

# Gay and Bisexual Men in Kampala, Uganda

Phoebe Kajubi · Moses R. Kamya · H. Fisher Raymond · Sanny Chen · George W. Rutherford · Jeffrey S. Mandel · Willi McFarland

© Springer Science+Business Media, LLC 2007

**Abstract** HIV/AIDS disproportionately affects gay and bisexual men around the world; however, little is known about this population in sub-Saharan Africa. We conducted a respondent-driven sampling survey of gay and bisexual men in Kampala, Uganda ( $N = 224$ ). Overall, 61% reported themselves as “gay” and 39% as “bisexual”. Gay and bisexual men were 92% Ugandan; 37% had unprotected receptive anal sex in the last six months, 27% were paid for sex, 18% paid for sex, 11% had history of urethral discharge. Perception that gay and bisexual men are at risk for HIV infection was low. Gay and bisexual men in Kampala are overwhelmingly Ugandan nationals from all parts of society. Recognition of gay and bisexual men in local HIV prevention programs and education messages are urgently needed. Our study demonstrates that gay and bisexual men in Uganda are willing to identify themselves and participate in research.

**Keywords** Men who have sex with men · Uganda · Africa · HIV · Risk behavior

## Introduction

Men who have sex with men (MSM) are present in all regions of the world, including sub-Saharan Africa (Caceres et al. 2006; Geibels et al. 2007; McFarland and Caceres 2001; Murray and Roscoe 1998; UNAIDS 2006). The profile of MSM was raised in the field of public health as they were the group in which AIDS was first discovered. Since the beginning of the epidemic, MSM have contributed immensely to our understanding of the epidemiology of HIV, ways to prevent transmission, and the care of persons affected by HIV/AIDS. However, little is known about MSM and HIV among MSM in sub-Saharan Africa, despite an enormous and growing amount of HIV research from the region. One population-based cohort in Uganda measured homosexual anal intercourse at under 1% (Wawer et al. 2001), well below the level anticipated in studies from developing countries world wide (Caceres et al. 2006). One HIV prevalence survey of MSM in Senegal found HIV prevalence at 21.5%, substantially higher than the estimated under 1% for the general adult population (UNAIDS 2006; Wade et al. 2005). In the same study, one in five MSM reported unprotected anal intercourse in the preceding month, and the prevalence of sexually transmitted diseases (STD) was high. In an unpublished report of another survey, the Ghanaian national AIDS control program found that MSM cut across all social classes, religions, and ethnicities and had high rates of sexual risk behavior (Ghanaian National AIDS/HIV/STI Control Programme 2004).

Typical of countries with generalized epidemics, HIV surveillance, prevention programs, and research in Uganda focus on heterosexual transmission. Homosexual behavior is illegal (Ugandan Penal Code Act, sections 21 and 140) and widely considered immoral. Nonetheless, the attention

---

P. Kajubi · G. W. Rutherford · J. S. Mandel · W. McFarland  
Institute for Global Health, University of California,  
San Francisco, CA, USA

M. R. Kamya  
Department of Medicine, Makerere University, Kampala,  
Uganda

H. F. Raymond · S. Chen · W. McFarland (✉)  
HIV Epidemiology Section,  
San Francisco Department of Public Health,  
25 Van Ness Avenue, Suite 500, San Francisco,  
CA 94102-6033, USA  
e-mail: Willi\_McFarland@hotmail.com

given to the subject in the popular press and a quick internet search speak to the existence of gay and bisexual men in Uganda and suggest that same sex behavior may occur to a greater extent than is generally recognized. In addition, our formative phase identified bars, restaurants, and dance clubs that provide safe social spaces for gay and bisexual men in Kampala. However, no formal health survey has been conducted among gay and bisexual men in Uganda.

Although the legal and social climate of sub-Saharan Africa makes establishing HIV prevention programs and conducting research among MSM challenging, precedents exist in other populations whose behavior is illegal (e.g., commercial sex workers and illicit substance users). We therefore felt it timely to conduct the first survey of gay and bisexual men in Uganda. The aims were to describe the demographic characteristics of gay and bisexual men in Kampala, gauge awareness and level of sexual risk behavior, foster their inclusion in HIV/AIDS prevention and care program planning, and field test survey methods that may serve as a model for epidemiological research and HIV surveillance among MSM in sub-Saharan Africa.

## Methods

### Setting and Study Population

We conducted this survey in Kampala, the capital city of Uganda and the country's largest urban center with a population of about 1.2 million (250,000 adult males) (Uganda Bureau of Statistics 2002). Our study population was men aged 18 years or older who self-identified as gay or bisexual and were residents of Kampala. We elected to use self-identity as gay or bisexual as the inclusion criterion rather than the broader definition of men who have sex with men (i.e., any history of male–male sexual behavior) to leave less doubt as to the primary focus of the survey and the current, volitional sexual behavior of these men with respect to other men. We acknowledge that this criterion may have excluded men who have sex with men who do not identify as gay or bisexual. For clarity and consistency, in this report we refer to the target population of our study and to results for the combined participants of our survey as “gay and bisexual men”. We use the term “gay” men when referring only to the subset who self-identified this way, and similarly for “bisexual” men. In one question on perception of HIV risk, we used the term “men who have sex with men” to distinguish anyone having male–male sex from bisexuals specifically. The study was reviewed and approved by the Internal Review Boards of Makerere University and the University of California, San Francisco, as well as by the Uganda National Council for Science and Technology.

### Sampling Design, Formative Phase, and Recruitment

We used respondent-driven sampling (RDS) to recruit participants for our survey (Hekathorn 1997; Ramirez-Valles et al. 2005). The RDS methodology is based on long-chain recruitment whereby members of the target population participating in the study refer other members of the target population to the study. Thus, successive waves or generations of recruitment referrals establish the sample. RDS is adapted to sampling hidden or hard-to-reach populations and has become increasingly used for HIV serological and behavioral surveillance worldwide (Abdul-Quadar et al. 2006; Magnani et al. 2005).

An improvement in RDS over conventional snowball sampling is that it provides a theoretical basis to produce population estimates through statistical adjustment. An underpinning assumption of RDS is that the long-chain recruitment can be modeled as a first-order Markov process allowing for the calculation of sample weights and standard errors that adjust for otherwise biased recruitment patterns (Heckathorn 1997). As referral chains lengthen, a dynamic equilibrium is achieved which balances the tendencies of persons with similar characteristics to associate with each other, relative network sizes, and the underlying make-up of the target population (Heckathorn 1997). By tracking who recruits whom and by recording the relative network sizes of participants, data are collected by which the biases inherent in referral recruitment can be adjusted in the analysis (Heckathorn 1997). These biases are quantified by the “homophily” of each variable, that is, the propensity of persons to recruit others similar to themselves, and by individuals' relative network sizes (Heckathorn 1997). Relative network size affects a person's probability of being recruited into the study. Data for the adjusted analyses are sufficient when the sample reaches equilibrium. Equilibrium occurs when additional waves of recruitment do not substantially change the composition of the sample with respect to key variables. As recruitment progresses, equilibrium on key variables that may indicate different social networks (e.g., education) is monitored to determine when the sample has a stable proportion of those characteristics.

