

Power, privilege and HIV prevalence:  
examination of sexual HIV-risk factors in MSM and transgender  
women who engage in transactional sex

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**Objective:** To understand power-related predictors for risky sexual behavior among men who have sex with men (MSM) and Transgender Women (TW) at high risk for HIV infection in Lima, Peru.

**Methods:** Survey data from a cross-sectional sample were analyzed. Risk of unprotected anal intercourse (UAI) associated with different transactional sex roles (i.e. giving money or goods for sex, receiving, both giving and receiving) was examined separately among only those participants who engaged in transactional sex in the last 6 months and among all partnerships (transactional and non-transactional) in the last 3 months. These analyses were conducted using multivariate logistic regression and generalized estimating equations (GEE), respectively.

**Results:** In the inter-individual analysis among individuals engaged in transactional sex, those who engaged only in giving money and/or goods for sex had an increased risk of self-reported UAI during their last act of transactional sex compared with those who received money and/or goods in exchange for sex. This effect was modified by drug and/or alcohol use during sex and all categories of the interaction of transactional sex and use of alcohol and drugs had significantly higher odds of UAI than the referent (receiving goods/money and non-use of alcohol/drugs) (ORs: 2.4-5.9). In the population level analysis, when partnerships involving giving money/goods for sex were compared to all non-transactional sex partnerships, this group demonstrated a lower risk of UAI (OR 0.36; 95% CI: 0.20, 0.66). This association remained but was non-significant ( $p=0.10$ ) when the comparator was limited to non-stable, non-transactional partnerships.

**Conclusions:** More research is needed to explore the association of risky sexual behavior among MSM and TW and different transactional sex roles. In addition, interventions should consider tailoring efforts to individuals who participate in different transactional sex roles.

## **Power, privilege and HIV prevalence: examination of sexual HIV-risk factors in MSM and transgender women who engage in transactional sex**

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## Introduction

Both men who have sex with men (MSM) and transgender women (TW) are at increased risk of contracting HIV and other STIs worldwide (1). A meta-analysis in 2007 demonstrated a prevalence odds ratio (POR) of 33.3 for HIV in MSM compared to the general population (1). Similar to HIV epidemics in other countries in the region, Peru's HIV epidemic is concentrated. Estimates of prevalence among the general population are 0.2% compared to 12.4% in the MSM population (2). Condom use has been estimated to reduce the per-contact rate of HIV in MSM populations (3), although evidence is not as strong as for heterosexual populations (4). In addition, Ludford et al. (5) found an association of alcohol and drug use to condom use in Peru, demonstrating that reduced condom use could be associated with substance use among MSM in Peru.

Transactional sex has been described as a risk factor in the acquisition of HIV (6). Transactional sex extends beyond conventional definitions of sex work both in terms of identity and in the instruments of exchange. Bauermeister et al. (7) define transactional sex as, "the commodification of the body in exchange for shelter, food, and other goods and needs." There are gaps in the literature regarding outcomes related to transactional sex in the general population, particularly for individuals who pay money or give goods for sex. Literature on transactional sex within populations of MSM and TW is even more limited (8).

This study will explore power-related predictors of condom use through an examination of its association with transactional sex role. Kippax and Smith (10) distinguish domination from power as "a relation in which a person (or group) is not recognized as an agent and is unable to resist actions directed towards him or her." Scheibe

(9) quotes a young MSM in South Africa engaged in transactional sex, "he said that we were not going to have sex with a condom, and so I had to do it, [...] I was having problems, I needed a place to stay". Scheibe's quote demonstrates that the "ability to resist" may be compromised in transactional sex. Pulerwitz et al. (11) explored power in a population of US women using a sexual relationship power scale (SRPS) and its association with condom use. The SRPS covers topics of violence, anger, role in decision-making, vocalization, outside relationships and actions of the individual, the partner and the couple. Pulerwitz et al. (11) found an association of education and income with condom use; an association with relationship power and condom use remained above and beyond these factors. In the analysis below, power is defined as an individual's level of participation in decision-making and ability to negotiate sexual acts. This study will primarily examine power through the effect of transactional sex role, in a sub-population of individuals at high risk for acquisition of HIV and other STIs.

To understand power-related predictors for risky sexual behavior among MSM and TW in Lima, this study examines risk of unprotected anal intercourse (UAI) associated with different transactional sex roles (e.g. giving vs. receiving money or goods vs. both giving and receiving) in a cross-sectional sample of 3,744 MSM and TW in Lima, Peru. In order to understand this risk, this study has two aims:

- 1) To examine inter-individual risk of UAI during last transactional sex act in this population of MSM and TW among those who have engaged in transactional sex.
- 2) To examine differences in self-reported UAI among all transactional and non-transactional partnerships in this population.

For the first aim, I hypothesize that those who engaged only in giving money and/or goods for sex in the last 6 months will have an increased risk of self-reported unprotected anal intercourse during their last act of transactional sex compared with those who received money and/or goods in exchange for providing sex after adjusting for relevant covariates. Furthermore, I hypothesize that drug/alcohol use during a transactional sexual encounter will increase the effect of giving money or goods on the likelihood of UAI relative to other transactional sex roles.

For the second aim, compared to non-transactional partnerships, I hypothesize that partnerships in which the participant gave money and/or goods for sex, in the three months prior to the survey, will have increased occurrence of UAI. Additionally, I hypothesize that the effect of transactional sex role will differ according to type of sex (e.g., insertive, receptive anal intercourse) and drug and/or alcohol use.

Knowledge gained on the risk of UAI in this understudied population of individuals who give money or goods in exchange for sex could provide valuable information for public health interventions. An indication of increased risk of UAI could provide the impetus to develop targeted behavior change interventions for this sub-population. Such behavior change interventions would target those with greater power, and thus, prevent STIs for them and their partners. In addition, interventions aimed at financial support could be considered to reduce vulnerability among MSM and TW who rely on income from transactional sex to meet their basic needs.

## Methods

A cohort of high-risk<sup>1</sup> men who have sex with men (MSM) and transgender women (TW) was recruited for the SABES study in Lima, Peru and followed with repeat HIV testing. MSM and TW were recruited at four study sites in Lima through network referral, presentation at STI clinic sites, and active recruitment from peer educators at venues and within the community (13). Enrollment ended in April 2016. Three thousand seven hundred and forty-two high risk TW and MSM completed a survey at baseline consisting of 156 questions. Sexually active individuals (at least one partner in the last three months) 18 years and older were requested to complete a detailed Computer-Assisted Self-Interview (CASI) questionnaire on STI history, sexual partners and behaviors, sexual orientation, gender identity, drug and alcohol use, transactional sex, stigma and psychosocial coping skills. This cross-sectional observational study examined the primary exposure of interest, transactional sex role, and its association with UAI using these data. The exposure of transactional sex role and outcome of UAI used data collected in two sections of the survey, the "Transactional Sex" and "Partner Concurrency" sections, to comprehensively examine this association. Duplicate records were identified through repeat patient ID numbers, and only the first recorded survey was included in the dataset.

