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Socioecological Influences on Community Involvement in HIV Vaccine Research

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Abstract

Objective—This study investigated socioecological factors influencing HIV vaccine research participation among communities living in geographic areas with high HIV prevalence and high poverty rates.

Methods—We surveyed a sample of 453 adults ≥ 18 years from areas of high poverty and high HIV prevalence in metro Atlanta and differentiated the effects of individual-, social/organizational-, and community-level characteristics on participation in HIV vaccine research via multilevel modeling techniques that incorporated questionnaire, program, and census data.

Results—Models that adjusted for both individual-level covariates (such as race, gender, attitudes, and beliefs concerning HIV research), social/organizational- and community-level factors such as local HIV prevalence rates, revealed that the extent of HIV prevention-related programs and services in census tracts contributed to individuals' likelihood of participation in an HIV vaccine study. Additionally, neighborhood-based organizations offering HIV medical and treatment programs, support groups, and services (e.g., food, shelter, and clothing) encourage greater HIV vaccine research participation.

Conclusions—The findings support the hypothesis that community-level factors facilitate participation in HIV vaccine research independent of both individual- and social/organizational-level factors.

Keywords

HIV/AIDS; HIV Vaccine; Socioecological Model; Community Engagement; Willingness to Participate; Recruitment

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Introduction

With over 50,000 new HIV infections estimated to occur annually in the United States, the HIV/AIDS epidemic is far from over.¹ The number and proportion of HIV/AIDS cases among specific groups continue to highlight the need for new biomedical prevention interventions, including an HIV vaccine, microbicide, or pre-exposure prophylaxis (PrEP) to complement existing behavioral prevention strategies.²⁻⁶

New biomedical options will expand the set of behavioral, policy and structural approaches, and existing effective medical interventions including administration of antiretroviral therapy to reduce maternal-to-child transmission.⁷⁻¹¹ Both encouraging and disappointing results from HIV vaccines, microbicides, pre-exposure prophylaxis, cervical barrier methods, and herpes treatment trials were realized in the past few years with priority groups at risk for HIV infection.¹²⁻¹⁸ Yet even with positive developments in HIV biomedical research, recruitment challenges endure as the existing pipeline of candidate biomedical prevention options will need to be evaluated among those racial and ethnic groups who are disproportionately affected by HIV in the US but who have also been historically underrepresented in clinical trials. Moreover, as new biomedical strategies are tested in study protocols, potentially even larger cohorts will be needed as risk status is ameliorated and new standards of care are adopted.¹⁹⁻²⁰ Among those most needed in future domestic HIV biomedical prevention studies are men-who-have-sex-with-men (MSM), especially black/African American men, and minority women living in areas of high poverty and HIV prevalence.²¹ Therefore, it is critical to invest in effective community engagement and recruitment approaches to yield support and participation from these groups to achieve HIV biomedical prevention research aims.

Although racial and ethnic minorities, particularly black/African Americans, comprise a significant proportion of HIV incident cases in the United States, they remain underrepresented in HIV-related clinical trials with $\leq 26\%$ overall enrollment rates in Phase I and II HIV vaccine clinical studies compared to whites who comprised 87% (N=2,323) of Phase I and 73.8% (N=783) of Phase II HIV Vaccine Trials Network (HVTN), AIDS Vaccine Evaluation Group (AVEG), and HIV Network for Prevention Trials (HIVNET) trial participants.²² Therapeutic HIV studies have experienced similar challenges with enrollment of non-white minorities in studies, both as a function of under recruitment of these groups and individual (un)willingness-to-participate in studies.²³ The 1994 NIH mandate specifying the inclusion of women and minorities in federally-sponsored studies underscored the importance of recruiting and retaining black/African Americans and Hispanics on research-related community advisory boards, promoting community organizing, and encouraging study participation.²⁴⁻²⁵ Given the scope and magnitude of HIV/AIDS in minority communities, calls to action have been issued by community leaders and national AIDS organizations such as the Black AIDS Institute (BAI), National AIDS Education and Services for Minorities, National Minority AIDS Council (NMAC), SisterLove/SisterSong, and others to increase support for and participation in biomedical HIV prevention research.²⁶⁻²⁷