A purported strength of RDS is that less formative research is needed to be able to access diverse, hidden networks of the target population because members of the population recruit them for you as the chains grow. Nonetheless, a focused formative phase is needed to assess the feasibility of RDS and guide the conduct of the survey. Our formative phase goals were therefore to gain a basic understanding of the diverse networks of the population in terms of demographic characteristics, assess the willingness of gay and bisexual men to participate in the survey, identify initial seeds to start recruitment chains, recruit gay

and bisexual Ugandans to be trained as interviewers, and to decide on practical issues such as the use of incentives, where to conduct interviews, and to field test the questionnaire. We gained initial contact through websites targeting gay and bisexual men in Uganda and we also contacted a local member of the clergy whose name appeared in the popular media in connection with providing counseling services to gay and bisexual men. We also discussed issues of gay and bisexual men with persons providing HIV prevention and care services to the general Ugandan population. We made appointments with key informants at a location of their choice and conducted semi-structured interviews covering the above listed goals. We also asked key informants for other persons and members of organizations connected to gay and bisexual men in Kampala to serve as key informants or seeds. Key informants also identified a few locations (e.g., bars, restaurants, dance clubs) where gay and bisexual men and women congregate. We conducted informal observations of these venues and interviews with venue owners, employees, and patrons. Altogether, we interviewed 20 key informants, including gay and bisexual businessmen, professionals, students, unemployed youth, and Africans who were non-Ugandan nationals living in Kampala. Among interviewed, there were two self-identified Ugandan lesbians. Key informants included seven AIDS service providers.

Of note, we actually selected the RDS design during our formative phase when we asked key informants whether they preferred RDS or time-space sampling after explaining their basic approaches. Time-space sampling is a method that entails mapping the venues where gay and bisexual men congregate and sampling random time periods for recruitment at the venues (Abdul-Quadar et al. 2006; MacKellar et al. 1996). Key informants indicated they preferred RDS for several reasons: that gay and bisexual men would be better at knowing who are other gay and bisexual men, reaching men who we would not be able to reach at venues, advocating for better participation, and because the RDS method better preserved the confidentiality of the few venues in Kampala where they felt safe.

Our formative phase also succeeded in identifying seeds in basic demographic groups and in hiring gay and bisexual interviewers for the study. Other decisions made from the formative phase information included not offering an explicit monetary incentive for participation, using a mobile phone number to have participants call for appointments, conducting interviews at any location of the participant's choice, not conducting HIV testing in this first study, keeping the length of the questionnaire to a minimum, and which variables to track to monitor equilibrium. During recruitment, we tracked age, education level, paying or receiving money for sex, and having foreign male

sex partners from nations outside of Africa (specifically in our study, from European, North American, or Asian countries). We chose these variables based on descriptions of gay and bisexual networks and the perception voiced by HIV prevention informants that gay and bisexual men in Kampala may be an elite, highly educated group that has been influenced by "Western" values. In actuality, many of our colleagues in HIV prevention were skeptical that gay and bisexual men existed in many numbers in Uganda, that they were not native to Uganda, or were mostly boys and young men who were paid for sex by foreigners. Neither Ugandan nationality nor African race were eligibility criteria for our study, but current residence in Kampala was.

All eight identified seeds succeeded in starting recruitment chains. Theoretically, equilibrium can be achieved independently of the choice of these initial seeds given enough waves of recruitment (Heckathorn 1997). However, for efficiency, seeds are usually chosen to reflect different segments of the population as determined in the formative phase. Of note, seeds are removed from the data for the adjusted analysis. In our study, we recruited six self-identified gay men and two bisexual men among persons referred to us by our key informants to serve as seeds. The eight seeds were chosen to achieve a range of socio-economic status, educational level, and Ugandan ethnicities. After completing the study questionnaire, the initial seeds and subsequent participants were given three recruitment coupons and instructed to give them to other men they knew personally and knew to be gay or bisexual. Persons who presented with a coupon and who were eligible were consented, enrolled, and in turn given three recruitment coupons.

Recruitment was flexible to the needs of the potential participants. Potential participants called a mobile phone number printed on the coupon to schedule their screening at any location comfortable to them. This was often a restaurant or bar well known by gay and bisexual men, but participants also designated intersections or neighborhoods to walk and talk. At or near the location, a private area was found for interviewing. Men wishing to participate were screened for eligibility by age (18 years and above), being gay or bisexual (in response to the question: "Would you describe yourself as gay, bisexual, straight, or heterosexual?"—the latter two were excluded), and being in possession of a coupon indicating they were recruited by another participant with whom they were acquainted.

While it may be impossible to eliminate every person who was "faking" being gay or bisexual, we took the following steps. First, we did not advertise or offer any incentive to participate in the study. Second, we carefully instructed the initial seeds and each subsequent participant to only recruit men they personally knew to be gay or bisexual and explained why this was important. Third, our

interview team included gay and bisexual men whose experience we believe provided invaluable (admittedly intangible) insight as to who was or was not gay or bisexual, including gauging the potential participants' knowledge of and comfort with terms for gay and bisexual men and their sexual practices in common usage by gay and bisexual Ugandans. Lastly, we believe that the strong stigma of being gay or bisexual balanced against no explicit incentive would dissuade most non-gay or bisexual men from participating. Of note, to reduce the potential that persons would participate in the survey multiple times, all potential participants were screened by the Principal Investigator (Phoebe Kajubi).

Eligible men gave verbal informed consent prior to survey administration after discussing the research objectives, procedures, risks, benefits, and means of maintaining confidentiality. As stated above, we did not offer an explicit incentive for survey participation (i.e., a "primary incentive"); however, participants were given 4000 Uganda shillings (approximately \$2) for reimbursement of receipts for their transportation to the interview site after completing the interview. Nor did we provide an incentive to recruit others (i.e., a "secondary incentive"), which is common in other RDS studies (Abdul-Qudar et al. 2006; Heckathorn 1997; Magnani et al. 2005). Enrollment occurred in two months, from September through October 2004. No personal identifying information was collected in order to protect confidentiality. We planned to continue recruitment until equilibrium was achieved on age, education, paying for sex, being paid for sex, and sex with a foreign man from a country outside of Africa or until the projected sample size of 500 was reached (which ever came last). However, we terminated recruitment early (at  $N = 224$ ) due to unwanted publicity in a national newspaper that threatened confidentiality of participants. While the study did not collect names or other personal identifying information, the newspaper article described the study's distinctive recruitment coupon, thus potentially identifying the carrier as a gay or bisexual man. Fortunately, the study had achieved equilibrium on all variables by that point.