For aim one, a subset of data from individuals who self-identified as engaging in transactional sex in the last six months was analyzed. Transactional sex role was defined as

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<sup>1</sup> MSM and TW were eligible if they met any one of the following criteria (12):

- 1) Sexually transmitted infections diagnosed at screening or during the last six months;
- 2) Self-identification as a sex worker;
- 3) No condom use during last anal intercourse;
- 4) Anal intercourse with >5 partners in the last six months;
- 5) Sexual partner of an HIV-infected man.

giving, receiving or both giving and receiving "money, gifts, favors, or a place to sleep in exchange for anal sex (insertive or receptive) with another man or transvestite/transgender/transsexual." The association between the outcome of interest, self-reported UAI during last transactional sex, and the exposure of interest, transactional sex role, was examined using multivariate logistic regression. Respondents' age, education, income, gender identity, sexual preference (insertive/receptive/versatile), sexual orientation (heterosexual/bisexual/homosexual), self-identification as a sex worker and drug and alcohol use during sex in the last three months were identified as potential confounders ([see suppl. 1](#)). Any drug or alcohol use during sex in the last 3 months was used as a proxy for drug and/or alcohol use during the last transactional sex act. The binary outcome is UAI compared to anal intercourse with a condom during the last transactional sex act, irrespective of the type of sex during that act (e.g., insertive or receptive). The exposure is transactional sex role: those who only gave money/goods for sex or those who both gave and received money/goods for sex were compared separately to those who only received money/goods for sex.

An unadjusted model was fit (with transactional sex and the outcome, UAI), with subsequent forward selection for additional risk factors and potential confounders identified *a priori* ([see suppl 1](#)). Covariates independently associated with the outcome of UAI with a p-value <0.20 for the Pearson's chi-square test of homogeneity were included in the primary model. Covariates with a p-value  $\geq 0.20$  were added individually to this model and remained if the estimated odds ratio (OR) for the relation of transactional sex to UAI changed more than 10%. Potential modification of the association of transactional sex role



with UAI by drug or alcohol use during sex was examined using a likelihood-ratio test for the interaction term added to the model without interaction terms.

For aim two, the association of sexual roles (transactional and non-transactional) with UAI was evaluated using all reported partnerships in the sample. Each participant identified up to three sexual partners in the last three months and responded to questions regarding the last sexual encounter with each respective partner. Female partners accounted for 4.7% of 4,068 partnerships and were excluded from analysis. Partner type was used to define the exposure of interest, transactional sex role; stable/casual/one night stands are non-transactional partnerships and identification of a partner as a client or sex worker indicates participants received money/goods for sex, or gave money/goods for sex, respectively ([see suppl. 2](#)). Available details on condom use for specific sex acts during the last sexual encounter were used to create outcome and covariate variables. Sexual activity that was not anal intercourse was excluded from analysis.

Generalized estimating equations (GEE) with exchangeable correlation and robust standard errors were used to account for potential clustering by participant in examining the association of interest. An unadjusted model was fit between the exposure of interest, sex role (transactional and non-transactional), and the outcome, condom use during last sex with each identified partner. The full model included sex role and type of sex (insertive/receptive/both insertive and receptive) in addition to partner covariates and all of the covariates initially considered for aim one. Participant-identified partner gender and sexual preference were also included in the analysis ([see suppl. 1](#)). The majority of partnerships contained no information on partner sexuality (58-72%) and thus, the covariate was excluded from the model. Modification of the effect of transactional sex role

by type of sex or drug and/or alcohol use during sex was evaluated using the Wald test. Subsequently, interaction terms (e.g. type of sex, drugs/alcohol use during sex) that were not found to be significant at the  $p < 0.05$  level were removed from the final model.

All analyses were conducted in STATA 14.1 SE (College Station, TX: StataCorp LP).

## Results

### Descriptive-Inter-Individual Transactional Sex and Partnership data

Descriptive statistics for aims one and two are listed in Tables [1a](#) and [1b](#), respectively. A total of 1,478 individuals engaged in transactional sex in the last 6 months, of which, 36.5% had UAI during the last transactional sex act. The majority of these individuals (51.0%) exclusively received money or goods in exchange for sex. Two hundred seventy-four individuals (18.5%) exclusively gave money or goods for sex. Most covariates had no or very little missing data. However, any drug or alcohol use during sex in the last three months was missing for 240 individuals (16.2%) and sexuality was missing for 148 (10.0%).

Those who gave and those who both gave and received money/goods tended to be older compared with those receiving money/goods ([Table 1a](#)). Participants who gave money/goods were also more likely to have had at least 3 years of higher education (42.7%) and to earn at least 1000 soles per month (37.6%) compared to the other groups. There were differences in gender between the groups; TW were 30.4% of those who received money/goods for sex in comparison with 11.6% of those who gave money/goods for sex. Sexual orientation, sexual preference, and drugs/alcohol use during sex had similar distributions by transactional sex roles.

In the partnership data, 267 events were non-AI sexual events and were excluded from analysis. An additional 557 (14.4%) partnerships had missing information on type of sex and condom use at last sex (data not shown). Three thousand and fifty one partnerships remained. UAI occurred in 60.9% of these partnerships. Transactional partnerships were characterized by older participant age ([Table 1b](#)). Partnerships in which the participant gave money had a high proportion (30.6%) that involved transgender partners. Non-transactional partnerships involved the fewest transgender partners (6.3%), and had the highest percentage of participants who completed higher education.

### **AIM 1: Multivariate logistic regression for inter-individual analyses among those who engage in transactional sex**

The unadjusted ORs for transactional sex role and UAI were 1.79 (95% CI: 1.35, 2.39) and 2.22 (95% CI: 1.74, 2.84) for giving money and goods for sex and both giving and receiving money and goods for sex, respectively. Education, income, and alcohol/drug use during sex were all independently associated with UAI at the level of  $p < 0.20$ ; gender and self-identification as a sex worker were strongly associated at the  $p < 0.05$  level (ref: [Table 2](#)). Age, sexual orientation and sexual preference were not significantly associated with UAI in the univariate analyses. Only sexual orientation meaningfully changed the resulting OR in the full model without interaction and was subsequently included (results not shown). Alcohol/drug use during sex modified the effect of transactional sex role on UAI ( $p = 0.02$ ) and was added to the final model presented in Fig 1.

Log odds UAI =  $\alpha + \beta_1$ Transactional sex +  $\beta_3$ Education +  $\beta_4$ Income +  $\beta_5$ Gender +  $\beta_7$ Sexual orientation +  $\beta_7$ Sex worker +  $\beta_8$ Drugs\_alc +  $\beta_9$ Trans\_sex\*drugs\_alc

**Fig 1. Aim 1: Final Model**

Both high income and the highest level of education demonstrated a potential decrease in odds for UAI compared to their lowest reference groups among those of the same transactional sex group when adjusted for all other factors with ORs of 0.71 (95% CI: 0.48, 1.04) and 0.71 (95% CI: 0.48, 1.06) respectively. These results did not reach significance ( $p=0.08$  and  $p=0.09$ ).