Motivation to participate in biomedical research among minorities is multifaceted and operates at multiple levels. It is widely accepted that a number of socioecological factors influence health behaviors.²⁸⁻²⁹ The socioecological framework integrates multi-level factors including community-level factors (e.g., racial distribution, HIV prevalence), social/organizational-level (e.g., accessible testing sites, community education programs), and individual-level factors (e.g., attitudes, gender).^{30, 31} Previous studies have demonstrated decisional pathways are complex in HIV/AIDS research participation and individual-level influences have a significant role in promoting involvement.³²⁻³³ It has been argued that

microlevel theories typically utilized in explaining research participation are compromised in their ability to predict intention and behavior in the face of alternative options.³⁴ Thus, these models may have limited explanatory power to understand the complexity of the relationships in the broader socioenvironmental milieu. How contextual factors and community characteristics interact with individual- and social/organizational-level influences to effectively promote HIV prevention research participation remains to be explored.

We therefore theorize there are multiple factors at the individual-, social/organizational-, and community-levels interacting to influence participation in HIV biomedical studies. Greater understanding of how individuals respond to the call to volunteer for HIV biomedical research within their communities can yield insight into the development of a powerful multisystem community engagement and study recruitment model. Thus, we set out to assess the interplay of individual characteristics, including race and gender, and psychosocial factors such as attitudes and beliefs toward HIV prevention research. We also considered perception of study volunteerism at the local clinical research organization via our measure of “organizational relevance as a psychosocial variable.”^{32–33} This construct reflects connection or engagement of individual’s values and commitment to the organization which is a networked coalition entity among other local operations also engaged in AIDS-related work.³⁵ Finally, we examined community-level factors such as HIV prevalence and provision of local HIV prevention services to understand the formation of motivation to participate. Given the theorized influence of macrolevel factors on health behaviors, we expected community-level factors would influence community involvement independent of other individual and compositional factors commonly associated with participation such as race and ethnicity, gender, and beliefs and attitudes related to motivation.

Material and Methods

Participants

From August 2007 through January 2008, venue-based sampling was conducted in the metro Atlanta area in areas of high poverty and high HIV prevalence.³⁶ Venues were selected by study staff and partner agencies, who had hosted HIV vaccine-related functions. The study staff determined the suitability of venues based upon discussions with agency staff, target population observation at the locations, and other considerations (e.g., safety). The sampling frame ultimately included 21 locations that demonstrated the potential to recruit an adequate number of eligible study participants within specified venue-day-time periods (VDTs).

The sampling strategy allowed for recruitment to occur at various times and days of each week during randomly selected blocks of time. Project assistants were given assignments to perform recruitment and data collection based on a master schedule of monthly activities. They randomly approached members of attendee populations about the survey. For those who met the eligibility criteria and consented to participate in the study, the study staff directed participants to a semi-private area or nearby quiet spots in outdoor locations to complete the self-administered, paper questionnaire. The questionnaire took approximately twenty minutes to complete.

Persons were eligible for this study if they were at least 18 years of age and could read and speak English. Approximately five hundred and forty people were invited to participate. Of these, 453 were eligible and provided written informed consent (yielding a response rate of 83.9%). A T-shirt or health promotion incentive valued up to \$10 such as a bag with condoms and safe sex items was offered for participation in this study. The Emory University Institutional Review Board approved this protocol.

Measures

The inventories developed for this study were constructed based on a review of the literature, from our previous research with similar populations and our existing instruments, along with other scaling options.^{35–38} The measures utilized for this study have been previously reported and were determined to be reliable and have been validated with similar populations.^{37–41}

Dependent variable—We selected HIV vaccine community participation as the dependent variable, focusing on involvement in HIV vaccine research as it is typically more difficult to achieve participation in biomedical research compared to other HIV prevention efforts. HIV-related research participation was measured by asking respondents: “On a scale from 0 (definitely not) to 10 (definitely so), rank your likelihood of getting others involved in HIV vaccine research in the next 6 months.” Kurtosis estimates were examined to determine normality of the distribution and the Shapiro-Wilk test was subsequently performed to assess skewness with nonsignificant normality ($z = -0.23$). Similarly, the kurtosis estimate on the raw scaled outcome was also acceptable ($z = -0.90$). Given that the raw outcome score displayed a greater degree of normality and acceptable clustering, the variable was subsequently rescaled from 1 (definitely not/not very likely) to 5 (definitely so/very likely) using percentile splits. The resulting kurtosis score remained relatively similar ($z = -0.99$) to its previous version ($z = -0.90$), as did its degree of skewness ($z = -0.28$).

