

## AN EVALUATION OF MPOWERMENT ON INDIVIDUAL-LEVEL HIV RISK BEHAVIOR, TESTING, AND PSYCHOSOCIAL FACTORS AMONG YOUNG MSM OF COLOR: THE MONITORING AND EVALUATION OF MP (MEM) PROJECT

Gene Shelley, Weston Williams, Gary Uhl, Tamika Hoyte,  
Adanze Eke, Carolyn Wright, Gregory Rebchook, Lance Pollack,  
Kelly Bell, Yan Wang, Qi Cheng, and Susan M. Kegeles

Young men who have sex with men (MSM) of color are at increased risk for HIV infection. Mpowerment (MP) is an intervention designed to reduce risky sexual behavior and increase HIV testing among young MSM ages 18–29. From 2009 to 2012, three community-based organizations with support from the U.S. Centers for Disease Control and Prevention evaluated MP among  $N = 298$  participants. Following a repeated measures design, data from 3- and 6-month follow-ups were compared to baseline. HIV testing and self-efficacy for safer sex increased at both follow-up time points; self-acceptance as an MSM was higher at follow-up 2. Condomless anal/vaginal sex was lower at follow-up 1 only. Frequency of exchange of safer sex messages among gay/bisexual/transgender friends was lower at follow-up 1, but similar to baseline at follow-up 2. Exposure to MP was associated with improved perceived positive social norms about safer sex and safer sex messages among gay/bisexual/transgender friends.

In 2006, the U.S. Centers for Disease Control and Prevention (CDC) began an initiative that funded community-based organizations (CBOs) to implement Effective Behavioral Interventions (EBIs). EBIs are HIV prevention interventions for which research has shown evidence of effectiveness to prevent HIV among MSM of color (Collins, Harshbarger, Sawyer, & Hamdallah, 2006) and reduce health disparities

---

Gene Shelley, Gary Uhl, Carolyn Wright, and Yan Wang are affiliated with the Centers for Disease Control and Prevention, Atlanta, Georgia. Gregory Rebchook, Lance Pollack, and Susan M. Kegeles are affiliated with the Center for AIDS Prevention Studies, San Francisco, California. Weston Williams is affiliated with Public Health Analytic Consulting Services, Inc., Miami, Florida. Kelly Bell is an independent researcher. Adanze Eke and Qi Cheng are affiliated with Karna LLC, Atlanta.

We acknowledge Alberto Curotto, former staff of the Center for Aids Prevention Studies, who worked with us on this evaluation and provided theoretical and practical assistance to the first half of this project. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Address correspondence to Gene A. Shelley, PhD, Mailstop E-59, Centers for Disease Control and Prevention, 1600 Clifton Rd., Atlanta, GA 30329. E-mail: gshelley@cdc.gov

(CDC, 2013). Mpowerment (MP), a community-level intervention designed to prevent HIV among young MSM, is an EBI that was recently emphasized in CDC's High Impact Prevention (HIP) Initiative (Mermin & Fenton, 2012), which calls for implementing the best combinations of EBIs along with increased HIV testing and antiretroviral therapy (ART) for HIV-infected persons. MP was evaluated and found to be efficacious in reducing sexual risk behavior in research trials with predominantly White MSM in the 1990s (Kegeles, Hays, & Coates, 1996; Kegeles, Hays, Pollack, & Coates, 1999), but changes in society, adaptations to MP and facets of the HIV epidemic may have led to different outcomes over time since then (Horner, Rew, & Torres, 2006). While monitoring the fidelity of MP at CBOs and providing capacity building assistance to them helps to ensure that implementation is occurring as intended (Kegeles et al., 2012; Kegeles, Rebchook, Tebbetts, Arnold, & the TRIP Team, 2015), monitoring outcomes provide information about whether participants reduce sexual risk behaviors following the intervention when implemented in non-research settings.

Many CBOs are funded by CDC to implement MP and other EBIs, but limited information is available beyond the original randomized, controlled trials about changes in behavior and psychosocial factors that are presumed to be associated with exposure to the interventions. Outcome monitoring evaluations may be conducted to assess the effectiveness of CDC-funded interventions and to inform decisions about which interventions should be included in future funding initiatives.

The MEM (Monitoring and Evaluation of Mpowerment) project is an outcome monitoring evaluation of MP, and is one of a group of outcome monitoring evaluations of EBIs conducted by the CDC that monitor changes in clients' self-reported HIV transmission risk behaviors after participating in the interventions. Similarly, the objectives of MEM were to assess post-exposure changes in psychosocial factors and sexual risk and HIV testing behaviors among individuals exposed to the intervention. In addition, since the original MP research trials lacked racial/ethnic diversity because the communities that the intervention was tested in were predominantly White (Kegeles et al., 1996, 1999), a second objective of MEM was to conduct outcome monitoring of MP in racial/ethnic minority communities.

## THE MP INTERVENTION

MP is a community-level, community mobilization intervention to reduce sexual risk behavior by addressing psychosocial factors at individual, interpersonal, social, and structural levels. MP operates on the idea that attitudes, beliefs, sense of agency, social support, peer influence, personal and community empowerment and the perception of peers' social norms will influence individuals' sexual risk behavior (Kegeles et al., 1996).

