

**EVALUATING THE IMPACT OF A
JOINT COMMUNICATION CAMPAIGN ON
MULTIPLE SEX PARTNERSHIPS
IN MOZAMBIQUE**

INTERIM REPORT



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March 2013

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ACKNOWLEDGEMENTS

This evaluation study was funded by the United States Agency for International Development (USAID) as part of Project SEARCH, Research-to-Prevention (R2P) Project, based at Johns Hopkins Bloomberg School of Public Health, contract number #GHH-I-02-07-00032-00. This study would not have been possible without the participation of the various organizations that launched the Campaign to Reduce Multiple and Concurrent Sex Partnerships in Mozambique. These organizations included Population Services International (PSI-Mozambique); N´weti Comunicao para Sade; the Fundao para o Desenvolvimento da Comunidade (FDC), and the Johns Hopkins Center for Communication Programs (JHU-CCP-Mozambique), all working under the lead of the Conselho Nacional de Combate ao HIV/SIDA (CNCS-Mozambique). We are very thankful to the Instituto Nacional de Estatística de Mozambique (INE) including Dr. Manuel Gaspar, Vice President, Dr. Arao M. Balate, Director Nacional de Censos e Inquritos, Dr. Carlos Creva, and their highly trained field team that collected the survey data for this study. We also wish to acknowledge the USAID Mission in Mozambique for their guidance and support with the study. Special thanks goes to Amata Kwizera from the JHU-CCP-Mozambique office for her thorough work during the development and pretesting of the questionnaire, her coordination of the field work with INE, and her critical revisions and feedback of the slides used in the presentation of the results delivered in September of 2011 to USAID-Mozambique and to the CNCS and other in-country organizations working on HIV prevention. We also want to thank Patrick Devos, CCP Country Director, and Sozinho Guerra of JHU-CCP-Mozambique for their support with logistics and cost administration of the survey. Alison Cheng and Timothy Mah of USAID/Washington reviewed earlier drafts of this report and provided useful insights. Emily A. Hurley of Johns Hopkins Bloomberg School of Public Health (JHSPH) provided terrific editing assistance with the various drafts. Brandon Howard of JHSPH contributed to the final editing and formatting. And most of all, our big thanks to all the survey respondents that contributed their valuable time and candid answers to every survey question. We wish that the results of the information they provided, presented in this study, can be used widely to continue to design and implement effective HIV prevention programs in Mozambique.

Recommended citation: Figueroa ME and Kincaid DL. *Evaluating the Impact of a Joint Communication Campaign on Multiple Sex Partnerships in Mozambique, Interim Report*. March 2013. Baltimore: USAID | Project Search: Research to Prevention.

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ACRONYMS

BCC	Behavior change communication
CNCS	<i>Conselho Nacional de Combate ao HIV/Sida</i> (Mozambique National AIDS Council)
CP	Concurrent partnerships
DHS	Demographic and health survey
EA	Enumeration area
FDC	<i>Fundação para o Desenvolvimento da Comunidade</i> (Foundation for Community Development)
HIV	Human immunodeficiency virus
INE	<i>Instituto Nacional de Estatística</i> (National Statistical Institute)
INS	<i>Instituto Nacional de Saúde</i> (National Institute of Health)
INSIDA	<i>Inquérito Nacional de Prevalência, Riscos Comportamentais e Informação sobre o HIV e SIDA</i> (National Survey on Prevalence, Behavioral Risks, and Information about HIV and AIDS)
IPC	Interpersonal communication
JHU	Johns Hopkins University
MCA	Multivariate causal attribution
MSP	Multiple sexual partnerships
PPS	Probability proportional to size
PSI	Population Services International
PSU	Primary sampling unit
SEM	Structural equation model
SES	Socioeconomic status
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Introduction

With an estimated prevalence of 11.5%, Mozambique is one of the countries in sub-Saharan Africa most affected by the HIV epidemic (INS, 2009). Heterosexual sexual relations remain the most common mode of HIV transmission, and multiple sex partnerships (MSP) are understood as a key driver of the HIV epidemic in Mozambique. Though HIV prevention programs in Mozambique and neighboring regions have been successful in increasing condom use and HIV testing on a population level, the integration of MSP and concurrent sex partnerships (CP) reduction as a key component in these programs is a relatively new strategy. From November 2009 to December 2010, four organizations working on HIV prevention in Mozambique joined efforts to launch the first national campaign in the country focusing on HIV prevention and the reduction of MSP/CP. Evaluating these initiatives and identifying the factors that contribute to or hinder their success is critical to building more effective programs in the future.

This report provides results of an evaluation of the impact of a year-long mass media behavior change communication (BCC) campaign in Mozambique. It also aims to describe the context and mechanisms through which the campaign may have affected MSP, condom use, and HIV testing behaviors. Specifically, these mechanisms are ideational (psychosocial) variables through which BCC efforts have an effect on behavior. Collectively, these results aim to help identify the factors contributing to an effective MSP BCC program, improve MSP interventions in Mozambique, and inform the development of similar programs in other settings.

Methods

A household survey was conducted in the four provinces with the highest HIV prevalence—Sofala, Gaza, Maputo Province and Maputo City—to assess the effect of the joint communication program on MSP and other HIV prevention behaviors: condom use and HIV testing. A multi-staged, stratified probability sample was used to select primary sampling units, enumeration areas, household units, and individual men and women within households. The sample was designed to provide estimates with 95% confidence for the rural and urban strata across the four provinces, for the large cities within each province, and for the remaining urban areas in each province. Prior to data collection, the study received approval from both the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) and the National Bioethics Committee of the Ministry of Health in Mozambique.

In addition to HIV prevention behaviors and program exposure, the survey questionnaire measured a set of socio-demographic characteristics that could potentially confound the effect of the joint communication program on the behavioral outcomes. In an effort to help explain the effect of the program on behavior, the questionnaire also measured ideational variables derived from behavior change theory, formative research, other HIV-related studies conducted in Mozambique, messages included in the campaign, and related research in neighboring countries. These ideational variables were knowledge, attitudes and interpersonal communication for MSP, attitudes and self-efficacy for condom use, and interpersonal communication for HIV testing. The survey measured campaign exposure by means of message recall of television, radio, and print materials distributed during the campaign.

Multivariate Causal Attribution (MCA) analysis was used to assess the effect of the MSP joint campaign on the three HIV prevention behaviors. Structural Equation Models (SEM) were used to investigate the direct and indirect effects of the joint campaign on each of the behavioral outcomes in the following steps:

- (1) The first equation estimated predictors of recall (exposure) to the communication campaign.
- (2) Controlling for potential confounders, the second equation tested whether the communication program was one of the predictors of the behavior-specific ideational variables.
- (3) Controlling again for potential confounders, the third equation used each HIV prevention behavior as the outcome and tested whether the communication program and/or the ideational factors predicted the behavior.

Results

Results from the MSP 2011 survey are based on a total sample size of 1,666 respondents (indicating a 95% response rate). Overall, the majority of Mozambican women (84%) and about half of Mozambican men reported having only one sexual partner in the last 12 months prior to the survey. In general, across all provinces, reported condom use at last sex was higher with casual versus steady partners. Condom use at first sex was more prevalent among the younger generation (15- to 24-year-olds) with no statistical differences between men and women (21% and 20% respectively). Reported condom use at last sex, however, was higher among men (51%) as compared to women (29%). Reported HIV testing in the last 12 months was also lower among men (31.8%) compared to women (42.6%), and about one third of respondents in the four provinces reported never having been tested for HIV. A combined measure of campaign exposure was developed that included 18 communication components disseminated during the campaign period. Exposure to the joint communication program was high, with 81% of the intended audience reporting being exposed to at least one of the 18 components. Exposure to the joint campaign was lower in rural areas, among women, and among older adults (34-54 years old). Results indicated that the higher the recall of the campaign messages (dose-response), the higher the prevalence of desired HIV prevention behaviors. Further, recall of the joint campaign showed positive effects on the ideational variables (the proximate determinants of HIV prevention behavior), including decreased favorable attitudes towards MSP, increased knowledge of the risk of MSP, increased favorable attitudes and self-efficacy to use condoms, and increased discussion with spouse and others about MSP and about HIV testing.

SEM model results indicated that the campaign was successful in reducing HIV risk behavior through an indirect effect on MSP, increased uptake of HIV testing, and increased condom use at last sex. For condom use and for HIV testing, the effect of the joint campaign was both direct and indirect through the corresponding ideational variables. The dose-response associations between the level of campaign exposure and the behavioral outcomes further support that the observed relationship is causal: that the campaign was indeed responsible for the observed variation in behavior.

Discussion

The results of the survey provide substantial evidence that the joint communication campaign had a positive effect on HIV prevention behaviors through its high reach and effect on ideational factors. The

analyses of both ideational and demographic variables and their associations with HIV prevention behavior give insight on how to better design BCC programs to decrease MSP and other HIV risk behaviors in Mozambique and similar settings. Specifically, behavior change campaigns need to address the ideational variables identified in this report and tailor messages for specific segments of the population in terms of gender, age, and geographic regions, and those in most need of MSP reduction, condom use, and/or HIV testing promotion efforts.

It is unlikely that any of the four partner organizations would have independently reached the magnitude of the audience reported by the joint campaign, which underscores the importance of collaborative and coordinated efforts in HIV communication programs. Higher recall of television spots indicates that future programs need to continue to maximize the use of the mass media. Programs should also increase involvement of community-based organizations and religious groups and other appropriate media to reach men, such as during sports hours. As Internet use continues to grow, programs should seek to identify ways in which their messages can be disseminated by this medium as well. Reach must also increase in rural areas, where campaign exposure was lower than in urban areas.

Similar evaluations as the one undertaken for this joint communication program should be conducted in other settings to continue to build the evidence of the role of BCC on HIV prevention. Finally, data were collected six months after the mass media messages ended and reflect relatively short-term effects only. An additional round of data collection is planned for early 2013 that will assess the effect of recent efforts to reduce MSP in Mozambique and examine any additional effect of some of the components of the joint campaign on behavior change over a longer period of time.

INTRODUCTION

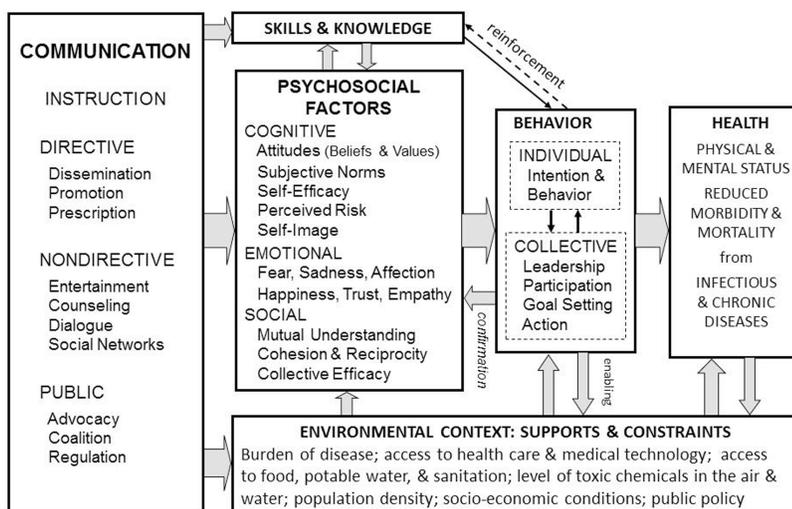
Transmission of HIV remains a major global threat today, especially in sub-Saharan Africa, home to 68% of the world's infected individuals (UNAIDS, 2007). With an estimated prevalence of about 11.5%, Mozambique is one of the epidemic's worst affected countries (INS, 2010). As in the rest of the region, heterosexual sexual relations remain the most common mode of HIV transmission in the country.

A recent scientific debate has emerged about the role of concurrent partnerships (CP) in HIV transmission. Some experts theorize that CP, or sexual relationships that overlap in time, are key drivers of heterosexual transmission in the HIV epidemic, notably in areas with low condom use and low rates of circumcision like sub-Saharan Africa (Jana, Nkambule, & Tumbo, 2008; Mah & Halperin, 2008). Others question the notion that concurrent partnerships carry increased risk compared to serial monogamy (Sawers & Stillwaggon, 2010). In either case, discouraging multiple sexual partnerships (MSP) and promoting sexual monogamy can be an effective way of reducing sexual networks through which the HIV virus spreads. Recent data for Mozambique suggests that 16% of women and 53% of men have had more than one sexual partner in the previous year (INS, 2010). Yet MSP and CP may be more widespread than previously documented. Recent research has found that men and women engage in informal sexual encounters that they do not consider "partnerships" (Arias, 2011), and thus reporting of these sexual relations may be underestimated in national surveys.

