table 3 and 4 summarize the weighted multinomial regression, with results for congregations with a non-HIV health program contrasted with results for congregations with no health program in Table 3, and results for congregations with a HIV program contrasted with results for congregations having a non-HIV health program in Table 4. Separating the results in this way allows us to highlight first the significant predictors of congregational engagement in health programs and then controlling for these, the significant predictors of congregational engagement in HIV programs. A number of predictors were significantly associated with the likelihood of engaging in a non-HIV health program relative to no engagement in health programs: including *older congregants* (has 40% or more members over the age of 60) (OR = 1.53), a higher percentage of *volunteers* at congregation events (OR for logged value = 2.53), more *adult attendees* (OR for logged value = 5.01), *secular collaborations* (OR=3.09) or *religious collaborations* (OR=2.34) relative to no external collaboration, and having a group that *assesses community needs* (OR=2.12).

As shown in Table 4, the predictors positively associated with having an HIV program compared with another type of health program were: *African American (>60% or more of attendees)* (OR=3.77), *staff resources* (the number of paid staff) (OR associated with increase of one sample standard deviation = 1.40), has a group that *assesses community needs* (OR=1.92), has an official *statement welcoming gays* (OR=3.67), has an *HIV positive member* (OR=2.37), and *allows gay members* (OR=1.94).

Predictors of Congregational Health and HIV Programs Stratified by Congregation Size

Columns 2 to 4 of Tables 3 and 4 summarize models for the congregation size strata. Two variables were significant in all stratified models: the *adult attendees* was positively associated with having a non-HIV health program (OR for logged value range 3.30 to 8.86) and having an official *statement welcoming gays* was associated with increased odds of having an HIV program (OR range 3.44 to 5.41).

All other significant predictors showed different associations by outcome and congregation size in the stratified models.

Predictors of non-HIV health programs—The core variables of *older congregants* (OR=2.95) and *African-American* (OR=6.24) were positively associated with having a non-HIV health program in medium-sized congregations but were not significantly associated with having a non-HIV health program in small or large congregations. Several variables related to resources and external engagement, including the proportion of *volunteers* at congregation events (OR range 2.44 to 3.40), collaborations with external organizations (both *secular* and with other *religious organizations*) (OR range 2.43 to 4.80), and having a group that *assesses community needs* (OR range 1.62 to 2.33), were positively associated with having a non-HIV health program for small and medium congregations, though not for large congregations.

Predictors of HIV Programs—The core variable of *African-American* was positively associated with having an HIV program in medium (OR=9.59) and large congregations (OR=6.78) but had no significant association with having an HIV program in small congregations. *Staff resources* (OR=1.38) was significant only in large congregations, and 25% FTE (having at least 25% effort by a staff person dedicated to social service programs) (OR range 2.53 to 2.60) was positively associated with having an HIV program for medium and large congregations. External collaboration significantly predicted having an HIV program among large congregations (OR = 3.08) for *any secular collaboration* and (OR=3.85) for *only religious collaborations*, both compared to no external collaboration but had no significant association among small or medium congregations. Having a group that *assesses external need* was significant among medium congregations (OR = 2.77) but not among small or large congregations. Having an *openly HIV positive member* and *allows gay leaders* were both positively associated with having an HIV program among medium-sized congregations (OR=6.13) and OR=3.59 respectively) but not among small or large congregations.

Predictive Margins of Predictors of Congregation Health and HIV Programs

Figures 1-3 further illustrate the impact that size has on the association of each set of predictors with the outcomes. Small congregations had a relatively low predicted probability of engaging in non-HIV health programs (26%) and a very low predicted probability of engaging in an HIV program when we turned all predictors “off” (1%). When we increased resources, external engagement, and changed doctrine and policy so that they were most inclusive, we found that the predicted probability of engaging in non-HIV health programs significantly increased to 89%. Participation in HIV programs was low under all scenarios, although having more inclusive doctrine/policies resulted in the largest change in the probability of engaging in an HIV program of any single domain of predictors (Figure 1).

Among medium and large-sized congregations, the pattern of predicted probabilities of engaging in a non-HIV health program and HIV were similar to that of small congregations. When we turned “on” resources and external engagement variables together, the model predicted higher probabilities of participation in non-HIV health programs. When we turned

on the inclusiveness variables, there were also increases in the predicted probability of engagement in HIV programs and when we created a scenario in which resources were high, external engagement was high, and doctrine and policy were more inclusive, the model predicted the highest percentage of congregations participating in an HIV program of any scenario (Figures 2 and 3).