MP is a complex intervention with a variety of core elements that CBOs tailor to their local population and implement according to guiding principles. MP was originally developed for 18–29-year-old MSM and to focus on sexual risk reduction; a focus on increasing the frequency of HIV testing was added over time. The intervention includes the following core elements, which are expected to work together synergistically: (1) core group, (2) formal outreach, (3) M-Groups, (4) informal outreach, (5) publicity, and (6) the project space. See Kegeles et al. (1996, 1999, 2012, 2015) for a description of the components of MP. The core elements are aimed at reducing sexual risk behavior and increasing the frequency of HIV testing and are expected to result in positive changes in psychosocial precursors to behavior change

(e.g., self-efficacy to get HIV testing, communication skills to have safer sex). There is no specified time point when a participant completes the intervention, since activities are ongoing. For example, informal outreach (peers supporting each other to get tested) occurs over time. Mpowerment, by design, has no requirements to attend any Mpowerment activities. MSM are free to attend as many or as few Mpowerment activities as they desire.

## METHODS

The methods used in this study varied from those used in the original MP efficacy research done by the Center for AIDS Prevention Studies (CAPS). In the original research, surveys were administered to a cohort of young MSM, prior to the implementation of the intervention in their community, and subsequently for several waves of data collection. Participant involvement in the intervention varied considerably, from attending nearly all project activities to never having heard of MP in their community (Kegeles et al., 1996, 1999). In contrast, the current outcome monitoring evaluation defined what it meant for an individual to be exposed to a sufficient amount of the intervention to reasonably expect behavior change. CDC staff decided that M-group participation would be considered the start into the intervention since the M-group contains the largest dose (HIV prevention messaging) of the intervention.

### PARTICIPATING CBOS

CBOs receiving CDC funding to implement MP with young MSM of color were invited to apply for additional funding to collect outcome monitoring data for MEM. The CBOs were chosen so that they varied by geographic location, and the specific racial/ethnic minority they were targeting. The CBOs chosen that served primarily MSM of color were:

- CBO-A, Atlanta, Georgia, focused on African American MSM and transgender individuals ages 18 to 29 (since there were relatively few transgender participants in the study, we use the term MSM throughout);
- CBO-B, Chicago, Illinois, focused on Latino MSM aged 13 to 24 during the first project year and aged 18 to 24 during the remaining years (the CBO found that younger participants had different interests and needs than older participants and MP sessions could not address both age groups at once; thus, the focus changed to only the older participants); and
- CBO-C, San Diego, California, focused on MSM of color aged 18 to 24 and their partners.

### DATA COLLECTION

Staff from each CBO attended a 2-day orientation to learn about the MEM procedures. MEM outcome and process monitoring evaluation data were collected from April 2010 to January 2012 during which CBO staff collected demographic, psychosocial, HIV testing and sexual risk behavior data from young MSM of color who were exposed to the M-groups. Baseline data prior to the start of MP implementation could not be collected because the CBOs had been implementing MP since 2006. Instead, baseline data were collected from individuals prior to their participation in an M-Group. Data were collected again from the same individuals at 3 and 6 months after M-Group participation. Participants completed the self-administered

baseline and follow-up surveys using Questionnaire Design System (QDS) software on hand-held devices or laptops provided by the CBOs and collected either at the CBO or at outreach locations.

The CBO staff also collected process monitoring data about how much exposure participants had to different core elements of the intervention, as well as how CBOs implemented MP (i.e., CBO staffing, use of MP funds, and the content of MP activities).

### PARTICIPANT RECRUITMENT

Strategies to recruit and retain MEM participants varied across the three CBOs. CBOs recruited young MSM into MP and MEM simultaneously. CBO-A recruited participants through social marketing campaigns, outreach conducted at venues (e.g., CBOs, college/university organizations), health care providers, and through the site's case management program. CBO-B recruited participants through presentations to high school gay-straight alliances and outreach conducted at gay night-clubs. CBO-C recruited participants during outreach at health fairs, clubs and bars, college campuses, events hosted by the MP project, and through their HIV testing mobile unit. CBOs provided various incentives to MEM participants (e.g., gift cards, clothing, VIP entry into clubs, concert tickets).

Prospective MEM participants were prescreened in order to limit participation to young MSM of color who were newly exposed to the intervention during this project period. Potential participants had to meet the following eligibility criteria: identify as a gay or bisexual male; be within the CBOs' target population age range; had never been involved in any MP activity prior to recruitment into MEM, or had very little involvement, i.e., had not attended an M-Group, more than two project discussion groups, a core group meeting or a project social event (a formal outreach activity), in the prior 12 months, and had not visited the project space more than three times in the prior 12 months. Although this study was to focus on MSM of color, CBOs did not turn anyone away from their services. A few White participants were included in our study. This may have happened for several reasons including interviewer confusion over the race of the participant, self-identification as White by mixed-race respondents, or participant error in completing the survey.

### SURVEY AND PROCESS MONITORING DATA

The participant data surveys (baseline and two follow-up surveys) included questions about HIV testing, sexual-risk behaviors, drug and alcohol use, and exposure to specific components of MP and whether they occurred in the past 3 and 12 months. With respect to sexual behavior, participants were asked if sex occurred with primary or non-primary partners, while high on a substance, or was part of transactional sex in which the participant traded sex for food, shelter, or money. In addition, psychosocial factors were examined through scales that assessed positive attitudes about condoms, self-efficacy for practicing safer sex, perceived social norms about safer sex, dissemination of safer sex messages, self-acceptance as an MSM, and social support from gay/bisexual/transgender friends.