While HIV prevention programs in Mozambique and neighboring regions have been successful in increasing behaviors like condom use and HIV testing on a population level, the integration of MSP/CP behavior reduction as a key component in these programs is a relatively new strategy. Yet as recent attention has focused on CP, some countries are increasingly interested in integrating MSP/CP into their communication interventions. Therefore, evaluating and describing the effectiveness of these interventions is critical to the development of more effective programs in the future.

Successful prevention programs that aim to influence HIV related practices employ communication strategies based on theories of behavior change. One particular theoretical lens that can guide the development of these programs is the Meta Theory of Health Communication (Kincaid et al., 2012; depicted in Figure 1). According to this multi-theoretical framework, communication can influence HIV prevention behavior through its effect on a set of ideational (psychosocial) factors, including cognitive elements (e.g. beliefs), emotional factors (e.g. self-efficacy), and social elements (e.g. interpersonal communication). By addressing the ideational factors that are relevant for HIV prevention, behavior change communication (BCC) programs are more likely to have a positive impact on health behaviors and ultimately on the burden of the HIV epidemic.

Figure 1. A meta-Theory of Health Communication (Kincaid et al., 2012).



Using findings from formative research and scientific literature, four organizations working in Mozambique—FDC, JHU, PSI, and N’weti—implemented a full-scale multiple-phase campaign beginning in December 2009. The goal of the campaign was to discourage and reduce MSP/CP, emphasizing the slogans *“andar fora e maningue arriscado”* (to go outside is risky business) and *“amores a mais e demais”* (too many loves is too much). Secondary behavior change messages also targeted condom use and HIV testing. With funding largely from the United States Agency for International Development (USAID) and leadership of the Mozambique National AIDS Council (CNCS), these four organizations partnered to launch a year-long communication campaign to strategically disseminate these prevention messages throughout the country. To maximize reach during the one-year campaign, the implementing organizations used television, radio, print materials, and billboards as well as community-level activities as channels to disseminate the campaign messages.

The R2P project used the framework depicted in Figure 1 to design the evaluation and assess the impact of the joint campaign on MSP and two other HIV preventive behaviors: condom use and HIV testing. Using the same framework, the evaluation also identified if the campaign worked through the mediating ideational variables to influence each of the prevention behaviors. This report includes the results of this evaluation and also describes the ideational variables through which the joint campaign may have affected MSP, condom use, and HIV testing. The report also includes descriptive data on the levels of, and factors associated with, HIV prevention behaviors in Mozambique. Collectively, these results aim to identify the factors contributing to an effective MSP BCC program, and recommend ways to develop and improve MSP/CP interventions in Mozambique and similar settings.

METHODS

This section describes the MSP 2011 sampling methodology, data collection procedures, survey design, and data analysis methods.

Sampling methodology

The MSP-2011 survey was conducted by the *Instituto Nacional de Estatística* (INE; National Institute of Statistics) in four provinces where according to the 2009 National AIDS survey (INS, 2010), HIV prevalence is higher than the national average: Sofala (15.5% prevalence), Gaza (25.1%), Maputo Province (19.8%) and Maputo City (16.8%). We used a multi-staged, stratified sample design based on the 2010 Mother Sampling frame developed from data and cartography generated by the 3rd General Census of Population and Housing, 2007. The MSP 2011 sample selection was conducted in four stages: (1) 70 Primary Sampling Units (PSU) were selected with Probability Proportional to Size (PPS); (2) an Enumeration Area (EA) within each PSU was selected with PPS; (3) a listing and classification of all the residential and non-residential structures within each selected EA was developed and a total of 25 residential units/households were randomly selected from this list; and (4) using a Kish grid, a man (aged 15-54) or woman (aged 15-49) was selected from each of the 25 residential units (12 for men and 13 for women). The units selected for the sample of men were different from those selected to sample women, yielding independent samples for men and for women. The sample was designed to provide estimates with 95% confidence for the rural and urban strata across the four provinces, for the large cities within each province, and for the remaining urban areas in each province. A total of 20 PSUs were selected from the Sofala and Gaza provinces; while 30 were selected from Maputo Province and Maputo City in order to account for the greater socio-demographic diversity of these areas. The target sample size for the MSP-2011 survey was 1,750 households. The final sample obtained was 1,666, representing a 95% response rate.

Data collection

Prior to data collection, pilot testing of the questionnaire and of the survey methodology (identification of enumeration areas, household listing, respondent selection, interview process, and other logistics) took place during November and December of 2010. A team of 14 staff from INE including provincial and headquarters' staff were trained on the different sections and types of questions in the questionnaire, appropriate recording of responses and human subjects research ethics. Results from the pilot testing allowed the team to refine the wording in the questionnaire, improve instructions regarding proper recording of responses, and refine field operations. The research team invested in substantial field training for staff to ensure privacy during the interview—as other family members tend to be around while the interview takes place. Survey administration took place from February to April 2011. Data were double-entered independently, compared, and corrected for inconsistencies to maximize data quality. Data validation was done through verification of frequency distributions and checking for out-of-range codes, verification of EAs in each province, and the distribution of the sample by gender. The study received approval from both the Johns Hopkins School of Public Health Institutional Review Board (IRB) and the National Bioethics Committee of the Ministry of Health in Mozambique.

Survey design

The survey questionnaire was developed to measure the effect of the communication program on reducing MSP, increasing condom use, and HIV testing. It was also designed to measure a set of ideational variables related to each behavior and socio-demographic characteristics that could potentially confound these effects. The ideational variables assessed in the survey were derived from theory, formative research, other HIV-related studies conducted in Mozambique, messages included in the campaign, and experiences in other countries that have measured some of these ideational factors, such as South Africa (Kincaid & Parker, 2008).

The questionnaire included items in the following four categories: socio-demographic variables (potential confounders), ideational variables (proximate determinants of behavior), behavioral variables (outcomes), and campaign recall (exposure).

Socio-Demographics

This category included questions on age, religion, educational level, place of residence, occupation, source of income, and two proxy measures for socioeconomic status (SES). The first of these SES measures was a standard of living index constructed from a composite of household services and durables that included electricity, water, toilet, mobile phone, refrigerator, truck, and computer ($\alpha=0.81$). The second was a poverty estimate index in which respondents were asked how many days in the last 12 months they had gone without cooking fuel, potable water for drinking/cooking, medication or medical treatment, enough food for the entire family, or enough money. Answers ranged from never (value of 1), rarely (2), sometimes (3), and many times (4). A combined poverty index (α 0.82) was computed from responses to these questions.

Additional variables directly related to the social and behavioral context of HIV risk also measured included marital status, age at first sex, and alcohol and drug consumption. A final section included questions on media consumption (frequency of exposure to television, radio, internet, magazines, and newspapers).

Ideational Variables

Multiple Sex Partners

Three ideational variables related to MSP were measured in the questionnaire. The first of the ideational variables related to MSP was *knowledge* that having just one spouse/partner prevents HIV infection. This variable was measured as a spontaneous response to the question, "What can a person do to prevent getting infected with HIV?" Only spontaneous responses related to having one sex partner or reducing the number of partners were considered correct knowledge of this preventive behavior.

The second ideational variable measured was *attitude* towards having MSP. Respondents were provided with a series of statements that reflected beliefs and values about having more than one sex partner. For each statement, respondents were asked to indicate whether they totally agreed with the statement, partially agreed, partially disagreed or completely disagreed. Factor analysis was used to develop a scale that represented attitudes towards MSP ($\alpha=0.75$; see Table A1 in Appendix 1).

The third ideational variable was *interpersonal communication* with one's spouse/partner about avoiding MSP to prevent HIV infection. This variable was measured in two ways: (1) respondents were asked whether in the last 12 months they and their spouse/boy-girlfriend had talked about anything related to HIV or sexual behavior in the family. Those who gave a positive answer were asked what they had talked about. Respondents who spontaneously mentioned *andar fora*, being faithful and/or having only one sex partner, were classified as having talked about this topic; (2) respondents were asked whether in the last 12 months they had talked with anyone about the *andar fora* messages. Those who gave a positive response were asked whom they had talked to. Those who mentioned they talked with their spouse/partner were also counted as having talked about this topic.

An additional factor analysis was conducted to combine knowledge and interpersonal communication with spouse/partner into a single joint construct that was labeled *MSP ideation* ($\alpha=0.52$).

Condom Use

Two ideational variables related to condom use were measured, and are detailed in Tables A2 and A3 in Appendix 1.

The first of these assessed *attitude* towards condom use. Survey respondents were provided with a series of 10 statements that reflected beliefs and values about condoms. For each statement, respondents were asked to indicate whether they totally agreed with the statement, partially agreed, partially disagreed or completely disagreed. Factor analysis was used to develop a scale representing attitude towards condom use ($\alpha=0.87$). Table A2 shows the statements that were included in the development of this scale.

The second ideational variable measured *self-efficacy* of condom use. This ideational factor was measured by asking respondents how confident were they that they could perform 4 specific behaviors related to condoms (see Table A3 in Appendix 1). A scale representing self-efficacy of condom use was developed through a factor analysis ($\alpha=0.78$).

HIV Testing

One ideational variable was developed from the questionnaire to measure discussion of HIV testing with others or *interpersonal communication (IPC)* about HIV testing among respondents. The composite variable measuring IPC consisted of the following three questions ($\alpha=0.65$):

1. Has anyone with whom you have had sex, including your spouse, ever asked you to get an HIV test?
2. In the last 12 months, have you asked anyone with whom you have had sex, including your spouse, to get an HIV test?
3. In the last 12 months, did you ever discuss HIV testing with any of your friends?

Behavioral Outcome Measures

Multiple Sex Partners

Two separate questions in the survey measured MSP behavior. First, respondents who reported having had sex in the last 12 months were asked, “In total, including your spouse/girlfriend (boyfriend), with how many different people have you had sexual intercourse in the past 12 months?” Second, regardless of the number of people with whom respondents reported having had sex, each was asked a series of questions on a grid for their most recent sex partner (up to three) during the last 12 months. The grid also included classification of each sex partner (as spouse, live-in partner, boyfriend/girlfriend, friend, relative, acquaintance, or one-night stand), use and frequency of use of condoms with each partner (described below) and other questions about each sex partnership. A comparison of the method used in this survey for measuring MSP to methods used in the INSIDA (INS, 2010) is included in Appendix 6.

Condom Use

Measurement of reported condom use in the MSP survey used several questions to account for a range of behaviors: (1) ever used condoms, (2) condom use at first sex, (3) condom use to prevent HIV (spontaneous answer), (4) condom use at last sex with each reported sex partner (grid), and (5) frequency of condom use with each partner (up to three) mentioned on the MSP grid (5-point Likert scale ranging from “Never” to “Always”).

HIV Testing

Respondents were asked whether they had ever been tested for HIV. Those who gave a positive response were asked when they last tested. Responses were classified in the following categories: (1) 12 months or less, (2) 12-23 months, (3) two or more years.

Correct Recall and Exposure to the Communication Campaign

To assess exposure to the MSP campaign, the questionnaire included a series of recall questions specific to various campaign messages and activities. A joint campaign exposure measure was developed based on the number of unique campaign components correctly recalled (range 0-18; $\alpha=0.84$).

Television recall questions were classified into four variables representing the advertisements produced by each of the four partner organizations. During these questions, respondents were shown a total of 14 images extracted from the MSP campaign television advertisements (3-4 images per organization). For each image that the respondent recognized, they were asked to describe the message that the image intended to convey. Only spontaneous, *unaided* responses were recorded in the questionnaire. A set of pre-coded answers provided by each organization as well as others obtained from the questionnaire pretesting were included in the questionnaire. Other open-ended responses were coded during the data analysis. A rigorous coding of these responses was followed; an answer was considered valid when it included any of the specific messages conveyed by the image of the television advertisement, beyond a simple answer of “HIV” or “AIDS.”

Two other recall items required respondents to complete each of the two campaign slogans.

Respondents who were not able to spontaneously complete the slogan correctly were read the slogan and asked if they ever heard it. All respondents were asked to indicate the meaning of the slogan, and only respondents who correctly completed each slogan *unaided* were considered to have successfully

recalled it. Additionally, two items assessed recall of radio programs (*Vidas Mascaradas* and *Andar Fora*) and two items assessed recall of other campaign related television programs (*Tsha-Tsha* and *Tchova Tchova Historias de Vida*). Lastly, respondents were shown five print materials and the images of three billboards and asked if they had ever seen any of those materials and billboards. Those who answered positively were coded as “one” (recalled) and the rest were coded as “zero” (no recall).