DISCUSSION

The results of our study suggest that the factors associated with the existence of congregational HIV programs are different from those associated with other types of health programs and, importantly, that these factors differ according to the size of the congregation. The constellation of significant predictors within each size stratum provides new information about the congregational settings in which HIV-related or other health programs are most likely to develop.

Only two variables were significant for all congregation size categories. For non-HIV health programs, it was the number of adults in the congregation. Congregation size may be an indicator of available resources, both human and financial. As congregations grow, they gain more resources; larger congregations are also more likely have congregants with varied health needs, knowledge of community health needs, and possibly more opportunities for partnerships in the community—all of which can increase the likelihood of having a health program. For HIV programs, in contrast, it was not congregation size but having an official statement welcoming gay persons that was the only predictor significant for all congregation size categories. Such a statement is an important indicator of the commitment a congregation, whether large or small, has to creating a community that is inclusive of gay persons. Such congregations may have increased awareness of the need to address HIV in the community and the role religious organizations can play.

Non-HIV health programs

The number of adults in the congregation was a significant predictor of non-HIV health programs among congregations of all sizes. However, this was the *only* significant predictor for large congregations, while human resources and external engagement were also significant for small or medium-sized congregations. The different results for large compared to small/medium congregations may be due to a more heightened awareness of need within large congregations as described above. Large congregations may also be more likely to have multiple ministries and social service programs that bring them into greater contact with outside organizations. These findings suggest that, if the size of the congregation provides some indication of congregational resources for health programs, the number of adults in the congregation may be the only predictor among these large congregations after some minimum threshold of other characteristics (human resources and external engagement) has been met.

HIV programs

Congregation size also affected the group of factors associated with an HIV program. An official statement welcoming gay persons was the only variable that predicted HIV

programs among small congregations. In contrast, race-ethnicity, staffing, and external collaboration also predicted HIV programs among medium or large congregations. We postulated above that a welcoming statement might serve as an indicator of the strength of the congregation's commitment to issues of importance in the gay community, including HIV. As Mendel and colleagues⁴² found, congregational HIV programs are related to perceived need in the congregation or broader community. In small congregations, this may be particularly important, since the amount of human and financial capital may never be large enough for the congregation to engage in HIV-related programs in the absence of a commitment to issues of particular concern to the gay community.

Congregational policy regarding gays and involvement in HIV programs—The results highlighted the importance of a congregation's overall policy regarding gay persons as a predictor of involvement in HIV programs. The predictive margins analysis found that, while resources and engagement had an important impact on the probability that congregations would address HIV, the biggest impact was related to having resources and engagement *as well as policies that emphasize inclusiveness*. This was true for all sizes of congregations, but the impact on medium and large congregations in particular was substantial. Greater inclusiveness might indicate that a congregation is less affected by HIV-related stigma and/or more aware of HIV-related needs; either or both of these things would make the congregation more likely to recognize HIV as a problem and address it.

Our results suggest some options for increasing religious congregations' capacity to address health and in particular HIV. For example, training opportunities for congregational members could help build the number of congregational volunteers and interest in collaborating with outside partners. Public health organizations could consider sharing the results of community assessments or offering to work jointly with congregations to conduct future assessments. Likewise, outside resources for hiring or training staff at the congregations could facilitate the development of HIV programs in congregations just as hospital--provided parish nurses have extended disease prevention programs.^{43,44} In-kind support, such as toll-free conference calls to support partnerships, copying and mailing services, and food and space for large events could be provided by health partners.⁴⁵

Strategies for encouraging collaboration should focus not only on enhancing resources and engagement, but also on educating congregations about the stigma experienced by persons with HIV and the ways in which congregations could help address the needs of people with HIV. In particular, our findings suggest that congregations whose policies emphasize inclusiveness may be more likely to view HIV as an issue of concern to their community and therefore be ready to address it.

Limitations

Not all congregational health or HIV programs are equal in content, intensity, or quality, and the NCS does not differentiate programs on these factors. If a large portion of congregational efforts are unsuccessful or ineffective, identifying ways to encourage greater congregational involvement would not be an efficient way to pursue public health goals. Further, our previous in-depth, qualitative research has found that most congregational HIV

activities are conducted in partnership with external organizations^{9,46} and that congregations may be better suited as collaborators rather than the primary infrastructure for ongoing service provision.⁴⁷ Additionally, our data are cross-sectional; thus, we can draw no conclusions regarding causality. Important variables were omitted, such as clergy education level, which was shown to be important in previous analyses of the 1998 NCS,²⁸ but which was not measured in the 2006-2007 wave. We included whether the pastor has an advanced theological degree, but for many denominations, this is not equivalent to an academic graduate degree. Because clergy education may be related to other important variables, its omission may have unmeasured effects. Similarly, we were only able to measure fairly crude indicators related to stigma, such as allowing openly gay persons to be members, which do not allow for refined measurement of the full continuum of attitudes on which congregations vary.⁴⁸ Measuring stigma more directly will be important in future analyses of the impact of congregational factors on developing HIV programs.