MEM project staff attended MP activities (core group meetings, M-Groups, discussion groups, formal outreach events) and collected process monitoring data about the delivery of MP, which included information about the type and content of the activities and who was in attendance (participants ID numbers were recorded on attendance sheets). These data, in conjunction with the self-reported MP data from

participant surveys, were used to identify which MP activities participants had been exposed to.

#### DATA INCLUSION RULES

Individuals who completed the baseline survey in English were included in the baseline descriptive analysis ( $n = 436$ ); the few surveys that were conducted in Spanish were excluded from analysis. For the analyses of changes after the intervention, participants without post-intervention follow-up assessments ( $n = 100$ ) or who did not report any sexual activity at any time point ( $n = 38$ ) were excluded, yielding a sample of  $n = 298$  participants.

#### ANALYSES

Participant baseline data about demographic characteristics, exposure to MP activities, psychosocial factors, HIV testing, and HIV sexual-risk behaviors were analyzed using descriptive statistics such as frequencies, percentages, and means. The internal consistency of the psychosocial scales was evaluated by calculating Cronbach's alpha. We used the process monitoring data to construct a composite exposure score by multiplying the number of times participant participation was recorded by weights reflecting the exposure to MP (M-Group weight = 5, Discussion Group weight = 4, Core Group weight = 3, attending an MP social event weight = 3). CDC and CAPS staff, along with other providers of MP determined that not all components of MP should have the same weight because MP activities were expected to have the unequal strength of effect on participants because of differing amounts of exposure to prevention messages. Weights ranged from 3 to 5, rather than 1 to 3, because the CDC and CAPS staff determined that no one type of activity had twice or triple the effect of any other type of activity. For the longitudinal models, since the resulting scale would be too tight, the exposure composite score was divided by 20 to produce interpretable estimates. The development of the composite exposure score occurred through collaborative discussions between CAPS as the developers of MP and CDC staff.

Post-intervention changes in outcomes were analyzed using generalized estimating equations (GEE), and empirical (robust) standard errors/confidence intervals were applied. This analytical approach is an expansion upon generalized linear models that incorporates covariance within individuals and CBO, and accounts for the lack of independence between multiple observations for an individual over time (Zeger & Liang, 1986). Psychosocial scales were modeled as continuous outcomes. Dichotomous outcomes were modeled using a log binomial model, producing prevalence ratios. Models included a parameter for the 3- and 6-month follow-up times and the composite MP exposure scale. Models were adjusted for age, race/ethnicity, education, employment status, and self-reported HIV-positive status. For some outcomes, the full model failed to converge due to small cell sizes, so covariates were added using forward selection, including as many covariates as possible to achieve a convergent model.

## RESULTS

### RETAINING MEM PARTICIPANTS

CBOs tried different strategies to retain participants throughout the project. CBO-A focused on recruiting a large number of participants, but lost many of them

to follow-up. CBO-B focused on recruiting participants who they thought would be more likely to be able and willing to participate in the follow-up surveys. This CBO concentrated on MEM survey data collection with a lesser focus on M-group participation. After the survey, participants were given a card to make an M-group appointment; however some of these participants ended up only doing the surveys and never attended an M-group (and thus had to be excluded from the analysis). CBO-C emphasized collecting MEM data from participants at all three time-points. Both CBO-A and CBO-C tried to administer the baseline survey just prior to M-group participation.

Retaining MEM participants through the 3- and 6-month follow-up assessments was difficult for the CBOs due to participants moving within the city, leaving town, being incarcerated, or joining military service. In addition, there was high turnover at some of the CBOs both in intervention and data collection staff during the project. As a result, new staff had to be trained to implement the MP intervention as well as to conduct evaluation activities for MEM. This contributed to the loss of participants because clients were not contacted in a timely manner before being lost to follow-up. This was especially true for CBO-A.

In the longitudinal analysis sample ( $n = 298$ ), 60.1% completed both follow-ups, 25.8% completed follow-up 1 but not follow-up 2, and 14.1% completed follow-up 2 but not follow-up 1. CBO-B reported the highest percent of participants who participated in both follow-up surveys (73.6%), which was significantly higher than at CBO-A (37.2%,  $p < .001$ ) or CBO-C (43.6%,  $p < .001$ ). Participants excluded from longitudinal analyses due to non-participation or being lost to follow-up at both time points ( $n = 100$ ) were less likely to be Hispanic and reported significantly fewer partners and more condomless non-primary partners ( $p < .05$ ). Exclusion was not associated with age, education, employment, HIV positivity, or other sexual risk behaviors assessed.

### SAMPLE CHARACTERISTICS

Table 1 shows participant characteristics of the full sample at baseline ( $N = 436$ ). Participants reported having male (80.2%), female (7.6%), and transgender (0.9%) sex partners in the prior 12 months; 17.5% reported not having a sex partner. The majority of participants were 18–24 years old (80.3%) and either Hispanic (41.9%) or non-Hispanic Black/African American (39.6%). Most reported having a high school diploma/GED (31.7%) or some college (44.7%). Nearly 22% reported that they had never been tested for HIV, while 9.2% had tested HIV-positive. In the 12 months prior to the baseline survey, 8.5% of participants reported an STI diagnosis, 73.6% reported using alcohol or drugs, and 1.3% reported injecting drugs.