By using questions that required unaided, correct recall of the message content of the communication campaign, the methodology increased the validity and reliability of the measure of exposure and minimized the potential for social desirability and acquiescence response (tendency to answer yes to any question).

Data analysis

Multivariate Causal Attribution (MCA) analysis was used to assess the effect of the MSP campaign on the three HIV prevention behaviors. MCA analysis is appropriate under the following conditions: a population-level intervention has been implemented that can be evaluated by a survey of the population *after* it has occurred; an appropriate theory of causality is assumed; the intervention is based on appropriate causal theories of change; and the statistical requirements for a causal inference, (structural equation modeling (SEM) and path analysis) have been met. The latter includes control of confounding variables, exclusion tests, tests for exogeneity, and Hosmer-Lemeshow chi2 goodness of fit test (Babalola & Kincaid, 2009; Kincaid & Do, 2006). The integrated statistical methodology of MCA is supported by the general theory of causation based on Pearl’s Structural Causal Model (SCM) which “subsumes and unifies other approaches to causation, and provides a coherent mathematical foundation for the analysis of causes and counterfactuals” (Pearl, 2009a, p. 96; 2009b).

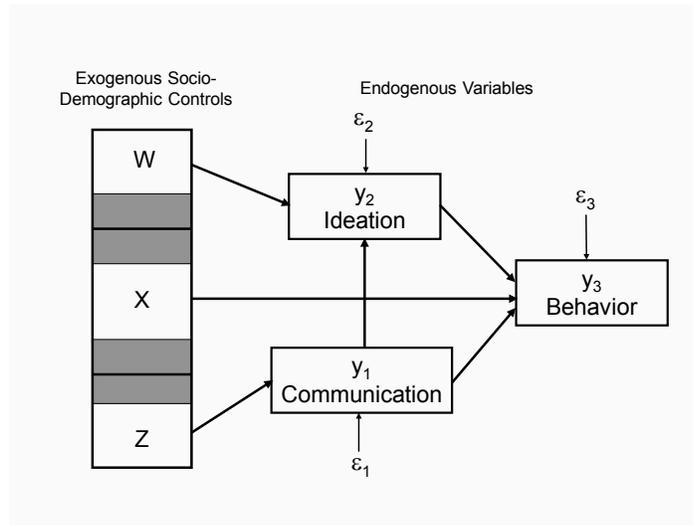
By means of multiple regression analysis, SEM examines 2 or more dependent (endogenous) variables in which one is a covariate [predictor] in the equation of the other. SEM helps resolve the problems of confounding variables and selection bias. The effect of exposure to the communication campaign is estimated after adjusting for a set of potential exogenous or confounding variables (X , W , Z), which are expected to affect exposure as well as the outcome of interest. Structural equation modeling (SEM) allows us to investigate the direct and indirect effect of the communication campaign on each behavior.

Figure 2 presents a path diagram of the structural equation model comprised of three equations. Starting with exposure to the communication program, the equation 3 estimates the predictors of exposure to the communication campaign using a set of exogenous socio-demographic control variables (Z). Equation 2 estimates the predictors of the behavior-specific ideational variables and tests whether the communication program (Y_1) is one of these predictors. Finally, equation 1 estimates the predictors of HIV prevention behavior on a set of exogenous or control variables (X_1) and tests whether the communication program (Y_1) and/or the ideational factors (Y_2) have any effect on the expected outcome behavior.

For each of the three HIV prevention behaviors—multiple sex partners, condom use and HIV testing—we estimated a structural equation model (SEM) using the corresponding ideational variables described above. We used factor analyses to compute the composite measures for the ideational variables and we

tested for exogeneity of the communication program variable and each of the ideational variables using biprobit regression analysis.

Figure 2: Structural equation modeling with multiple regression analysis to estimate the impact of communication on prevention behavior



$$y_{3it} = \beta_0 + \beta_1 y_{2it} + \beta_2 y_{1it} + \beta_3 X_{it} + \varepsilon_{3it} \quad \text{Behavior} \quad (1)$$

$$y_{2it} = \delta_0 + \delta_1 y_{1it} + \delta_2 W_{it} + \varepsilon_{2it} \quad \text{Ideation} \quad (2)$$

$$y_{1it} = \gamma_0 + \gamma_1 Z_{it} + \varepsilon_{1it} \quad \text{Communication} \quad (3)$$

RESULTS

Descriptive statistics

Table 1 presents the results of the demographic and socioeconomic characteristics of survey respondents in the four sampled provinces. These were used as control variables in all the regression analyses developed to assess the impact of the campaign, as shown in later sections.

Socio-Demographics

Respondents in the sample had a mean age of 30 years (range 15-54), about half were women, and the majority were married or in union. More than two-thirds had children and more than half lived in urban areas. The majority of respondents ascribed to some religion and indicated that it played a role in how they conduct their life. About a fifth of the sample had not attended school and less than half reported working for cash. Two out of every ten respondents reported working as a farmer and another similar percentage reported being employed with a fixed salary. Another 20% said they were students and 10% of the respondents were self-employed vendors.

The overall sample had a low to medium poverty level, as indicated by the two composite measures of SES. In the composite measure of standard of living ($\alpha=0.81$), households had an average of two of the five wealth indicator items. In the composite measure of poverty ($\alpha=0.82$), the sample had a mean index value of 2.2 (rarely to sometimes gone without any of the five goods/services measured).

About one-tenth of the sample reported sleeping outside their home in the last month prior to the survey, and a similar percentage reported spending 30 or more days consecutively outside their home. Less than half of the respondents in the sample reported spending time daily with their spouse/partner, and about half said they spent time daily with their children.

About a third of respondents reported consuming alcohol at least once in the last month, and about 25% of the sample reported heavy drinking (more than five drinks in one occasion for men and four for women) during the last month.

One-third of the sample reported listening to the radio every day and a higher percentage (44%) reported watching television daily. Most of the sample however did not report reading newspapers, magazines or using the Internet.

Table 1: Demographic characteristics of the MSP-2011 sample¹ (n=1,666)

Characteristic	Unweighted sample Percent (or mean)	Weighted sample Percent (or mean)
Age (mean)	30	30
Sex: female	52.6	57.5
Marital status: single	38.4	39.1
Ever had children	72.5	72.5
Number of children (mean)	2.2	2.3
Urban residence	54.0	61.5
Religion		
- None	19.7	20.3
- Catholic	17.1	17.7
- Protestant	34.1	33.3
- Other	29.1	28.7
Religion has no influence in life	9.7	12.5
Number of years in school		
- None	22.0	22.2
- Primary (1-6 years)	45.4	42.2
- Secondary and higher (7-12)	32.5	35.6
Receives cash for work	44.2	44.6
SES/poverty (mean = rarely) ²	2.3	2.2
SES/living standard (mean number of durables at home) ³	2.0	2.3
Occupation		
- Employed with fixed salary	18.0	19.4
- Self-employed salesman	8.2	9.6
- Farmer	22.2	21.6
- Student	20.3	21.8
Slept outside home in last month	14.2	14.0
Spent 30+ consecutive days outside home	12.6	11.3
Spends time daily with partner	40.4	39.3
Spends time daily with children	50.2	51.4
Drank alcohol at least once in the last month	31.0	31.9
Had more than 5 drinks on one occasion during the last month	24.9	24.2
Listens to the radio everyday	30.7	31.6
Watches TV everyday	37.9	43.8
Reads newspaper daily	3.1	4.3
Reads magazines daily	1.0	1.4
Uses the Internet daily	3.5	5.1
Participated in community meetings where HIV was discussed	22.1	21.4
Participated in religious meetings where HIV was discussed	18.7	19.6
Residence		
-Maputo city	14.5	23.9
-Maputo province	28.4	24.7
-Gaza	27.1	22.0
-Sofala	30.0	29.4

¹ Figures are percentages unless specified otherwise. ² Household has electricity, water, toilet, mobile, refrigerator, truck, or computer; alpha=0.81. ³In the last 12 months, gone without any of the following: cooking fuel; potable water for drinking/cooking; medication or medical treatment; enough food for entire family; enough money; alpha=0.82

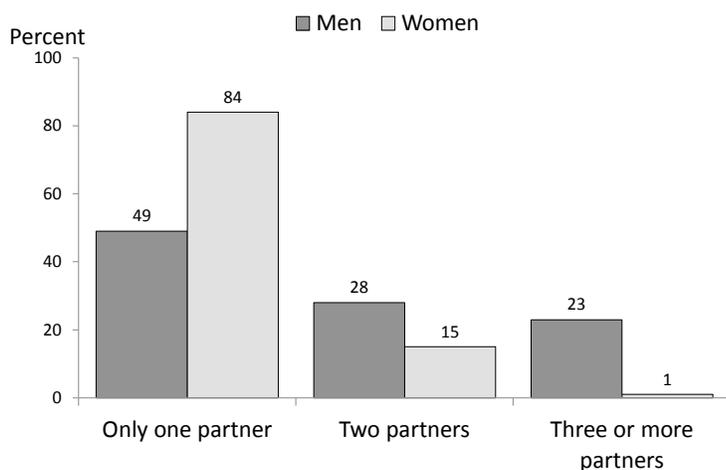
Prevalence of HIV prevention behaviors

Table 2 on page 22 summarizes the prevalence of reported MSP, condom use, and HIV testing by selected characteristics. In this and all the analyses that follow, the sample is limited to respondents that reported having had sex in the last 12 months (n=1,427), a sample representing 1,943,112 men (15-54) and women (15-49) in the four provinces.

Multiple sex partners

Results from the MSP-2011 survey showed that overall, the majority (84%) of Mozambican women and about half (49%) of Mozambican men reported having only one sex partner in the last 12 months prior to the survey (Figure 3). Twenty-eight percent of men indicated having two different sex partners in the 12 months prior to the survey and another 23% reported three. For women, the proportions reporting two and three different sex partners in the 12 months prior to the survey were 15% and 1%, respectively. For women, the number of sex partners in the last 12 months steadily declined with age, from 31% of 15- to 19-year-olds reporting MSP to only 2% of 40- to 49-year-olds, and no MSP reported among 50- to 55-year-olds. For men, the age group with the highest proportion of MSP was 20-29 years (67%) followed by 30-39 (51%) and 15-19 (47%). By place of residence, MSP prevalence ranged from 27% (Maputo province) to 36% (Maputo city).

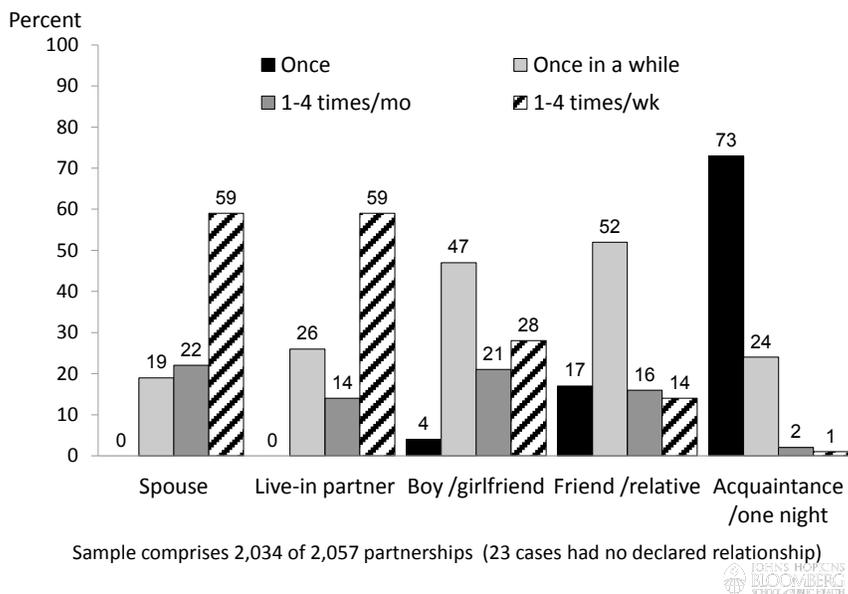
Figure 3: Reported number of sex partners (weighted data)



Sample that had sex in last 12 mo=1,427 (790 men and 876 women).

Among the 1,427 respondents who reported having had sex in the last 12 months prior to the survey, a total of 2,034 sex partnerships were documented. The majority of these relationships (79%) were almost equally classified as spouse (26%), live-in partner (25%) or boy/girlfriend (28%). The remaining 21% were described as friend/relative (15%) or acquaintance/one-night stand (5%). Frequency of sex varied by type of relationship (see Figure 4). The most frequent sex (1-4 times per week) occurred with more stable partners (spouses and live-in partners), while the least frequent sex was reported with more casual partners such as friends and acquaintances.

