

Public Health Management Corporation

Annual Progress Report: 2008 Formula Grant

Reporting Period

July 1, 2009 – June 30, 2010

Formula Grant Overview

The Public Health Management Corporation (formerly Philadelphia Health Management Corporation) received \$20,369 in formula funds for the grant award period January 1, 2009 through June 30, 2010. Accomplishments for the reporting period are described below.

Research Project 1: Project Title and Purpose

The Association of Drug Use and Sexual Risk for HIV Infection Among Black Men Who Have Sex with Men - The overall purpose of this project is to increase the current understanding of the factors that contribute to the disparate rates of HIV infection among Black men who have sex with men (MSM). Urban Black MSM are the single population most heavily impacted by the HIV epidemic in the United States, with HIV infection rates rivaling those found in many sub-Saharan African nations. This project will utilize existing data gathered from a sample of 540 Black MSM in Philadelphia to examine the link between drug use and sexual risk behaviors that may result in HIV infection (including acquisition or transmission). Moreover, this project will examine the link between drug use and HIV sexual risk for different subgroups of Black MSM, including HIV-negative and HIV-positive MSM, men who use different types of substances, and MSM who are gay- and non-gay identified.

Duration of Project

1/1/2009 – 6/30/2010

Project Overview

Since the early 1980s, the HIV epidemic in the United States has taken a severe toll on all MSM, but has most disproportionately impacted Black MSM. HIV prevalence rates in Black MSM, estimated between 30%-50%, are significantly higher in this population than other MSM. Although progress is being made to identify the correlates of risk for HIV within this population, many gaps still exist in our understanding of key contributing factors. The overall objective of this research project is to further our understanding of the link between the use of illicit drugs such as crack cocaine, and engaging in sexual behaviors known to increase risk for HIV infection among Black MSM. Increasing the public health community's understanding of the link between drug use and HIV risk behavior is vital for developing more effective programs, services, and policies to address the HIV epidemic in this population of men.

The specific aims of this research project are to:

1. Describe the prevalence and patterns of illicit drug use and sexual risk among Black MSM;
2. Compare drug use and sexual risk behaviors of subgroups of Black MSM, including HIV-positive and HIV-negative MSM and gay-identified and non-gay-identified MSM;
3. Assess the association between drug use and sexual risk behaviors, including the effects of different types of drug use on sexual risk practices, for different subgroups of Black MSM.

The methods for achieving these aims will entail the secondary analysis of existing data collected by Public Health Management Corporation (PHMC) from a sample of 540 Black MSM who participated in the national Brothers y Hermanos study of HIV risk in Black and Latino MSM, funded by the Centers for Disease Control and Prevention. In Philadelphia, 540 adult Black MSM were interviewed from May 2005-April 2006. This cross-sectional survey elicited detailed and comprehensive information from Black MSM in a variety of core domains, including socio-demographic characteristics, psycho-social well-being, HIV status, sexual practices and relationships, and recent substance use. This project will afford an opportunity to examine in detail the drug use-sexual risk link, which heretofore has not been a focus of investigators affiliated with the original Brothers y Hermanos research study.

Principal Investigator

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Other Participating Researchers

None

Expected Research Outcomes and Benefits

With studies suggesting that nearly 1 out of every 2 Black MSM may become infected with HIV in their lifetime, there is an urgent need for public health research that is focused on identifying the factors that increase these men's risk for HIV acquisition and transmission. The proposed project will produce new knowledge about the role of drug use in the disparate rates of HIV infection among Black MSM. The key product that will result from this project will be a manuscript published in a peer-reviewed public health journal that will facilitate the sharing of information about substance use and HIV risk behavior in Black MSM.

The potential benefits of this research are twofold. First, at a basic scientific level, this research will promote improved understanding of the association of drug use and HIV infection in Black MSM. Second, by improving understanding of this association, the HIV prevention community will be better equipped to meet the needs of Black MSM whose risk for HIV may be elevated by substance use.

