Sources of Racial/Ethnic Differences in Awareness of HIV Vaccine Trials

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Objectives. We explored the relative effects of 2 awareness components—exposure and attention—on racial/ethnic differences in HIV vaccine trial awareness among men who have sex with men (MSM).

Methods. Surveys assessing awareness of and attitudes toward HIV vaccine trials were administered to 1723 MSM in 6 US cities. Proxy measures of exposure included use of HIV resources and other health care services, community involvement, income, and residence. Attention proxy measures included research attitudes, HIV susceptibility, and HIV message fatigue. Using logistic regression models, we assessed the extent to which these proxies accounted for racial/ethnic differences in vaccine trial awareness.

Results. White MSM reported significantly ($P < .01$) higher rates of HIV vaccine trial awareness (22%) compared with Latino (17%), Black (13%) and "other" (13%) MSM. Venue-based exposure proxies and research-directed attitudinal attention proxies were significantly associated with awareness, but only accounted for the White-Latino disparity in awareness. No proxies accounted for the White-Black or White-"other" differentials in awareness.

Conclusions. Sources of disparities in awareness of HIV vaccine trials remain to be explained. Future trials seeking to promote diverse participation should explore additional exposure and attention mediators. (*Am J Public Health.* 2014;104: e112–e118. doi:10.2105/AJPH.2014.301893)

Although antiretrovirals improve the survival, health, and virulence of HIV-positive individuals,[1–7] the population impact of current HIV treatment is hindered by disparities in testing rates, uneven access to and quality of care, treatment side effects, and drug resistance.[8–16] Similarly, behavioral prevention interventions have limited effects on the various cultural, situational, environmental, and structural factors associated with HIV risk.[17–24] Development of a preventive HIV vaccine that is efficacious across diverse genetic, physiological, behavioral, and environmental settings could help resolve these issues.[25]

Although there has been a marked increase in the proportion of minority participants in US phase I and phase II preventive vaccine trials, these numbers do not reflect the HIV epidemic's impact in the United States. For example, Blacks accounted for an estimated 44% of all new HIV infections in the United States in 2010[26] but represented only 10% to 22% of volunteers enrolled in preventive HIV vaccine trials.[27,28] Potential reasons for the limited participation of people of color in clinical trials have been discussed elsewhere.[29–41] Awareness of such trials is one important predictor of racial/ethnic and other disparities in trial participation.[32,37,42–44]

Few studies have explored the reasons for racial/ethnic differences in awareness of clinical trials.[43,45] We postulate that such differences reflect variations in exposure to information on trials or attention to the information provided.[43] Exposure refers to, for example, provision of materials and messages in venues frequented by members of certain groups, including provision of information through physical and online venues that may differ in their racial/ethnic composition.[46,47] Even when people are exposed to such materials, a number of factors can influence their attention to this information. For instance, the racial/ethnic composition of advertisement models or the cultural appropriateness of the messaging used can influence the duration and type of attention (e.g., favorable or unfavorable) devoted to messaging.[48–50] Moreover, attention to messages focusing on health promotion is often associated with perceived health risk and susceptibility.[51,52]

We explored the relative importance of exposure and attention in racial/ethnic differences in awareness of HIV vaccine trials among men who have sex with men (MSM) who resided in one of 6 US cities and had never taken part in such a trial. Exposure and attention factors may serve as mediators of the relationship between race/ethnicity and awareness, or race/ethnicity may be an effect modifier of the association of exposure and attention with awareness.

METHODS

Data were collected between December 2010 and March 2011 in Boston, Massachusetts; Chicago, Illinois; Denver, Colorado; Houston, Texas; Los Angeles, California; and New York, New York. We used quota sampling to ensure adequate participation from MSM self-identifying as Black or Latino. Eligibility was restricted to individuals who were assigned male gender at birth, who currently resided in one of the 6 cities, who were 18 to 49 years of age, whose self-reported HIV status was negative, and who were at elevated risk for HIV (i.e., they had engaged in unprotected anal intercourse with 1 or more male or male-to-female transgender partners in the preceding 6 months or engaged in any anal intercourse with 2 or more male or male-to-female transgender partners during that period).