All categories of the interaction of transactional sex and use of alcohol and drugs had higher odds of UAI than the referent (receiving goods/money and non-use of alcohol/drugs) among those of the same education, income, gender, sexual orientation, and sex worker status (ORs: 2.4-5.9) ([Table 3](#)). Within transactional role group comparisons, alcohol and drug use during sex did not significantly alter the odds of UAI for the giving and the both categories ([Table 4](#)). However, among those receiving money/goods for sex the odds of UAI were 2.37 times higher when alcohol and/or drug use during sex was reported (95% CI: 1.26, 4.42).

## **AIM 2: GEE with logit link for all partnerships: comparing UAI in transactional sex roles with non-transactional sex partnerships**

The unadjusted model demonstrates a decrease in risk for UAI in transactional sex partnerships in which the participant gave money/goods for sex when compared with non-transactional partnerships: OR of 0.50 (95% CI: 0.30, 0.83) and  $p=0.007$ . There is no evidence of a difference in UAI between partnerships where the respondent received money/goods for sex and non-transactional partnerships (0.81, 95% CI: 0.56, 1.17) ([Table 5](#)).

The initial model including both covariates expected to modify the effect of transactional sex role and UAI, type of sex and alcohol and or drug use during sex, did not

indicate significant interactions, Wald tests  $p > 0.05$  ([Table 6](#)), though point estimates are provided in [Table 7](#) alongside the final model.

The final model without these interaction terms again demonstrates a potential decrease in risk of UAI in giving money/goods for sex partnerships when compared with non-transactional partnerships adjusting for alcohol and/or drug use during sex, type of sex, age, education, income, self-identification as a sex worker, sexual orientation, gender (respondent and partner's), and sexual preference (respondent and partner's). The odds of UAI was 0.36 (95% CI: 0.20, 0.66),  $p = 0.001$ , for those giving money/goods compared to non-transactional sex; the odds of UAI for receiving money/goods compared to non-transactional sex partnerships was not significant, OR=0.78 (95% CI: 0.51, 1.18).

UAI was more common in partnerships where both insertive and receptive AI was reported compared with insertive sex only, OR of 2.39 (95% CI: 1.70, 3.35;  $p < 0.001$ ). Risk of UAI associated with alcohol and/or drug use during sex was also elevated, controlling for all other factors, OR 1.28 (95% CI: 1.00, 1.63;  $p = 0.049$ ) ([Table 7](#)).

The final model is below in Fig. 2:

Log odds UAI =  $\alpha + \beta_1$ Sexual role+  $\beta_2$ Age +  $\beta_3$ Education +  $\beta_4$ Income +  $\beta_5$ Gender +  $\beta_6$ Sexual preference +  $\beta_7$ Sexual orientation +  $\beta_7$ Sex worker +  $\beta_8$ Drugs\_alc +  $\beta_{11}$ Type of sex +  $\beta_{12}$ Partner\_gender +  $\beta_{13}$ Partner\_sexual preference

**Fig 2. Aim 2: Final Model**

### **Sensitivity analysis**

To explore this potentially reduced risk of UAI, the data were combined for a transactional vs. non-transactional sex comparison, and the association with reduced UAI ( $p = 0.02$ ) persisted ([Table 8a](#)). Given previous research that has demonstrated less condom use in stable partnerships (14), the unadjusted analysis was repeated with finer levels of

partnership type ([Table 8b](#)). Stable partnerships were 38.1% of the non-transactional sex partnerships. Compared to a casual partnerships/one night stands, partnerships which are stable have double the odds for UAI at last sex (OR 2.04; 95% CI: 1.75, 2.40;  $p < 0.001$ ).

## Discussion

### Aim 1: Inter-individual analyses among those who engage in transactional sex

The analyses examining risk of UAI associated with transactional sex role among those who identified having transactional sex in the last 6 months demonstrate a persistent and robust positive association between UAI and giving as well as both giving and receiving money/goods vs. receiving money/goods ([Table 3](#)). There is strong evidence that alcohol and drug use during sex modify this effect. Odds ratios for UAI in the presence vs. absence of alcohol or drug use were not significant for the giving and both giving and receiving groups ([Table 4](#)). In contrast, the odds of condom non-use was significantly higher in the presence of alcohol/drug use among those receiving money or goods for sex. These findings suggest that power-related dynamics in condom use may shift with impairment, with those in strictly receiving roles less able to negotiate condom use. In the presence of alcohol/drug use, the point estimates reveal a similarly high risk of UAI for the both category and a lower odds of UAI in the giving category. One interpretation is that the both category may be inherent risk-takers. However, as the within group comparison is non-significant for the giving and the both giving and receiving categories, these effects could be due to chance.

The strengths of this analysis include controlling for educational level and income, demonstrating an effect of transactional sex independent of these sociodemographic

factors related to power. The large sample size for the primary exposure of interest is also a strength of this analysis. One limitation is that these data lacked information on type of anal intercourse (insertive/receptive/both) during the last transactional sex event, which could have provided more information on the relationship of transactional sex role to UAI.

## **Aim 2: Population-level analysis of all TW and MSM partnerships**

The final model for the population level analysis demonstrated a decreased occurrence of UAI in the "giving" group vs. all non-transactional partnerships ([Table 7](#)). This effect remained but was no longer significant ( $p=0.10$ ) in a sensitivity analysis, which disaggregated the non-transactional category into stable and non-stable partnerships and used non-stable partnerships as the referent ([Table 8b](#)). In the final model, receptive plus insertive anal intercourse (vs insertive only) and use of alcohol/drug use during sex had significantly higher odds of UAI. There were low numbers (72) of partnerships in which the participant gave money/goods for sex. Effect modification for both type of sex and drug and/or alcohol use during sex was not detected, perhaps as a result of inadequate power. Separate point estimates in the model with interaction terms suggest that a larger sample may be able to evaluate more complex relationships of risk behavior and type of sex to condom negotiation within transactional and non-transactional partnerships ([Table 7](#)).

The low number of partnerships identified could be indicative of measurement error in identifying transactional sex. In Ecuador, 6% of MSM and TW reported sex work as opposed to 52% reporting transactional sex (6). The partnership type question used the same definition of transactional sex as the transactional sex section, but prefaced it with a partner type term, "sex worker" or "client." Participants may have responded reflecting

their own definitions and perceptions of commercial sex work instead of the broader concept of transactional sex.

## Overall

The multiple approaches using different components of the dataset are a strength of this study, providing a more comprehensive understanding of the relationship between giving money/goods for sex and UAI both among participants who engaged in transactional sex and in all partnerships. Among only those participants who engaged in transactional sex, giving money/goods for sex, demonstrated a robust increase in odds for UAI, compared to receiving money/goods for sex. The partnership analysis demonstrated a decrease in odds for UAI in partnerships where the participant gave money/goods for sex, when compared to a different referent of all non-transactional partnerships. Sensitivity analyses revealed heterogeneous grouping of the non-transactional referent as a strong predictor of UAI. All transactional partnerships demonstrated decreased risk of UAI when compared to all non-transactional partnerships. In disaggregating the non-transactional category, the risk of UAI associated with giving money/goods for sex was no longer significant, while stable non-transactional partnerships had a doubling of risk. The analysis had inadequate power in a subset of the partnership data to replicate the analysis completed in aim one, giving money/goods for sex vs. receiving money/goods for sex.