Nevertheless, this study reveals important new insights into how predictors of congregational involvement in HIV programs differ from those associated with involvement in other health programs and how these factors vary by size of the congregation. These findings have implications for future research on congregational involvement in health programs and should be of interest to public health professionals who want to build effective partnerships with faith-based organizations--particularly those interested in fostering greater participation of the religious community in HIV care and prevention.

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SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

As trusted community organizations, religious congregations are uniquely positioned to address health issues such as HIV. However, while many congregations have initiated a variety of health-related programs, few have developed HIV programs.

What does this article add?

This paper identifies and compares the predictors of congregational HIV and other health programs using data from a nationally-representative sample of congregations.

What are the implications for health promotion practice or research?

The factors associated with the existence of health and HIV programs differed from one another and by size of congregation. This study provides new information on the factors predicting congregational involvement in health and HIV-specific programs and helps organizations interested in partnering with congregations to address health or HIV understand which factors predict involvement. Results of this study can inform efforts to increase the capacity of religious congregations to address HIV.

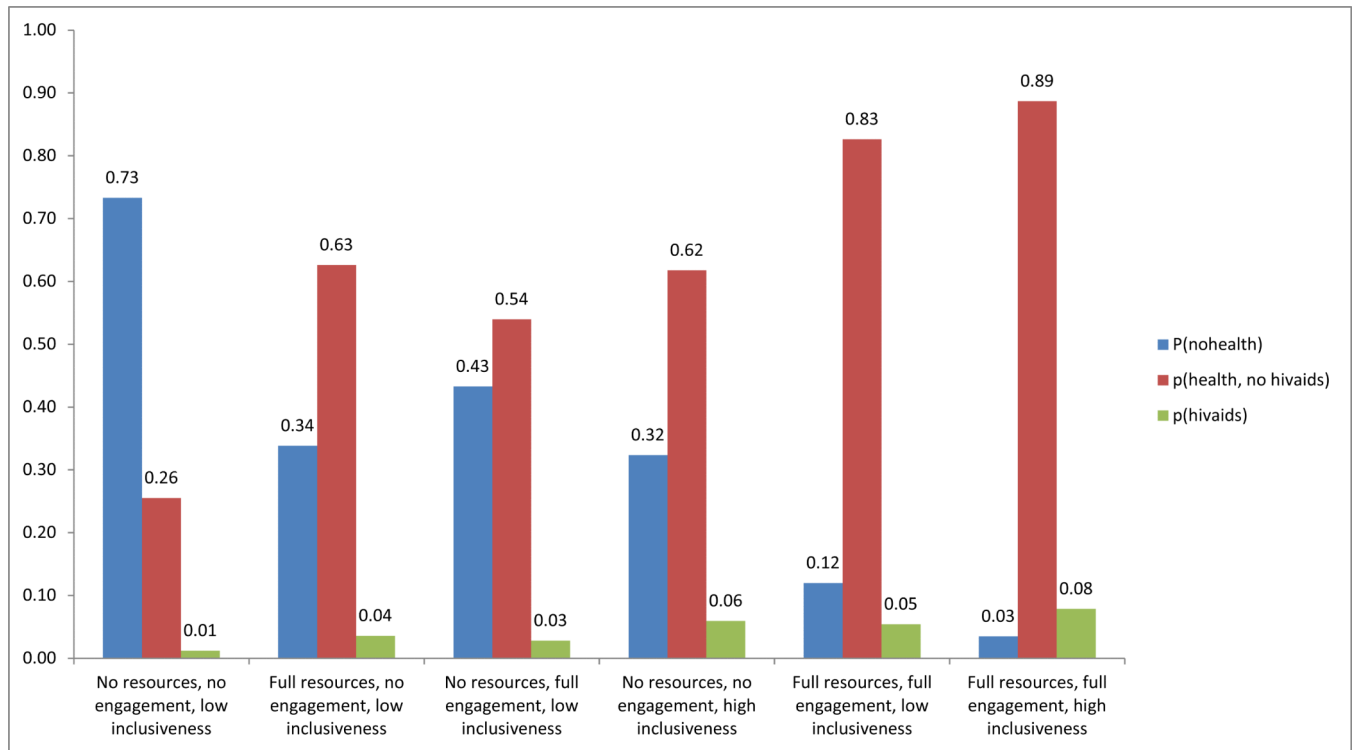


Figure 1. Predictive margins of having an HIV program, other health program, and no health program by changes in predictors in small congregations (less than 120 members)