Multiple recruitment approaches were used to achieve a target sample of 300 MSM in each of the 6 cities. Recruitment was primarily conducted via the Internet. We recruited online respondents from 2 social Web sites aimed at MSM (Adam4Adam, Manhunt) and 1 general social network site (Facebook). Online

methods included passive recruitment via banner ads and active recruitment via direct e-mails to potentially eligible men. The study was promoted as a "men's health survey," and interested individuals were directed to an online screening instrument to determine their eligibility. Roughly 52% of online contacts were deemed ineligible, and 35% of the individuals contacted did not complete the screening instrument or the survey. We adopted automatic and periodic manual quality assurance mechanisms to safeguard against repeat responders. Those who completed online surveys received a $50 online gift certificate.

Ten percent of the target sample was reserved for in-person (offline) recruitment and survey completion. We incorporated an in-person sample to ensure inclusion of individuals who might not be reached through online recruitment and advertising. We recruited the 10% in-person sample through a combination of passive techniques such as newspaper advertisements in lesbian, gay, bisexual, or transgender (LGBT) and alternative newspapers, transit ads, and palm cards distributed at bars and restaurants serving MSM, as well as through participant referrals. In-person contacts were directed to call an 800 number or send a 1-word text message to a 5-digit number.

In-person screening included quality assurance checks to reduce the likelihood of repeat respondents or respondents who had already completed the online survey. Eligible respondents were provided an appointment at a local accessible venue where self-administered surveys were conducted. Individuals who completed in-person surveys were also encouraged to inform friends about the study. All in-person surveys were conducted over 2 consecutive days within each city. In-person survey completers received $75 in the form of an American Express gift card.

A total of 1835 eligible MSM completed the survey. Among these eligible MSM, 1757 (96%) had never participated in a preventive HIV vaccine study and were included in the final analyses. An additional 34 individuals were excluded owing to incomplete responses. The final sample consisted of 1723 MSM respondents (94% of the full sample). The 34 excluded respondents were less likely than the members of the full sample to self-identify as White (24% vs 58%; $P<.001$), less likely to reside in Boston (6% vs 16%; $P<.001$) or Los Angeles (3% vs 17%; $P<.001$), and more likely to reside in Chicago (44% vs 16%; $P<.001$). There were no statistically significant differences with respect to recruitment approach (online or in person) or HIV vaccine trial awareness.

Measures

The outcome measure of interest was HIV vaccine trial awareness, as reflected in responses to the following item: "Clinical trials to test a new HIV vaccine are being conducted in this city. Have you heard or read anything about the current vaccine trials?" We constructed a binary measure for item responses (1 = yes, 0 = no or don't know). We combined no and don't know responses because less than 3% of the sample answered with the latter. Self-reported race/ethnicity was used to construct our race variable. Respondents were asked to identify 1 or more racial/ethnic groups with which they identified from a list of 8 options and a "decline to state" option. Our racial classification algorithm classified respondents as Black if they selected this racial group irrespective of any other racial/ethnic identity chosen, Latino if they self-identified as Latino but not Black, White if they self-identified as White but not as Black or Latino, and "other" if they did not self-identify as belonging to any of the preceding 3 groups.

Our initial model design included 5 proxy measures for exposure and 5 for attention. Proxy exposure variables reflected the avenues by which clinical sites reached out to inform communities about the trials. These variables were use of HIV resources, involvement with community-based organizations (CBOs) or groups, visits to health care providers, city of residence, and income.

HIV service organizations, other CBOs, and health care providers are all common resources used by HIV clinical research sites to promote studies. In addition, employees working in these organizations may more regularly encounter information on clinical trials, which may increase word-of-mouth dissemination of such information. Thus, we would anticipate that individuals who use these resources more frequently are more likely than those who do not to be exposed to trial information.