To my knowledge, this is the only study examining the association of different transactional sex roles on UAI in Latin America. The inter-individual analysis demonstrates an increase in UAI in transactional acts for those individuals who give money or goods for sex. Interventions that target condom use for those who in engage in transactional sex, should focus on those who give money/goods for sex and those who use alcohol and/or



drugs during sex. Examining all relationships at the population level, the results of the second aim demonstrate a different association than the results of the first aim. If giving money/goods for sex truly decreases the occurrence of UAI on average, it is important to acknowledge that those who engage in transactional sex are assumed to be more at risk for HIV and STIs. Unprotected AI is only one component of this risk, in addition to number of partners, partner's HIV/STI status, frequency of sex, and sexual network (14–17).

Limitations include the fact that engaging in transactional sex is an imperfect measure of power in negotiation of condom use. Bayer et al. (14) qualitatively describe differences in sex workers and their sense of choice and status in Lima, Peru. Other measures of power in sexual acts were not recorded in this study, such as included in the Sexual Relationship Power Scale (SRPS).

The use of these survey data has several limitations related to participants' interpretation of and response to questions. Self-reported condom use is recognized as an incomplete proxy for actual use, even in private survey settings, when compared with semen biomarker tests (13). However, the use of CASI is non-invasive, and expected to limit social desirability bias in these data. Transactional sex questions did not evaluate exchange of money separately from exchange of goods, and the analysis is unable to explore differences in UAI between non-monetary and monetary exchanges.

These are cross-sectional data and therefore not suitable for causal inference, primarily due to ill-defined temporality. The recruitment strategy was designed to capture high numbers of high-risk individuals. As no sampling frame is available for this elusive population, participants cannot be randomly selected. Thus, the sample may not be

representative of the general MSM population in Lima, Peru. Its generalizability is further restricted to urban settings and may not be relevant in other countries.

Though missing data did not exceed 20% in any analysis, complete case analysis may have resulted in selection bias for missing data, particularly for GEE which does not require a correctly specified correlation structure but does assume the data to be missing completely at random (MCAR).

### **Future Studies**

Future analyses are recommended to exclude or separate stable partnerships within the analyses when examining UAI since these dyads are likely distinct populations in terms of risk and benefit perception. Adding a SRPS could increase knowledge around condom negotiation in all MSM and TW partnerships. In addition to methodological considerations for future studies, more studies are needed to explore transactional sex and its distinct roles within MSM and TW populations both in Latin America and the world. Particularly, most studies on transactional sex and sex work focus on those individuals who receive money/goods for sex, but more information is needed on their partners who may give money/goods for sex exclusively or be engaged in both behaviors.

### **Interventions**

There is very little evidence on effective interventions for MSM and TW engaging in transactional sex. More in-depth studies are needed provide a knowledge base on the risk and complications of transactional sex to inform intervention development. For those receiving money/goods for sex, more training is needed for condom negotiation and risk perception. Miagma et al.(18) reported incomplete knowledge for STI risk in Vietnam among those who exchange sex for money and goods. Studies in the US have shown

increased transactional sex during periods of unemployment and food insecurity (7,19). Interventions to reduce economic vulnerability might reduce the number of MSM and TW who engage in transactional sex for support. A review of interventions for risk reduction in female sex workers (FSWs) demonstrated limited but positive effects of microenterprise interventions on number of partners (20). Cash transfers, studied most often in adolescent women, show some promising results (21) and could also be considered for this population.

This study also provides further impetus for developing interventions aimed at those who give money/goods in exchange for sex to reduce their own risk for HIV and STIs with targeted behavioral change. A qualitative study of clients of FSWs in Haiti demonstrated interest in receiving prevention interventions provided to sex workers (22). The first RCT to evaluate an intervention for increasing condom use in male clients of FSW is ongoing near the US-Mexico border (23). Effective behavior change responses in those with more power could reduce demand for transactional sex or increase negotiation of condom use.

## Conclusions

Those who engaged only in giving money and/or goods for sex in the last 6 months had an increased risk of self-reported UAI during their last act of transactional sex compared with those who received money and/or goods in exchange for sex. This effect was modified by drug and/or alcohol use during sex.

When partnerships involving giving money/goods for sex were compared to all non-transactional sex partnerships, this group demonstrated a lower risk of UAI. This

association remained but was non-significant ( $p=0.10$ ) when the comparator was limited to non-stable, non-transactional partnerships. More research with larger sample sizes is needed to explore power-related predictors of UAI, particularly in those who give money/goods for sex. A possible approach could involve tailored interventions for individuals who participate in different transactional sex roles.

## Tables and Figures

**Table 1a: Descriptive Statistics Among those who Engaged in Transactional Sex in the Past 6 Months by Transactional Sex Role**

Demographic Covariates	Transactional Sex Giving		Transactional Sex Both		Transactional Sex Receiving	
	N=274		N = 450		N=754	
	n	%	n	%	n	%
<b>Age (Years)</b>						
18-25	63	23.0	182	40.0	394	52.3
26+	211	77.0	268	60.0	360	47.8
<b>Education Level</b>						
<Secondary School	38	13.9	124	27.6	127	16.8
Secondary Only	58	21.1	127	28.2	251	33.3
Some Higher Ed	60	21.9	83	18.4	187	24.8
Higher Ed+	117	42.7	115	25.6	188	24.9
Missing	1	0.1	1	0.2	1	0.4
<b>Monthly Income</b>						
No Income	41	15.0	89	19.8	165	21.9
<Minimum Wage	60	21.9	165	36.7	278	36.9
750-999 soles	70	25.6	89	19.8	155	20.6
1000+	103	37.6	107	23.8	156	20.7
<b>Gender</b>						
Cisgender	242	88.3	323	71.8	525	69.6
Transgender	32	11.6	127	28.2	229	30.4
<b>Sexual Preference</b>						
Insertive	54	19.7	97	21.6	192	25.5
Versatile	121	44.2	204	45.3	293	38.9
Receptive	99	36.1	149	33.1	269	35.7
<b>Sexual Orientation</b>						
Homosexual	191	69.7	267	59.3	425	56.4
Bisexual	64	23.4	117	26.0	210	27.9
Heterosexual	6	2.2	20	4.4	30	3.4
Missing	13	4.7	46	10.2	89	11.8
<b>Self-identified Sex Worker</b>						
Yes	37	13.5	198	44.0	369	48.9
No	237	86.5	252	56.0	384	50.9
Missing	-	-	-	-	1	0.1
<b>Drugs/Alc Use w/ Sex</b>						
None	30	11.0	42	9.3	82	10.9
Any	199	72.6	331	73.6	554	73.5
Missing	45	16.4	77	17.1	118	15.7