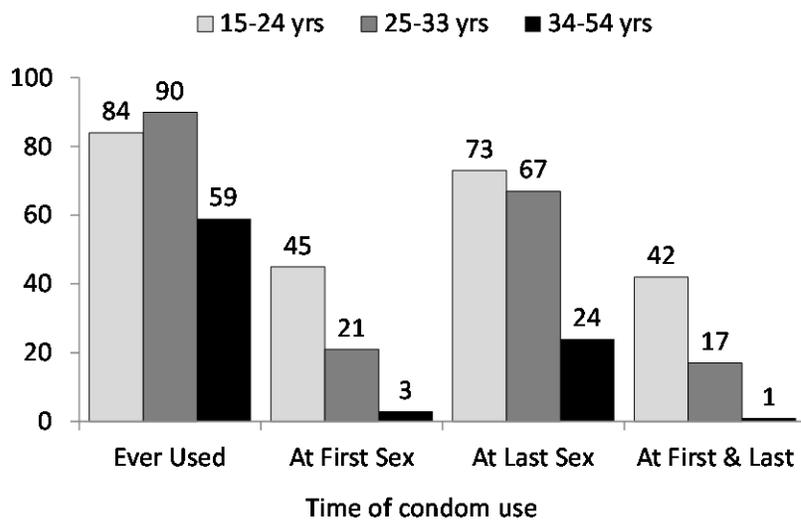
Figure 4: Frequency of sex by type of relationship



Condom Use

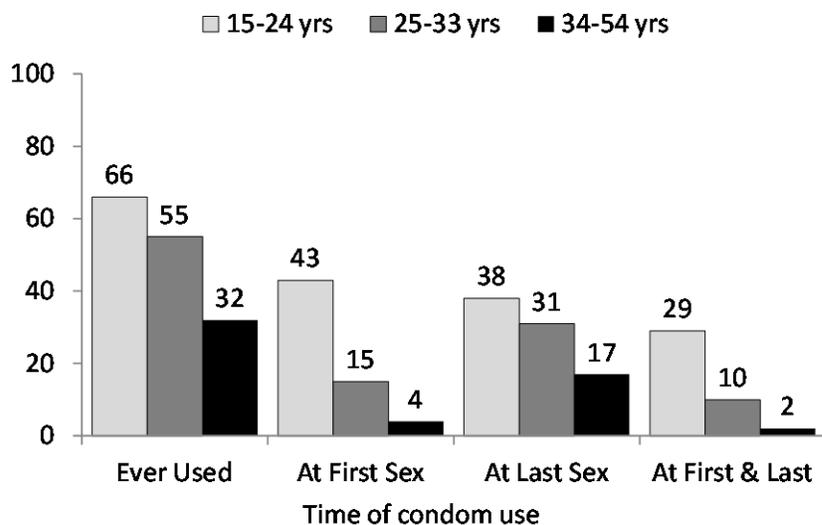
Table 2 compares different measures for condom use among those who had sex in the last 12 months. On average, 61% reported having ever used a condom, 20% had used a condom at first sex, and 38% had used a condom at last sex. With the exception of condom use at first sex, for any other measure, reported condom use was higher among men (between 40% and 65%) compared to women, and among the younger age groups (around 50%). Condom use at first sex was the highest (44%) among youth 15-24. This figure is more than double that for the age group 25-33 and more than 10 times higher compared to the oldest group 34-55. This difference suggests a generational shift in condom use, with almost half of the young age group using condoms the first time they had sex, with similar levels among men (21%) and women (20%). Reported condom use at last sex, however, was higher among men (51%) compared to women (29%). This differential may be the result of a lower proportion of women being able to negotiate condom use at last sex—only 38% of women 15-24 reported using condom at last sex while for men this figure is 73% (see Figures 5 and 6).

Figure 5: Condom use indicators by age group (Men)



N=1,427 men and women ages 15-54 years who had sex the last 12 months. Weighted by sex, urban/rural residence and province

Figure 6: Condom use indicators by age group (Women)

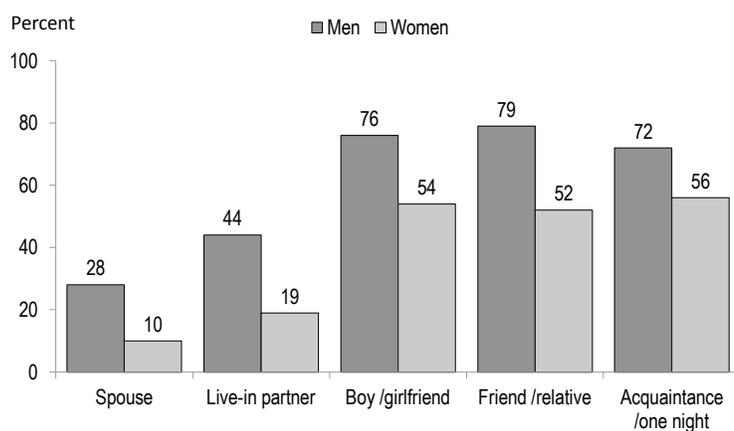


N=1,427 men and women ages 15-54 years who had sex the last 12 months. Weighted by sex, urban/rural residence and province

By residence, condom use across measures was generally higher in urban areas as compared to rural areas, with the highest levels being in Maputo city. In general, frequency of condom use was low (values between 2–almost never used, and 3–sometimes used). Gaza and Sofala, however, had the lowest averages of frequency of condom use among the study provinces.

Condom use also varied by type of sexual relationship. Overall, levels of reported condom use at last sex were lower with more stable relationships and increased with more casual types of relationships, ranging from 18.7% condom use at last sex with spouse to 70% with a friend/relative or acquaintances/one night stand. Figure 7 presents this association separately for men and women.

Figure 7: Reported condom use at last sex by type of relationship



Sample comprises 2,034 partnerships (1,173 for men and 861 for women)

HIV Testing

Moderate levels of self-reported HIV testing in the last 12 months were found in men (31.8%), women (42.6%) and the overall sample (40%). Among women, testing was highest among those 25-33 years of age (54%) and 15-24 years of age (41%), while the oldest age group reported the lowest testing prevalence (38%; see Table 2). In contrast, among men, the lowest proportion of HIV testing (26.5%) in the last 12 months was found in the youngest group (15-24 years). Geographically, the greatest percentage of those who reported being tested in the last 12 months resided in Maputo city (54%) and in urban areas (46%).

About one-third of men and women in the four provinces had never been tested for HIV. The proportion of never tested was higher among men (47%), among those living in rural areas (46%), and among the youngest (42%) and oldest age groups (40%). By province, Gaza and Sofala had the highest proportion of men and women that had never been tested for HIV, 43% and 40%, respectively. Maputo city had the lowest proportion of respondents who had never been tested for HIV; only 23% in that province reported never being tested (Table 2).

Table 2: Summary of HIV prevention behaviors among those reporting having had sex in the last 12 months (weighted data)¹

n=1,427	MSP	Condom Use				HIV Testing			
		Ever used a condom	Condom use the first time one had sex	Condoms with any of 1-3 partners at last sex	Average frequency of condom use over 1-3 partners ²	Never tested	2+ years ago	12-23 months ago	Less than 12 months ago
Gender									
Male	51.0	74.8	21.0	50.7	2.762	46.6	12.3	7.0	34.1
Female	15.9	51.4	20.0	29.1	2.112	26.8	12.4	15.2	45.6
Age group									
15-24 yrs	35.1	73.8	44	53.4	2.912	42.1	11.3	11.6	34.9
25-33 yrs	35.4	66.2	17.2	42.9	2.521	24.0	12.6	12.6	50.8
34-55 yrs	22.3	45.4	3.0	20.3	1.798	40.3	13.0	10.9	35.8
Residence									
Rural	27.2	36.8	11.7	19.7	1.744	28.5	14.7	10.5	46.3
Urban	35.8	76.3	25.7	49.6	2.784	46.0	8.6	13.6	31.8
District									
Maputo City	35.8	90.2	29.3	59.8	3.291	22.7	14.9	8.3	54.1
Maputo Province	27.1	71.3	26.5	49.8	2.586	35.0	14.5	8.7	41.9
Sofala	30.2	40.8	10.9	21.7	1.768	39.7	10.9	17.1	32.3
Gaza	29.7	46.1	17.0	24.3	2.008	43.2	9.3	11.3	36.1
Total:	31.9	61.3	20.4	38.2	2.387	35.2	12.4	11.7	40.8
¹ All figures are percentages except for the average condom use frequency measure ² Condom frequency scale: 1=Never 2=Almost never 3=Sometimes 4=Almost always 5=Always									

Ideation of HIV Prevention Behaviors¹

Ideational Variables for Multiple Sex Partners.

Knowledge of MSP risk. About half of the respondents in the survey spontaneously said that having only one sex partner prevented HIV infection; the lowest figures, however, were found among the 15- to 24-year-olds (32%) and among residents of Gaza (36%); the highest (61%) were found among older people (34-54) and residents of Sofala (66%).

Attitude towards MSP. About half of respondents held favorable attitudes toward MSP with large differentials by gender. While 35% of women had favorable attitudes towards MSP, this figure is almost double (65%) for men. People in Gaza and Sofala also reported higher favorable attitudes towards MSP compared to their counterparts in Maputo province and Maputo city.

Partner communication about MSP. About 40% of respondents reported talking to their spouse/boy-girlfriend about having one sex partner to prevent HIV. This figure was the lowest in Gaza (27%) while it was more than double in Sofala.

Ideational Variables for Condom Use.

Attitudes toward condom use. The average attitudinal score of 2.69 on the 5-point Likert scale is indicative of partial agreement or somewhat favorable attitudes toward condom use.

Self-efficacy for condom use. Similarly to attitudes, the average self-efficacy score of 2.83 indicates some level of confidence for condom use. Men had higher confidence (score=3.1) than women (score=2.6). A joint *condom use ideation* variable (attitude and self-efficacy) was calculated ($\alpha=0.87, 0.78$) and on average, it showed generally favorable attitudes (score=2.7) but was found to be widely distributed (SD: 0.80), indicating a wide variation among respondents regarding condom use ideation.

Ideational Variables for HIV Testing

Interpersonal communication about HIV testing. Almost half of respondents (48%) reported talking with friends about HIV testing during the past 12 months. Though figures were generally similar across age groups, men (61.1%) and urban residents (56.9%) reported more of this type of IPC behavior than their female (38.4%) and rural (33.9%) counterparts. Those reported having been asked by their spouse/partner to get an HIV test made up 23.8% of the sample, with the lowest figure found in rural areas (16.8%) and in the province of Gaza (16.8%). The percentage of respondents who themselves reported having asked their spouse/partner to get tested was 29%, and no notable differences across provinces, age, gender, or area of residence were observed. After combining these three measures to describe overall IPC ($\alpha=0.65$), it was observed that about 60% of respondents engaged in at least one form of IPC about HIV testing. By sex, men reported higher levels of IPC (68%) than women (52%). By age, only 53.7% of those between 34 and 54 years of age reported IPC compared to 61.3% of 15- to 24-year-olds and 25- to 33-year-olds.

¹ As mentioned before, these results are based on the sample of 1,427 respondents who reported having had sex in the last 12 months.

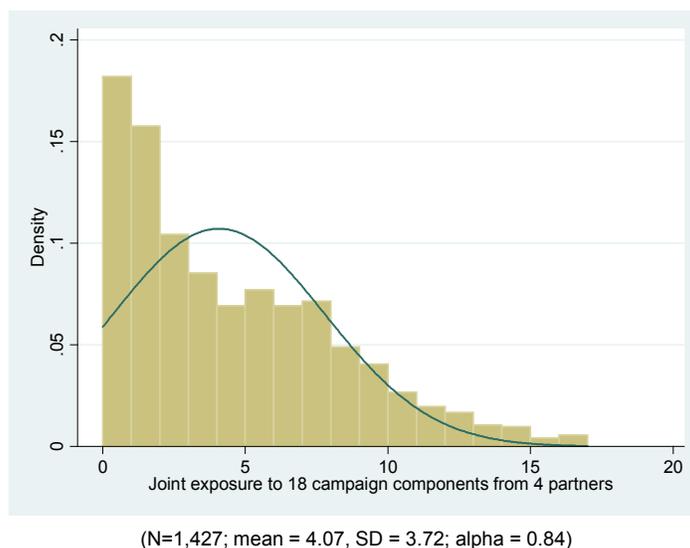
Exposure to the Multiple Sex Partners campaign²

Eighteen communication components were included in a combined measure of exposure to the MSP communication campaign (Cronbach alpha=0.84). Overall, 81.2% of survey respondents were exposed to at least one or more of the implementing organizations' communication activities. This proportion represents a population of 2,267,486 men (15-54) and women (15-49) in the four survey areas. Exposure was especially high for television advertisements (around 40% for some messages), print materials/billboards (between 30%-40% for some messages), and for the spontaneous completion of the slogan "*andar fora e maningue arriscado*" (36% overall, 50% in urban areas).