HIV resource use was measured as a mean score reflecting the frequency in the preceding 12 months (never, 1–2 times, 3–4 times, ≥ 5 times) with which one engaged in 6 specific activities: "attended community forums or educational events on HIV prevention," "got tested for HIV," "talked to a professional (e.g., STD clinic counselor, doctor) about sex or HIV," "looked for information online about HIV or sexually transmitted diseases," "called an HIV hotline," and "talked to a friend or family member about HIV or sexually transmitted diseases." Higher scores reflected a higher frequency of engaging in such activities.

CBO involvement was measured with a series of 3 items assessing whether, in the preceding 12 months, a respondent volunteered or worked for "a local gay, lesbian, bisexual, or transgender organization"; "a local HIV or AIDS service organization"; or "other local political, community, or service organizations." Given that findings from preliminary analyses of the different types of organizations (HIV/AIDS, LGBT, and other) and their representation in the sample, as well as their association with vaccine trial awareness, did not significantly differ from the findings with the overall involvement indicator, individuals were classified as being involved with a formal community organization if they responded affirmatively to 1 or more of these items.

Provider access (use) was constructed as a binary indicator reflecting affirmative responses to a single item, "Have you visited a health care provider in the past 12 months?" In addition, the specific racial composition and dynamics (e.g., de facto segregation) of a given city can influence one's likelihood of being exposed to trial information. Thus, we included city of residence as another proxy for exposure. Finally, an individual's income can influence his or her access to particular venues, as well as the social networks likely to influence word-of-mouth dissemination of information. We therefore included income as a proxy of exposure. However, to the extent that income is associated with daily stress and competing priorities, it may also serve as a proxy for attention.

The proxy attention variables were age, attitudes toward clinical research, perceived HIV susceptibility (risk of future infection), openness to sex with men who are HIV infected,

and HIV message fatigue (Table 1). Age was postulated as an attention proxy because it can affect the perceived relevance of a study to one's life, and developmental stages may have an impact on attention. Our 4 attitudinal variables—clinical research attitudes, perceived HIV susceptibility, seromixing openness, and HIV message fatigue—were hypothesized as proxies for attention because they may influence one's receptivity to messaging about new HIV prevention modalities.

General clinical research attitudes involved responses to 6 items about clinical research such as "I trust my local clinical research institutions to protect me from harm if I participated in their HIV clinical trials" and "I feel like clinical research institutions care more about profit than the health of community members." Item responses were made on a 5-point Likert scale ranging from strongly disagree to strongly agree.

A summary measure of perceived HIV susceptibility was constructed from the following 3 items: "I have a low risk of becoming HIV positive in the near future," "I am sure I can stay HIV negative for the rest of my life," and "I worry that I may get HIV from my sexual partners." The 5-point response scale for each item ranged from strongly agree to strongly disagree. Responses to the final item were reversed prior to computing the summary score such that higher values reflected higher perceived susceptibility.

Similarly, we constructed a summary seromixing measure (openness to sex with HIV-infected men or men whose HIV status was unknown) from 4 items (on the same 5-point scale used for the susceptibility scale): "I try to avoid sex with positive guys," "I don't mind having sex with positive guys even if we do not use condoms," "I don't mind having sex with positive guys as long as we use condoms," and "Because of HIV medications, positive guys are not as likely to infect me as they would have been in the past." Higher summary scores reflected greater openness to engaging in sex with HIV-infected partners.

In contrast to susceptibility, HIV message fatigue is expected to reduce people's attention to HIV trial messages and materials. We operationalized this variable as a summary of a pair of 5-point scale items: "I am tired of thinking about HIV" and "There is too much focus on HIV." Higher scores reflected greater HIV message fatigue.

Data Analyses

We used exploratory factor analyses and internal reliability (Cronbach alpha) values to construct appropriate composite measures. We included individual items in the composite factors if the exploratory factor analysis loadings exceeded 0.6 (results are available from the first author on request). For descriptive purposes, standard bivariate tests of association (χ^2 test for categorical explanatory variables and *t* test for continuous explanatory variables) were conducted to explore the extent of racial/ethnic differences in the distributions of the exposure and attention proxies.