**Table 1b: Descriptive Statistics for all MSM and TW Partnerships**

Demographic Covariates	Participant Gave		Participant Received		Neither	
	N=72		N=186		N=3,617	
	n	%	n	%	n	%
<b>Age (Years)</b>						
18-25	19	26.4	70	40.0	1,738	48.1
26+	53	73.6	116	62.4	1,877	51.9
Missing	-	-	-	-	2	
<b>Education Level</b>						
<Secondary School	10	13.9	47	25.3	354	9.8
Secondary Only	27	37.5	72	38.7	775	21.4
Some Higher Ed	15	20.8	29	15.6	986	27.3
Higher Ed+	20	27.8	38	20.4	1,501	41.5
Missing	-	-	-	-	1	
<b>Monthly Income</b>						
No Income	16	22.2	28	15.1	635	17.6
<Minimum Wage	23	31.9	86	46.2	971	26.9
750-999 soles	8	11.1	33	17.7	802	22.2
1000+	25	34.7	39	21.0	1,209	33.4
<b>Gender</b>						
Cisgender	66	91.7	104	55.9	3,181	88.0
Transgender	6	8.3	82	44.1	436	12.1
<b>Sexual Preference</b>						
Insertive	23	31.9	39	21.0	770	21.3
Versatile	33	45.8	70	37.6	1,793	49.6
Receptive	16	22.2	77	41.4	1,054	29.1
<b>Sexuality</b>						
Homosexual	41	56.9	112	60.2	2,453	67.8
Bisexual	28	38.9	43	23.1	927	25.6
Heterosexual	1	1.4	9	4.8	68	1.9
Missing	2	2.8	22	11.8	169	4.7
<b>Drugs/Alc Use w/ Sex</b>						
None	12	16.7	34	18.3	476	13.2
Any	48	66.7	138	74.2	2,400	66.4
Missing	12	16.7	14	7.5	741	20.5
<b>Type of Sex</b>						
Insertive	22	30.6	47	25.3	949	26.2
Receptive	18	25.0	66	35.5	1,337	37.0
Both	14	19.4	23	12.4	575	15.9
Missing*	18	25.0	50	26.9	756	20.9

**Table 1b cont.**

Demographic Covariates	Participant Gave		Participant Received		Neither	
	N=72		N=186		N=3,617	
	n	%	n	%	n	%
<b>Partner Gender</b>						
Cisgender	50	69.4	164	88.2	3,389	93.7
Transgender	22	30.6	22	11.8	228	6.3
<b>Partner Sexual Preference</b>						
Insertive	19	26.4	96	51.6	1,552	42.9
Receptive	22	30.6	43	23.1	873	24.1
Versatile	26	36.1	36	19.4	931	25.7
Missing	5	6.9	11	5.9	261	7.2
<b>Partner Sexual Orientation</b>						
Homosexual	16	22.2	35	18.8	547	15.1
Bisexual	11	15.3	39	21.0	348	9.6
Heterosexual	3	4.2	7	3.7	130	3.6
Missing	42	58.3	105	56.5	2,592	71.7

\*Missing includes 267 individuals who identified a partner but did not indicate AI, and 557 individuals who did not indicate type of sex/condom use

**Table 2 Univariate Results for Aim 1 Inter-individual Analysis**

COVARIATE	CATEGORY	OR (95% CI)	CHI <sup>2</sup> <0.2
<b>TRANSACTIONAL SEX ROLE</b>	Giving money/goods for sex	1.79 (1.34, 2.40)	P<0.001*
	Both giving and receiving money/goods for sex	2.22 (1.74, 2.85)	
	Receiving money/goods for sex (ref)	-	
<b>AGE</b>	25+	0.91 (0.73, 1.12)	p=0.37
	<25 (ref)	-	
<b>EDUCATION</b>	Higher education (3+yrs)	0.72 (0.53, 0.98)	p=0.17**
	Some higher education (<3 yrs)	0.83 (0.60, 1.14)	
	Secondary school	0.91 (0.67, 1.24)	
	Less than Secondary school (ref)	-	
<b>INCOME</b>	High (>1000 soles/month)	0.68 (0.50, 0.95)	p=0.05**
	Middle (>750 <1000 soles/month)	0.91 (0.66, 1.27)	
	Low (< minimum wage=750/month)	0.99 (0.74, 1.33)	
	None (ref)	-	
<b>GENDER</b>	Transgender Woman	0.77 (0.66, 0.98)	p=0.03*
	Man (ref)	-	
<b>SEXUAL ORIENTATION</b>	Heterosexual	0.94 (0.53, 1.65)	p=0.98
	Bisexual	1.00 (0.78, 1.28)	
	Homosexual (ref)	-	
<b>SEXUAL PREFERENCE</b>	Versatile	0.96 (0.72, 1.26)	p=0.88
	Receptive	1.02 (0.77, 1.35)	
	Insertive (ref)	-	
<b>SEX WORKER</b>	Yes	0.77 (0.63, 0.97)	p=0.02*
	No (ref)	-	
<b>ALCOHOL/DRUG USE DURING SEX</b>	Yes	1.32 (0.92, 1.89)	p=0.13**
	No (ref)	-	

\*p<0.05; \*\*p<0.20



**Table 3 Aim 1: Multivariate Logistic Regression Results**

COVARIATE	CATEGORY	OR (95% CI) *WALD P<0.05
<b>GIVE – ALC/DRUGS</b>	Give money/goods for sex and alcohol and/or drug use during sex	3.77 (1.91, 7.42) p<0.001*
<b>GIVE – NO ALC/DRUGS</b>	Give money/goods for sex and no alcohol or drug use during sex	5.89 (2.29, 15.16) p <0.001*
<b>BOTH – ALC/DRUGS</b>	Both Give and Receive money/goods for sex and alcohol and/or drug use during sex	5.22 (2.75, 9.93) p <0.001*
<b>BOTH – NO ALC/DRUGS</b>	Both Give and Receive money/goods for sex and no alcohol or drug use during sex	4.80 (2.04, 11.31) p<0.001*
<b>REC – ALC/DRUGS</b>	Receive money/goods for sex and alcohol and/or drug use during sex	2.37 (1.26, 4.42) p=0.007*
<b>REC – NO ALC/DRUGS</b>	Ref – Receive money/goods for sex and no alcohol or drug use during sex	-
<b>SEXUAL ORIENTATION</b>	Heterosexual	1.05 (0.55, 1.98) p=0.89
	Bisexual	0.97 (0.72, 1.30) p=0.83
	Homosexual (ref)	-
<b>EDUCATION</b>	Higher education (3+yrs)	0.71 (0.48, 1.06) p=0.09
	Some higher education (<3 yrs)	0.94 (0.63, 1.41) p=0.77
	Secondary school	0.95 (0.66, 1.37) p=0.78
	Less than Secondary school (ref)	-
<b>INCOME</b>	High (>1000 soles/month)	0.71 (0.48, 1.04) p=0.08
	Middle (>750 <1000 soles/month)	0.96 (0.65, 1.42) p=0.84
	Low (< minimum wage=750/month)	1.16 (0.82, 1.65) p=0.40
	None (ref)	-
<b>GENDER</b>	Transgender Woman	0.78 (0.54, 1.12) p=0.18
	Man (ref)	-
<b>SEX WORKER</b>	Yes	0.84 (0.62, 1.12) p=0.23
	No (ref)	-