## Measures

A structured questionnaire was developed based on the MSM module of the Family Health International instrument for behavioral surveillance (Family Health International 2000), questionnaires for MSM in San Francisco, USA (CDC 2005), and questions generated locally during the formative phase. The formative phase also pilot tested the questionnaire with gay and bisexual Ugandan key informants. The instrument was developed in English

and forward and backward translated to and from Luganda. The questionnaire was administered face-to-face by trained interviewers, some of whom were gay or bisexual Ugandans themselves. The survey was offered in either English or Luganda according to the participant's preference. The questionnaire included demographic characteristics (e.g., age, nationality, education, marital status); sexual orientation and identity; sexual behavior (e.g., first sexual experiences, global number of partners by gender, partner types, frequency of condom use); access to HIV prevention services and messages; and history and recognition of STD symptoms. Experience of violence was asked as "Have you ever been subjected to any form of violence or abuse?", and if yes, followed by "Was any of this violence or abuse the result of you being gay/bisexual?" Experience of forced sex was asked as "Have you ever been forced or coerced into having sexual contract?" Sexual behavior and partner characteristics were also asked on a partner-by-partner basis for up to the five most recent partners in the preceding six months. For each partner, we asked the partner gender, age, partner type (e.g., permanent, steady, casual, exchange [cash for sex], anonymous, one-time, other), nationality (tribe if Ugandan, other African country or country outside of Africa [if they did not know this, then we asked their partners' race]), and where they first met. If the partner was male, we asked how many episodes of insertive and receptive anal intercourse in the preceding six months, and how many were unprotected (no condom used). If the partner was female, we asked how many episodes of vaginal and anal intercourse in the preceding six months, and how many were unprotected. Despite collecting this level of detail, unfortunately, due to the requirement of RDS data to have a sufficient number of cross-recruitments by persons with different characteristics, not all variables were possible to analyze in the adjusted analysis (see below), particularly the partner-by-partner characteristics. Many variables were collapsed as presented in the Tables and text. For example, our indicator of HIV risk through insertive or receptive unprotected anal sex had to be created by aggregating this risk/exposure across all male partnerships and using the total sample as the denominator (i.e., the percent of gay and bisexual men reporting this risk out of all gay and bisexual men).

From feedback during the formative phase, we decided not to conduct HIV testing nor did we ask participants their HIV serostatus in this study (although we did ask if they had tested for HIV). This decision was made upon considering the additional potential risks to HIV-infected participants should they be inadvertently identified as participating in our study. We did not wish to compound the potential risks of being identified as homosexual with the risk of being identified or perceived as HIV-infected in this very first study of gay and bisexual men in Uganda or

present an undue barrier to participation if men feared HIV testing. We also conducted the survey anonymously, no names or personal identifying information was asked for or collected.

## Data Analysis

The analysis of RDS data requires specific software (RDSAT) that adjusts for the long-chain referral recruitment design to produce population estimates. RDSAT is freely downloadable at <http://www.respondentdrivensampling.org>. Crude sample estimates (i.e., the proportions of key variables in the sample itself) are adjusted to reflect the make-up of the target population based on tracking who recruits whom and the relative sizes of participants' networks. Unique numbers on the recruitment coupons link recruiter to recruitee. Relative network size was based on response to the question: "How many other gay or bisexual men do you know by name, nickname, or face (acquainted with) who you have seen in the last six months." RDSAT calculates point estimates and 95% confidence intervals (CI).

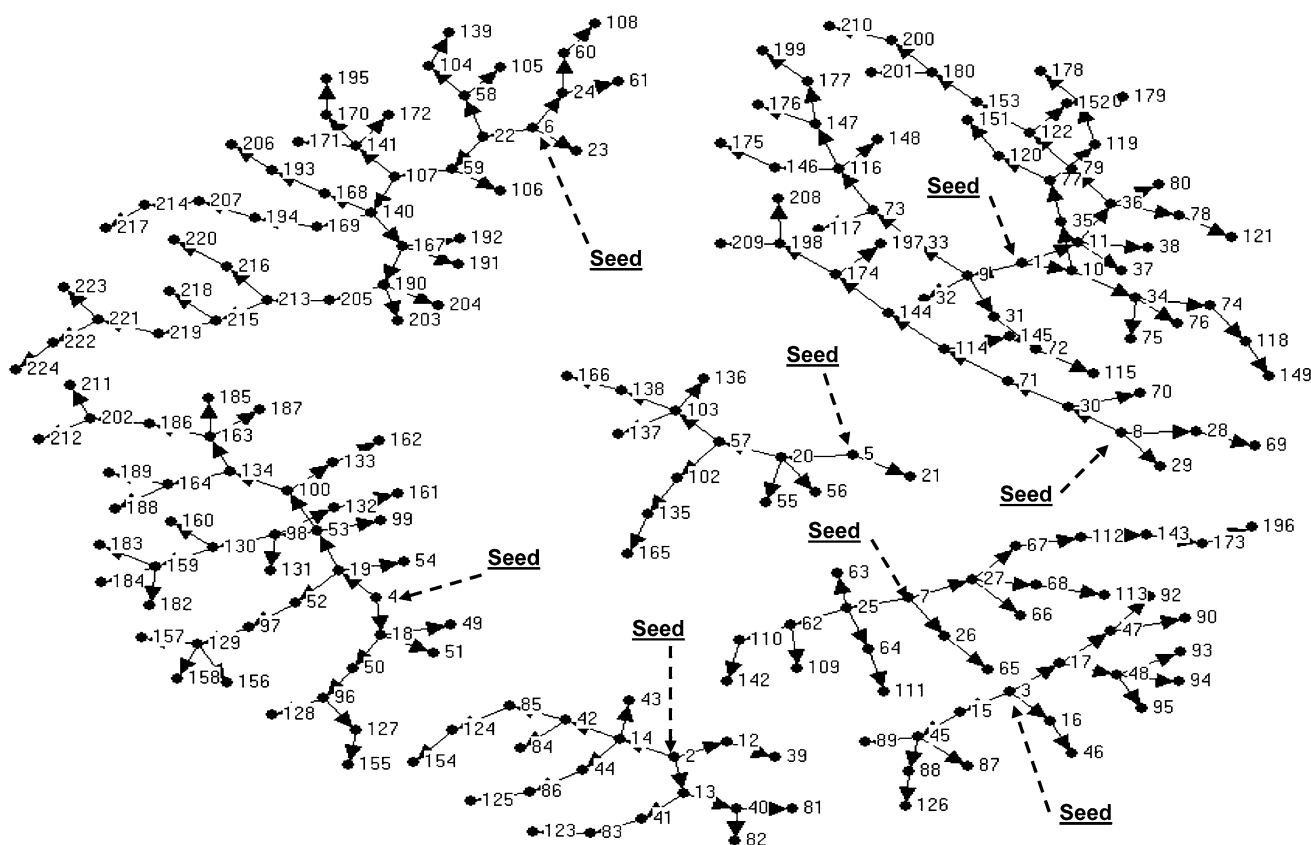
We present adjusted point estimates and 95% CI for demographic characteristics among young (under 25 years) and older (25 and older) gay and bisexual men. We present sexual orientation and risk behavior for the sample as a whole. We further stratified the sample by those who reported themselves as "gay" versus "bisexual" and compare demographic characteristics, sexual risk behavior, and perceptions of HIV risk between these groups. At present, RDSAT does not have the capacity to calculate adjusted means or to conduct multivariate analysis. Nor does RDSAT produce statistics for comparison of proportions between groups (e.g., *P*-values or odds ratios). The lack of statistics and description of the underlying distribution of the adjusted variables creates a challenge in deciding if differences between groups are significant. To be practical and conservative, we adopted the following rules. If there was completely no overlap between the adjusted 95% CI around the point estimates for both strata, we considered the difference to be highly likely to be significant and state this as a difference. If the adjusted 95% CI of one group excludes the point estimate of the other and vice versa, but there is some amount of overlap in the 95% CI, we considered the difference to be potentially significant. We describe such finding as "somewhat" higher or lower. If neither of these criteria are met, then we do not draw inference that there is any difference. In some instances, particularly for the stratified analyses, cross-recruitment between sub-groups was too small to calculate point estimates or confidence limits in RDSAT. Finally, RDSAT currently does not calculate adjusted means and standard errors for continuous variables. We therefore

examined the distributions and cross recruitments of continuous variables (age, age of sexual debut, age gap with partner) and selected cut-offs for categories that captured the range of responses while maintaining enough cross-recruitments.