Our primary analyses included a series of multivariable logistic regression models specified with race/ethnicity indicators only (model A), all of the exposure and attention variables (model B), and interaction effects between race/ethnicity and exposure or attention (model C). Model B initially comprised all of the exposure and attention variables; we engaged in stepwise exclusion of all nonsignificant variables in the model and used the χ^2 test to compare the model fit for each subsequent model. Our final parsimonious model is presented here. For each racial/ethnic indicator, interaction effects were specified and tested

TABLE 1—Variable Names, Descriptions, and Psychometric Traits Within the Sample of Men Who Have Sex With Men: 6 US Cities, 2010–2011

Variable Name	Description	Proxy Type[a]	Range	Cronbach α (No. Items)
HIV resources	12-mo number and frequency of accessing HIV resources (e.g., testing, community forums)	E	0–4 (4 = higher resource utilization)	0.67 (6)
CBO involvement	Volunteered or worked for any (LGBT, HIV/AIDS, or other political, community or service) organizations in past 12 mo	E	0,1	
Provider access	Saw a health care provider at least once in prior 12 mo	E	0,1	
City	City of residence	E	0,1	
Income	Income in prior 12 mo from all sources (e.g., work, Medicaid, GA)	E (A)	9 categories	
CRS aware	Ever heard or read about the local CRS	A (E)	0,1	
Age	Current age	A (E)	4 categories	
Research attitude	Attitudes about clinical research and researchers in general (e.g., "I trust my local clinical research institutions to inform me if experimental vaccines or drugs are potentially harmful.")	A	0–4 (4 = favorable)	0.78 (5)
HIV susceptibility	Self-reported risk of seroconverting in the future (e.g., "I am sure I can stay HIV negative for the rest of my life.")	A	0–4 (4 = high risk)	0.65 (3)
Seromixing	Openness to having sex (with or without condoms) with an HIV-infected man	A	0–4 (4 = more open)	
Message fatigue	Fatigue with hearing about or focusing on HIV (e.g., "I am tired of thinking about HIV.")	A	0–4 (4 = more fatigue)	

Note. CBO = community-based organization; CRS = clinical research site; GA = government assistance; LGBT = lesbian, gay, bisexual, or transgender. The 6 US cities were Boston, MA; Chicago, IL; Denver, CO; Houston, TX; Los Angeles, CA; and New York, NY.
[a]Hypothetical mediation effect: E = exposure; A = attention. Items in parentheses are potential secondary mediation effects for the variable.

separately with each of the exposure and attribute variables in the final version of model B. Interactions deemed significant at the .1 level were included in model C. All analyses were conducted in R 3.0.1 (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Roughly 16% of the sample self-identified as Black, 22% as Latino (non-Black), 54% as White (non-Latino), and 7% as a member of another racial/ethnic group. Table 2 presents the descriptive results for each of our key variables along with tests of association for differences between racial/ethnic groups. Racial/ethnic groups differed significantly ($P < .05$) in the levels and prevalence of all variables with the exception of HIV message fatigue.

Level of HIV vaccine trial awareness was highest among White MSM (22%) and lowest among Black MSM and those in the "other" racial/ethnic group (13%). Black MSM had the highest average score on the HIV resource use measure (0.9, as compared with 0.8 in all other groups) and the highest level of 12-month involvement with a CBO (40% vs 25%–29% in the other groups).