**Table 4 Aim1: Within Group Comparisons of Transactional Sex Role and Drug/Alcohol Use during sex**

CATEGORY	OR	95% CI
<b>GIVE – ALC/DRUGS VS. GIVE NO ALC/DRUGS</b>	0.64	(0.29, 1.40) p=0.26
<b>BOTH – ALC/DRUGS VS. BOTH NO ALC/DRUGS</b>	1.09	(0.56, 2.10) p=0.80
<b>REC – ALC/DRUGS VS. BOTH NO ALC/DRUGS</b>	2.37	(1.26, 4.42) p=0.007*

**Table 5. Unadjusted results for Aim 2 Partnership Analysis**

EXPOSURE	CATEGORY	
GIVE	Give money/goods for sex	0.50 (0.30, 0.83) p <0.007*
RECEIVE	Receive money/goods for sex	0.81 (0.56, 1.17) p=0.26
NEITHER	Ref - Non-transactional (stable/casual/one night stand)	-

**Table 6. Wald Tests Results for Interaction Terms Only for Partnership Analysis**

COVARIATE	CATEGORY	OR** (95% CI) * WALD P<0.05
INTERACTION-TYPE OF SEX/TRANSACTIONAL	Give money/goods for sex#Recep Only	0.36 (0.08, 1.58) p=0.18
	Give money/goods for sex#Both Ins Receptive	0.42 (0.10, 1.76) p=0.24
	Receive money/goods for sex#Recep Only	1.09 (0.43, 2.76) p=0.85
	Receive money/goods for sex#Both Ins Receptive	2.45 (0.55, 10.95) p=0.24
INTERACTION GIVE – ALC/DRUGS	Give money/goods for sex and alcohol and/or drug use during sex	2.92 (0.33, 26.19) p=0.34
REC – ALC/DRUGS	Receive money/goods for sex and alcohol and/or drug use during sex	1.31 (0.46, 3.76) p=0.61

\*\* OR is not the exact comparison, just the exponentiated coefficient for the output

**TABLE 7 – PARTNERSHIP ANALYSIS WITH AND WITHOUT INTERACTION**

COVARIATE	CATEGORY	MODEL W/ INTERACTION	MODEL W/OUT INTERACTION
		OR (95% CI) * WALD P<0.05	OR (95% CI) * WALD P<0.05
<b>TRANSACTIONAL</b>	Give money/goods for sex	-	0.36 (0.20, 0.66) p=0.001*
	Receive money/goods for sex	-	0.78 (0.51, 1.18) p=0.24
	Neither (ref)	-	-
<b>TYPE OF SEX</b>	Receptive AI only	-	0.94 (0.68, 1.31) p=0.73
	Both Insertive and Receptive AI	-	2.39 (1.70, 3.35) p<0.001*
	Insertive AI only (ref)	-	-
<b>INTERACTION-TYPE OF SEX/TRANSACTIONAL</b>	Give money/goods for sex & Receptive Only sex	0.09 (0.008, 0.84) p=0.04*	-
	Give money/goods for sex & Both Insertive/Receptive sex	0.25 (0.03, 1.94) p=0.18	-
	Give money/goods for sex & Insertive Only sex	0.25 (0.02, 2.73) p=0.26	-
	Receive money/goods for sex & Receptive Only sex	0.55 (0.20, 1.55) p=0.26	-
	Receive money/goods for sex & Both Insertive/Receptive sex	3.03 (0.67, 13.8) p=0.15	-
	Receive money/goods for sex & Insertive Only sex	0.53 (0.16, 1.73) p=0.29	-
	Non-transactional sex & Receptive Only sex	0.95 (0.69,1.32) p=0.77	-
	Non-transactional sex & Both Insertive/Receptive sex	2.34 (1.66, 3.29) p<0.001*	-
	(ref) Non-transactional sex & Insertive Only sex	-	-
<b>ALCOHOL/DRUG USE DURING SEX</b>	Yes	-	1.28 (1.00, 1.63) p=0.049*
	No (ref)	-	-
<b>INTERACTION ALC/DRUGS DURING SEX AND TRANSACTIONAL SEX</b>	Give money/goods for sex & alcohol and/or drug use during sex	0.91 (0.29, 2.89) p=0.87	-
	Give money/goods for sex & no alcohol or drug use during sex	0.25 (0.02, 2.73) p=0.26	-
	Receive money/goods for sex & alcohol and/or drug use during sex	0.86 (0.38, 1.97) p=0.73	-
	Receive money/goods for sex & no alcohol or drug use during sex	0.53 (0.16, 1.73) p=0.29	-
	Non-transactional sex & alcohol and/or drug use	1.24 (0.97, 1.59) p=0.09	-
	Ref – Non-transactional sex & no alcohol or drug use during sex	-	-
<b>AGE</b>	25+	0.85 (0.69, 1.04) p=0.11	0.84 (0.69, 1.03)
	<25 (ref)	-	-
<b>EDUCATION</b>	Higher education (3+yrs)	1.11 (0.78, 1.57) p=0.56	1.11 (0.78, 1.56) p=0.57
	Some higher education (<3 yrs)	1.08 (0.76, 1.54) p=0.66	1.08 (0.76, 1.53) p=0.68
	Secondary school	1.22 (0.85, 1.75) p=0.28	1.21 (0.84, 1.72) p=0.30
	Less than Secondary school (ref)	-	-
<b>INCOME</b>	High (>1000 soles/month)	0.78 (0.57, 1.05) p=0.11	0.77 (0.57, 1.05) p=0.10
	Middle (>750 <1000 soles/month)	0.90 (0.66, 1.24) p=0.52	0.90 (0.66, 1.24) p=0.52

TABLE 7 – PARTNERSHIP ANALYSIS WITH AND WITHOUT INTERACTION

COVARIATE	CATEGORY	MODEL W/ INTERACTION	MODEL W/OUT INTERACTION
		OR (95% CI) * WALD P<0.05	OR (95% CI) * WALD P<0.05
	Low (< minimum wage=750/month)	0.97 (0.72, 1.31) p=0.85	0.98 (0.72, 1.32) p=0.89
	None (ref)	-	-
<b>GENDER</b>	Transgender Woman	0.82 (0.57, 1.17) p=0.27	0.83 (0.58, 1.18) p=0.29
	Man (ref)	-	-
<b>SEXUAL PREFERENCE</b>	Versatile	0.91 (0.66, 1.25) p=0.55	0.91 (0.66, 1.25) p=0.55
	Receptive	1.05 (0.70, 1.57) p=0.81	1.04 (0.69, 1.56) p=0.84
	Insertive (ref)	-	-
<b>SEXUAL ORIENTATION</b>	Heterosexual	0.72 (0.36, 1.42) p=0.34	0.70 (0.36, 1.39) p=0.31
	Bisexual	0.84 (0.66, 1.08) p=0.18	0.84 (0.66, 1.08) p=0.18
	Homosexual(ref)	-	-
<b>SEX WORKER</b>	Yes	0.88 (0.65, 0.43) p=0.43	0.88 (0.65, 1.20) p=0.43
	No (ref)	-	-
<b>PARTNER GENDER</b>	Trans	1.47 (0.97, 2.24) p=0.07	1.52 (1.00, 2.30) p=0.05
	Cis (ref)	-	-
<b>PARTNER SEXUAL PREFERENCE</b>	Versatile	0.96 (0.73,1.26) p=0.75	0.95 (0.73, 1.25) p=0.74
	Receptive	0.98 (0.72, 1.34) p=0.89	0.98 (0.72, 1.33) p=0.89
	Insertive (ref)	-	-