Summary of Research Completed

During this reporting period the following key activities were completed: 1) review of 57 published research articles relevant to the proposed study; 2) determination of key variables for inclusion in analyses, based upon review of the literature, including specification of key independent variable of “past 3 month crack cocaine use” and mediating variable “traded sex past 3 months”; 3) bivariate analyses of association of key variables (correlates) with recent crack cocaine use; 4) completion of multivariate logistic regression analyses examining relationship of crack cocaine use and trading sex to condom use with male and female partners; 5) completion of mediational analyses examining the role of sex trading in mediating the relationship between crack cocaine use and condom use; 6) review of potential journals for submission of manuscript tentatively titled “Black MSM and the Association of Crack Cocaine Use and Sex Trading to Condom Use with Male and Female Partners” (journal: AIDS and Behavior); and, 7) initiation of manuscript writing (anticipated submission by November 30, 2010). In the text that follows these key activities are summarized.

Final Review of the Research Literature and Refining of Data Analysis Plan

During this reporting period, the review of published research was completed. Though initiated in the prior reporting period, the literature review is a process that necessarily must be ongoing to keep pace with newly published research that may emerge during the period leading up to the preparation of a manuscript. In total, 57 relevant research articles were identified through the pubmed or google scholar search engines, and were downloaded, printed, and reviewed by the Principal Investigator.

Of significance, this extensive review of the research literature helped to inform several key decision points in planning for the data analyses for this project. In particular, the literature review pointed to the importance of focusing on crack cocaine apart from other drugs, because of certain unique properties of, or correlates of crack cocaine use, which differ from other illicit drugs. For instance, though the psychoactive and physiological effects of powder cocaine (typically snorted) and crack cocaine (typically smoked) use are similar, there is evidence of a greater risk of causing harm, propensity for dependence, and development of compulsive cocaine use when smoked. Crack cocaine users (though not necessarily cocaine users) often engage in sex work to support their drug use. Sex trading is often an economic response driven by the need to obtain more crack cocaine. While the link between crack cocaine use and sex trading has been established in high risk heterosexual populations -- in particular among Black women who trade sex for drugs -- little has been written about the role of crack cocaine use in sexual transmission of HIV among Black MSM. While there is a preponderance of articles about the use of “club drugs” like crystal methamphetamine, poppers and ecstasy, crack cocaine use has received scant attention. Indeed, in the Principal Investigator’s review of the literature, no article could be identified that included an analysis of risk behaviors of Black MSM with both female and male partners that are attributable to crack cocaine use.

Following the extensive review of the research literature, the following decisions were made for subsequent data analyses: 1) crack cocaine use would be the key independent variable of interest, while the use of other substances (which often accompany crack cocaine use) should be

adjusted for in multivariate models; and 2) the association of sex trading to crack cocaine use should be examined, to identify a potential mediating relationship.

Bivariate and Multivariate Regression Analyses

Measures

Key independent and dependent measures were identified for inclusion in the bivariate and multivariate analyses. These measures include:

Demographics: Self-reported measures included in analyses were age, gross annual income (measured as an ordinal variable in dollars), sexual identity (homosexual/gay, bisexual, heterosexual/straight, other), history of ever being incarcerated and number of times incarcerated in lifetime, and self-reported HIV status (negative, positive, unknown). Black or African American race was a requirement for entry to the study.

Substance Use: Participants were asked which of a list of illicit drugs they had used in the past 3 months including (yes/no): marijuana, crystal methamphetamine, powder cocaine, crack cocaine, heroin, amyl nitrate (poppers), and club drugs (ecstasy, GHB, Ketamine). These data were gathered through responses to the question “*Did you use [insert drug name here] in the past 3 months?*” The use of ecstasy, GHB, and ketamine were assessed with one single question. A composite measure of any drug use other than crack cocaine (yes/no) was also created for this analysis. The use of crack cocaine in the past 3 months was the key independent variable of interest for this study.

Sexual Partners: Participants were asked about male and female sexual partners in the past 3 months, including main partners and partners other than main partners (referred to hereafter as “non-main partners”).