### INTERVENTION EXPOSURE

Participation in MP, both self-reported and as recorded on attendance sheets by CBO staff members (process data), are reported in Table 2. Participating in an M-Group was the most common exposure to MP (83.6%). This information (which theoretically should have been 100% since all participants reported M-Group attendance on the surveys) came instead from the attendance sheets, which did not always capture all attendance because participants may have failed to sign-in or staff may have missed recording participant IDs on the attendance sheets. The next most common exposure was picking up free condoms and/or lube (78.5%), which most often occurred at the project space. As might be expected, participating in the Core Group, which involves the planning and execution of project activities and so

TABLE 1. Participant Characteristics at Baseline

Characteristic	CBO-A	CBO-B	CBO-C	Total	Longitudinal Analysis
	<i>n</i> = 180	<i>n</i> = 110	<i>n</i> = 146	<i>N</i> = 436	<i>n</i> = 298
Sex at Birth					
Male	100	99.1	100	99.8	99.7
Female	0	0.9	0	0.2	0.3
Gender Identity					
Male	99.4	99.1	100	99.5	99.3
Female	0.6	0	0	0.2	0.3
Transgender, Female to Male	0	0.9	0	0.2	0.3
Gender of Sex Partners (prior 12 months)					
Male	86.7	67.3	81.9	80.2	87.8
Female	6.1	9.1	8.3	7.6	7.1
Transgender	2.2	0	0	0.9	0.7
No Sex Partners	12.2	29.1	15.3	17.5	10.1
Gender of Sex Partners (last 3 Months)					
Male	77.7	57.3	70.8	70.2	78.4
Female	4.4	3.6	4.9	4.4	5.1
Transgender	1.7	0	0	0.7	0.3
No Sex Partners	21.2	40	26.4	27.7	19.3
Age Category					
<= 17	3.3	34.5	0.7	10.3	10.4
18–24	73.9	65.5	99.3	80.3	78.9
25+	22.8	0	0	9.4	10.7
Race/Ethnicity					
Hispanic	6.1	99.1	42.8	41.9	45.5
Non-Hispanic:					
Black/African American	86	0	12.4	39.6	39.1
American Indian/Alaska Native	0	0	0.7	0.2	0
Asian	0	0	16.6	5.5	4.7
Native Hawaiian/Pacific Islander	1.1	0	2.8	1.4	0.7
White	0.6	0	17.9	6.2	5.4
Other	6.1	0.9	6.9	5.1	4.7
Education					
Less than high school graduate	8.4	41.8	4.1	15.4	15.8
High school graduate/GED	35.0	30.0	28.8	31.7	30.9
Some college (including tech)	43.9	28.2	58.2	44.7	44.6
Bachelor's degree	11.7	0	8.9	7.8	8.1
Post-graduate degree (Masters)	1.1	0	0	0.5	0.7
Self-Reported HIV Testing History					
Never Tested	6.7	43.6	24.0	21.8	19.8
Previously Tested:					
Negative	73.3	54.5	69.2	67.2	68.5
Positive	18.3	0.9	4.1	9.2	9.7
Indeterminate	0.6	0	2.1	0.9	1
Unknown/refuse/missing	1.1	0.9	0.7	0.9	1
Self-Reported STI Diagnosis					
Any STI (gonorrhea, syphilis, and/or chlamydia) in last 3 months	4.4	3.6	1.4	3.2	4.7
Any STI (gonorrhea, syphilis, and/or chlamydia) in prior 12 months	11.1	8.2	5.5	8.5	10.1
Drug and Alcohol Use (prior 12 months)					
Drug or Alcohol Use	65.6	68.2	87.7	73.6	74.8
IDU	1.7	0	1.6	1.3	1.4

TABLE 2. MEM Participant Exposure to Mpowerment

	CBO-A	CBO-B	CBO-C	Total
	% ( <i>n</i> = 128)	% ( <i>n</i> = 80)	% ( <i>n</i> = 90)	% ( <i>N</i> = 298)
Process Data—attendance at:				
M-Group	89.1	66.3	91.1	83.6
Core Group	11.7	18.8	35.6	20.8
Discussion Group	58.6	70.0	22.2	50.7
Social Event	47.7	85.0	76.7	66.4
Self-Report				
Volunteered for Mpowerment	46.5	32.5	48.9	43.4
Visited the Mpowerment Website	37.5	45.0	36.7	39.3
Saw an Mpowerment advertisement	53.1	53.8	45.6	51.0
Picked up free condoms and/or lube	75.8	83.8	77.8	78.5
Had a discussion about safer sex or received condoms from a local outreach worker	61.7	71.3	57.8	63.1

*Note.* Process data were collected by attendance sheets, which may have missed some individuals; also, individuals may have participated in an activity more than one time.

requires a higher degree of involvement and commitment than other activities, was lowest at 20.8%. Combining exposure frequency at follow-ups 1 and 2, the composite exposure scale mean was 19.26 ( $SD = 26.87$ , range 0–211), indicating high levels of average exposure. A value of 18, for example, reflects participation in the M-Group, core group, and formal outreach (discussion group and two social events). Some participants even attended more than one M-Group. There was substantial variation in exposure to the intervention according to the CBO: the mean (standard deviation) exposure at follow-up was: CBO-A 17.40 (25.15), CBO-B 28.01 (35.29), and CBO-C 12.59 (13.13). These differences in exposure between CBOs at follow-up were statistically significant using the Kruskal-Wallis Test ( $X^2 = 19.31$ ,  $p < .001$ ). Pairwise comparisons showed significant differences between CBO-A and B ( $X^2 = 10.43$ ,  $p < .01$ ), B and C ( $X^2 = 18.17$ ,  $p < .001$ ), but not between A and C, showing that the degree of exposure to MP was significantly higher at CBO-B versus CBOs-A or C.