While exposure to any one component was very high, the overall exposure level was higher in urban (92.1%) compared to rural areas (63.9%), among men (86.6%) compared to women (77.2%), and in the youngest age group (86%) as compared to the oldest (75.9%). The province of Gaza also shows the lowest level of exposure (67.5%) of the four study provinces, while in Maputo city exposure to at least one component was as high as 95.5%.

Figure 8 suggests that about 20% of the population in the survey was not exposed to any campaign message, and another 15% was exposed to only one of the 18 components. The population was exposed to a median of three out of the total 18 campaign components—meaning that half of the population in the survey was exposed to three or fewer of the campaign components while the other half was exposed to more than three components. About 20% of the population in the sample was exposed to eight or more of the 18 components.

Figure 8: Distribution of recall of 18 communication components



² The term "recall" refers to the actual recollection of the content of the communication messages while the term "exposure" is used more broadly to refer to both seeing/hearing messages and recalling the content of such messages. For this part and the rest of the analysis we will use the term "exposure."

Causal analysis of the impact of the communication campaign

MCA analysis and SEM models were used to assess the impact of the joint MSP campaign on the HIV prevention behaviors. The SEM presented in Figure 2 on page 13 consists of three equations—communication exposure, ideational variables, and prevention behavior. The estimated equation for communication exposure remains the same for the three prevention behaviors in the analyses below. For the models shown, all the (SEM) statistical tests for a causal inference described above were met.

Predictors of exposure to the joint MSP campaign

The regression model for communication exposure used all variables listed in Table 1 but only those that were statistically significant (to at least the $p < 0.05$ level) are shown in the final model (see Table A4 in Appendix 3). Main predictors of exposure to the joint communication campaign were being female, having seven years or more of education, having a higher SES, being a student, having participated in religious meetings where HIV/AIDS was discussed, having visited bars in the last month, living in the urban areas of the four sampled provinces, and having higher consumption of Internet, TV, radio, newspaper, and magazines.

Predictors of ideational outcome variables

The regression models for MSP ideation, condom use ideation, and ideation on HIV testing used exogenous variables listed in Table 1 but excluded the variables that were previously identified in the communication exposure equation. In each of the ideational equations, the communication exposure level was tested to determine possible impact on the ideational variable. In all four ideation equation models—attitudes toward MSP and knowledge of MSP risk, condom use ideation, and IPC on HIV testing—exposure to the communication campaign was statistically significant. Campaign exposure had a **negative** effect on favorable attitudes toward MSP and a positive effect on knowledge and discussion of the MSP risk (Table A5); it had a positive effect on condom use ideation (Table A6) and on IPC about HIV testing (Table A7). Controlling for potential confounders, those with a negative attitude towards MSP were more likely to: have a high level of exposure to the joint MSP campaign, know about the MSP risk, be farmers, and be confident (have high self-efficacy) toward remaining with just one sexual partner. Those with a favorable attitude towards MSP were more likely to be men, have visited bars in the last month and drink heavily, have some level of education, and live in the urban area of Sofala and in the province of Gaza (Table A5, Model 1). Controlling for all other variables, those with a higher knowledge and discussion of MSP risk were more likely to have a high level of exposure to the joint MSP campaign, be confident (self-efficacy) to have one sex partner and avoid MSP, have discussed HIV/AIDS in community and religious meetings, have high consumption of TV, radio, newspaper and magazines, and live in the urban area of Sofala. Those with lower levels of knowledge and discussion of MSP were more likely to be single and younger.

Predictors of prevention behaviors

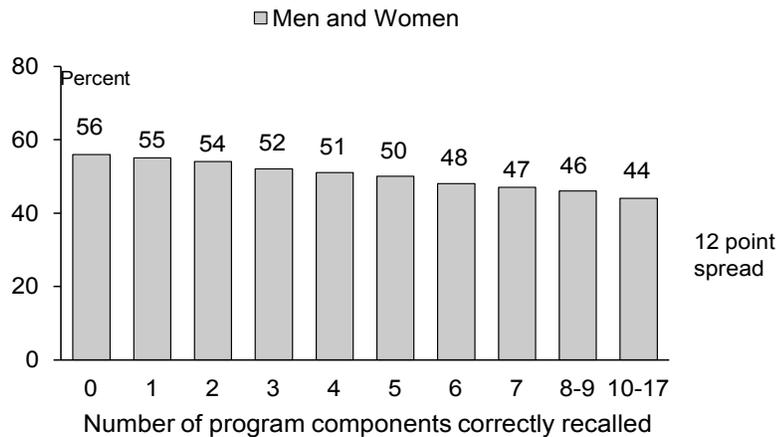
Logistic regression models were used to assess the impact of the ideational variables (potential mediators of the campaign's effect) and campaign exposure on each of the behavioral outcomes, controlling for the aforementioned potential confounders. For each of the three outcome behaviors, the relevant ideation variables had a significant impact on the corresponding behavior. Greater MSP

ideation (knowledge and discussion of MSP) predicted lower levels of MSP behavior (OR=0.78). Mediation analysis showed that 81% of the impact of knowledge and discussion on MSP was direct and the remaining 19% was indirect through MSP attitudes adding an additional pathway in the final model (Figure 7). Condom use ideation had a positive and significant impact on condom use at last sex with any partner (OR=1.30). In HIV testing behavior, men and women who engaged in interpersonal communication about testing were more likely to have been tested in the last 12 months than those who did not engage in these conversations (OR=3.2). All of these effects were significant at the $p < 0.01$ level (Tables A5-A7 in Appendix 3).

Adjusted probability of MSP by levels of the significant predictors

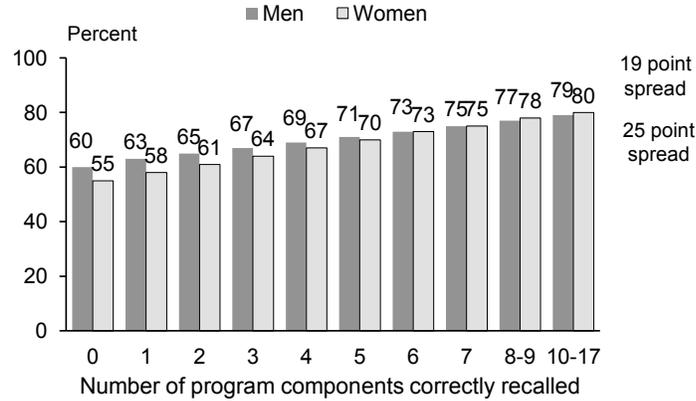
Controlling for all other variables in the regression equations, exposure to the communication campaign had a dose-response effect on increased knowledge and discussion of the MSP risk (Figure 10) as well as less favorable attitudes toward MSP (Figure 9). The more items recalled, the more adaptive the attitudes and greater the knowledge of the respondent. After accounting for the two MSP ideational variables, exposure to the campaign shows no association with MSP, suggesting that the campaign had an indirect effect on lowering multiple sexual partners through the mediation of MSP attitudes and knowledge/discussion of MSP (Figure 11).

Figure 9: Proportion of favorable attitudes toward MSP by campaign recall



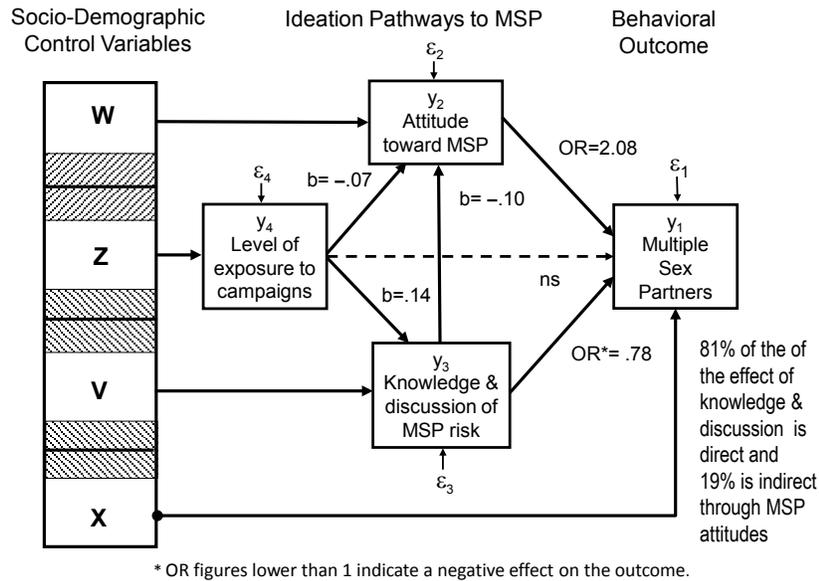
N = 1,427 men & women; $p < 0.028$; ages 15-54 yrs. who have had sex in the last 12 months; median split (.49/.51); adjusted with logistic regression. $R^2 = .17$, 70% correctly classified.

Figure 10: Proportion of those reporting any knowledge or discussion about risk of MSP with partners in the last 12 months by level of campaign recall and gender



N = 677 men, 750 women; p<0.02; p<0.001; ages 15-54 yrs. who have had sex in the last 12 months; adjusted with logistic regression

Figure 11: Structural Equation (path) model for multiple sexual partners



Model of campaign impact on condom use

Campaign exposure was linearly related to the five measures of condom use at last sex, and this finding was consistent in the stratification of condom use by partner type (see Appendix 5, Figure A4). Additionally, respondents with greater exposure to the communication campaign were more likely to have a favorable ideation toward condom use (attitudes and self-efficacy).

In the final model, campaign exposure also had a significant impact on condom use beyond what was explained by the ideational variables. For condom use at last sex, 34% of the effect of campaign recall on condom use was indirect through condom use ideation, while 66% of the impact of the campaign was direct. For frequency of condom use, those figures are similar (68% direct and 32% indirect through condom ideation).

Model of campaign effect on HIV testing

Exposure to the campaign had a direct and significant impact on the ideational variable—IPC about HIV testing (OR=1.18). Overall, 82% of the effect of the campaign on HIV testing behavior can be explained through the mediation of this ideational variable. However, the impact analysis by gender showed that the campaign had a direct effect on HIV testing for men (but not for women) above and beyond that which can be explained by the mediating variables. Overall patterns exhibit a similar linear dose-response, monotonically increasing levels of behavior with increasing levels of campaign exposure. Appendix 4 contains the final SEM model.

DISCUSSION

Summary of findings

Overall reach and effect of campaign

The results described in this report provide substantial evidence of a positive effect of the behavior change communication (BCC) campaign on Multiple Sex Partners (MSP) and other HIV prevention behaviors. The reach of the campaign was high; more than 80% of respondents correctly recalled at least one of the 18 components of the campaign. This proportion represents more than 2.2 million people (men 15-54 and women 15-45) in the four survey areas. Campaign exposure/recall was highly related to the mass media components, especially television advertisements. The slogan *andar fora e maningue arriscado* also had a high spontaneous completion rate (close to 40% for the overall sample, and 50% for urban areas).

The campaign influenced several ideational variables, the proximate determinants of HIV prevention behavior. Exposure/recall to the campaign had a linear (dose response) negative impact on favorable attitudes towards MSP, a positive impact on knowledge of the risk of MSP, a positive impact on attitudes and self-efficacy for condom use, and a positive impact on discussion with spouse and others about MSP and about HIV testing. The linear relationship between campaign exposure/recall and positive ideational variables explained a substantial proportion of the campaigns' observable impact on HIV prevention behaviors, especially MSP.

Results and methodology compared to previous literature

The present study used a slightly different measure of MSP than those used in previous studies. This methodological difference may explain the higher prevalence of MSP reported in this study as compared to findings from INSIDA 2009. A discussion of these results and methodological differences are detailed in Appendices 6 and 7.

In comparing secondary behavioral outcomes to data from 2009, the results from the MSP 2011 survey suggest that condom use has increased over the last two years in the four study provinces except among men in Gaza. HIV testing among women increased 10-20% in the same 2-year period; these increases were slightly lower for men compared to women but still statistically significant. A further comparison of these results on the three outcome behaviors is found in Appendix 6.

Specific recommendations for BCC programs

The results of both the ideation and demographic variables provide several insights on how to improve future BCC programs designed to decrease MSP and other HIV risk behaviors in Mozambique and similar regions.