## Results

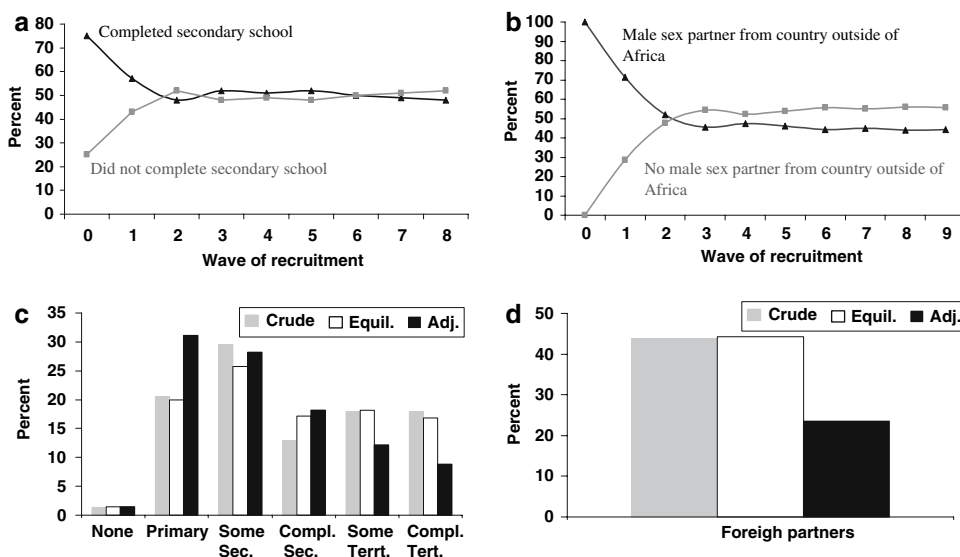
Figure 1 shows the recruitment chains for our RDS survey of gay and bisexual men in Kampala. Eight seeds germinated and their chains grew to different lengths. The longest referral chain extended to 13 waves; the average number of waves was four. As the chains grew, 650 coupons were distributed; 230 men presented themselves for the survey; 224 men were screened as eligible and all of these completed the survey. The six excluded did not identify as being gay or bisexual at screening. We did not ask participants how many persons they attempted to recruit but were unsuccessful. Only one person said that the person who gave them the study coupon was a stranger; he is included in the analysis. The sample of 224 was achieved in less than two months. Recruitment started slow but accelerated up to the moment that we stopped the study. The median reported number of gay and bisexual men that participants said they knew by name, nickname, or face and had seen in the last six months was 30 (interquartile range [IQR] 20–100). The median number of gay or bisexual men considered as close friends was 5 (IQR 2–10). When asked to estimate how many gay and bisexual men lived in Kampala, the median response was 1,000 (IQR 300 to 2,600).

Figure 2 shows equilibrium by recruitment wave and the crude, equilibrium, and adjusted population estimates for education and having sex with a male partner from a country outside of Africa—two key variables we used to monitor the survey. Despite actively seeking seeds of lower education level, the majority had completed secondary education (Fig. 2a, wave 0). As recruitment progressed, the level of education decreased and stabilized near 50% having completed secondary education by the second to third wave. We could not identify seeds who did not report having a male sex partner from a country outside of Africa (Fig. 2b, wave 0); however, the proportion of respondents reporting foreign male sex partners from countries outside Africa dropped from 100% with successive waves, stabilizing by the third to fourth wave with 44% having any foreign male sex partner from outside Africa. The RDSAT population-adjusted levels for education and having foreign male sex partners from outside Africa were lower than the crude and equilibrium levels. Whereas 18% and 17% reported graduating from university in the crude sample and at equilibrium, respectively, the population-adjusted



**Fig. 1** Recruitment chains in a respondent-driven sample of gay and bisexual men, Kampala, Uganda, 2004

**Fig. 2** (a) Equilibrium for education in a respondent-driven sample of gay and bisexual men, Kampala, Uganda, 2004. (b) Equilibrium for having a sex partner from a country outside of Africa in a respondent-driven sample of gay and bisexual men, Kampala, Uganda, 2004. (c) Crude, equilibrium, and adjusted estimates of education level in a respondent-driven sample of gay and bisexual men, Kampala, Uganda, 2004. (d) Crude, equilibrium, and adjusted estimates of having a male sex partner from a country outside of Africa in a respondent-driven sample of gay and bisexual men, Kampala, Uganda, 2004



estimate was 9% (95% CI 5–15). For having any foreign male sex partners from outside Africa, the crude and equilibrium levels were both 44%, while the population-adjusted level was 24% (95% CI 17–32).

Table 1 shows the crude and population-adjusted estimates of demographic characteristics stratifying the sample by younger (under 25 years old,  $N = 138$ ) and older

(25 years and older,  $N = 86$ ) gay and bisexual men in Kampala. The majority of younger (95%) and older (84%) participants were Ugandan nationals (92% combined); virtually all the remainder was nationals from other African countries. Only one participant was North American and one was European. Among younger participants, the three most common occupations were student (34%), retail

**Table 1** Demographic characteristics of gay and bisexual men by age group, Kampala, Uganda

Variable	<25 years old (N = 138)			25 years and older (N = 86)		
	Crude N (%)	Adjusted %	95% CI	Crude N (%)	Adjusted %	95% CI
<i>Highest education level attained</i>						
None	2 (1)	1	0–3	1 (1)	0	0–1
Primary	31 (22)	32	12–47	15 (17)	20	9–31
Some secondary	38 (28)	20	13–30	17 (20)	20	11–33
Completed secondary	28 (20)	23	13–35	11 (13)	26	4–50
Some tertiary	32 (23)	19	12–34	8 (9)	9	1–22
Completed tertiary	7 (5)	5	1–9	33 (38)	25	12–38
Other (e.g., vocational training)	0	–	–	1 (1)	1	0–3
<i>National origin</i>						
Ugandan	126 (91)	95	90–98	79 (92)	84	76–99
African national, non-Ugandan	11 (8)	5	2–9	6 (7)	15	0–24
National of non-African country	1 (1)	1	0–1	1 (1)	0	–
<i>Occupation/employment</i>						
Student	62 (45)	34	21–47	6 (7)	6	0–14
Professional	13 (9)	8	2–13	44 (51)	41	26–57
Retail	12 (9)	32	14–46	12 (14)	9	3–16
Trade	35 (25)	20	14–34	18 (21)	24	15–45
Other	1 (1)	–	–	1 (1)	2	0–8
Unemployed	15 (11)	4	1–10	4 (5)	0.4	0–1
Missing	0	–	–	–	–	–
<i>Religion</i>						
Catholic	35 (25)	47	37–63	30 (35)	34	19–47
Protestant	63 (46)	32	17–42	26 (30)	30	19–44
Muslims	29 (21)	16	9–25	17 (20)	30	13–48
Seventh Day Adventist	2 (1)	3	0–7	1 (1)	1	0–2
Other	9 (7)	3	0–6	12 (14)	7	2–14
Ever married to a woman	9 (7)	7	2–24	29 (34)	46	22–64
Currently married to a woman	1 (1)	0	–	10 (2)	20	7–35