**Table 8a. Partnership Sensitivity Analysis: Unadjusted All Transactional vs. All Non-Transactional Partnerships**

<b>EXPOSURE</b>	<b>CATEGORY</b>	<b>OR 95% CI *WALD P&lt;0.05</b>
<b>TRANSACTIONAL</b>	Gave or Receive money/goods for sex	0.70 (0.52, 0.95) p =0.02*
<b>NEITHER</b>	Ref - Non-transactional (stable/casual/one night stand)	-

**Table 8b. Partnership Sensitivity Analysis: Unadjusted Transactional Roles and Stable Partnerships vs. Non-transactional Casual/One Night Stands**

<b>EXPOSURE</b>	<b>CATEGORY</b>	<b>OR 95% CI *WALD P&lt;0.05</b>
<b>GIVE</b>	Gave money/goods for sex	0.64 (0.38, 1.08) p=0.10
<b>RECEIVE</b>	Received money/goods for sex	1.08 (0.74, 1.56) p=0.70
<b>STABLE</b>	Non-transactional stable partners	2.04 (1.75, 2.40) p<0.001
<b>CASUAL/ONE NIGHT STAND</b>	Ref - Non-transactional (casual/one night stand)	-

# Supplements

## 1. Coding for respective analyses

Transactional	0 = Receiving; 1=Both; 2=Giving
Age	0 = 18-25 yrs ;1=26+
Education	0 = Did not finish secondary 1=completed only secondary 2=some higher ed 3=completed high ed and beyond
Income	0 = no income; 1=<minimum wage (750 soles/month); 2=min wage to <1000 soles/month; 3 = high income 1000+ soles/month
Gender	0 = not transgender; 1 = transgender
Sexual Preference	0 = insertive; 1 = versatile; 2 = receptive
Sexual Orientation	0 = homosexual; 1 = bisexual; 3 = heterosexual
Drugs_Alc	0 = No drugs/alcohol during sex (last 3months); 1 = Any drugs/alcohol during sex (last3months)
Sex Worker	0 = No; 1=Self-identify as sex worker
UAI	0= Condom use last transactional sex UAI (insertive or receptive); 1 = Any non- condom use last transactional sex UAI (insertive or receptive)

Figure 1 - Aim 1 Covariates and Coding

Transactional Role*	0 = Neither; 1=Receiving; 2=Giving
Type of Sex	0 = Insertive Only; 1 = Receptive Only; 2=Both Insertive and Receptive
Partner Gender	0 = not transgender; 1=transgender
Partner Sexual Role	0 = insertive; 1 = versatile; 2 = receptive
UAI**	0 = Condom use last sex 1 = Any non-condom use last sex

Figure 2: Covariates for Partnership Analysis in Addition to those from Aim 1

\*Exposure and \*\*Outcome come from different questions in the survey and are defined differently than Aim 1

## 2. Questions used from the CASI data

### ***Individual Participant data and covariates***

#### **Age**

Determined from Date of Birth and Survey Visit Date

#### **Education**

4. How many years of elementary school did you study?
5. How many years of high school did you study?
6. How many total years of higher education/technical school did you study?

#### **Income**

7. What was your total monthly income last month?

#### **Gender**

11. Do you consider yourself a Transvestite/Transgender/Transexual?

#### **Sexuality**

12. How do you consider yourself in regard to your sexuality? (homosexual, bisexual, heterosexual)

#### **Sexual Role**

13. Currently, how do you describe our sexual role? (active, passive, modern/versatile)

#### **Drug and Alcohol Use During Sex**

140. In the last three months, indicate the number of times that you have had sex that you have been under the influence of alcohol, drugs, or both simultaneously before or during sex.

### ***Transactional Sex Section questions***

#### **Transactional sex (give \$/goods) - exposure**

124. In the last six months, did you ever give money, gifts, favors, or a place to sleep in exchange for anal sex (insertive or receptive) with another man or transvestite/transgender/transsexual?

#### **Transactional sex (give \$/goods) - outcome**

125. The last time that you gave money, gifts, favors, or a place to sleep in exchange for anal sex (insertive or receptive) with another man or transvestite/transgender, did you use a condom?

#### **Transactional sex (receive \$/goods) - exposure**

126. In the last six months, did you ever receive money, gifts, favors, or a place to sleep in exchange for anal sex (insertive or receptive) with another man or transvestite/transgender/transsexual?

#### **Transactional sex (receive \$/goods) - outcome**

127. The last time that you received money, gifts, favors, or a place to sleep in exchange for anal sex (insertive or receptive) with another man or transvestite/transgender, did you use a condom?

#### **Identification as a sex worker (covariate)**

128. Do you consider yourself a sex worker?

### ***Partner Data and Covariates***

"Think of your (\_\_\_/second to/third to) last sexual partner in the past 3 months" – All covariates have repeated questions if >1 partner

41. Have you had any sexual partners in the last 3 months?

No, 1. Yes, my last sexual partner I'll call \_\_\_\_ )If No, Skip to Q. 89

**Partner Type Sex questions**

**Exposure – Transactional Sex**

42. \_\_\_\_ (38.1) was .....

(your stable partner, your casual partner, a one night stand, your client: someone who gave you money or gifts, etc. in exchange for anal sex, a commercial sex worker: you gave money or gifts, etc. to this person in exchange for anal sex)

**Participant – "Receive"** – "someone who gave you money or gifts, etc. in exchange for anal sex

**Participant – "Give"** – "someone you gave money or gifts, etc. in exchange for anal sex"

**Partnership – "non-transactional"** - stable partner, casual partner, one night stand

**Partner Gender** (current plan is to remove partners who are women from analyses completely)

42. \_\_\_\_ (38.1) was a .....

(0. Man, 1. Tranvestite/Transgender/Transexual, 2. Woman (born female, not Trans).

**Partner Sexuality**

43. What is \_\_\_\_ (38.1)'s sexual identity?

(Homosexual, Bisexual, Heterosexual).

**Partner Type – exposure variable**

44. \_\_\_\_ (38.1) was .....

(your stable partner, your casual partner, a one night stand, your client: someone who gave you money or gifts, etc. in exchange for anal sex, a commercial sex worker: you gave money or gifts, etc. to this person in exchange for anal sex)

**Partner Sexual Role**

54. What is \_\_\_\_ (38.1) 's sexual role in bed? (active, passive, modern/versatile -active and passive)

**Partner Condom Use and Sex Type - outcome** (*for simplicity planning to include only anal receptive and anal insertive in the analyses*)

56. Please indicate all the ways you had sex with \_\_\_\_ (38.1) the last time.

(Receptive oral sex without a condom; Insertive oral sex without a condom; Anal receptive sex without a condom; Anal receptive sex with condom; Anal insertive sex without a condom; Anal insertive sex with condom; Masturbation; none).