Strategies for promoting HIV prevention practices

MSP

As the first national BCC campaign to publicly address MSP, this campaign and its evaluation demonstrate the efficacy of using ideational variables such as knowledge, attitude and interpersonal

communication (IPC). Communication through the mass media and through community-level interventions should employ strategies to encourage these ideational variables and increase discussion of HIV prevention with others. The more people talk about these issues, the more they will reflect about them, exchange ideas, and change their behavior.

Our results indicate that while 35% of women had favorable attitudes towards MSP, this figure was almost double (65%) for men. This is consistent with our data showing men are more likely to actually engage in MSP behavior and with research describing MSP as a traditionally esteemed symbol of masculinity in Mozambique (Hunter, 2004). Future campaigns need to help people increase their sense of self-efficacy by modeling this behavior and by focusing on changing undesirable MSP attitudes among men. Additionally, since alcohol consumption was a significant predictor of having more than one sex partner, BCC programs should also consider integrating messages about the risks of excessive alcohol use into HIV prevention interventions.

Future MSP campaigns should also continue to integrate with and build off of secondary prevention practices shown to be successfully influenced by BCC, such as condom use and HIV testing.

Condom use

The causal relationship found in this evaluation between condom ideation and condom use and the frequency of condom use, suggests that designing messages to increase self-efficacy and positive attitudes about condom use would be an effective way to increase these behaviors. In addition to ideation, other predictors of condom use that emerged from the data analysis should also be used to improve the design of future BCC programs.

One particular finding was the generally higher prevalence of condom use among the younger age group (15- to 24-year-olds) compared to the older groups, suggesting both a generational shift in the practice and the effectiveness of condom promotion and youth programs in Mozambique. Organizations should continue to promote condom use among youth to ensure consistency in this practice, and increase condom use at first sex among the next generation of sexually active youth.

The results also suggest that individuals who visited bars, drank heavily, and spent 30 or more days away from home were more likely to use condoms during their last sex. This may be related to the results of the bivariate analysis showing higher condom use with casual sexual partners. In fact, one factor negatively associated with condom use was reporting the spouse as a sexual partner in the last 12 months prior to the survey. This indicates that estimates of condom use at last sex cannot ignore the role that type of sexual relationship plays on this prevention behavior, or the overlap between condom and MSP behavior. Additional research is needed to further explore the interaction of heavy drinking and sexual relationships with casual partners.

Programs should continue to promote consistent condom use as a way to prevent HIV infection among regular and non-regular partners (sexual relationships), and consider how to effectively balance the promotion of condom use with *one partner* messaging.

HIV Testing

Thanks to the expansion in access to HIV testing, and to community-level and mass media efforts, the level of HIV testing has increased dramatically in Mozambique. Yet there is still work to be done. About one-third of men and women in the four study provinces have *never* been tested for HIV. This proportion is higher among men (47%), people living in rural areas (46%), and those living in the provinces of Gaza (43%) and Sofala (40%). Future BCC efforts that promote HIV testing should incorporate the ideational variables shown to be effective in this campaign and tailor some of them to men in these specific rural regions.

One of the main ideational factors associated with HIV testing in this study was discussion with others, which increased as a result of the present campaign. Programs should encourage interpersonal communication to promote testing as normative and socially supported behavior. Participation in community meetings was especially important in communication about testing and testing behavior. Campaigns should build off these efforts to bring messaging beyond mass media and into community venues in cases where IPC is particularly effective.

Partnership and communication channels

It is unlikely that any of the four partner organizations would have independently reached the size of the population that they all reached together, emphasizing the importance of collaborative and coordinated efforts in HIV BCC programs. Future efforts should similarly strive to increase synergy and exposure to the different components of a campaign. In this regard, it is not necessary that all programs attempt to use the same approach or use the same messages. Combining diverse approaches may have more overall impact than utilizing a single messaging strategy. A program may focus on a particular audience segment (men, for example), specific regions of the country (community-level interventions), or even one specific outcome (condom use, HIV testing, or MSP reduction). It would improve the overall impact if the organizations coordinated their efforts with an agreed upon national strategy in which each program knows where it fits and can contribute effectively.

The high recall of television spots indicates that future programs need to continue to make use of this channel of communication to maximize reach and overall impact. Participation in community and religious meetings was strongly and positively related to recall of the campaign, and future programs should consider increasing community-based activity as another means of disseminating campaign messages. Having visited bars was also related to recall of the campaign. This finding is plausible considering that some of the campaign messages were aired during the Football World Cup, which was viewed heavily in bars. This finding suggests that programs should consider buying air time during highly viewed sports events as a potentially effective way to disseminate messages, especially those targeted at men who gather in bars. Alcohol was mentioned above as having an association with MSP, so airing MSP prevention messages in bars might also be a way to target those at highest risk of engaging in this practice and at locations where MSP is likely to be initiated.

Internet use in Mozambique is still low, and the current campaign did not develop Internet content in the dissemination strategy. However, Internet use will continue to grow according to the global trend and due to Mozambique's consistent economic growth and the reform of its telecommunications landscape (Paul Buddle Communication Pty Ltd., 2012). Future programs should consider ways in which

their messages can circulate through this medium. Experience in South Africa, where social media use is higher, indicates that many people use Twitter and Facebook *while* watching HIV prevention programs on television (Kincaid & Parker, 2008). These mediums represent opportunities for expanding interpersonal communication, an influential factor in HIV prevention behavior, according to this study.

The slogan *andar fora e maningue arriscado* had a high spontaneous recall (close to 40% for the whole sample) and has now become part the common language to refer to HIV prevention in Mozambique. Future programs are encouraged to recycle and build off of this highly identifiable slogan.

Regional differences also need to be considered in BCC efforts. Reach has to increase in rural areas where the campaign recall and exposure was lower compared to urban areas. This can be done through the involvement of community radio and other means accessible to the rural populations. Additionally, programs should focus on behavior change pertinent in these areas. For example, respondents in Gaza and Sofala reported higher favorable attitudes towards MSP compared to their counterparts in Maputo province and Maputo city, and condom use was higher in urban compared to rural areas.

Limitations and future research

Though this was a national campaign, the evaluation was only done in four provinces and cannot be generalized to the rest of the country. Research in Mozambique and elsewhere needs to continue to identify ideational variables like those measured in this evaluation, in order to improve program design and program impact. New qualitative research should explore additional variables related to HIV prevention behavior that have not yet been tested in sample survey research. The theoretical framework presented in this report provides a set of ideational variables that programs and researchers are encouraged to use. For example, this study was not able to assess the role of perceived norms, another ideational variable that has been shown to have a significant role on HIV prevention behaviors.

Measuring MSP continues to pose a set of operational challenges in the field. Further research is needed to assess and compare the validity of these measures (see Appendix 7).

Designing the analysis around structural equation models was appropriate to reveal the causal pathways in which the campaign worked through specific ideational variables related to each of the three HIV prevention behaviors. The rigorous statistical tests for the causal inference, however, make it difficult to include more than three or four equations (program exposure, ideational variables, and outcome variables) in the same SEM. The role of additional ideational variables and the interaction with the variables used could not be explored in the SEM. The finding of increasing condom use with more casual partners gives us preliminary insight into how condom use and MSP might be related, but the ideation of these two behaviors were measured and analyzed by means of separate SEMs. Though all of the behaviors were affected by the campaign through the ideational variables, there was a large direct effect of the campaign on condom use that was not explained by the ideational variables included in the analysis. The SEM goodness of fit chi2 statistics confirmed a good model fit, but the direct effect requires further analysis. Further secondary analysis and future surveys should consider integrating these separate analyses into a single, more comprehensive MSP explanatory model if the statistical requirements can still be met.

Perhaps the most important limitation applies to all surveys done after a communication campaign ends. Enough time may not have passed between the end of the campaign and the survey data collection to capture the full extent of the impact and changes in behavior. The present study only reflects relatively short-term impacts and changes. Change, by definition, takes time to occur. The models reported here, for example, indicate an impact on interpersonal communication and ideation that has a measured short-term impact on behavior. However, certain behaviors require more time to develop, for instance, talking to a sex partner or friend into getting tested for HIV, or for acting on an intended behavior after having changed their thinking (ideational impact). Future surveys conducted after the next round of campaigns and even unobtrusive measures such as clinic records for HIV testing and condom sales will let us know if the impacts measured in this survey will be sustained and even increase in the future.

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Appendix 1: Ideational scales

Table A1: Favorable attitudes towards multiple sex partners scale (reversed)

1	There is faithfulness in a couple when there are sexual relations outside the marriage/couple that are kept secret so the partner isn't suspicious
2	A man needs many sexual partners even if sex is good with his wife
3	Having someone else for sex makes it easier to deal with your main partner when problems come up.
4	I sometimes have sex with someone one day and then another person the next day.
5	I don't really feel a tie to anyone I have sex with.
6	I need someone else so that I do not feel lonely in case I ever break up with my main partner.
7	Now and then, I go to someone else besides my main partner because the sex is so good.
8	There are people I will have sex with whenever they call me.
Total Average Score (reversed mean=1.96)	

Internal reliability: alpha = 0.75; N=1427 sexually active

4-point Likert-type scale of *agreement (1) to disagreement(4)*

Table A2: Attitude towards condom use scale*

1	Condoms are for preventing diseases outside the marriage, not to be used between husband and wife.
2	Men (Women) are afraid that his wife/girlfriend (husband/boyfriend) will turn him down if he suggests using a condom.
3	If someone ever has trouble putting on a condom, they will be embarrassed to try to use a condom again.
4	Men who use condoms with their wives/girlfriends show that love is lacking in their couple.
5	Using condoms to protect against HIV is humiliating to the man
6	Men who use condoms with their wives are opening the door for her to have sex with other men.
7	A respectful woman should not talk about condoms.
8	There is no need to use condoms if you trust the other person.
9	When you use a condom you can't get the taste/pleasure.
10	Every woman should have children and this is why she doesn't want to know about condoms.
Total Average Score: 2.69	

* Internal reliability: alpha = a=0.87; N=1427 sexually active

REVERSED: 4-point Likert-type scale of *disagreement*

Table A3: Condon self-efficacy scale*

1	Certain I can use a condom, even if I drank too much.
2	Certain I can buy a condom without feeling embarrassed.
3	Certain I can refuse to have sex if someone that I like will not use a condom.
4	Men: Correctly put a condom on? Women: Correctly put a condom on the man with whom you are having intercourse with?
Total Average Score: 2.83	

* Internal reliability, alpha = 0.78; N=1427 sexually active

4-point Likert-type scales of certainty

Appendix 2: Structural equation models for condom use and for HIV testing in the last 12 months