Sex Trade: Participants were asked about buying and paying for sex with male partners. Question items included “In the past 3 months, did you have anal sex with any male sex partners because they gave you drugs, money, a place to stay, or other things you needed?” and “In the past 3 months, did you give another man drugs, money, a place to stay, or other things so that he would have anal sex with you?” A single item measuring “traded sex past 3 months” was constructed from these items.

Unprotected Anal and/or Vaginal Sex: The dependent variables measured for this study included unprotected receptive and insertive anal intercourse with any male partner in the past 3 months (yes/no), unprotected receptive and insertive anal intercourse with a non-main male partner in the past 3 months (yes/no), and unprotected vaginal or anal intercourse with any female partner in the past 3 months (yes/no).

Data Analyses

Descriptive statistics were generated for participant characteristics. Demographics, HIV status, substance use, partner type and risk behaviors were stratified by whether the participant had used crack cocaine in the past 3 months (referred to as recent crack cocaine use). With the exception of the association of crack cocaine use to other types of illicit drugs (shown below in Table 1),

these results have been previously reported in table format. Significant differences were identified between those with and without a recent history of crack cocaine use by using differences in Chi-square tests of independence or Fisher exact test if the expected value of any cells was less than 5.

Multivariate logistic regressions were employed to assess variables associated with engaging in unprotected sex with male and female partners in the past 3 months. Variables included in multivariate models were those found to be statistically significant in univariate analyses ($P \leq .10$) or relevant based on *a priori* knowledge. Multivariate logistic regression assessed the contribution of crack cocaine use to each of the sexual risk behavior outcomes among MSM reporting sex with male or female partners in the past 3 months, while adjusting for age, sexual identity, HIV status, income, marijuana use, and the use of any other type of illicit drugs. Because of the high prevalence of marijuana use in the study population (43.9% in past 3 months), and the known association of marijuana use to sexual risk behaviors, we control for these substances in all multivariate models. A total of 4 regression models were examined for condom use with male partners (insertive unprotected anal sex with any male partner in past 3 months, receptive unprotected anal sex with any male partner in past 3 months, insertive unprotected anal sex with a non-main male partner in past 3 months, receptive unprotected anal sex with a non-main male partner in past 3 months) and 1 regression model examined condom use with female partners (unprotected vaginal or anal sex with any female partner in the past 3 months).

Mediational analysis was conducted to investigate the relationship between the independent predictor variable (recent crack cocaine use) and the dependent variables. In particular, exploratory regression analyses suggested that the relationship between crack cocaine use and the risk behavior outcomes might be mediated by sex trading. According to Baron and Kenny (1986), mediation is possible when a) the predictor and dependent variables are associated with each other (in this case, crack cocaine and condom use with male and female partners); b) both are associated with a third, potentially mediating variable (in this case, sex trading); and c) the strength of association between the predictor and dependent variable is reduced after accounting for the influence of the mediating variable (in this case, the inclusion of sex trading diminishes the strength of association between crack cocaine use and condom use with male and female partners). (R.M. Baron & D.A. Kenny. 1986. *The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, 51, 1173-1182*). A full discussion of these analyses is beyond the scope of this report, though some are included in the discussion of results below.

Select Study Results

Crack Cocaine Use and Other Drug Use

In this sample of 540 Black MSM, 219 participants (40.6%) reported using crack cocaine in the past 3 months. Other drugs commonly used by participants included powder cocaine (38.7%) and marijuana (43.9%). Less commonly used drugs included poppers (5.9%), heroin (2.4%), crystal methamphetamine (1.7%), and club drugs (ecstasy, GHB, ketamine) (2.0%). [Note: Previous annual report contained study sample characteristics, including patterns of substance

use]. As shown in Table 1 below, recent crack cocaine users were significantly more likely to report using all other substances with the exception of club drugs.

Association of Crack Cocaine Use to Condom Use Behaviors with Male and Female Partners

In exploratory analyses, we examined the association of crack cocaine use to the five dependent variables of interest, both in unadjusted and adjusted models. Table 2 below shows that, in unadjusted models, crack cocaine use was highly predictive of unprotected sex with male and female partners. One exception noted is the association of crack cocaine use to receptive UAI with any male partner, which in unadjusted models was marginally significant at $p=.14$. The significant relationship of crack cocaine use to the risk behavior outcomes is one of the conditions necessary for a mediational relationship to be established. Though not shown below in this table, we conducted another set of regression analyses in which we included the sex trade variable in the adjusted models.