## References

1. Baral S, Sifakis F, Cleghorn F, Beyrer C. Elevated Risk for HIV Infection among Men Who Have Sex with Men in Low- and Middle-Income Countries 2000–2006: A Systematic Review. Kalichman S, editor. *PLoS Med*. 2007 Dec 1;4(12):e339.
2. UNAIDS, Peru MOH. Informe Nacional Sobre Los Progresos Realizados en el Pais. Peru: Periodo 2012 - diciembre 2013 [Internet]. 2014 [cited 2016 Mar 15]. Available from: [http://www.unaids.org/sites/default/files/country/documents//PER\\_narrative\\_report\\_2014.pdf](http://www.unaids.org/sites/default/files/country/documents//PER_narrative_report_2014.pdf)
3. Silverman BG, Gross TP. Use and effectiveness of condoms during anal intercourse. A review. *Sex Transm Dis*. 1997 Jan;24(1):11–7.
4. Giannou FK, Tsiara CG, Nikolopoulos GK, Talias M, Benetou V, Kantzanou M, et al. Condom effectiveness in reducing heterosexual HIV transmission: a systematic review and meta-analysis of studies on HIV serodiscordant couples. *Expert Rev Pharmacoecon Outcomes Res*. 2015 Oct 21;1–11.
5. Ludford KT, Vagenas P, Lama JR, Peinado J, Gonzales P, Leiva R, et al. Screening for drug and alcohol use disorders and their association with HIV-Related Sexual Risk Behaviors among Men Who Have Sex with Men in Peru. *PloS One*. 2013;8(8):e69966.
6. Solomon MM, Nurena CR, Tanur JM, Montoya O, Grant RM, McConnell JJ. Transactional sex and prevalence of STIs: a cross-sectional study of MSM and transwomen screened for an HIV prevention trial. *Int J STD AIDS*. 2015 Oct;26(12):879–86.
7. Bauermeister JA, Eaton L, Meanley S, Pingel ES. Transactional Sex With Regular and Casual Partners Among Young Men Who Have Sex With Men in the Detroit Metro Area. *Am J Mens Health*. 2015 Oct 5;
8. Oldenburg CE, Perez-Brumer AG, Biello KB, Landers SJ, Rosenberger JG, Novak DS, et al. Transactional sex among men who have sex with men in Latin America: economic, sociodemographic, and psychosocial factors. *Am J Public Health*. 2015 May;105(5):e95–102.
9. Scheibe A, Kanyemba B, Syvertsen J, Adebajo S, Baral S. Money, power and HIV: economic influences and HIV among men who have sex with men in sub-Saharan Africa. *Afr J Reprod Health*. 2014 Sep;18(3 Spec No):84–92.
10. Kippax S, Smith G. Anal Intercourse and Power in Sex Between Men. *Sexualities*. 2001 Nov 1;4(4):413–34.
11. Pulerwitz J, Amaro H, Jong WD, Gortmaker SL, Rudd R. Relationship power, condom use and HIV risk among women in the USA. *AIDS Care*. 2002 Dec;14(6):789–800.
12. Sanchez J, Lama JR, Kusunoki L, Manrique H, Goicochea P, Lucchetti A, et al. HIV-1, sexually transmitted infections, and sexual behavior trends among men who have sex

- with men in Lima, Peru. *J Acquir Immune Defic Syndr* 1999. 2007 Apr 15;44(5):578–85.
12. Javier Lama, Jessica Rios, Carolyn Bain, Robert de la Grecca, Audrey Brezak, Ann Duerr. Design Strategy of an Ongoing Study to Detect and Treat Early HIV Infection Among Men who have Sex with Men in Lima Peru. 2015 (Unpublished).
  14. Cambou MC, Perez-Brumer AG, Segura ER, Salvatierra HJ, Lama JR, Sanchez J, et al. The risk of stable partnerships: associations between partnership characteristics and unprotected anal intercourse among men who have sex with men and transgender women recently diagnosed with HIV and/or STI in Lima, Peru. *PloS One*. 2014;9(7):e102894.
  15. Koblin B, Chesney M, Coates T, EXPLORE Study Team. Effects of a behavioural intervention to reduce acquisition of HIV infection among men who have sex with men: the EXPLORE randomised controlled study. *Lancet Lond Engl*. 2004 Jul 3;364(9428):41–50.
  16. Amirkhanian YA. Social Networks, Sexual Networks and HIV Risk in Men Who Have Sex with Men. *Curr HIV/AIDS Rep*. 2014 Mar;11(1):81–92.
  17. Lasry A, Sansom SL, Wolitski RJ, Green TA, Borkowf CB, Patel P, et al. HIV sexual transmission risk among serodiscordant couples: assessing the effects of combining prevention strategies. *AIDS*. 2014 Jun;28(10):1521–9.
  18. Mimiaga MJ, Reisner SL, Closson EF, Perry N, Perkovich B, Nguyen T, et al. Self-perceived HIV risk and the use of risk reduction strategies among men who engage in transactional sex with other men in Ho Chi Minh City, Vietnam. *AIDS Care*. 2013 Aug;25(8):1039–44.
  19. Whittle HJ, Palar K, Napoles T, Lemus Hufstedler L, Ching I, Hecht FM, et al. Experiences with food insecurity and risky sex among low-income people living with HIV/AIDS in a resource-rich setting. *J Int AIDS Soc* [Internet]. 2015 Nov 4 [cited 2016 May 30];18(1). Available from: <http://www.jiasociety.org/index.php/jias/article/view/20293>
  20. Wariki WM, Ota E, Mori R, Koyanagi A, Hori N, Shibuya K. Behavioral interventions to reduce the transmission of HIV infection among sex workers and their clients in low- and middle-income countries. In: The Cochrane Collaboration, editor. *Cochrane Database of Systematic Reviews* [Internet]. Chichester, UK: John Wiley & Sons, Ltd; 2012 [cited 2016 May 30]. Available from: <http://doi.wiley.com/10.1002/14651858.CD005272.pub3>
  21. Heise L, Lutz B, Ranganathan M, Watts C. Cash transfers for HIV prevention: considering their potential. *J Int AIDS Soc* [Internet]. 2013 Aug 23 [cited 2016 May 30];16(1). Available from: <http://www.jiasociety.org/index.php/jias/article/view/18615>

22. Jean S., Kays M., Smith R., Lehnertz N. Factors Influencing Condom Use among Male Clients of Female Sex Workers in Haiti [Internet]. PSI Haiti; 2010 [cited 2016 May 30]. Available from: [https://www.psi.org/wp-content/uploads/drupal/sites/default/files/publication\\_files/HaitiFactorsInfluencingCondomUse\(TU\).pdf](https://www.psi.org/wp-content/uploads/drupal/sites/default/files/publication_files/HaitiFactorsInfluencingCondomUse(TU).pdf)
23. Pitpitan EV, Chavarin CV, Semple SJ, Magis-Rodriguez C, Strathdee SA, Patterson TL. Hombre Seguro (Safe Men): a sexual risk reduction intervention for male clients of female sex workers. *BMC Public Health*. 2014;14(1):475.