\* Estimates adjusted for recruitment patterns

Subgroups do not always add up to totals due to missing data or rounding

(32%), and trades (20%). Among older participants, the three most common occupations were professional (41%), trades (25%), and retail (9%). Both younger and older gay and bisexual men were widely distributed across professed religions. More older gay and bisexual men had been married (46%) or were currently married (20%) to a woman compared to younger gay and bisexual men (7% and 0%, respectively).

Table 2 shows sexual orientation and sexual behavior of gay and bisexual men in Kampala. The majority (61%, adjusted) identified as gay and 39% identified as bisexual. Fifty-five percent were attracted to only males; an additional 22% were attracted mostly to males; no respondent was attracted to only females. However, 46% had at least one female partner in the last five years. Most (79%) were aware of their attraction to males by age 18 years. Nearly

all men were sexually active by age 20 years (96%), and 67% had a woman as their first sex partner. Two-thirds (67%) had their first sex with a man by age 18 years, with the largest percent (38%) meeting their first male sex partner at school. Thirty-one percent had greater than five lifetime male partners; 21% had greater than five female partners; 27% never had a female sex partner. Slightly less than one-fourth had sex with a foreign partner from a non-African nation. Having paid money for sex was acknowledged by 18%, and 27% acknowledged having been paid for sex. Nearly equal proportions had unprotected insertive and receptive anal sex in the last six months, 36% and 37%, respectively. When asked if they could describe any symptoms of sexually transmitted diseases (STD) in men, 33% spontaneously mentioned genital sores or ulcers; 28% mentioned urethral discharge. Only 1% mentioned anal

**Table 2** Sexual orientation and sexual behavior, gay and bisexual men, Kampala, Uganda

Variable	Crude <i>N</i> (%)	Adjusted* % (95% CI)
<i>Self identified as</i>		
Gay	144 (64)	61 (47–69)
Bisexual	80 (36)	39 (31–53)
<i>Sexually attracted to...</i>		
Only male	131 (58)	55 (41–65)
Mostly male	45 (20)	22 (14–31)
Equally male and female	19 (8)	11 (6–18)
Mostly female	28 (13)	12 (7–20)
Only female	0 (0)	–
<i>Partners in last 5 years</i>		
Only male	128 (57)	54 (41–64)
Mostly male, some female	38 (17)	13 (8–20)
Equally male and female	15 (7)	6 (3–10)
Mostly female, some male	39 (17)	23 (16–33)
Only female	3 (1)	0 (0–3)
<i>Age first aware of attraction to males (years)</i>		
<15	67 (30)	19 (11–27)
15–18	110 (49)	60 (51–72)
19–24	41 (18)	18 (11–26)
25+	6 (3)	2 (0–4)
<i>Age first understood word “homosexual” (years)</i>		
<15	46 (21)	16 (9–26)
15–18	107 (48)	45 (33–55)
19–24	56 (25)	35 (23–51)
25+	14 (6)	3 (0–6)
<i>Age at first sex</i>		
<11	31 (14)	8 (5–13)
11–15	78 (35)	44 (31–55)
16–20	102 (46)	43 (34–56)
21+	11 (5)	4 (0–9)
<i>Gender of first sex partner</i>		
Male	104 (46)	33 (23–44)
Female	119 (54)	67 (56–77)
<i>Age gap with first sex partner (absolute value in years)</i>		
0	26 (12)	10 (6–15)
1–3	122 (54)	63 (51–72)
4–5	24 (11)	9 (5–14)
6–10	15 (7)	12 (3–22)
11+	34 (15)	7 (4–13)
<i>Age at first sex with man (years)</i>		
<15	36 (16)	12 (6–17)
15–18	111 (50)	55 (44–66)
19–24	54 (24)	29 (20–41)
25+	17 (8)	4 (2–6)

**Table 2** continued

Variable	Crude <i>N</i> (%)	Adjusted* % (95% CI)
<i>Where first met another gay man</i>		
School	84 (38)	38 (28–52)
Bar or dance club	88 (39)	26 (17–35)
Private venues	50 (22)	35 (23–49)
<i>Lifetime number of male sex partners</i>		
0	0 (0)	–
1	16 (7)	18 (4–39)
2	30 (13)	30 (17–47)
3–5	50 (22)	20 (11–37)
6–10	68 (30)	18 (11–23)
11+	49 (22)	13 (4–20)
<i>Lifetime number of female sex partners</i>		
0	67 (30)	27 (19–38)
1	39 (17)	24 (11–39)
2	30 (13)	7 (4–10)
3–5	36 (16)	21 (11–31)
6–10	34 (15)	13 (6–20)
11+	17 (8)	9 (4–13)
Reporting any lifetime foreign sex partner from a non-African nation	98 (44)	24 (17–32)
Ever paid money to a man or woman for sex	57 (25)	18 (12–26)
Ever been paid money for sex	62 (28)	27 (17–36)
Any unprotected insertive anal sex in last 6 months	64 (29)	36 (25–50)
Any unprotected receptive anal sex in last 6 months	57 (25)	37 (28–50)
Aware of lubricants for anal sex	213 (95)	92 (80–98)
Always uses lubricants for anal sex with men	183 (82)	80 (68–86)
<i>Mentioned as STD symptom in men</i>		
Urethral discharge	90 (40)	28 (21–38)
Painful urination	104 (46)	33 (26–44)
Genital sores/ulcers	95 (42)	33 (25–44)
Swelling in groin	24 (11)	10 (4–16)
Itching	80 (36)	22 (16–29)
Ulcers or sores on anus	9 (4)	1 (0–3)
Cannot retract foreskin	2 (1)	0
<i>History of STD symptoms (ever)</i>		
Urethral discharge	37 (17)	11 (7–16)
Anal discharge	7 (3)	1 (0–2)
Genital sores/ulcers	24 (11)	7 (4–10)
Ulcers or sores on anus	10 (4)	2 (1–3)
<i>Preventive behaviors adopted in last six months</i>		
Decreased partners	100 (45)	37 (30–51)
Avoided anal sex	35 (16)	20 (14–32)

**Table 2** continued

Variable	Crude <i>N</i> (%)	Adjusted* % (95% CI)
Started using condoms with anal sex	43 (19)	10 (7–16)
Always used condoms with anal sex	62 (28)	21 (16–35)
Tested for HIV	70 (31)	24 (18–37)
<i>Sources of HIV information</i>		
Radio	219 (98)	99 (97–100)
Posters at health centers	187 (83)	80 (80–91)
Television	175 (78)	73 (73–87)
Newspapers	167 (75)	70 (69–84)
Friends	172 (77)	67 (63–83)
Peer educators	124 (55)	56 (39–58)
Medical personnel	109 (49)	51 (47–65)
Male sex partners	131 (58)	46 (38–60)
Lecture at school	122 (54)	45 (39–59)
Brochures	93 (42)	32 (25–44)
<i>Ever experienced violence</i>		
Any	102 (46)	43 (38–59)
Any because you are homosexual	61 (27)	22 (18–33)
Ever forced to have sex	33 (15)	12 (8–16)

\* Estimates adjusted for recruitment patterns

Sub-groups do not always add up to total due to missing data or rounding

sores and none mentioned anal discharge, although 1% reported having anal discharge and 2% anal sores. Eleven percent had a history of urethral discharge and 7% had a history of genital sores.