Visits to health care providers in the preceding 12 months were more frequent among White MSM (81%) than among MSM in the other groups (65%–71%). White MSM also had higher annual incomes than those in other groups, along with higher representation in Boston and lower representation in Houston,

TABLE 2—Descriptive Statistics for the Variables Analyzed Among Men Who Have Sex With Men, by Race/Ethnicity: 6 US Cities, 2010–2011

	Race/Ethnicity				
	White	Latino	Black	Other	*P*
Sample, no. (%)	923 (53.6)	372 (21.6)	303 (15.6)	125 (7.2)	
Vaccine trial awareness, %	21.8	16.7	13.2	12.8	< .001
Exposure proxies					
HIV resource use score, mean (SD)	0.81 (0.50)	0.82 (0.51)	0.91 (0.53)	0.80 (0.51)	.02
Involved in community-based organization, %	29.1	24.7	39.6	28.0	< .001
Visited a provider, %	80.8	71.2	66.3	64.8	< .001
City of residence, %					< .001
Boston, MA	20.9	9.1	7.9	23.2	
Chicago, IL	16.6	15.1	18.2	16.0	
Denver, CO	19.4	12.9	14.2	8.0	
Houston, TX	17.6	22.3	12.5	11.2	
Los Angeles, CA	14.0	22.3	19.8	19.2	
New York, NY	11.6	18.3	27.4	22.4	
Income, $, %					< .001
0–4999	4.8	10.6	8.3	12.7	
5000–9999	5.7	8.8	10.8	10.0	
10 000–14 999	9.5	12.3	14.4	7.3	
15 000–19 999	10.1	11.7	11.2	7.3	
20 000–29 999	12.3	13.2	11.5	13.6	
30 000–39 999	10.3	11.1	13.3	14.5	
40 000–49 999	10.9	11.1	11.5	9.1	
50 000–75 999	17.3	10.9	9.4	13.6	
≥ 75 000	19.2	10.3	9.7	11.8	
Attention proxies					
Age, y, %					< .001
18–24	20.7	28.0	20.5	28.8	
25–29	22.0	27.7	19.5	27.2	
30–39	29.9	29.3	29.7	31.2	
40–49	27.4	15.1	30.4	12.8	
Attitude toward research score, mean (SD; 95% CI)	2.75 (0.75; 1.28, 4.22)	2.60 (0.87; 0.90, 4.30)	2.65 (0.90; 0.90, 4.40)	2.68 (0.89; 0.94, 4.42)	< .01
HIV susceptibility score, mean (SD; 95% CI)	1.77 (0.99; −0.16, 3.70)	2.03 (0.98; 0.12, 2.94)	2.02 (0.99; 0.09, 3.95)	1.90 (0.88; 0.18, 3.62)	< .001
Seromixing score, mean (SD; 95% CI)	0.94 (0.84; −0.70, 2.58)	0.85 (0.81; −0.73, 2.43)	1.04 (0.88; −0.68, 2.76)	0.84 (0.76; −0.64, 2.32)	< .01
Message fatigue score, mean (SD; 95% CI)	1.44 (0.92; −0.35, 3.23)	1.44 (1.06; −0.63, 3.51)	1.39 (1.01; −0.58, 3.36)	1.64 (1.05; −0.41, 3.69)	.1

Note. CI = confidence interval. The sample size was n = 1723.

TABLE 3—Relative Odds Ratios for HIV Vaccine Trial Awareness Among Men Who Have Sex With Men: 6 US Cities, 2010–2011

	Model A, Relative OR (95% CI)	Model B, Relative OR (95% CI)
Intercept	0.28*** (0.24, 0.33)	0.09*** (0.05, 0.17)
Race/ethnicity		
Non-Latino White (Ref)	1.00	1.00
Non-Latino Black	0.56** (0.39, 0.80)	0.53*** (0.36, 0.78)
Non-Black Latino	0.68* (0.50, 0.93)	0.79 (0.57, 1.09)
Other	0.52* (0.30, 0.90)	0.47* (0.27, 0.84)
Exposure proxies		
HIV resources		1.84*** (1.44, 2.36)
Involvement in community-based organization		1.66*** (1.27, 2.18)
City		
Boston, MA (Ref)	1.00	1.00
Chicago, IL		0.38** (0.25, 0.58)
Denver, CO		0.50** (0.34, 0.75)
Houston, TX		0.35*** (0.23, 0.53)
Los Angeles, CA		0.24*** (0.15, 0.38)
New York, NY		0.61* (0.40, 0.92)
Attention proxies		
Attitude toward research		1.40*** (1.18, 1.65)
Message fatigue		1.15* (1.01, 1.31)
Fit statistics		
Akaike information criterion	1641	1541
χ^{2a}	. . .	0.001

Note. CI = confidence interval; OR = odds ratio.
[a]Test of model fit (vs previous model).
*$P < .05$; **$P < .01$; ***$P < .001$.