### PSYCHOSOCIAL VARIABLES

Most of the psychosocial scales showed good internal reliability, with the Cronbach's alpha for all scales above .80 with the exception of Condom Use Attitudes Use (.72) and Self-Acceptance as an MSM (.69). Mean scores for those responding at each time point are shown in Table 3.

There were numerous changes in psychosocial variables that followed participation in MP (see Table 4). After adjusting for composite MP exposure and demographic covariates, the following statistically significant changes were identified. Self-efficacy for safer sex significantly improved from baseline levels at both follow-up time points (both  $p < .05$ ), and self-acceptance as an MSM significantly

TABLE 3. Outcome Summary by Follow-up Time

	Baseline (N = 298)	Follow-up 1 (N = 256)	Follow-up 2 (N = 221)
<b>Psychosocial Outcomes (range)</b>	<b>Mean (SD)</b>	<b>Mean (SD)</b>	<b>Mean (SD)</b>
Condom use attitudes (1–5)	3.26 (0.77)	3.32 (0.74)	3.35 (0.66)
Self-efficacy for practicing safer sex (1–5)	3.52 (0.79)	3.60 (0.70)	3.60 (0.67)
Perceived safer sex social norms of gay/bisexual/transgender friends (1–5)	2.89 (0.90)	3.04 (0.86)	2.97 (0.88)
Safer sex messages among gay/bisexual/transgender friends (0–4)	0.92 (0.60)	0.83 (0.48)	0.90 (0.51)
Self-acceptance as an MSM (1–5)	3.44 (0.80)	3.42 (0.89)	3.61 (0.68)
Social support from gay/bisexual/transgender friends (1–6)	5.01 (0.98)	5.12 (0.99)	5.08 (0.96)
How satisfying is anal sex when your partner is wearing a condom and you are on the bottom	2.36 (1.20)	2.51 (1.17)	2.52 (1.23)
How satisfying is anal sex when you are wearing a condom and your partner is on the bottom	2.31 (1.18)	2.53 (1.13)	2.40 (1.20)
Safer sex is much less (1) . . . much more (5) pleasurable than unsafe sex	3.33 (1.28)	3.36 (1.31)	3.19 (1.20)
<b>Sexual Partners, Risk Behaviors</b>	<b>% yes</b>	<b>% yes</b>	<b>% yes</b>
Condomless anal or vaginal sex	39.8	33.9	41.3
. . . with a non-primary partner	19.5	17.7	21.6
. . . while intoxicated or high on non-injection drugs	13.2	12.3	9.6
. . . with a partner of unknown/discordant HIV status	7.7	7.1	4.6
. . . in exchange for receipt of something	0.7	0.4	1.4
<b>HIV Testing</b>			
Reported having an HIV test in the last 6 months	53.6	65.0	70.2

improved by follow-up 2 ( $p < .01$ ). Interestingly, the dissemination of safer sex messages among gay/bisexual/transgender friends decreased significantly from baseline to follow-up 1 ( $p < .05$ ), although there was no longer a significant difference from baseline by follow-up 2. At follow-up 1, participants reported satisfaction with anal sex when wearing a condom and their partner is on the bottom increased ( $p < .01$ ), but this variable returned to baseline levels by follow-up 2. More Mpowerment exposure was significantly associated with improvements in perceived social norms about safer sex and HIV testing among gay/bisexual/transgender friends ( $p < .05$ ) and increased discussions about safer sex among gay/bisexual/transgender friends ( $p < .05$ ).

#### OUTCOMES REGARDING HIV TESTING, NUMBER OF SEXUAL PARTNERS, AND SEXUAL RISK BEHAVIORS

As shown in Tables 3 and 4, the prevalence of self-reported HIV testing in the last 6 months was significantly higher than baseline (53.6%) at follow-up 1 (65.0%, PR = 1.20,  $p < .01$ ), and was sustained at follow-up 2 (70.2%, prevalence ratio [PR] = 1.28,  $p < .001$ ). There was a significant reduction in the reported prevalence of condomless sex with any partner from baseline to follow-up 1 (PR = 0.80,  $p < .05$ ), but this change was not sustained at follow-up 2. There were no significant changes for condomless sex with non-primary partners, while intoxicated or high on non-injection drugs, with a partner of unknown/discordant HIV status, or in the context