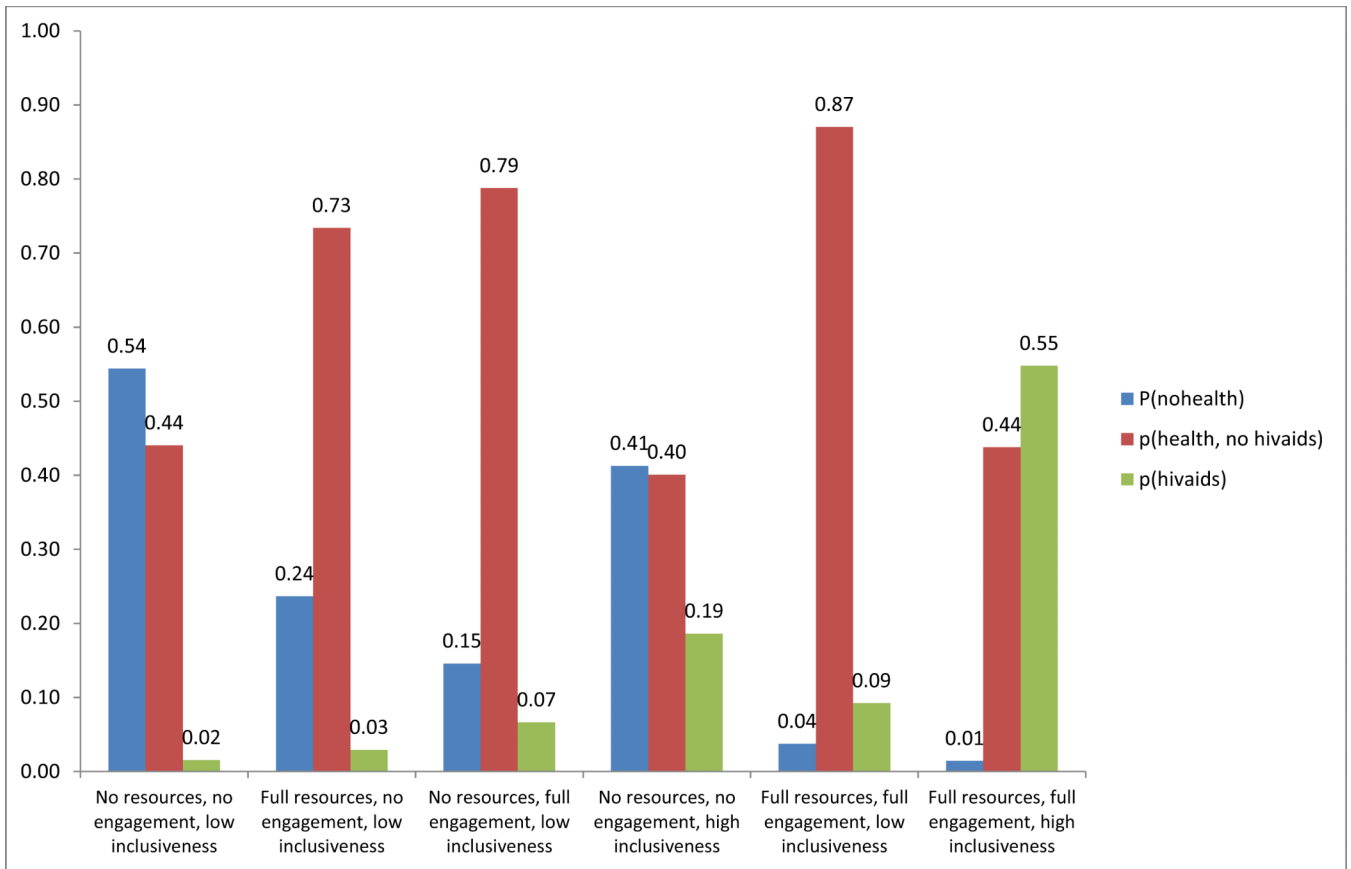


Figure 2. Predictive margins of having an HIV program, other health program, and no health program by changes in predictors in medium-sized congregations (121-500 members)