Table 2 also shows preventive behavior adopted in the last six months, sources of information, and experience of violence. The most common preventive behavior adopted was decreasing the number of partners (37%), followed by testing for HIV (24%), always using condoms with anal sex (21%), and avoiding anal sex (20%). When asked about their sources of information on HIV, 99% had heard about HIV on the radio, followed in ranking by posters at health centers (80%), television (73%), newspapers (70%), friends (67%), peer educators (i.e., an outreach worker, not a gay or bisexual peer) (56%), and medical personnel (51%). Less than half (46%) mentioned getting information on HIV from male sex partners. Violence (physical, verbal, or sexual) was experienced by 43% of gay and bisexual men, with 22% experiencing violence because they were homosexual and 12% having been forced to have sex. The most common perpetrator of the violence was a family member (40%).

In response to an open-ended question, “What do you feel is the most important issue facing gay and bisexual men in Kampala today”, the most common responses related to discrimination and lack of acceptance in society,

followed by the illegal status of male-male sex; 21 mentioned unemployment and 11 mentioned HIV/AIDS (note, figures are unadjusted due to the open-ended nature of the question).

Table 3 illustrates key differences between gay and bisexual men. Gay men were more likely to have completed tertiary (i.e., university) level education than bisexual men (15% vs. 4%, respectively) and included a somewhat higher proportion of professionals (24% vs. 10%, respectively). As may be expected, gay men were more likely to report being attracted to only males (86%) compared to bisexual men (1%), while bisexual men were more likely to have 11 or more lifetime female partners than gay men (21% vs. 0%, respectively). Gay men were more likely to be aware of their attraction to males before the age of 15 years than bisexual men (30% vs. 5%, respectively) and to have had their first sex partner be male (49% vs. 9%, respectively). Bisexual men were more likely to report having been paid for sex (43%) compared to gay men (17%) and having had urethral discharge (19% vs. 6%, respectively). Bisexual men tended to perceive their risk for HIV as higher compared to gay men; 13% of gay men and 23% of bisexual men described their own risk for HIV as being “very high”. Only 4% percent of gay men and 8% of bisexual men considered the risk of HIV for men who have sex with men in general to be “very high”. However, the majority of both groups concurred that the risk of HIV for bisexual men in general was “very high”: 69% of gay men and 55% of bisexual men. No differences in gay men compared to bisexual men were noted with respect to age, religion, age at first sex, having foreign sex partners from non-African nations, sources of HIV information, or experience of violence or forced sex.

## Discussion

We conclude that the vast majority, 92%, of gay and bisexual men in Kampala are Ugandan nationals, and nearly all are nationals of African nations. Most have never paid for sex, been paid for sex, or had a foreign male sex partner. Gay and bisexual men in Kampala come from all walks of life and include the unemployed, those in trades, students, and professionals. Most became aware of their sexual orientation by the age of 18 years. They are willing to identify themselves and participate in research.

The application of RDS in our study demonstrates how convenience or conventional snowball sampling would have reached very different conclusions. Without the long-chain referral approach and the statistical adjustments that account for recruitment patterns, the crude sample estimates would suggest that gay and bisexual men are highly educated by Ugandan standards (Uganda Bureau of

**Table 3** Differences in demographic characteristics, HIV-related risk behavior, and perception of risk for HIV, gay vs. bisexual men, Kampala, Uganda

Variable	Gay (N = 144)			Bisexual (N = 80)		
	Crude N (%)	Adjusted* %	95% CI	Crude N (%)	Adjusted* %	95% CI
<i>Highest education level attained</i>						
None	2 (1)	2	0–4	1 (1)	0	–
Primary	30 (21)	14	6–28	16 (20)	21	10–32
Some secondary	30 (21)	11	6–19	25 (31)	32	23–47
Completed secondary	22 (15)	16	7–30	17 (21)	36	18–45
Some tertiary	31 (22)	19	11–34	9 (11)	7	3–15
Completed tertiary	29 (20)	15	9–25	11 (14)	4	1–9
<i>Occupation/employment</i>						
Student	46 (32)	28	17–43	22 (28)	25	14–37
Professional	44 (31)	24	12–34	13 (16)	10	2–20
Retail	11 (8)	15	5–32	14 (18)	22	9–34
Trade	30 (21)	13	7–21	23 (29)	33	20–50
Unemployed	13 (9)	9	2–21	6 (8)	8	2–18
Currently married to a woman	4 (3)	2	0–2	7 (9)	12	3–22
<i>Sexually attracted to...</i>						
Only male	126 (88)	86	76–94	5 (6)	4	1–7
Mostly male	14 (10)	22	13–42	31 (39)	35	23–49
Equally male and female	3 (2)	2	0–7	16 (20)	24	13–37
Mostly female	0	–	–	4 (35)	38	24–50
Only female	0	–	–	0	–	–
<i>Partners in last 5 years</i>						
Only male	125 (87)	88	81–95	3 (4)	1	0–18
Mostly male, some female	12 (8)	7	2–12	26 (33)	25	18–41
Equally male and female	1 (1)	0	0–1	14 (18)	13	6–21
Mostly female, some male	5 (4)	5	1–10	34 (43)	51	37–62
Only female	0	–	–	3 (4)	10	1–17
<i>Age first aware of attraction to males (years)</i>						
<15	58 (40)	30	18–46	9 (11)	5	3–13
15–18	60 (42)	56	39–70	50 (63)	69	55–78
19–24	22 (15)	13	6–21	19 (24)	22	12–32
25+	4 (3)	2	0–4	2 (3)	4	0–8
<i>Age first understood word “homosexual” (years)</i>						
<15	33 (23)	22	11–34	13 (16)	10	4–17
15–18	68 (47)	35	24–51	39 (49)	59	49–72
19–24	33 (23)	41	21–38	23 (29)	27	15–35
25+	10 (7)	3	1–6	5 (6)	5	1–10
<i>Gender of first sex partner</i>						
Male	92 (64)	49	32–66	12 (15)	9	4–14
Female	51 (36)	51	35–68	68 (85)	91	86–96
<i>Lifetime number of female sex partners</i>						
0	67 (47)	44	29–59	0	–	–
1	28 (20)	32	12–49	11 (14)	12	4–19
2	23 (16)	8	5–14	7 (9)	5	2–10
3–5	11 (8)	10	3–19	25 (31)	42	28–58
6–10	12 (8)	6	3–10	22 (28)	20	9–34
11+	2 (1)	0	0–1	15 (19)	21	10–30