TABLE 4. Changes in Outcomes After Mpowerment

	Follow-up 1 Estimate (95% CI)	Follow-up 2 Estimate (95% CI)	Mpowerment Exposure Estimate (95% CI)
<b>Psychosocial Outcomes (regression coefficients)</b>			
Condom use attitudes	0.07 (−0.03, 0.16)	0.11 (0.00, 0.21)	0.00 (−0.04, 0.05)
Self-efficacy for practicing safer sex	0.11 (0.02, 0.21)*	0.12 (0.00 <sup>1</sup> , 0.23)*	−0.03 (−0.07, 0.02)
Perceived safer sex social norms of gay/bisexual/transgender friends	0.11 (0, 0.23)	0.04 (−0.1, 0.17)	0.05 (0.01, 0.1)*
Safer sex messages among gay/bisexual/transgender friends	−0.09 (−0.17, −0.01)*	−0.05 (−0.14, 0.04)	0.03 (0.002, 0.06)*
Self-acceptance as an MSM	−0.04 (−0.13, 0.05)	0.14 (0.05, 0.23)**	0.02 (−0.03, 0.08)
Social support from gay/bisexual/transgender friends	0.11 (−0.03, 0.25)	0.13 (−0.03, 0.28)	−0.01 (−0.08, 0.05)
How satisfying is anal sex when your partner is wearing a condom and you are on the bottom	0.11 (−0.06, 0.29)	0.13 (−0.08, 0.34)	0.04 (−0.03, 0.12)
How satisfying is anal sex when you are wearing a condom and your partner is on the bottom (0–4)	0.25 (0.07, 0.42)**	0.16 (−0.04, 0.36)	−0.03 (−0.1, 0.04)
Safer sex is much less (1). . . much more (5) pleasurable than unsafe sex	−0.01 (−0.18, 0.16)	−0.16 (−0.37, 0.04)	0.04 (−0.03, 0.11)
<b>Sexual Partners, Risk Behaviors</b>			
	Follow-up 1 PR (95% CI)	Follow-up 2 PR (95% CI)	Mpowerment Exposure PR (95% CI)
Condomless anal or vaginal sex (Yes/No)	0.80 (0.67, 0.97)*	0.96 (0.77, 1.20)	1.01 (0.93, 1.09)
. . . with a non-primary partner	0.84 (0.60, 1.17)	0.99 (0.70, 1.41)	1.03 (0.93, 1.15)
. . . while intoxicated or high on non-injection drugs <sup>a</sup>	0.98 (0.68, 1.42)	0.74 (0.46, 1.20)	0.93 (0.79, 1.11)
. . . with a partner of unknown/discordant HIV status <sup>b</sup>	1.00 (0.58, 1.73)	0.60 (0.27, 1.35)	0.84 (0.56, 1.25)
. . . in exchange for receipt of something	0.46 (0.04, 5.06)	1.32 (0.21, 8.28)	1.23 (0.97, 1.55)
<b>HIV Testing</b>			
Reported having an HIV test in the last 6 months <sup>d</sup>	1.20 (1.06, 1.36)**	1.28 (1.11, 1.47)***	1.01 (0.99, 1.03)

*Note.* Analyses of dichotomous sexual risk behaviors conducted using a log binomial model, resulting in adjusted prevalence ratios with the baseline as the reference. Models adjusted for the composite Mpowerment exposure variable plus age, race/ethnicity, education, employment status, and self-reported HIV-positive status. <sup>a</sup>Model was not controlled for employment or education, due to a very small number reporting the outcome in some of the groups, which resulted in a non-convergent model; <sup>b</sup>Model was not controlled for race/ethnicity or education, due to a very small number reporting the outcome in some of the groups, which resulted in a non-convergent model; <sup>c</sup>In exchange for drugs, money, a place to stay, clothing, or something else you needed; model was controlled only for HIV status due to small numbers by other covariates resulting in non-convergence; <sup>d</sup>Among those who self-reported not having a previous positive HIV test result; <sup>1</sup>Positive nonzero value rounded. \* $p < .05$ . \*\* $p < .01$ .

of transactional sex. There were no significant associations between the number of sex partners, sexual risk behaviors, or HIV testing and the extent of MP exposure.

## DISCUSSION

This study showed persistent positive changes in the prevalence of HIV testing and self-efficacy for practicing safer sex after participating in MP. At baseline, nearly a quarter of participants (22%) had never before been tested for HIV. This is higher than was observed in a recent nationally representative sample of MSM (CDC, 2011) that reported only 9% had not been tested during their lifetime (Hispanic/

Latino, 11%; Black/African American, 9%; White, 7%). Among participants aged 18–24 in that study, 17% had never had an HIV test.

HIV testing increased from 54% to 70% after Mpowerment. HIV testing is a critically important component of HIV prevention and treatment, and so increases in the percent of persons tested is a desired outcome for this population. Increased HIV testing is an objective of the National HIV/AIDS Strategy for the United States (NHAS; Holtgrave, 2014; The White House 2010, 2015), and the CDC's High Impact Prevention (HIP) Initiative (Mermin & Fenton, 2012). This finding highlights the role that community-level, community-mobilization interventions can serve in progress towards achieving this goal.

The prevalence of condomless sex at 3 months decreased from 40% to 34% at follow-up 1, but returned to baseline levels by 6 months post-baseline. This may indicate the need for increased emphasis on safer sex MP activities and messaging as a participant experiences MP.