Individual-level and Psychosocial Covariates—In addition to demographic variables including race, income, gender, and age, we examined the role of psychosocial variables. Drawing from the theory of reasoned action schema, we assessed *attitudes* toward HIV vaccine research.⁴² In addition, behavioral and normative *beliefs* were examined. Consideration of social *norms* was also critical given historical and cultural consideration of clinical study participation in minority communities.^{43–44} Our items assessed whether significant others, including partners and family, peers, and friends, might respond favorably to participation in HIV trials. The relevance of clinical research was also measured via the “organizational relevance” scale, which incorporates specific attitudes about HIV vaccine research based on identification with the aims of the clinical research site. This variable has been linked to intentions to participate in future HIV vaccine functions.^{33, 37}

Social/organizational-Level Factors—Given the important role of community-based and AIDS service organizations in mobilizing individuals to participate in HIV vaccine research, we examined the placement of organizations offering social services, support functions, social group activities, community education, and HIV prevention programming in participants’ localities. The catalogue of organizational offerings was drawn from a dataset reflecting 299 unique organizational services and activities, including HIV-related evidence-based programs identified in the literature review from the 13 county Atlanta metropolitan area.³⁶ The variables analyzed in this study include the number of programs providing HIV case management, HIV medical and treatment services, HIV/STD testing and counseling, community education and outreach, HIV mentoring and support groups, HIV interventions, and HIV-related support services such as food, shelter, clothing and transportation. Additional variables included the targeted level of organizations’ HIV prevention services and offerings (i.e., individual, group, community).

Community-Level Variables—Data at the census tract level were available for a number of social, demographics and community variables expected to influence interest in research participation. We included HIV prevalence, racial composition of the neighborhood (the extent of Spanish speaking households in census tracts compared to English-speaking households), the number of adults in the population ≥ 25 years, educational attainment

status (male high school graduation rates), employment status, household median income, and household vacancy in the area. All co-factors were measured at the census tract level and expressed as percent per tract based on cases per 1,000 residents (e.g., percent of census tract that is black/African-American, percent of census tract that is multi-racial). These co-factors were linked to their respective zip codes for matching with individual-level factors predicted to influence community participation.

Analytic Approach—We capitalized on the multilevel structure of the data to evaluate the influence of all factors on the outcome. Public health research increasingly depends on clustered data, such as census tract level data, to assess the effectiveness of programs, interventions and policies; however, systematic bias arises when observations within the same cluster are analyzed.^{45–46} The primary model building strategy is therefore to generate estimates of regression coefficients that account for the problem of dependence emerging from use of clustered data. We explored the maximum likelihood effects of the various factors on participation in HIV research by using a random intercept model with covariates.⁴⁶ The models were tested for multicollinearity and assessed for any confounding factors. All covariates were classified as significant and remained in model when the p-value was less than 0.10.

Results

Tables 1 and 2 provide descriptive sociodemographic data and results for the variables. Demographically, the majority of this sample was African American and in the 18–39 age group. Most respondents were female. While just over half of all respondents reported working full-time, a quarter of participants reported yearly incomes of under \$40,000 (n=116, 27.2%).

Table 2 demonstrates that the average number of HIV/AIDS-related services by type of programming ranged from an average of .251 HIV case management services per neighborhood to an average of 1.39 individual-focused programs per neighborhood. In this study, the neighborhood programming variables (e.g., HIV case management, HIV medical treatment and services) represent the density or number of programs in each zip code area. Some areas had no programming while others had some. In Table 2, the descriptive statistics are averaged across areas. For example, a mean of .251 for HIV case management services indicates that a quarter of the zip codes had HIV case management programming.

Results from the analysis of the multilevel relationships are shown in Table 3. Parameter estimates in these models are based on maximum likelihood estimates using a random intercept model. We chose this model because the significant likelihood ratio χ^2 (p= .051) and the small and insignificant Durbin-Wu Hausman χ^2 in models I and III (8.13, p= .521; 6.88, p= .649, respectively) indicate residual variance is noteworthy enough to warrant investigating differences between neighborhoods rather than disregarding them.⁴⁶ Moreover, the fixed-effects model is less parsimonious than the random effects model because it estimates intercepts for each neighborhood rather than the variance across them.