**Table 3** continued

Variable	Gay ( <i>N</i> = 144)			Bisexual ( <i>N</i> = 80)		
	Crude <i>N</i> (%)	Adjusted* %	95% CI	Crude <i>N</i> (%)	Adjusted* %	95% CI
<i>Lifetime number of male sex partners</i>						
0	0	–	–	1 (1)	2	0–3
1	6 (4)	16	1–42	10 (13)	21	9–39
2	17 (12)	25	11–36	13 (16)	17	8–28
3–5	49 (34)	29	19–42	23 (29)	44	29–56
6–10	29 (20)	10	5–15	1 (1)	8	4–12
11+	41 (28)	20	9–32	32 (40)	9	3–19
Ever paid money to a man or woman for sex	30 (21)	12	7–18	27 (34)	27	16–42
Ever been paid money for sex	36 (25)	17	7–29	26 (33)	43	31–58
Any unprotected receptive anal sex with a man in last 6 months	40 (28)	26	16–40	17 (21)	14	9–23
<i>Mentioned as STD symptom in men</i>						
Urethral discharge	55 (38)	21	14–31	35 (44)	42	28–56
Painful urination	66 (46)	28	19–40	38 (48)	42	31–57
Genital sores/ulcers	60 (42)	28	18–41	35 (44)	42	28–57
Swelling in groin	16 (11)	8	3–17	8 (10)	12	3–29
Itching	47 (33)	18	12–30	33 (41)	26	18–38
Ulcers or sores on anus	7 (5)	2	0–2	2 (3)	1	0–3
Cannot retract foreskin	2 (1)	0	–	0	–	–
<i>History of STD symptoms (ever)</i>						
Urethral discharge	16 (11)	6	3–10	21 (26)	19	11–28
Anal discharge	6 (4)	2	0–4	1 (1)	0	–
Genital sores/ulcers	13 (9)	7	3–12	11 (14)	6	3–11
Ulcers or sores on anus	6 (4)	1	0–4	4 (5)	2	0–3
<i>Perceived risk of becoming infected with HIV</i>						
None	21 (15)	4	1–6	6 (8)	4	1–8
Low	91 (63)	36	23–49	55 (69)	41	28–54
Somewhat high	18 (13)	48	32–62	10 (13)	32	20–43
Very high	13 (9)	13	8–21	8 (10)	23	13–37
<i>Perceived risk that a man who has sex with men will become infected with HIV</i>						
None	11 (8)	17	7–30	9 (11)	3	1–6
Low	58 (40)	67	50–80	30 (38)	75	61–86
Somewhat high	38 (26)	12	5–22	25 (31)	13	4–26
Very high	36 (25)	4	2–8	15 (19)	8	2–18
<i>Perceived risk that a bisexual man will become infected with HIV</i>						
None	1 (1)	0	0–1	0	–	–
Low	4 (3)	1	0–3	5 (6)	13	2–25
Somewhat high	32 (22)	30	14–42	32 (40)	33	22–46
Very high	106 (74)	69	57–85	42 (53)	55	41–68
Tested for HIV	52 (36)	28	15–43	18 (23)	15	7–26

\* Estimates adjusted for recruitment patterns

Sub-groups do not always add up to total due to missing data or rounding

Statistics 2002). Moreover, the crude estimates for having a foreign male sex partner from outside of Africa were nearly double the adjusted level. These contrasts suggest that convenience or purely snowball sampling would reach a biased sub-population of gay and bisexual men by virtue of

the highly educated, older, and “Westernized” being more visible, easier to recruit for research, and better connected to other gay and bisexual men. In addition, such convenience samples may reinforce misconceptions of gay and bisexual men in Africa as being there simply to serve

paying Europeans, North Americans, or Asians as seen in our crude versus equilibrium versus adjusted sample. Furthermore, the adjusted estimates of demographic characteristics of gay and bisexual men more closely match the Ugandan census than the crude estimates (Uganda Bureau of Statistics 2002). Of note, our desire to use the most scientifically rigorous sampling design was in agreement with our key informants' perceptions of how best to reach diverse gay and bisexual men and how best to preserve their confidentiality. RDS also proved fast and efficient at obtaining a sizable sample of this hidden population, even without explicit incentives.

The low overall self-perception of risk for HIV among gay and bisexual men in Kampala is of concern. There is the possibility that they may not respond to HIV prevention messages, particularly ones not targeting gay and bisexual men. Results on perception of risk for HIV also show a reversal of the usual concept of the "bisexual bridge". In the West, Asia, and Latin America, there has been concern that the high prevalence of HIV among MSM may cross into the low prevalence general heterosexual population through bisexual men to women (Choi et al. 2003; Konda et al. 2007; Prabhu et al. 2004). Uganda, like many countries in East and Southern Africa, already has a generalized epidemic. What has been missing from prevention efforts and research studies is the risk of HIV transmission to and between gay and bisexual men. In our study, the majority of both gay and bisexual men felt that bisexual men were the ones at risk for HIV. These estimates echo comments made during our formative phase that gay and bisexual men have heard HIV is more common among women (which is true in sub-Saharan Africa [UNAIDS 2006]), and therefore sticking to only male partners and avoiding bisexual male partners would prevent acquiring HIV. However, a disconnect between this attitude and their potential risk for HIV is shown by the majority having female sex partners in their lifetime, and nearly half having female partners in the last five years, and over one in five having been married to a woman. We believe the overall low perception of their own risk for HIV, among both gay and bisexual men, is misplaced. The constellation of indicators points to real potential for HIV acquisition: more than one-third having unprotected receptive anal intercourse, more than one-third having insertive anal intercourse, and the majority having multiple partners. Moreover, one-eighth reported a history of STD in a background of only one-third, at best, recognizing any symptom of an STD.

Gay and bisexual men in Kampala also placed a low priority on HIV/AIDS when sharing their views on the main issues facing gay and bisexual men in Kampala. HIV/AIDS was rarely mentioned as an important issue—even when asked at the end of a survey focusing on HIV/AIDS.

HIV/AIDS ranked well behind discrimination and lack of acceptance in society, and behind unemployment—an issue not inherently specific to gay and bisexual men of Kampala. Findings suggest that the minimal steps of recognizing gay and bisexual men in HIV/STD prevention programs and including the risk of transmission through male-male sex into education messages may go a long way to dispelling the common self-perception of low risk. Unfortunately, the substantial level of experience of violence and discrimination being the foremost of their concerns are likely to present a barrier to participation of gay and bisexual Ugandans in future programs.

We cannot prove in our study that HIV was prevalent among gay and bisexual men in Uganda because we did not conduct HIV testing. Nonetheless, we can point to the study in Senegal, which found HIV prevalence much higher than the general population (Wade et al. 2005). In retrospect, our decision not to conduct HIV or STD testing may be the main limitation of our study if it weakens the case advocating for prevention programs for gay and bisexual men in Uganda. The next study should consider inclusion of HIV and STD testing, with strong safeguards to protect confidentiality. Moreover, prevention programs should consider HIV testing sites or hours and STD messages specifically targeting gay and bisexual men in Uganda. At the same time, counselors and physicians need to be sensitized to the existence of gay and bisexual men in Uganda and their specific health care needs, including the risk of HIV transmission through male-male sex and extra-genital sites for STD (Kent et al. 2005).