Los Angeles, and New York. Latino MSM and MSM in the "other" racial/ethnic group tended to be younger than White and Black MSM.

With respect to our attention attitude scores, White MSM had the most positive attitudes toward clinical research and the lowest perceived HIV susceptibility. Latino MSM and MSM in the "other" racial/ethnic group reported the lowest openness to engaging in sex with HIV-serodiscordant partners.

Table 3 lists the relative odds ratios for our multivariable models. Model A included the odds ratios for vaccine trial awareness in racial/ethnic groups only. Black MSM and MSM in the "other" racial/ethnic group were 44% to 48% less likely than White MSM to report vaccine trial awareness ($P < .001$ and $P = .02$, respectively). Latino MSM were 32% less likely to report awareness than White MSM ($P < .01$). Model B included the 5 explanatory exposure and attention variables that were significant in our parsimonious model (i.e., after stepwise exclusion). Two exposure proxies (provider access and income) and 3 attention proxies (age, HIV susceptibility, and seromixing) were nonsignificant, and their exclusion did not significantly change the model fit (deviance = −19.474; $df = -14$; $P = .15$).

The remaining 5 proxy measures included 3 exposure proxies (HIV resource use, CBO involvement, and city of residence) and 2 attention proxies (clinical research attitudes and HIV message fatigue). In general, MSM who reported greater use of HIV resources (70%; $P < .001$) and greater CBO involvement (41%; $P < .02$) had higher odds of HIV vaccine trial awareness. Awareness was significantly associated with area of residence. MSM in Boston were nearly 65% more likely than MSM in New York ($P = .02$) and up to 4 times more likely than MSM in Chicago, Denver, Houston, and Los Angeles ($P < .001$) to report awareness of vaccine trials. Having a more positive attitude toward clinical research was associated with a 40% increase in the likelihood of being aware of current vaccine studies ($P < .001$). MSM reporting higher levels of HIV message fatigue were 15% more likely than those at lower levels to report vaccine trial awareness.

Although inclusion of these exposure and attention proxies significantly improved the model fits (model A Akaike information criterion [AIC] = 1641; model B AIC = 1541; χ^2 analysis of deviance $P < .001$), they appeared to mediate only the disparity in awareness between Latino MSM and White MSM. The vaccine trial awareness relative odds ratios for Black MSM and MSM in the "other" racial/ethnic group relative to White MSM remained unchanged and significant ($P < .001$ and $P < .01$, respectively). There were no significant interaction effects between any of the race/ethnicity indicators and any of the exposure or attention proxy measures (model C; data not shown).

DISCUSSION

Racial/ethnic differences in clinical trial awareness may partially explain racial/ethnic differences in trial participation. Our findings suggest that, on average, White MSM are 47% to 98% more likely than MSM of color to be aware of current HIV vaccine clinical trials. The 47% awareness gap for White MSM relative to Latino MSM disappeared once we accounted for several exposure and attention variables. By contrast, the awareness gap for Black MSM and MSM in the "other" racial/ethnic group relative to White MSM was unaffected by inclusion of these significant variables, which would suggest that the sources of these disparities are not mediated by the factors identified in our models.

