

Implementation and Evaluation of an HIV Risk Reduction Intervention among Men at High Risk of HIV in the Western Cape

Introduction

HIV/AIDS is the largest global pandemic in history. The overwhelming burden of the disease is concentrated in sub-Saharan Africa, which accounts for 3% of the global population but almost 50% of the global HIV-infected population (UNAIDS 2003). Several hypotheses have been posed to explain the discrepancies in the distribution of the disease, including the lack of male circumcision, lack of access to condoms, and poverty. Sexual behavior in this region has also been examined in an attempt to explain the discrepancies. Understanding the main drivers of the epidemic is important in shaping future outreach programs, prioritizing interventions, and determining the appropriate money allocation for such. Recently, concurrent sexual partnerships, as opposed to serial monogamous partnerships, has been proposed as the driving factor of epidemic size and spread in sub-Saharan Africa (Halperin 2004; Mah 2008). This is a controversial proposition because without substantial evidence it can be viewed as stereotyping the sexual mores of people in developing countries. This is also a hotly contested theory because concurrent sexual partnerships, or concurrency, is not generally defined, is particularly challenging to quantify, and has complex effects on the epidemic that have yet to be modeled or understood in detail. Therefore, for my master's thesis, I hope to critically analyze the concurrency theory, suggesting new and unique ways to collect raw data, and develop new, more elaborate simulation models to determine the true effects of concurrency, versus serial monogamy, on the size of the HIV/AIDS epidemic.

Background

The HIV/AIDS pandemic in South Africa constitutes a serious public health issue. South Africa continues to have the largest number of people living with HIV in the world with over 5.5 million people infected with the virus (Shisana et al., 2005). HIV prevalence rates appear to be increasing annually with estimates in 2006 at 10.9%, compared to 8.5% in 2001 (Statistics South Africa, 2006).

However, national HIV prevalence rates such as these that aggregate prevalence data across age, gender, race, and geographic location masks the differential vulnerability to HIV infection that is evident among particular groups within the general population. Robust surveillance strategies are urgently needed to provide information about population groups most at risk for HIV, the characteristics of these groups, and the factors and behaviours that make them more susceptible to infection than other groups. With this kind of information HIV intervention strategies can be tailor-made for target groups, and thus have greater effectiveness.

Table 1 extracts HIV prevalence data among 15851 respondents from a recent national household survey conducted by the Human Sciences Research Council (HSRC) (Shisana et al., 2005).

		%
RACE	<i>Black</i>	19.9
	<i>White</i>	0.5
	<i>Coloured</i>	3.2
	<i>Indian</i>	1.0
LOCALITY TYPE	<i>Urban formal</i>	13.9
	<i>Urban informal</i>	25.8
	<i>Rural formal</i>	13.9
	<i>Rural informal</i>	17.3

The findings show that in the age group 15-49 years, HIV prevalence rates are substantially higher among people who identified themselves as “black” than among any other racial group. Prevalence rates are also substantially higher among people living in urban and rural informal communities compared to urban and rural formal communities. A meta-analysis of various household surveys conducted in South Africa confirmed these findings (Kleinschmidt et al., 2007).

Table 2. extracts age-stratified data from the above-mentioned HSRC study. These findings show that among men prevalence rates rise sharply from the age of 24 years, and begin to decline from the age of 55 years. Furthermore, these results clearly demonstrate gender disparities in national HIV prevalence rates. The peak age-specific HIV prevalence for women is 25-29 years, five to ten years earlier than the peak for men (30-39 years).

AGE <i>(in years)</i>	MALES		FEMALES	
	%	95% CI	%	95% CI
15-19	3.2	1.4 – 7.1	9.4	7.1 – 12.4
20-24	6.0	3.8 – 9.4	23.9	19.8 – 28.4
25-29	12.1	8.0 – 17.9	33.3	27.7 – 39.4
30-34	23.3	17.2 – 30.7	26.0	21.5 – 30.9
35-39	23.3	17.8 – 29.8	19.3	14.9 – 24.6
40-44	17.5	12.0 – 24.7	12.4	9.4 – 16.2
45-49	10.3	6.5 – 16.0	8.7	6.0 – 12.6
50-54	14.2	8.5 – 22.7	7.5	4.9 – 11.2
55-59	6.4	1.9 – 19.8	3.0	1.6 – 5.6
=>60	4.0	1.9 – 5.2	3.7	2.2 – 6.3

The gender disparities in HIV infection noted above indicates that HIV infection in women between the ages of 20 and 44 years of age is most likely due to having sex with men who are on average between 5 and 10 years older than them, i.e. between the ages of 25 and 54 years of age.