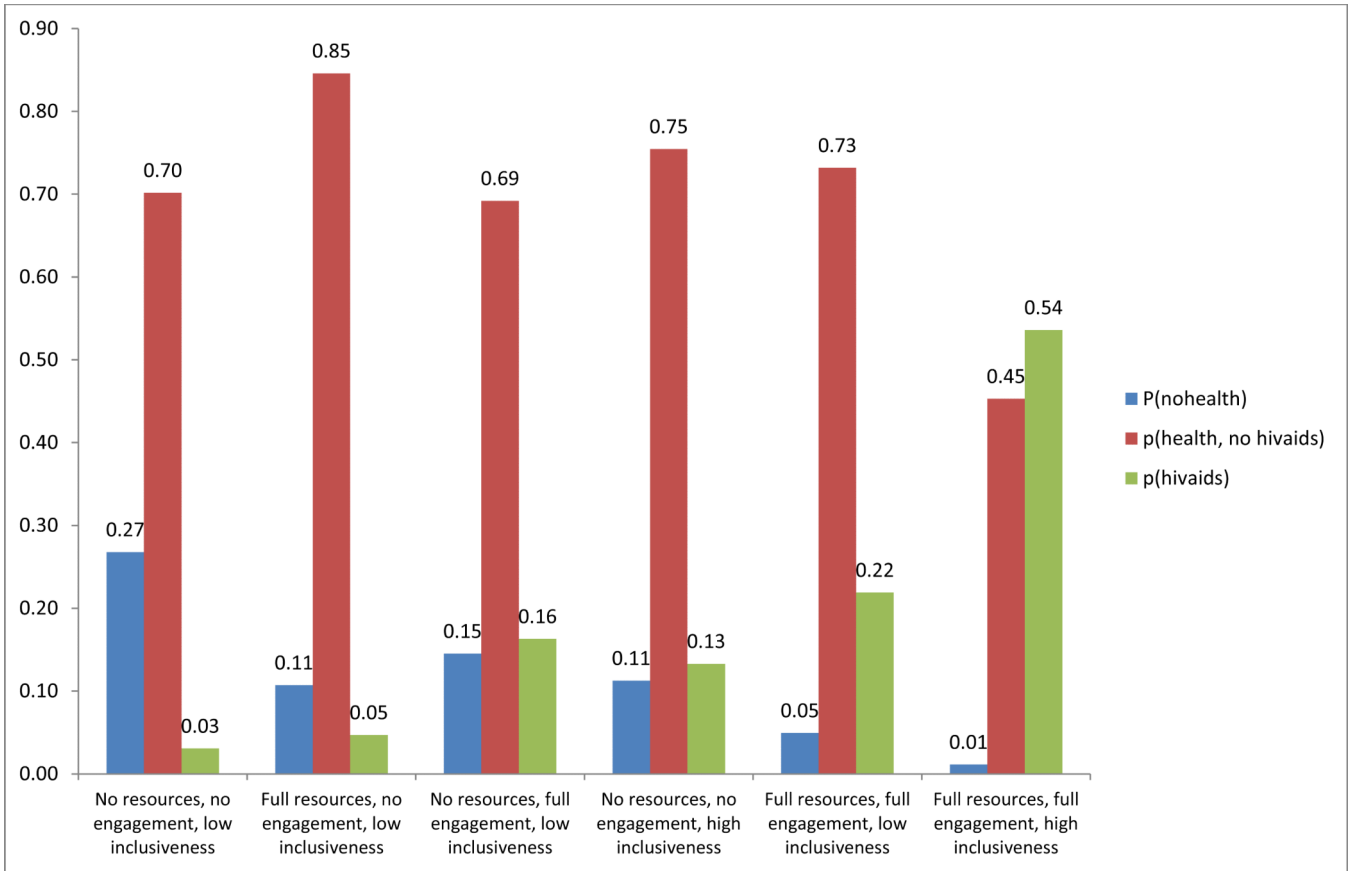


Figure 3. Predictive margins of having an HIV program, other health program, and no health program by changes in predictors in large congregations (501 or more members)