In all models except for the model predicting unprotected sex with female partners, the effect of crack cocaine use was significantly reduced – another condition necessary for establishing a mediational relationship. Through further exploratory analyses (including correlations of sex trading and crack cocaine use), we were able to determine that sex trading mediates the relationship between crack cocaine use and unprotected anal intercourse (UAI) with male partners, though does not operate in the same manner with female partners. Intuitively this makes sense. Men who use crack cocaine are more likely to engage in UAI with male partners, and this is likely because of the crack-sex trade connection. However, men who use crack cocaine are not more likely to engage in unprotected vaginal/anal intercourse with female partners if they trade sex with men, suggesting that other factors may explain the association between crack cocaine use and unprotected sex with women. One plausible factor could be sex trading with female partners, however unfortunately, men in this study were not asked about their sex trade with females.

In brief, the results of this analysis indicate that in a sample of older, low-income Black MSM in Philadelphia, crack cocaine use is *prevalent*, crack cocaine use is *predictive of unprotected sex* with male and female partners, and that the *pathway* through which crack cocaine use affects condom use *may differ* with male and female sexual partners. Sex trading appears to mediate the relationship between crack cocaine use and UAI with male partners, yet not with female partners. These findings appear to be novel and when published, will contribute to the scant research currently available on the association of crack cocaine use to HIV risk behavior among Black MSM.

Manuscript Preparation and Journal Selection

An important step in the manuscript submission process is to identify a good-fit for the article being proposed. During this reporting period the Principal Investigator (P.I.) conducted a search of relevant journals, including their impact scores, and determined that a good journal “home” for the manuscript being prepared is *AIDS and Behavior*. Currently, the manuscript is in early-draft stage. All analyses are completed, and all needed literature citations have been gathered. The completion of this manuscript, tentatively titled “Black MSM and the Association of Crack-Cocaine Use and Sex Trading to Condom Use with Male and Female Partners” is a priority.

Table 1 -- Use of Other Drugs by Black MSM Who Report Recent Crack Cocaine Use and Black MSM Reporting No Recent Crack Cocaine Use, Philadelphia, PA, 2005-2006, n=540

	Used crack cocaine in past three months	Did not use crack cocaine in past 3 months	P-value
Crack cocaine use	219 (100.0%)	-----	
Powder cocaine use	180 (82.2%)	29 (9.0%)	<.001
Marijuana	118 (53.9%)	119 (37.1%)	<.001
Poppers (Amyl Nitrite)	21 (9.6%)	11 (3.4%)	.003
Heroin	10 (4.6%)	3 (0.9%)	.009
Crystal methamphet.	8 (3.7%)	1 (0.3%)	.004
Club Drugs (Ecstasy, Ketamine, GHB)	4 (1.8%)	7 (2.2%)	1.0

Table 2 -- Unadjusted and Adjusted Association of Crack Cocaine Use to Condom Use with Male and Female Partners

Dependent variable	Independent variable	
	Crack use past 3 months	
	Unadjusted	Adjusted
Insertive UAI with any male partner past 3 mos.	OR 4.75****	OR 2.00**
Receptive UAI with any male partner past 3 mos.	OR 1.378	OR 2.92***
Insertive UAI with non-main male partner past 3 mos.	OR 1.833***	OR 1.93**
Receptive UAI with non-main male partner past 3 mos.	OR 1.51*	OR 2.01*
Unprotected vaginal or anal sex with any female partner past 3 mos.	OR 1.86**	OR 1.70

*p≤.10, **p≤.05, ***p≤.01, ****p≤.001

^Adjusted for age, income, sexual orientation, HIV status, marijuana use, and other illicit drug use. Adjusted models do not include sex trading variable.

^^Analysis restricted to MSM reporting sex with a female partner in the past 3 months (n=217).

UAI=Unprotected Anal Intercourse