Significant individual-level and psychosocial-factors included race and income (black/African Americans and those with lower average incomes were more likely to participate), favorable attitudes, norms and beliefs toward HIV vaccine research, and perceived relevance of the clinical research organizational efforts in the lives of participants. Significant community-level effects included accessibility to HIV case management, HIV medical treatment services, and support services. Notably, those communities with service providers whose program efforts focused primarily on individuals were less likely to get involved in

HIV prevention research. The proportion of the black/African American population in the community was also significant.

The full multilevel model revealed significant individual-level and community-level factors influencing participation including HIV medical treatment service, HIV-related support services, individual-level programming efforts, income, norms and behavioral beliefs. Multilevel random coefficient models were estimated using the most robust variables including HIV medical treatment, support services, programming focus, income, norms and beliefs. None of the random coefficient models improved the fit of the data. The results indicate the full multilevel model was a better fitting model (i.e., BIC 713.64) than either the community/organizational (846.76) or the individual models (1303.59) alone.

Discussion

Delineating the multilevel factors associated with community involvement in HIV research is a vital step in mobilizing people to participate in HIV vaccine trials. To that end, this study suggests local HIV service provision and programming influences individuals' decisions to engage in HIV-related research activities independent of other individual and compositional factors commonly associated with participation in HIV prevention research such as race, gender, beliefs and attitudes.

This study augments the explanatory power of microlevel behavioral theory with consideration of an array of other contextual factors that may play a role in realizing greater involvement of priority populations in biomedical HIV prevention research.⁴⁷ Overall, the study validates the importance of accounting for socioecological issues that may have important influences on individual involvement in HIV biomedical prevention research efforts.⁴⁸

The individual model established that four of five psychosocial components were significant with intention to get involved in HIV research, which is similar to previous findings.³³ The results demonstrate the importance of favorable beliefs and attitudes toward biomedical research and HIV vaccine development. "Behavioral beliefs" toward participation are clearly an important predictor of future involvement and represent an important intervention point for programmatic efforts. Similarly, group norms (e.g., perceived social pressure to perform a behavior or forego it) were significant in relation to the dependent variable.⁴⁹ This finding suggests concern about what others may think about one's research participation affects participants' decision making.

Additionally, the organizational relevance of the clinical research site resulted in significant effects. As respondents increasingly see themselves aligned with ideological purposes as well as the mission of the clinical research site, they are more likely to participate in future biomedical HIV prevention research. Thus, latent characteristics, such as a perceived sense of inclusion, which results from community-organized research involvement, influence this population. Similarly, appraisal of the research site's mission, vision, and values in decision-making is realized in the normative context. This result suggests first impressions or previous interactions with the site may be used as a heuristic for decision-making on volunteerism.

With respect to the second multilevel model that examined the relationship social/organizational- and community-level characteristics within the participants' residential areas, we found specific types of support services and programming had important relationships with the likelihood of HIV vaccine research participation. The provision of HIV medical treatment and case management and support services by organizations within the local setting serves as a participatory motivator in HIV vaccine research.

We observed a focus on strictly individual-level service provision does not influence persons to action on HIV vaccine research. This effect likely arises because HIV/AIDS is viewed as a more significant community health problem in the census tracts with high HIV prevalence. Local AIDS service (ASOs) and community-based organizations (CBOs) which have an array of health promotion offerings and are connected via coalition efforts play a critical function in building a solid social capital structure.⁵⁰⁻⁵¹

Despite sampling in areas of high poverty, the majority of respondents had annual household incomes greater than \$40,000, perhaps indicating urban gentrification is occurring in these communities, which may influence interest in participating in HIV vaccine trials. In the partial model, we found a greater proportion of black/African American residents influenced the likelihood of involvement in HIV vaccine research.²⁻⁶ We believe this effect also results from general awareness of the presence of HIV in the community and the personal relevance of the issue to the population (i.e., black/African Americans were more likely to become involved in HIV-related research in the individual-level model).