There were also changes in psychosocial variables after participating in MP, and some were also associated with the extent of exposure to the intervention. There was an increase in participants' self-efficacy for practicing safer sex at both follow-ups, indicating that they felt more capable of engaging in safer sex after exposure to the intervention. However, there was a decline in the diffusion of safer sex messages among gay/bisexual/transgender friends at follow-up 1, although this returned to baseline levels at follow-up 2. Declines in the diffusion of safer sex messages among gay/bisexual/transgender friends might be explained by a lack of opportunity to discuss these issues, little perceived need to discuss these issues because they may have been incorporated as norms within these groups of friends, or fatigue from recently discussing these issues with a friend. The more MP activities the participants engaged in, the stronger they perceived the social norms to be regarding safer sex, and the more they discussed safer sex with gay/bisexual/transgender friends. Perhaps this finding reflects that the individuals became more a part of an MP community, which supported stronger positive norms and increased communication among friends about HIV prevention.

There were differences between the outcomes of this study and the original MP research (Kegeles et al., 1996, 1999). The early research did not target HIV testing. With respect to sexual risk reduction, the original MP research showed a decrease in condomless sex with non-primary partners, which was very important since studies at that time (Becker & Joseph, 1988; Eckstrand & Coates, 1990; Schechter et al., 1988; Winkelstein et al., 1987) suggested that that the greatest vulnerability to HIV came from sex with such partners. MEM participants only showed a significant decrease in condomless sex at the first follow-up across partner type, and the decrease was not sustained. This may reflect design differences between the original research and the current evaluation, or a sign of the changes in the epidemic and perceptions of risk. More recent research has shown that sex with primary partners can be a larger source of new infections (Goodreau et al., 2012; Sullivan, Salazar, Buchbinder, & Sanchez, 2009). The differences in sexual risk reduction findings might also be the result of implementing the intervention with more disadvantaged populations than occurred in the original studies conducted in middle class college towns. We are also in a very different era with respect to HIV, in that the original studies were conducted before the advent of antiretroviral medications, which can lower HIV viral load and reduce the risk of HIV infection. Thus, people may feel

less concerned about risky sexual behavior. It may be more challenging to change and sustain sexual risk behavior reductions when HIV is no longer a lethal disease in the U.S. Social and sexual environments are different now than in the nineties, and supporting young MSM of color to reduce condomless sex in the current times may require “booster” intervention elements implemented over time. Several studies have suggested the merits of booster sessions in behavioral interventions (Gearing, Schwalbe, Lee, & Hoagwood, 2013; Lochman, 1985, 1992).

Participation in the different MP components varied across MEM participants. Although participants in this evaluation were recruited prior to participating in the M-Group, they were not required to attend any of the other MP activities, and the MP intervention itself does not require attendance at MP activities. In fact, some participants did not attend any MP activities and were excluded from the analysis.

The original research was done with predominantly White MSM and began prior to any MP activities among the study population, while this study consisted almost exclusively of MSM of color in a population that had already been exposed to some MP activities. Stronger results may have been found if the study population had been completely naïve to MP.

There are several limitations to this study. The study did not involve the use of a control group. Hence, it is not possible to rule out the possibility that the changes observed from YMSM being exposed to the intervention occurred independently of the intervention. Our analyses assessed dependent variables 3 and 6 months after baseline, and does not provide information on whether changes were sustained beyond that period of time. In addition, process information gathered during the MEM evaluation illustrated CBO-level implementation challenges that could have affected the evaluation outcomes. These challenges included recruitment and retention of participants, staffing, and data issues. Each of the three CBOs served different populations, so it is not possible to disaggregate CBO from the population served regarding differences in outcome change. CBO-level implementation challenges included data collection issues (software-related and client retention) and staff turnover, which contributed to loss of already collected data and loss of participants to follow-up, all having an effect on final analysis sample size. This may have resulted in a project population that was different from that which was originally enrolled, potentially limiting generalizability and leading to selection bias. Additionally, the participation of individuals as recorded by the attendance sheets may be an undercount, because of failure to record participant IDs on the attendance sheet. Despite these limitations, these results reflect the challenges that are frequently encountered in real-world implementation.

Even though MP was not originally designed to increase rates of HIV testing and knowledge of one’s current HIV status, incorporating those outcomes into the intervention could assist in the prevention of HIV. MP, and likely other evidence-based interventions, could be used as strategies to further the aims of CDC’s High Impact Prevention approach. Using evidence-based approaches to mobilize communities around the adoption of new technologies such as PrEP can empower people to manage their sexual health, thus reducing HIV infection. Evidence-based, community-level interventions can also reduce barriers to engagement in HIV care (e.g., reducing HIV stigma, increasing health literacy or health care empowerment, developing peer norms related to health care utilization), or promote new HIV testing and drug adherence technologies (e.g., home HIV testing, fourth-generation testing, adherence

apps). As such, evidence-based community-level interventions can strongly complement biomedical prevention approaches, resulting in comprehensive, bio-behavioral high impact prevention strategies. These results support the consideration of MP's inclusion in strategies to reduce HIV-related risk behaviors for MSM of color. These outcomes from a community-level intervention and those from the family of outcome monitoring projects of individual- and group-level EBIs can inform discussions about which EBIs the CDC and other funders should support.