Figure A1: SEM for condom use with any of the last 3 sexual partners

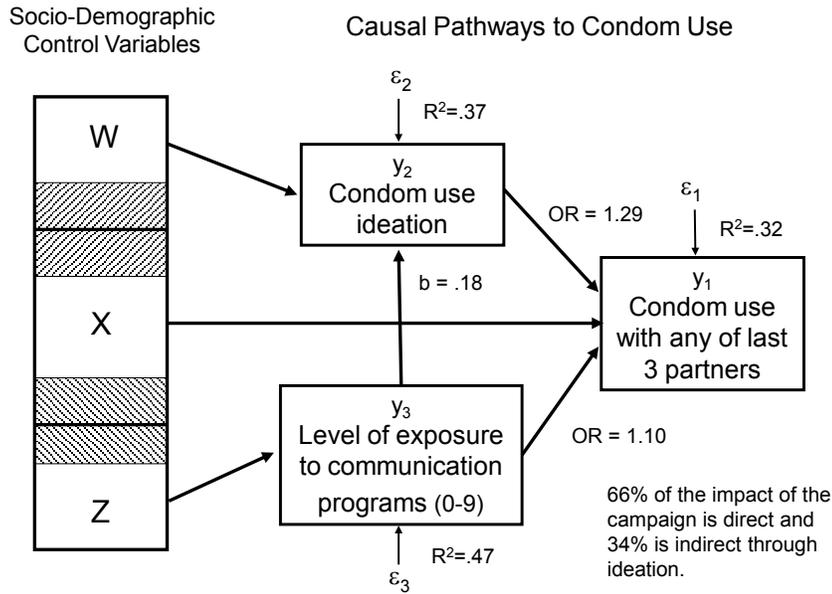


Figure A2: SEM for frequency of condom use

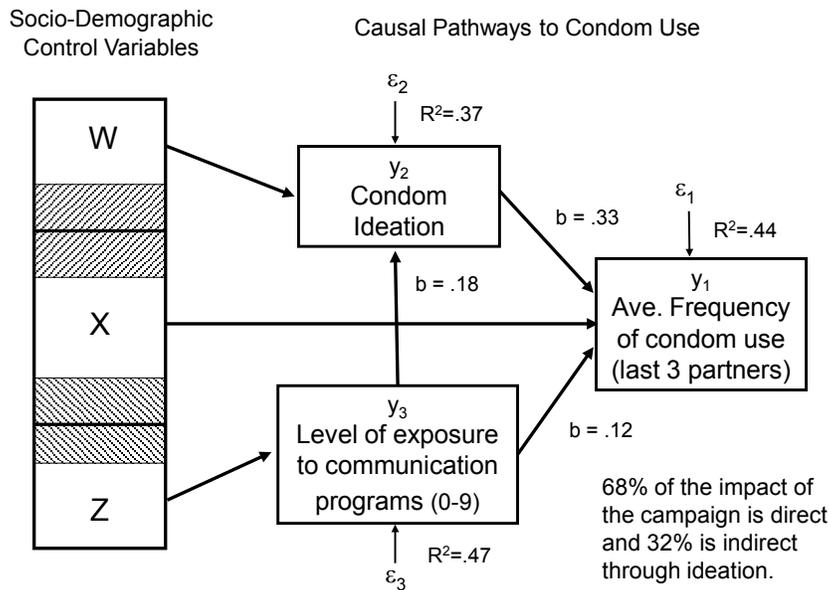
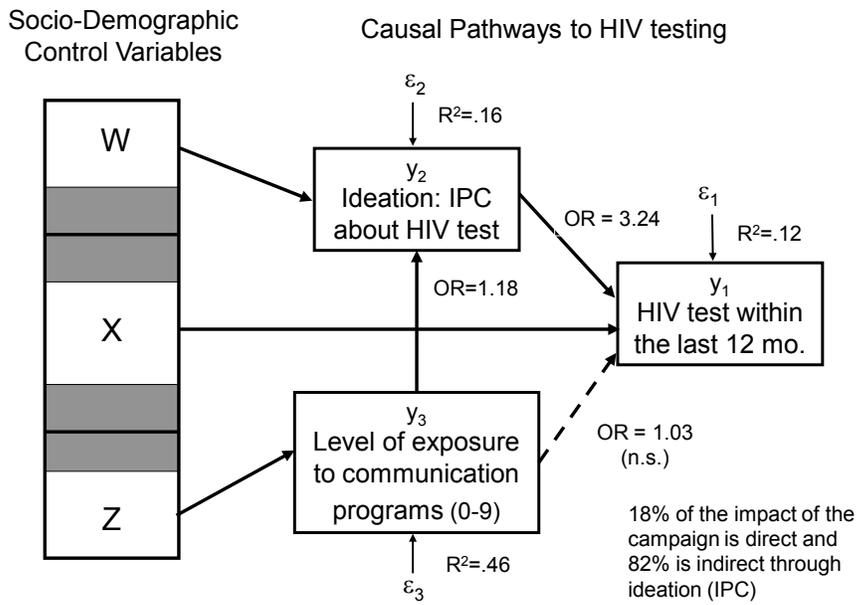


Figure A3: SEM for HIV testing in the last 12 months



Appendix 3: Full multivariate regression models for structural equations

Table A4: Multivariate linear regression of a set of predictor and control variables on campaign exposure (n=1658)

Variable	Campaign Exposure (standardized beta coefficients)
General Characteristics	
Male	-0.07*
Mid-High educ. level (vs none)	0.18***
Higher standard of living (SES)	0.16***
Being a student	0.10***
Lives in Maputo urban (ref categ. for province is Maputo city)	0.06**
Lives in Sofala (urban)	0.11***
Lives in Gaza (urban)	0.11***
Other	
Visited bars in last month	0.08**
Drinks heavily weekly/daily	ns
Discussion of HIV/AIDS in religious meeting	0.08***
Media consumption	
Higher internet use	0.09***
Higher TV viewing	0.25***
Higher radio listening	0.08***
Higher newspaper reading	0.06*
Higher magazine reading	0.09***
Adjusted R² (prob > F)	0.48 (0.000)

Significance levels: * = $p < 0.05$ ** = $p < 0.01$ *** = $p < 0.001$

Table A5: Multivariate regressions of a set of predictor and control variables on multiple sexual partners and two ideational variables (n=1,427)

Variable	Ideational Variables for MSP		MSP Behavior
	Model 1	Model 2	Model 3
	Having a favorable attitude towards MSP (Linear regression, figures are standardized beta coefficients)	Knowledge and discussion of risk of MSP with sex partner (Linear regression, figures are standardized beta coefficients)	Having multiple sex partners during last 12 months (Logistic regression, figures are odds ratios)
MSP-related			
Attitudes favoring MSP			2.08***
MSP Ideation	-0.09***		0.78**
Self-efficacy to avoid MSP	-0.24***	0.12***	0.36***
Campaign-exposure			
Recall of communication campaign	-0.07*	0.14***	1.04
General Characteristics			
Male	0.27***		4.30***
Single		-0.18***	
Middle age group (vs oldest)		-0.05*	1.90***
Youngest age grp (vs oldest)		-0.13***	2.01***
Primary educ. level (vs none)	0.08*		
Mid-High educ. level (vs none)			
Lives in Maputo urban (ref categ. for province is Maputo city)			0.80
Lives in Maputo (rural)			0.38***
Lives in Sofala (urban)	0.07*	0.23***	0.71
Lives in Sofala (rural)		0.40***	0.80
Lives in Gaza (urban)	0.12***		1.36
Lives in Gaza (rural)	0.12***		0.91
Other			
Visited bars in last month or drinks heavily weekly/daily	0.09**		1.95***
Works for cash			1.64**
Farmer	-0.08**		
Being Protestant/Evangelist (vs. Catholic)		-0.08**	
Discussion of HIV/AIDS in community meeting		0.08**	
Discussion of HIV/AIDS in religious meeting		0.06*	
Media consumption			
Higher Internet use	-0.10***		1.16*
Higher TV viewing		0.07*	
Higher radio listening		0.05*	
Higher newspaper reading		0.09**	
Higher magazine reading		0.06*	
Adjusted R² (prob >F)	0.2317 (0.000)	0.2945 (0.000)	
Pseudo-R² (prob > chi²)			0.2771 (0.000)

Sample includes only those that reported having had sex in the last 12 months.

Significance levels: * = $p < 0.05$ ** = $p < 0.01$ *** = $p < 0.001$

Table A6: Multivariate regressions of a set of predictor and control variables on condom use and ideation for condom use (n=1,427)

Variable	Model 1	Model 2
	Ideation for condom use (Linear regression, figures are standardized beta coefficients)	Condom use at last sex with any of last 3 sex partners (Logistic regression, figures are odds ratios)
Condom use ideation		1.30***
Campaign-exposure		
Recall of communication campaign	0.18***	1.10**
General Characteristics		
Male	0.10***	2.55***
Middle age group (vs. oldest)	0.09***	1.86***
Youngest age grp (vs. oldest)	0.04	2.88***
Primary educ. level (vs. none)	0.00	
Mid-High educ. level (vs. none)	0.10**	
Increased poverty	-0.12***	
Lives in Maputo urban (ref categ. for province is Maputo city)	0.01	1.19
Lives in Maputo rural	-0.01	0.62*
Lives in Sofala urban	-0.13***	0.65
Lives in Sofala rural	-0.15***	0.48*
Lives in Gaza urban	-0.14***	0.48**
Lives in Gaza rural	-0.10**	0.46**
Occupation		
Student		1.53*
Self-Employed Farmer	-0.14***	
Other		
Visited bars in last month or drinks heavily weekly/daily		1.79***
Spent 30 or more days away from home in last 12 months		1.67*
Spouse or live-in partner reported in MSP chart		0.32***
Religion		
Protestant/Evangelists (vs. Catholic)	-0.01	
Siao/Zione (vs. Catholic)	-0.03	
No religion (vs. Catholic)	-0.07**	
Other religion (vs. Catholic)	0.01	
Media frequency		
Higher Internet usage	0.14***	
Higher TV viewing		
Higher radio listening		
Higher newspaper reading		
Higher magazine reading	0.07**	
Adjusted R² (prob >F)	0.3655 (0.000)	
Pseudo-R² (prob > chi²)		0.3170 (0.000)
Sample includes only those that reported having had sex in the last 12 months.		
Significance levels: * = p < 0.05 ** = p < 0.01 *** = p < 0.001		

Table A7: Multivariate logistic regressions of a set of predictor and control variables on getting tested for HIV during last 12 months and on IPC about HIV testing (n=1,427)

Variable	Model 1	Model 2
	Interpersonal communication (IPC) about HIV testing (odds ratios)	Getting tested for HIV during last 12 months (odds ratios)
Interpersonal communication about HIV testing		3.11***
Campaign-exposure		
Recall of communication campaign	1.18***	1.02
General Characteristics		
Male	1.39*	0.41***
Middle age group (vs oldest)	1.51**	1.77***
Youngest age group (vs oldest)	0.98	1.21
Primary educ. level (vs. none)	1.46*	1.09
Mid-High educ. level (vs. none)	1.56*	1.49*
Lives in Maputo urban (ref categ. for province is Maputo city)	0.88	0.99
Lives in Maputo rural	0.84	1.06
Lives in Sofala urban	1.09	0.78
Lives in Sofala rural	1.54	0.67
Lives in Gaza urban	1.07	0.91
Lives in Gaza rural	0.81	0.96
Other		
Self-efficacy to avoid MSP		1.32*
Visited bars in last month or drinks heavily weekly/daily	1.43*	
Works for cash	0.70**	
Participated in community meeting where AIDS was discussed	1.97***	
Media frequency		
Higher Internet use		1.20**
Higher TV viewing	1.14**	0.88*
Higher radio listening		1.10*
Higher newspaper reading	1.30**	
Higher magazine reading	1.17	
Pseudo-R²	0.1595	0.1177
prob > chi²	0.000	0.000
Sample includes only those that reported having had sex in the last 12 months. Significance levels: * = p < 0.05 ** = p < 0.01 *** = p < 0.001		

Appendix 4: Summary of significant predictors of MSP, condom use, HIV testing and associated ideational variables (from the models in Appendix 3)

Predictors of having multiple sex partners (Source: Table A5, model 3)

An individual is more likely to have more than one sex partner if he/she:	An individual is less likely to have more than one sex partner if he/she:
has favorable attitudes towards MSP	knows about the risk of MSP and talked about MSP with the spouse/partner
is male compared to female	has high self-efficacy (confidence) for maintaining one sex partner and avoiding MSP
is in the lower two age groups rather than the oldest group	lives in the rural area of Maputo as compared to living in the city
visited bars in the last month and drinks heavily once a week or daily	
works for cash compared to being paid in kind	
has high use of the Internet	

Predictors of having a favorable attitude towards MSP (Source: Table A5, model 1)

An individual is more likely to have a favorable attitude toward MSP if he/she:	An individual is less likely to a favorable attitude towards MSP if he/she:
Is male compared to female	has a higher level of recall of the MSP campaign
visited bars in the last month and drinks heavily once a week or daily	knows about the risk of MSP and talked about MSP with the spouse/partner
has some education compared to no education	has high self-efficacy (confidence) for maintaining one sex partner and avoiding MSP
lives in Sofala urban area, Gaza urban and rural areas compared to Maputo City	is a farmer
	has high use of the Internet

Source: Table A5, model 1

Predictors of knowing and talking about MSP risk (Source: Table A5, model 2)

An individual is more likely to have talked about MSP if he/she:	An individual is less likely to have talked about MSP if he/she:
has a higher level of recall of the MSP campaign	is single
has self-efficacy (confidence) for maintaining one sex partner and avoiding MSP	in the lower two age groups rather than the oldest group
discussed HIV/AIDS in community and religious meetings	is Protestant/Evangelist compared to Catholic
had higher frequency of TV viewing, radio listening, newspaper and magazine reading	
lives in Sofala urban and rural compared to Maputo City	

Predictors of condom use at last sex: (Source: Table A6, model 2)

An individual is more likely to use condoms at last sex if he/she:	An individual is less likely to use condoms at last sex if he/she:
has a higher level of recall of the MSP campaign	reported a spouse or live-in partner as a sexual partner
has a higher level of ideation related to condom use (attitude and self-efficacy)	lives in the rural area of Maputo, Sofala rural, Gaza rural and urban compared to Maputo city
Is male rather than female	
Is in the lower two age groups rather than the oldest group	
visited bars in the last month and drinks heavily once a week or daily	
Is currently a student	
spent 30 or more days away from home in the last 12 months	

Predictors of condom use ideation: (Source: Table A6, model 1)