Table 1

Summary of predictors by domain

Domain and Variable	Variable type	Definition
<i>Composition and context</i>		
High poverty tract	Dichotomous	At least 30% of people in the congregation's 2000 census tract are below the official poverty level
Urban tract	Dichotomous	Congregation in urban tract in 2000 census
Congregational age	Continuous	Longevity of congregation in years (logged in models)
Older congregants	Dichotomous	Has 40% or more congregants age 60 or greater
Clergy graduated	Dichotomous	Senior clergy person graduated from a seminary or theological school
African American	Dichotomous	60% or more of the congregation's members are African American
County Health Index	Continuous	County Health Index (Higher is worse health)
County HIV rate	Continuous	County HIV Rate per 1,000 county residents in 2006
<i>Resources</i>		
Annual expenditures	Continuous	Congregation yearly budget (millions of dollars, logged in models)
Staff resources	Continuous	Number of paid staff at congregation (normalized)
Volunteers	Continuous	Percentage of congregants who volunteer in the congregation's programs (logged in models)
25% FTE	Dichotomous	Congregation has a staff person dedicating 25% effort to social service programs
Adult attendees	Continuous	Number of adults in congregation (logged in models)
<i>External engagement</i>		
<i>Collaborations</i>		
No collaborations	Dichotomous	No collaborations on social service programs
Secular collaborations	Dichotomous	Any secular collaborations on social service programs (as well as, potentially, religious organizations)
Religious collaborations	Dichotomous	Only religious collaborations on social service programs
Assesses community needs	Dichotomous	Has a group that assessed community needs within the last 12 months
Political participation	Dichotomous	Congregants informed of opportunities to participate in political activities within the past year
Seek government funding	Dichotomous	Congregation has applied for a grant from any government agency within the past two years
<i>Doctrine and policy</i>		
Conservative	Dichotomous	Theologically or politically conservative congregation (including responses of "more on the conservative side" vs. "more on the liberal side" or "right in the middle" for both variables)
Bible is inerrant	Dichotomous	Congregation considers the Bible to be the literal and inerrant word of God
Statement welcoming gays	Dichotomous	Congregation has a statement that officially welcomes gays and lesbians
HIV-positive member	Dichotomous	Anyone in the congregation is openly HIV-positive
Allows gay members	Dichotomous	Congregation allows openly gay persons to be full-fledged members
Allows gay leaders	Dichotomous	Congregation allows openly gay persons to be volunteer leaders

Table 2Mean Congregation Characteristics from the 2006-2007 Wave of the NCS^{*}

	All attendees	Attendees in congregations with no Health Programs	Attendees in congregations with health program (non HIV)	Attendees in congregations with HIV program	P-value [†]
Outcome					
HIV program	19.6%				
Health (no HIV) program	70.2%				
No health program	10.2%				
Composition and context					
High poverty tract	11.0%	8.4%	10.0%	17.3%	0.6
Urban tract	66.8%	53.0%	68.2%	83.3%	<0.001
Congregational age	79.5 (53.4) [‡]	72.3 (51.5)	80.9 (53.6)	82.8 (54.5)	0.044
Older congregants	37.4%	34.9%	39.2%	30.4%	0.282
Clergy graduated	83.2%	68.0%	86.2%	92.4%	<0.001
African American	12.6%	12.4%	10.9%	25.3%	0.480
County Health Index	-0.20 (0.68)	-0.14 (0.75)	-0.21 (0.66)	-0.26 (0.67)	0.100
County HIV rate	3.1 (3.7)	2.5 (2.8)	3.0 (3.6)	4.6 (4.9)	0.066
Resources					
Annual expenditures	1.0 (7.0)	0.51 (2.8)	1.1 (8.1)	1.7 (3.8)	0.231
Staff resources	0.03 (1.0)	-0.31 (0.55)	0.03 (0.89)	0.67 (1.74)	<0.001
Volunteers	18.0 (23.0)	14.3 (24.0)	18.6 (22.8)	20.2 (22.4)	0.035
25% FTE	18.6%	7.5%	18.7%	38.9%	<0.001
Number of adults	774 (1304)	289 (505)	804 (1286)	1461 (1941)	<0.001
External engagement					
No collaborations	35.5%	64.3%	29.6%	20.0%	<0.001
Secular collaborations	42.9%	21.5%	47.3%	55.1%	
Religious collaborations	21.5%	14.1%	23.1%	24.9%	
Assesses community needs	57.1%	34.3%	60.2%	79.1%	<0.001
Political participation	29.5%	23.7%	29.5%	41.6%	0.111
Seek government funding	9.7%	1.9%	10.5%	19.2%	<0.001
Doctrine and policy					
Conservative	66.9%	76.2%	66.1%	54.6%	0.005
Bible is inerrant	68.1%	78.6%	66.2%	60.4%	<0.001
Statement welcoming gays	9.5%	3.6%	7.4%	23.6%	0.031
HIV-positive member	9.5%	2.1%	8.6%	29.7%	0.001
Allows gay members	48.8%	31.2%	50.4%	72.5%	<0.001
Allows gay leaders	22.5%	13.6%	23.1%	36.2%	0.002

* Weighted to the attendee-level (proportion of attendees that went to a congregation with this characteristic)

[†] P-values from unadjusted regression of predictor on 3-level outcome[‡] Standard deviations of continuous variables are listed in parentheses

Table 3

Estimated odds ratios from multinomial regression models of engagement in a health (non HIV) program compared to no engagement in health or HIV