It is instructive to highlight the variables explored here and the implications. Risk perspectives (HIV susceptibility and seromixing) were not associated with awareness on average in the joint multivariate model. Although this was a sample of MSM who were at a behaviorally high risk of HIV, perceived HIV susceptibility varied considerably, with a quarter of the sample reporting their susceptibility as very low (< 1 on the 0–4 scale). Black and Latino MSM reported the highest perceived

susceptibility and White MSM the lowest. White and Black MSM reported greater openness to sex with HIV-infected men than other MSM in the sample. This would suggest that perceived risk does not influence attention to preventive vaccine trial promotions. It also suggests a couple of alternative scenarios. On the one hand, people at higher risk may not see the relevance of vaccine trials to their risk. On the other hand, attempts to attract higher-risk individuals may not be successful because of the way in which risk is addressed by the researcher.

Income and age were included as potential social network proxies that could transcend or possibly correlate closely with race/ethnicity. However, neither of these factors were significant in explaining differences in awareness, which suggests that messaging and study promotion can reach a broad constituency but that this diverse outreach is currently limited in its engagement of diverse racial/ethnic groups (i.e., it does not reach or appeal to people of color).

Interestingly, Black MSM had the highest average levels of 2 of the significant exposure proxies—HIV resource use and CBO involvement—of any group. Yet, inclusion of these variables did not account for the awareness gap between Black and White MSM. Nor was there evidence of a strong interaction (modifying) effect for race/ethnicity or vaccine trial awareness. This might suggest that venue-based awareness promotion is missing distinct and important organizations serving people of color, irrespective of city of residence. Thus, the question of why there are racial/ethnic gaps in awareness remains.

Aside from outreach to appropriate and diverse venues, racial/ethnic cultural issues may affect engagement. It is likely that there are unmeasured (and possibly unobservable) factors affecting these disparities, such as cultural and identity representation in promotional materials, differences in response to content and presentation (e.g., scientific data vs participant testimonials), or contextual group differences (e.g., segregation). If participation diversity is a central goal of clinical studies, more in-depth research focusing on the reasons for the lower levels of awareness of Black MSM and MSM from other (minority) racial/ethnic groups may be warranted, research that extends beyond mere reference to venues, risk, and mistrust of research. These factors are probably complex and multifaceted.

A key limitation of this study was our reliance on proxies, which are likely imperfect measures of the underlying concepts we wanted to address. Moreover, several potentially relevant proxies such as educational attainment were not included in the original survey. In addition, causality is an issue in interpretation of our data. Measures such as clinical research attitudes may be affected by awareness of trials, as opposed to vice versa. As such, our results should be understood as illustrative rather than definitive. Although the recruitment methods used can affect the generalizability of a study, we found no differences in vaccine trial awareness between individuals recruited online and those recruited in person.

In conclusion, despite significant racial/ethnic differences in our measured exposure and attention proxies, these proxies accounted for only some of the disparities in awareness of vaccine trials, largely between Latino and White MSM. We were able to explain few of the disparities in awareness among Black MSM, in particular, relative to other groups. Disparities in awareness may arise from cultural factors (e.g., identity representation in promotional materials), contextual or structural differences (e.g., de facto segregation and exclusion), or group-level attitudes toward local research institutions (e.g., quality of engagement with racial/ethnic group members). More research is needed to better identify the sources of these racial/ethnic disparities in vaccine trial awareness. ■

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This article was accepted January 16, 2014.

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M. P. Arnold, M. Andrasik, M. J. Mimiaga, K. Mayer, S. Buchbinder, and B. A. Koblin led the protocol design and survey development. S. Landers supported protocol and instrument design and led the data collection. M. P. Arnold led the data analysis. All of the authors contributed to the review of findings and the development of the article.

Acknowledgments

This research was supported by the National Institute of Mental Health (grant 3U01AI068614-04S1). This article resulted (in part) from research conducted for the Leadership Group for a Global HIV Vaccine Clinical Trials Network, supported by the National Institute of Allergies and Infectious Diseases (grant 5UM1AI068614).

Note. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Human Participant Protection

This study was approved by the institutional review board of the Fred Hutchinson Cancer Research Center. All participants provided written informed consent.

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