It is important to note our study population included a large percentage of African Americans (56%) and a significant proportion of men-who-have-sex-with-men, gay, bisexual, queer, and questioning participants (38.2%). This distribution is comparable to the characteristics underlying the US epidemic generally. In 2006, black/African American women constituted 61% of the estimated 54,230 domestic female incident HIV cases, and subgroup estimates among young (ages 13–29) black men-who-have-sex-with-men (MSM) demonstrate a rate 7.1 times greater than for white men in the same age group.⁵² Therefore, among areas with larger proportions of black residents to non-white residents, the importance of biomedical HIV prevention research likely holds greater relevance in its purpose of ameliorating HIV-related ethnic health disparities.

Interestingly, the prevalence rate of HIV in these neighborhoods did not have a significant influence on motivation to participate in HIV vaccine research. Our previous HIV spatial analysis study in Atlanta identified one large cluster centralized in downtown Atlanta containing 60% of prevalent HIV cases (1.34% prevalence rate within cluster compared to 0.32% outside the cluster).³⁶ Clustered tracts were associated with higher levels of poverty, higher density of African American residents, injection drug use, men having sex with men, and men having sex with men and IV drug use.³⁶ Given the generalized nature of the HIV epidemic in this city, the degree of appraisal given to HIV prevalence as a key motivating force for engagement in HIV vaccine research is trumped by other contextual and psychosocial factors. We interpret the findings to suggest the population is not motivated to participate by of the greater area prevalence but by the actions of the organizations to address the problem and by the beliefs individuals hold about what impact their actions will have on reducing the local epidemic.

Finally, the full model that accounts for all factors at the individual, social/organizational, and community-levels offers the best fit in explaining how persons become engaged in HIV vaccine research. These findings underscore the importance of all multilevel factors contributing to successful community mobilization around HIV prevention.⁵⁰ Thus, our study demonstrates contextual characteristics need to be considered for HIV vaccine mobilization to occur, with emphasis placed on expanding community-based organizational opportunities.

In the partial model, the proportion of blacks in the population influenced the likelihood of mobilizing the community. It may be easier to mobilize blacks because those communities are most deeply affected by rising HIV prevalence. Thus, it is important that our coalition (APRCC) develop novel outreach efforts that target this group to ensure that peers are

recruited to participate in HIV vaccine events and activities and that these efforts are ultimately organized and managed by community members. In addition, local organizations have an important role in realizing community involvement in HIV vaccine research. The extent of ASO and CBO provision of HIV treatment and support services is a factor in decision-making to become involved in the cause. A structural intervention, HIV service integration, has been shown to increase access to other types of services such as family planning and other types of health screening efforts (e.g., Hepatitis C) that may be beneficial to local communities.^{53–54} By increasing the capacity of the organizational delivery system to integrate building awareness around HIV vaccine research and the opportunities for involvement into existing service offerings, agencies can make participation more acceptable and accessible to wider audiences. With the majority of the ASO and CBO providers located within the areas assessed in this study and already connected to the APRCC structure there is ample opportunity to incorporate biomedical HIV prevention research education and recruitment outreach.

Limitations

Findings are limited by several factors, including the inherent limitations of a serial cross-sectional study design. The design does not allow for causal conclusions to be drawn. The study was concerned with relational modeling of various theoretical constructs thereby only allowing for covariant evaluation. In this study, intentions were evaluated. A body of research has demonstrated that intentions are moderately good predictors of future behavior.^{55–57} However, Buchbinder found willingness-to-participate was an imperfect predictor of actual participation in HIV vaccine research.⁵⁸ Given the general limitations in predicting behavior from stated beliefs and attitudes, it would be highly beneficial to the field to examine the role of intentions to behavior in future studies. This would offer additional insight on the factors which are truly motivating on achievement of each of the outcomes of interest.

Conclusions

This study explored the interplay of various contextual factors on the decision-making on HIV vaccine participation. The assessed variables reflecting motivations demonstrated predictive validity toward involvement in HIV vaccine research endeavors. The model components indicate consistent effects associated with the factor relationships. The multilevel model is therefore useful in understanding the complex interplay of factors that influence HIV vaccine involvement with this population.