Our data point to other potential HIV prevention approaches for gay and bisexual men in Uganda. If you discount the most common, popular media avenues of dissemination (radio, television, and newspapers) for gay and bisexual men as unacceptable to the mainstream, our data suggest that posters at health centers, peer educators, and medical personnel would still reach the majority. Up to the time of our survey, no informational materials on HIV/AIDS even mention gay and bisexual men in Uganda, let alone address their specific sexual health needs. Should gay and bisexual specific HIV prevention information materials be developed, our study suggests that the majority of gay and bisexual men are seeking this information at public health centers. As we suggest above, the simple recognition that gay and bisexual men are present in Ugandan society and that they need to be included in the existing HIV prevention efforts may go a long way towards raising awareness. Such efforts are the minimum starting point. Future research will need to determine specific prevention interventions tailored to the needs of gay and bisexual men in Uganda and sub-Saharan Africa and test their efficacy. It cannot be assumed that successful prevention interventions for gay and bisexual men in the West

will work for gay and bisexual men in sub-Saharan Africa. Our study demonstrates that many are willing to identify themselves as gay and bisexual men and to participate in public health research. Based on the contribution of gay and bisexual Ugandans to our study, research projects and prevention programs will best serve the needs of this population if they are designed as collaborations between providers and members of the target population. Finally, we recognize that the social and legal environment in Uganda and much of sub-Saharan Africa presents a challenge to conducting research and openly offering prevention programs for gay and bisexual men. However, there are pragmatic precedents in public health for reaching out to other populations whose behaviors are illegal.

**Acknowledgements** We wish to acknowledge the institutional support of Department of Medicine, Makerere University, Kampala, Uganda and funding provided by the Center for AIDS Prevention Studies, University of California, San Francisco, USA through grants P30 MH062246-0681, MH064712, and D43TW000003 from the National Institutes of Health. This study would not have been possible without the approval and guidance of the Uganda National Council for Science and Technology, Makerere University Internal Review Board, and the University of California Committee for Human Research. We thank our field staff for their conscientious and non-judgmental efforts. Finally, we appreciate the courage of the participants in sharing their personal stories.

## References

- Abdul-Quadar, A. S., Heckathorn, D. D., Sabin, K., & Saidel, T. (2006). Implementation and analysis of respondent-driven sampling: Lessons learned from the field. *Journal of Urban Health, 83*(suppl 7), 1–5.
- Caceres, C., Konda, K., Pecheny, M., Chatterjee, A., & Lyster, R. (2006). Estimating the number of men who have sex with men in low and middle income countries. *Sexually Transmitted Infections, 82*(suppl 3), iii3–iii9.
- Choi, K. H., Liu, H., Guo, Y., Han, L., Mandel, J. S., & Rutherford, G. W. (2003). Emerging HIV-1 epidemic in China in men who have sex with men. *Lancet, 361*, 2125–2126.
- Family Health International. (2000). Behavioral Surveillance Surveys. Arlington, Virginia.
- Giebel, S., van der Elst, E. M., Kingola, N., Luchters, S., Davies, A., & Getambu, E. M. (2007). “Are you on the market?”: A capture-recapture enumeration of men who sell sex to men in and around Mombasa, Kenya. *AIDS, 21*, 1349–1544.
- Ghanaian National AIDS/HIV/STI Control Programme. (2004). *MSM and HIV in Ghana, HIV/AIDS surveillance report*. Accra: Ministry of Health.
- Heckathorn, D. D. (1997). Respondent-driven Sampling: A New Approach to the Study of Hidden Populations. *Social Problems, 44*, 174–199.
- Kent, C. K., Chaw, J. K., Wong, W., Liska, S., Gibson, S., Hubbard, G., & Klausner, J. D. (2005). Prevalence of urethral, rectal, and pharyngeal Chlamydia and gonorrhea detected in 2 clinical settings among men who have sex with men: San Francisco, California, 2003. *Clinical Infectious Diseases, 41*, 67–74.
- Konda, K. A., Lescano, A. G., Leontsini, E., Fernandez, P., Klausner, J. D., & Coates, T. J. (2007). High rates of sex with men among high-risk heterosexually-identified men in low-income, coastal Peru. *AIDS and Behavior*, March [Epub ahead of print].
- MacKellar, D. A., Valleroy, L., Karon, J., Lemp, G., & Jansen, R. (1996). The young men’s survey: Methods for estimating HIV seroprevalence and risk factors among young men who have sex with men. *Public Health Reports, 111*(suppl), 138–144.
- Magnani, R., Sabin, K., Saidel, T., & Heckathorn, D. (2005). Review of sampling hard-to-reach and hidden populations for HIV surveillance. *AIDS, 19*(suppl 2), S67–S72.
- McFarland, W., & Caceres, C. (2001). HIV surveillance among men who have sex with men. *AIDS, 15*, S23–S32.
- Centers for Disease Control, Prevention. (2005). HIV prevalence, unrecognized infection, and HIV testing among men who have sex with men—five US cities, June 2004–April 2005. *MMWR, 54*, 597–601.
- Murray, S., & Roscoe, W. E. (1998). *Boy wives and female husbands: Studies of African homosexuality*. London: St. Martin’s Press.
- Prabhu, R., Owen, C., Folger, K., & McFarland, W. (2004). The bisexual bridge revisited: Sexual risk behavior among men who have sex with men and women, San Francisco, 1998–2003. *AIDS, 18*, 1604–1606.
- Ramirez-Valles, J., Heckathorn, D. D., Vazquez, R., Diaz, R. M., Campbell, R. T. (2005). From networks to populations: The development and application of respondent-driven sampling among IDUs and Latino gay men. *AIDS and Behavior, 9*, 409–413.
- Uganda Bureau of Statistics. (2002). Uganda Population and Housing Census. Available at: <http://www.ubos.org/2002%20Census%20Final%20Reportdoc.pdf>. Accessed 26 March 2007.
- UNAIDS. (2006). Report on the Global AIDS Epidemic. Geneva: UNAIDS. Available at: [http://data.unaids.org/pub/EpiReport/2006/2006\\_EpiUpdate\\_en.pdf](http://data.unaids.org/pub/EpiReport/2006/2006_EpiUpdate_en.pdf). Accessed 2 August, 2007.
- Wade, A. S., Kane, C. T., Diallo, P. A., Diop, A. L., Gueye, K., & Mboup, S. (2005). HIV infection and sexually transmitted infections among men who have sex with men in Senegal. *AIDS, 19*, 2133–2140.
- Wawer, M. J., Eng, S. M., Serwadda, D., Sewankambo, N. K., Kiwanuka, N., Li, C., & Gray RH. (2001). Prevalence of Kaposi sarcoma-associated herpesvirus compared with selected sexually transmitted diseases in adolescents and young adults in rural Rakai. *Sexually Transmitted Diseases, 28*, 77–81.