	All Congregations	Small (120 or fewer)	Medium (121-500)	Large (501+)
	Attendee-level weights [†]	Unweighted	Unweighted	Unweighted
Composition and context				
High poverty tract	1.28 (0.70, 2.34)	1.12 (0.53, 2.35)	0.59 (0.20, 1.76)	0.91 (0.26, 3.26)
Urban tract	0.88 (0.58, 1.33)	1.30 (0.72, 2.35)	0.89 (0.46, 1.75)	0.53 (0.16, 1.76)
Congregational age	1.01 (0.62, 1.64)	1.32 (0.72, 2.43)	0.79 (0.35, 1.80)	0.72 (0.22, 2.30)
Older congregants	1.53 (1.02, 2.29)*	1.08 (0.65, 1.82)	2.95 (1.48, 5.90)**	1.25 (0.56, 2.82)
Clergy graduated	1.48 (0.93, 2.35)	1.73 (0.98, 3.07)	1.17 (0.49, 2.80)	3.31 (0.71, 15.32)
African American	1.77 (0.97, 3.21)	1.11 (0.54, 2.28)	6.24 (1.69, 23.06)**	4.37 (0.36, 53.52)
County Health Index	1.19 (0.91, 1.54)	0.95 (0.66, 1.37)	1.04 (0.62, 1.75)	0.99 (0.44, 2.18)
County HIV rate	1.01 (0.95, 1.08)	1.00 (0.91, 1.1)	0.98 (0.89, 1.07)	1.00 (0.88, 1.14)
Resources				
Annual expenditures	1.03 (0.80, 1.32)	0.88 (0.60, 1.27)	1.02 (0.64, 1.62)	1.22 (0.77, 1.92)
Staff resources	0.84 (0.66, 1.09)	0.86 (0.19, 3.94)	1.01 (0.34, 2.94)	0.86 (0.62, 1.19)
Volunteers	2.53 (1.86, 3.45)***	2.44 (1.70, 3.49)***	3.40 (1.98, 5.84)***	1.60 (0.79, 3.26)
25% FTE	1.50 (0.82, 2.74)	1.21 (0.50, 2.96)	2.24 (0.71, 7.08)	0.77 (0.31, 1.94)
Number of adults	5.01 (3.24, 7.74)***	3.30 (1.15, 9.47)*	6.65 (1.01, 43.68)*	8.86 (1.47, 53.3)*
External engagement				
No collaborations [ref]	1.00	1.00	1.00	1.00
Secular collaborations	3.09 (2.03, 4.71)***	2.86 (1.60, 5.11)***	4.80 (2.41, 9.55)***	1.83 (0.76, 4.40)
Religious collaborations	2.34 (1.47, 3.74)***	2.43 (1.26, 4.70)**	3.61 (1.65, 7.90)**	0.99 (0.39, 2.48)
Assesses community needs	2.12 (1.50, 3.00)***	1.62 (1.01, 2.62)*	2.33 (1.30, 4.18)**	1.98 (0.94, 4.17)
Political participation	0.84 (0.57, 1.25)	1.26 (0.68, 2.32)	0.67 (0.35, 1.31)	0.61 (0.29, 1.28)
Seek government funding	2.25 (0.88, 5.74)	5.39 (0.63, 46.25)	1.10 (0.28, 4.33)	1.76 (0.48, 6.46)
Doctrine and policy				
Conservative	1.13 (0.73, 1.75)	0.92 (0.50, 1.71)	1.50 (0.68, 3.34)	0.72 (0.32, 1.62)
Bible is inerrant	0.95 (0.59, 1.53)	0.83 (0.38, 1.85)	1.28 (0.59, 2.77)	0.70 (0.31, 1.58)
Statement welcoming gays	1.32 (0.61, 2.87)	1.19 (0.36, 3.96)	0.96 (0.25, 3.67)	0.91 (0.21, 3.88)
HIV-positive member	2.25 (0.83, 6.14)	5.28 (0.61, 45.33)	1.41 (0.35, 5.77)	3.17 (0.39, 25.66)
Allows gay members	1.09 (0.68, 1.75)	1.66 (0.83, 3.32)	0.79 (0.38, 1.63)	0.89 (0.40, 2.03)
Allows gay leaders	1.45 (0.76, 2.78)	0.53 (0.20, 1.43)	1.48 (0.58, 3.74)	2.00 (0.66, 6.07)
N	1422	451	512	459

[†]We found no indication that the IIA assumption was violated; across the imputations, the minimum p-value for the test comparing HIV coefficients with and without health in the model was 0.66, and the minimum p-value for the test comparing no health coefficients was 0.90.