An individual is more likely to have a favorable condom ideation (attitude and self-efficacy) if he/she:	An individual is less likely to have a favorable condom ideation (attitude and self-efficacy) if he/she:
has a higher level of recall of the MSP campaign	has a higher level of poverty
Is male rather than female	works as a self-employed farmer
Is in the middle age group rather than the oldest	practices no religion compared to Catholics
has obtained the highest versus lowest educational level	lives in Sofala and Gaza Provinces (compared to Maputo City)
has a higher frequency of magazine reading and Internet use	

Predictors of HIV testing in the last 12 months: (Source: Table A7, model 2)

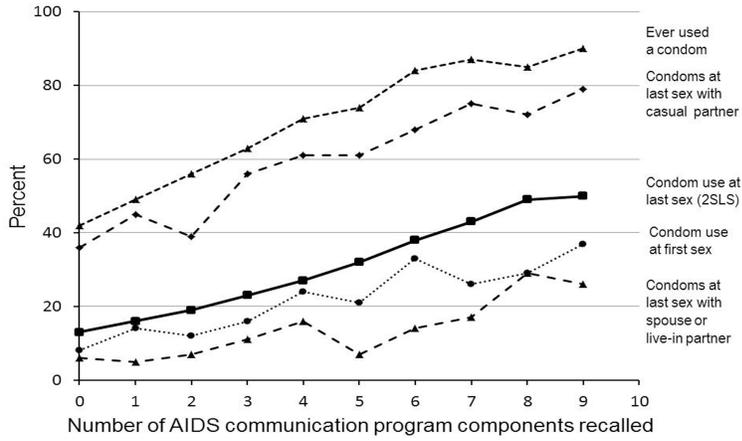
An individual is more likely to have been tested in the last 12 months if he/she:	An individual is less likely to have been tested in the last 12 months if he/she: ¹
reported interpersonal communication with partner/friends about HIV testing	
has a higher level of self-efficacy for maintaining one sex partner and avoiding MSP	
Is female rather than male	
Is in the middle age group rather than the oldest group	
has obtained the highest level of education compared to none	
has a higher frequency of listening to the radio	
¹ No one variable that was found negatively associated with HIV testing reached statistical significance.	

Predictors of interpersonal communication about HIV testing: (Source: Table A7, model 1)

An individual is more likely to have discussed getting tested for HIV if he/she:	An individual is less likely to have discussed getting tested for HIV if he/she:
has a higher level of recall of the MSP campaign	works for cash compared to being paid in-kind
is male rather than female	
is in the middle age group rather than the oldest group	
has obtained the middle or highest levels of education compared to none	
visited bars in last month and drinks heavily	
participated in community meeting where AIDS was discussed	
has a higher frequency of watching television	
has a higher frequency of reading newspaper	

Appendix 5: Condom use by timing, type of sexual partner and communication exposure

Figure A4: Percent condom use by timing and sexual partner type in the last 12 months by level of exposure to communication program



Appendix 6: Comparison of key behavioral outcomes with the INSIDA survey (INS, 2010)

Multiple sexual partners

Results obtained by the MSP survey 2011 show that the proportion of men and women that reported having more than one sexual partner in the last 12 months was significantly higher compared to data on multiple sexual partners reported by the INSIDA 2009. Table A8 provides the comparison between the MSP 2011 campaign and the INSIDA 2009. For this comparison, only men and women ages 15-49 were included, as these are the reference population used in the published report from INSIDA. See methodological note on Appendix 7 for an explanation of this difference.

Table A8: Comparison of data from INSIDA (2009) and MSP Campaign (2011) of multiple sex partners (weighted data)

Sexual Behavior	INSIDA 2009 (4 provinces)	MSP 2011 (4 provinces)
MSP in last 12 mo		
Women		(16.0)
Sofala	1.8	21.3
Gaza	1.1	8.9
Maputo Province	5.0	12.5
Maputo City	6.0	19.3
Men		(52.9)
Sofala	9.8	43.3
Gaza	17.5	65.4
Maputo Province	25.9	45.0
Maputo City	37.6	62.6

¹Total survey sample=1,666 cases. Sample ages 15-49=1,611

Condom use at last sex

Table A9 below compares condom use at last sex between the MSP survey 2011 and the INSIDA 2009. With the exception of men in Gaza, the results suggest an increase of condom use at last sex over the two-year period, among men and women (15-49) in the four provinces covered in the MSP survey. Increases in condom use seem to be higher among women compared to men.

Table A9: Comparison of data from INSIDA (2009) and MSP Campaign (2011) of condom use (weighted data)

Sexual Behavior	INSIDA 2009 (4 provinces)	MSP 2011 (4 provinces)
Condom use at last sex		
Women		(23.5)
Sofala	6.9	7.5
Gaza	9.5	13.4
Maputo Province	23.6	29.1
Maputo City	34.1	47.5
Men		(37.8)
Sofala	19.2	23.9
Gaza	26.6	23.3
Maputo Province	44.9	49.3
Maputo City	48.6	54.4

¹ Sample ages 15-49 that had sex in the last 12 months=1,378

HIV testing

Table 1.3 below compares the results for HIV testing in the last 12 months between the INSIDA 2009 and the MSP 2011 survey. Results indicate that HIV testing has increased over time in the four provinces in the survey. The highest proportion of HIV testing is reported in the province of Maputo city, for both men (47%) and women (54%). The proportion of women that have been tested in the last 12 months is higher than men in all four provinces. For women, the increases in HIV testing are 10 to 20 percent points between the two-year period; for men these increases are slightly lower compared to women but still significant.

Table A10: Comparison of data from INSIDA (2009) and MSP Campaign (2011) of self-reported HIV testing in last 12 months (weighted data)

Sexual Behavior	INSIDA 2009 (4 provinces)	MSP 2011 (4 provinces)
HIV test in last 12 months		
Women		(42.6)
Sofala	20.7	32.3
Gaza	26.1	41.8
Maputo Province	24.2	44.4
Maputo City	32.7	54.5
Men		(31.8)
Sofala	13.2	27.8
Gaza	9.8	19.6
Maputo Provincia	16.9	31.7
Maputo City	23.2	46.7

¹Sample ages 15-49=1,611

Appendix 7: Methodological note: Comparison of the current study and INSIDA 2009 in measurement of MSP

Measurement of multiple sex partners (MSP) has been an issue of debate and several studies have discussed the underreporting of sexual behavior in surveys such as the Demographic and Health Surveys (DHS) and AIDS surveys (such as INSIDA 2009; see for example Mishra et.al, 2009). Qualitative data for Mozambique (Holman, 2009; Arias & Figueroa, 2010) suggest that the practice of MSP is more pervasive among men and women than surveys have been able to estimate. With the common phrase of “*andar fora*” these studies have found that men and women engage in informal sexual encounters that they themselves do not consider or report as partnerships (Arias, 2011). This is something that we confirmed when testing the MSP survey questionnaire. Besides avoiding the use of the term sexual partners in key sections of the questionnaire, in the MSP 2011 survey several procedures were set in place to make sure that the measurement of sexual behavior was as valid and reliable as possible. The following list provides potential reasons that can help explain the differences obtained by the MSP 2011 and the INSIDA 2009 surveys regarding MSP data.

- 1) The sequence of the questions on sexual partners is slightly different between the two surveys.
 - a) MSP 2011 has a simple question about the total number of people the respondent had sex with in the last 12 months before the “partner grid” questions.
 - b) The INSIDA questionnaire (published in the Final INSIDA Report), asks about the total number of people the respondent had sex with, in the last 12 months immediately after the “partner grid” —but only respondents who reported a third partner in the grid are asked the question on the total number of sexual partners in the last 12 months. It was done this way because after each reported partner in the grid respondents are asked whether or not they had sex with any other person in the last 12 months besides the last partner. If the answer is no, the interviewer did not ask the “total number” question and moves on to another part of the questionnaire.

To our knowledge, no study has compared the accuracy of one sequence of questions over the other. The MSP 2011 asked all respondents “the total number of people they had sex with.” In addition, every respondent was also asked the partner grid questions, and at the end of each reported partner in the grid, they were asked again if they had sex with any other person in the last 12 months besides the last reported partner. It is worth noting that respondents in the MSP survey were consistent in their answers. Those who reported one partner in the question on the “total number” also reported one person later in the grid questions despite the probe for additional sex partners. The same consistency is observed for those that reported two partners. By placing the partner grid questions after the question on the “total number” of sex partners we have a measure of the reliability (test-retest consistency) of the estimate.

- 2) The wording of the question in the MSP-2011 survey asked the respondent to include the spouse/boy-girlfriend in the total count of the number of people they had sex with in the last 12 months.
 - a) The following question was used in the MSP survey (in English, emphasis added):

(Male) In total, including your spouse/girlfriend, with how many different people did you have sexual relations in the last 12 months?

(Female) In total, including your spouse/boyfriend, with how many different people did you have sexual relations in the last 12 months?

- b) INSIDA survey has a series of questions about the current partners before the question on the last time the respondent had sex (how many months ago) that precedes the partner grid questions. We do not know whether the questions about the most recent (current) sexual partners may have influenced which people and how many people the respondent reported in the partner grid. The question that INSIDA has after the partner grid is:

In total, with how many different people did you have sexual relations during the last 12 months?

As indicated above, INSIDA asked this question only to those who reported a third partner in the grid, not to all respondents. Therefore, there is no way of knowing what everyone else might have said if they were also asked this question.

- 3) The procedures followed by each survey were different, and this may have also contributed to the different results obtained.
- a) In the MSP survey, INE used a Kish grid to select randomly only one respondent (male or female of the eligible age) per household. In the INSIDA survey, every eligible man or woman in the household was selected for the interview. Having only one respondent per household as in the MSP-2011 may help create a greater sense of privacy and confidentiality than interviewing several people in the same household. In the MSP-2011 survey, interviewers were asked to record the presence of other people before the beginning of the sexual behavior questions. The results show that in 7% of the interviews, the presence of a child under 10 years of age was recorded. In three other cases, the presence of another adult was recorded. This suggests that the intense training provided to the interviewers on how to secure privacy worked quite well during the survey field work. Similar information in the INSIDA 2009 survey is not available.
- b) Interviewers in the MSP-2011 were very carefully trained to create empathy and rapport with the respondents, to read the consent form in detail, to clearly explain the purpose of the survey and how the information would be used, and to request honest answers. Respondents were also provided with a copy of the consent form that included telephones of the JHU-CCP office and the Mozambique Ethics Review Board they could use to report any incident or to ask any additional questions regarding the interview. Our experience during the pilot test and the training is that respondents very much welcomed the detailed consent process used, so we assume that it helped them achieve open and more candid participation. INSIDA also used a consent text, although the consent process seemed to have been less detailed compared to MSP-2011.
- 4) The MSP-2011 sample had a higher percent of urban population in the provinces of Sofala and Maputo Province compared to INSIDA. To the best of our knowledge, the MSP survey was the first to use the recently updated “mother sampling frame” based on the 2007 Census. This sampling

frame was not available when the INSIDA survey was being planned and fielded, and according to INE the MSP-2011 may better represent the “current reality” of the larger urban areas in the provinces included in the survey. It was not anticipated that using this updated sampling frame would result in a difference between surveys, as both samples were drawn to be representative of the survey areas and appropriately weighted to be comparable. In fact, INE was selected to conduct the MSP-2011 survey for this reason. We conducted a literature search, however, and found a few reports that used and/or commented on the findings from the 2007 Census data and the changes in Mozambique over the last decade. One of the comments was that the results from the 2007 Census created a reclassification of sites into urban locations that had been considered rural. The same report commented on the population growth of several urban municipalities like Matola, Beira, and others, which had changed the urban-rural distribution of some provinces like Maputo Province and Sofala. This may be the reason for the MSP-2011 sample having a higher proportion of urban areas in those provinces compared to INSIDA. As the frequency of “multiple sex partners” tends to be concentrated in urban locations this could also help explain the higher numbers in the MSP-2011.

Overall, the MSP-2011 more likely had a better representation of the reality of MSP in the four provinces sampled. These results, as originally planned, will serve as a new baseline for the evaluation of future HIV prevention communication campaigns. For the follow-up survey to evaluate ongoing and future prevention campaigns, the same procedures will be followed. The appropriate measurement of MSP can only be resolved by further survey research and improvement of the methodology along the lines developed in the MSP survey in 2011. In fact, the controversy with current estimates of “multiple and concurrent sexual partners” has led the R2P project to conduct studies to inform and improve the measurement of this particular outcome in future research. Preliminary findings from one such study provided support for the types of questions used and procedures follow by the MSP 2011 (Zeyla et al., 2012).