## CONCLUSION

This evaluation provides information on MSM who were enrolled in MP at three CDC-funded CBOs. Though sexual risk behavior changes were limited to a reduction in condomless anal/vaginal sex at the 3-month follow-up, self-efficacy for safer sex and self-acceptance as an MSM were both improved 6 months after baseline. Our finding that HIV testing in the past 6 months increased from 54 to 70% suggests that MP may be a useful tool to promote HIV testing.

## REFERENCES

- Becker, M. H., & Joseph, J. G. (1988). AIDS and behavioral change to reduce risk: A review. *American Journal of Public Health, 78*, 394–410.
- Centers for Disease Control and Prevention. (2011). HIV risk, prevention, and testing behaviors among men who have sex with men—National HIV Behavioral Surveillance System, 21 U.S. Cities, United States, 2008. *Morbidity and Mortality Weekly Report, 60*, 1–13.
- Centers for Disease Control and Prevention. (2013). Rates of diagnoses of HIV infection among adults and adolescents, by area of residence, 2011—United States and 6 dependent areas. *HIV Surveillance Report, 23*. [https://www.cdc.gov/hiv/pdf/statistics\\_2011\\_HIV\\_Surveillance\\_Report\\_vol\\_23.pdf](https://www.cdc.gov/hiv/pdf/statistics_2011_HIV_Surveillance_Report_vol_23.pdf)
- Collins, C., Harshbarger, C., Sawyer, R., & Hamdallah, M. (2006). The Diffusion of Effective Behavioral Interventions project: Development, implementation, and lessons learned. *AIDS Education and Prevention, 18*, S5–S20.
- Eckstrand, M. L., & Coates, T. J. (1990). Maintenance of safer sex behaviors and predictors of risk sex. *American Journal of Public Health, 80*, 973–977.
- Gearing, R. E., Schwalbe, C. S., Lee, R. H., & Hoagwood, K. E. (2013). The effectiveness of booster sessions in CBT treatment for child and adolescent mood and anxiety disorders. *Depression and Anxiety, 30*, 800–808.
- Goodreau, S. M., Carnegie, N. B., Vittinghoff, E., Lama, J. R., Sanchez, J., & Grinsztejn, B. (2012). What drives the US and Peruvian HIV epidemics in men who have sex with men (MSM)? *PLoS One, 7*, e50522.
- Holtgrave, D. R. (2014). Development of Year 2020 Goals for the National HIV/AIDS Strategy for the United States. *AIDS and Behavior, 18*, 638–643.
- Horner, S., Rew, L., & Torres, R. (2006). Enhancing intervention fidelity: A means of strengthening study impact. *Journal of Specialists in Pediatric Nursing, 11*, 80–89.
- Kegeles, S. M., Hays, R. B., & Coates, T. J. (1996). The MP Project: A community-level HIV prevention intervention for young gay men. *American Journal of Public Health, 86*, 1129–1136.
- Kegeles, S. M., Hays, R. B., Pollack, L. M., & Coates, T. J. (1999). Mobilizing young gay and bisexual men for HIV prevention: A two-community study. *AIDS, 13*, 1753–1762.
- Kegeles, S. M., Rebchook, G., Pollack, L., Huebner, D., Tebbetts, S., & Hamiga, J. (2012). An intervention to help community-based organizations implement an evidence-based HIV prevention intervention: The Mpowerment Project technology exchange system. *American Journal of Community Psychology, 49*, 182–198.
- Kegeles, S. M., Rebchook, G., Tebbetts, S., Arnold, E., & the TRIP Team. (2015). Facilitators and barriers to effective scale-up of an evidence-based multilevel HIV prevention in-

- tervention. *Implementation Science*, 10, 50. doi:10.1186/s13012-015-0216-2
- Lochman, J. E. (1985). Effects of different treatment lengths in cognitive behavioral interventions with aggressive boys. *Child Psychiatry and Human Development*, 16, 45–46.
- Lochman, J. E. (1992). Cognitive-behavioral intervention with aggressive boys: Three-year follow-up and preventive effects. *Journal of Consulting and Clinical Psychology*, 60, 426–432.
- Mermin, J., & Fenton, K. A. (2012). The future of HIV prevention in the United States. *Journal of the American Medical Association*, 308, 347–348.
- Schechter, M. T., Craib, K. J., Willoughby, B., Douglas, B., McLeod, W. A., Maynard, M., Constance, P., & O’Shaughnessy, M. (1988). Patterns of sexual behavior and condom use in a cohort of homosexual men. *American Journal of Public Health*, 78, 1535–1538.
- Sullivan, P. S., Salazar, L., Buchbinder, S., & Sanchez, T. H. (2009). Estimating the proportion of HIV transmissions from main sex partners among men who have sex with men in five US cities. *AIDS*, 23, 1153–1162.
- The White House. (2010). *National HIV/AIDS Strategy for the United States*. <http://www.whitehouse.gov/sites/default/files/uploads/NHAS.pdf>
- The White House. (2015). *National HIV/AIDS Strategy for the United States Updated to 2020*. <https://www.aids.gov/federal-resources/national-hiv-aids-strategy/nhas-update.pdf>
- Winkelstein, W., Lyman, D., Padian, N., Grant, R., Samuel, M., Wiley, J. A., . . . Levy, J. A. (1987). Sexual practices and the risk of infection with the human immunodeficiency virus. *Journal of the American Medical Association*, 257, 321–325.
- Zeger, S. L., & Liang, K. Y. (1986). Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*, 42, 121–130.