* p<0.05

** p<0.01

p<0.001

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Table 4

Estimated odds ratios from multinomial regression models of engagement in HIV program compared to engagement in a Health (non HIV) program

	All Congregations	Small (120 or fewer)	Medium (121-500)	Large (501+)
	Attendee-level weights	Unweighted	Unweighted	Unweighted
Composition and context				
High poverty tract	1.23 (0.60, 2.52)	0.92 (0.14, 6.00)	1.16 (0.38, 3.48)	1.40 (0.51, 3.86)
Urban tract	1.04 (0.54, 2.00)	1.14 (0.30, 4.25)	0.60 (0.22, 1.64)	1.92 (0.50, 7.36)
Congregational age	0.94 (0.50, 1.75)	0.46 (0.12, 1.73)	0.79 (0.27, 2.29)	0.73 (0.28, 1.95)
Older congregants	0.77 (0.46, 1.30)	0.85 (0.27, 2.65)	0.67 (0.30, 1.51)	0.81 (0.40, 1.62)
Clergy graduated	1.95 (0.90, 4.20)	1.81 (0.38, 8.71)	1.10 (0.31, 3.91)	1.65 (0.39, 7.00)
African American	3.77 (1.89, 7.50)***	0.41 (0.06, 2.76)	9.59 (3.17, 29.08)***	6.78 (2.48, 18.54)***
County Health Index	0.74 (0.49, 1.11)	0.79 (0.32, 1.93)	0.82 (0.41, 1.65)	0.97 (0.52, 1.80)
County HIV rate	1.04 (0.98, 1.10)	1.04 (0.86, 1.27)	1.00 (0.90, 1.10)	1.00 (0.91, 1.10)
Resources				
Annual expenditures	1.02 (0.72, 1.46)	1.24 (0.40, 3.83)	0.78 (0.42, 1.45)	0.86 (0.52, 1.41)
Staff resources	1.40 (1.13, 1.74)**	1.88 (0.3, 11.88)	1.58 (0.63, 4.01)	1.38 (1.11, 1.71)**
Volunteers	1.3 (0.79, 2.14)	1.28 (0.45, 3.63)	1.76 (0.78, 3.97)	1.04 (0.59, 1.83)
25% FTE	1.61 (0.96, 2.71)	1.12 (0.24, 5.30)	2.53 (1.10, 5.82)*	2.60 (1.33, 5.05)**
Number of adults	1.00 (0.51, 1.96)	0.66 (0.05, 9.42)	0.43 (0.04, 4.57)	0.67 (0.22, 2.05)
External engagement				
No collaborations [ref]	1.00	1.00	1.00	1.00
Secular collaborations	1.47 (0.79, 2.74)	0.44 (0.10, 1.81)	1.13 (0.38, 3.36)	3.08 (1.31, 7.24)**
Religious collaborations	1.76 (0.87, 3.55)	0.71 (0.16, 3.18)	1.16 (0.34, 3.89)	3.85 (1.52, 9.74)**
Assesses community needs	1.92 (1.16, 3.19)*	1.71 (0.56, 5.25)	2.77 (1.11, 6.90)*	1.74 (0.86, 3.54)
Political participation	0.98 (0.61, 1.57)	1.76 (0.53, 5.81)	1.97 (0.90, 4.31)	0.80 (0.44, 1.44)
Seek government funding	1.16 (0.64, 2.11)	2.35 (0.34, 16.22)	1.81 (0.66, 4.95)	1.00 (0.41, 2.44)
Doctrine and policy				
Conservative	1.06 (0.59, 1.89)	2.14 (0.49, 9.39)	1.26 (0.51, 3.08)	1.03 (0.53, 1.98)
Bible is inerrant	1.10 (0.61, 1.99)	0.79 (0.17, 3.61)	0.62 (0.20, 1.93)	0.94 (0.46, 1.91)
Statement welcoming gays	3.67 (1.84, 7.32)***	5.41 (1.14, 25.56)*	3.44 (1.29, 9.18)*	3.81 (1.60, 9.09)**
HIV-positive member	2.37 (1.35, 4.15)**	0.44 (0.04, 5.48)	6.13 (2.28, 16.53)***	1.27 (0.59, 2.75)
Allows gay members	1.94 (1.06, 3.55)*	3.30 (0.79, 13.79)	0.86 (0.32, 2.31)	0.97 (0.47, 2.02)
Allows gay leaders	1.29 (0.68, 2.43)	0.72 (0.14, 3.78)	3.59 (1.02, 12.60)*	1.09 (0.50, 2.40)
N	1422	451	512	459

* p<0.05

** p<0.01

*** p<0.001