The results from this study suggest our priority populations can be influenced to become involved in HIV prevention research. Generating positive promotion and greater community mobilization around HIV vaccine research within black/African American communities are activities that stem from positive attitudes toward health research and HIV vaccine development and favorable appraisal of sociopolitical involvement in HIV issues specifically embedded in participants' relationship with the clinical research site. These findings have programmatic implications for the initiation of community engagement via a coalition of partnership organizations. By linking individuals to organizations and, in turn, cultivating relationships between clinical research entities and those community organizations, effective coalitions can be formed. With experience in building trusting relations among their respective communities, the partners therefore bring enormous credibility to the endeavor.⁵⁹

Recognition of HIV/AIDS as an important issue signifies a normative concern for each organization. Bringing biomedical HIV prevention research to the agency agenda therefore signifies the importance of new prevention options to reduce HIV transmission. Thus,

agencies with stable histories in the community and for whom HIV prevention is a concern continue to serve as ideal allies for building trust and facilitating collective collaborative action.

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Table 1**Study Sample Characteristics**

Sample Demographics (N = 427)	Study Population (Total %)
Age (mean = 37.0 years old)	
18–29	142 (33.26)
30–39	111 (26.00)
40–49	113 (26.46)
50–59	50 (11.71)
60 and over	11 (2.58)
Gender	
Male	182 (42.62)
Female	237 (55.5)
Transgender: M → F	4 (0.94)
Transgender: F → M	4 (0.94)
Race	
White	128 (29.98)
Non-white	299 (70.02)
Ethnicity	
Asian/Asian-American/Pacific Islander	17 (3.98)
Hispanic/Latino/Chicano	10 (2.34)
African-American/Black	238 (55.74)
Caucasian/White	125 (29.27)
Native American/American Indian/Alaskan Native	3 (0.7)
Multiracial/Multicultural	34 (7.96)
Sexual Orientation	
Straight (heterosexual)	256 (59.95)
Lesbian, Gay, Bisexual, Queer, Questioning (LGBTQQ)	163 (38.17)
Educational Attainment	
K-12 grade	2 (0.47)
Technical/Vocational/Associates	123 (28.81)
Bachelor	103 (24.12)
Master's	122 (28.57)
Doctorate	57 (13.35)
Household Income	
Less than \$40,000	116 (27.17)
\$40,001–\$60,000	112 (26.23)
\$60,001–\$80,000	86 (20.14)
\$80,001–\$100,000	48 (11.24)
Over \$100,000	23 (5.39)

Table 2**Assessment of Multilevel Influences on Community HIV Vaccine Participation**

	Mean	SD	Min	Max
Individual Characteristics				
Race	1.700	0.46	1	2
Income	2.710	1.58	1	6
Gender	1.602	0.56	1	4
Age	36.419	11.81	18	67
Individual/Psychosocial Factors				
Attitudes	9.145	2.64	5	13
Social influences	10.808	2.30	4	15
Normative beliefs	11.920	3.53	6	20
Behavioral beliefs	13.965	3.99	7	20
Organizational relevance	6.808	2.56	1	13
Social/Organizational Characteristics				
HIV case management	0.251	0.43	0	1
HIV medical treatment/services	1.217	0.83	0	2
HIV testing & counseling	0.522	0.50	0	1
Community education and outreach	1.068	0.88	0	2
Mentoring and support services	0.386	0.49	0	1
Other HIV intervention approaches	0.522	0.50	0	1
Support services	1.140	0.88	0	2
Individual programs	1.386	0.84	0	2
Group programs	0.589	0.49	0	1
Community programs	1.106	0.86	0	2
Community Characteristics (/1000)				
Total black population	14.806	15.19	0.125	52.062
HIV prevalence	0.249	0.24	0.001	0.958
Spanish speaking	0.965	0.66	0	3.731
Population ≥25 yrs.	20.488	9.01	0	40.79
HS graduation rate (male)	2.138	1.44	0	5.473
Males employed	8.308	3.87	0.268	19.013
Median household income	42.120	15.83	0	93.15
Vacant households	0.905	0.44	0	1.93

Table 3

HIV Vaccine Research Involvement Predictors: Random Effects Model Parameter Estimates, Standard Errors, and P-Values

	Individual Model I	Partial Multilevel Model II	Full Multilevel Model III
	Parameter Estimate (SE)	Parameter Estimate (SE)	Parameter Estimate (SE)
(Random) Intercept	0.122 (0.433)	3.684 (0.543) ***	0.150 (0.779)
Individual Characteristics			
Race	0.219 (0.117) †		0.216 (0.156)
Income	−0.085 (0.035) *		−0.105 (0.048) *
Gender	−0.037 (0.092)		−0.152 (0.124)
Age	0.001 (0.004)		−0.006 (0.006)
Individual Psychosocial Factors			
Attitudes	0.059 (0.033) †		0.053 (0.043)
Norms	0.084 (0.033) *		0.129 (0.047) **
Normative beliefs	0.005 (0.024)		−0.016 (0.036)
Behavioral beliefs	0.080 (0.022) ***		0.078 (0.034) *
Organizational relevance	0.050 (0.024) *		0.032 (0.034)
Social/Organizational Characteristics			
HIV case management		−0.609 (0.329) †	−0.279 (0.282)
HIV medical treatment/services		0.592 (0.222) *	0.628 (0.188) ***
HIV testing counseling		0.269 (0.446)	0.034 (0.376)
Community education/outreach		0.213 (0.214)	0.146 (0.180)
Mentoring and support services		−0.667 (0.432)	−0.769 (0.369) *
Other HIV intervention		−0.132 (0.424)	−0.319 (0.360)
Support services		0.544 (0.223) *	0.473 (0.189) *
Program focus: individuals		−0.460 (0.217) *	−0.308 (0.191)
Program focus: group		−0.585 (0.417)	−0.250 (0.362)
Program focus: community		−0.006 (0.228)	0.060 (0.192)
Neighborhood/Community Characteristics (1000)			
Total black population		0.033 (0.018) †	0.017 (0.016)
HIV prevalence		−0.514 (0.988)	−0.185 (0.834)
Spanish speaking		−0.346 (0.253)	−0.267 (0.210)
Population ≥25 yrs.		−0.061 (0.052)	−0.068 (0.043)
HS graduation rate (male)		0.039 (0.184)	0.228 (0.160)
Males employed		0.094 (0.108)	0.038 (0.089)
Median household income		−0.007 (0.013)	0.013 (0.011)
Vacant households		−0.033 (0.423)	0.236 (0.352)
Sigma_u (SE)	.280 (.103)	--	--
Sigma_e (SE)	.989 (.041)	1.181 (.055)	.928 (.046)

	Individual Model I	Partial Multilevel Model II	Full Multilevel Model III
	Parameter Estimate (SE)	Parameter Estimate (SE)	Parameter Estimate (SE)
Likelihood RatioTest Sigma_u=0	2.67 (p=0.051)	0.0 (1.0)	0.0 (1.0)
Durbin Wu Hausmantest	8.13 (p=0.521)	--	6.88 (p=0.649)
BIC	1303.59 (df/12)	846.76 (df/21)	713.64 (df/30)
AIC	1254.91 (df/12)	774.47 (df/21)	613.80 (df/30)
Number individuals	427	231	206
Number zip codes	157	46	46

†
p<.10;

*
p<.05;

**
p<.01;

p<.001

Table 4

Measurement of Individual/Psychosocial Factors

Factors	Questions
<i>Behavioral Beliefs</i>	My community would really benefit from an HIV vaccine.
	My actions can inspire other to act.
	My participation in a HIV vaccine study would be very good.
	I benefit from health science research.
	My involvement in this cause will result in more ethical research.
	My involvement in this cause will improve my community's trust in medical research.
	I would participate in a HIV vaccine research study because it would help to prevent AIDS.
<i>Normative Beliefs</i>	I think my doctor would approve of my involvement in HIV vaccine research.
	I think my work colleagues would approve of my involvement in this cause.
	My immediate family is supportive of my involvement in HIV vaccine research.
	Most people important to me think my involvement in HIV vaccine research is good.
	Most people important to me usually support my interests.
<i>Attitudes</i>	If my pastor supported HIV vaccine research, I would be inclined to get involved.
	I like to do good for others.
	I like getting involved with HIV vaccine research.
	HIV is a serious concern in my immediate community.
	HIV testing is a benefit of a HIV vaccine study.
<i>Subjective Norms</i>	I would benefit from the medical care associated with a HIV vaccine study.
	Most people who are important to me think I should participate in the HIV vaccine effort.
	Most people who are important to me would approve of my involvement in this cause.
<i>Organization Relevance</i>	Most people who are important to me would support my interest in this cause.
	Being active with the clinical research site would help me to express who I am.
	Hearing that somebody else is involved with the clinical research site tells me a lot about that person.
	Others would view me favorably if I volunteered for a study at the clinical research site.