Studies conducted in South Africa (Jewkes et al., in press) and in other sub-Saharan African countries such as Uganda (Kelly et al., 2003) and Kenya (Luke, 2005) have demonstrated that the age differences between women and their male partners is a significant HIV risk factor, caused by transmission from older male partners. Jewkes and colleagues found that it was in relationships marked by substantial age differences (5 years or more) that communication was poorer, and the likelihood of women being able to suggest condom use was lower.

In sum, groups of people within the general population who have increased vulnerability to HIV infection and transmission are:

- *men between the ages of 25 and 54 who have multiple, concurrent younger female sexual partners and women between the ages of 20 and 44 who have older male sexual partners,*
- *people who identify themselves as “black”, and*
- *people who live in urban and rural informal settlements.*

Objective

The aim of this study is to implement an HIV risk reduction intervention among a hard to reach, high risk male population living in an urban informal settlement in Khayelitsha. This study will also test whether the intervention is effective in reducing risky sexual behaviors such as inconsistent condom use and multiple, concurrent sexual partnering among this population by comparing it to a male population living in a rural informal settlement in Khayamandi who do not receive the intervention.

The objective of my role in the foreign study is to participate in the secondary analysis of anonymous data for this study conducted by the Medical Research Council of South Africa in Cape Town. This study is being funded by the Western Cape Department of Health and has IRB approval. Data collection has commenced and all data will be collected by the end of March 2009. Collaborating institutions on this study include the School of Public Health and Family Medicine at the University of Cape Town, Tulane University School of Public Health and Tropical Medicine, and the Centers for Disease Control and Prevention. *My proposed research in Cape Town is consistent with my future work and MPH training at Brown University because some of the data collected may be used to parameterize the simulation models I hope to develop for my MPH thesis project.*

Methods

A pre-post comparison group study design will be employed whereby participants in the intervention and comparison sites will be recruited by means of respondent driven sample (RDS). Respondent driven sampling represents a feasible sampling approach that gains access to hard to reach groups of people by tapping into their social networks (Heckathorn, 2002; Salaganik & Heckathorn, 2004). RDS will therefore be used to recruit men in both study sites. *The recruitment process will continue through a number of recruitment cycles or waves until the required sample size is reached (the sample size required was determined in order to obtain a power of 80% to detect a difference of 10% improvement in condom use with partners over 3 repeated visits, assuming a correlation of $r=0.7$ between the repeated measurements and a loss to follow-up rate of at least 15%).*

At baseline, in both sites, participants will complete a behavioural assessment questionnaire. In Khayelitsha, this will be followed immediately by a one-on-one brief motivational interview (BMI). In both sites, participants who consent will provide a dried blood spot (DBS) for HIV prevalence testing. Those participants wishing to know their HIV status will be provided with voluntary testing and counselling (VCT). In Khayelitsha, participants will be invited to enrol in a small group intervention that will be held once per week for 10 consecutive weeks. At follow-up #1, four months after baseline, participants from both sites will be contacted and reminded to return to the study site where they will complete a second behavioural assessment questionnaire. In Khayelitsha, this will be followed immediately by the second BMI. At follow-up #2, eight months after baseline, participants from both sites will be contacted and

reminded to return to the study site where they will complete the third and last behavioural assessment questionnaire. In Khayelitsha, this will be followed immediately by the third BMI. In both sites, participants who consent will then provide a DBS for HIV prevalence testing. Those participants wishing to know their HIV status will be provided with VCT.

My work will involve analyses performed using RDSAT 5.5 (Heckathorn, 2006, www.respondentdrivensampling.org), which can properly weight network sizes and recruitment probabilities. Once appropriate weights are calculated, RDSAT provides representative estimates and confidence intervals. Detailed, appropriate statistical analysis will be conducted in consultation with Dr. Carl Lombard, Director of the Biostatistics Unit at the MRC and colleagues familiar with RDSAT, and other relevant software packages such as Stata version 9.0 and SPSS 15.0 for Windows. *I hope to be fluent in RDSAT software, with the help of Dr. Carl Lombard, by the end of my time in South Africa and I am already quite comfortable with Stata version 9.0.*

I will also be responsible for evaluating the primary outcome measures of the study.

Primary outcome measures are those that assess

- i. Condom use at last sex with three different types of sexual partners: main, casual and once-off partners.
- ii. Number of sexual partners in the past three months.

The primary outcomes will be measured at three time points: at baseline and at four and eight months.

This study will be the first in South Africa to provide information about men between the ages of 25 and 54 years who live in a rural informal community (Khayamandi) and who have multiple, concurrent, younger female partners. The only other study conducted among men who have multiple, concurrent, younger female partners and employing RDS was conducted in an urban informal settlement (Khayelitsha) in 2006 (Chopra et al., 2007). The results of the current study, which will be descriptive in nature, will provide information about HIV prevalence among men in both sites, their risk behaviors, their practices in seeking out younger and multiple female sexual partners, and their social networks. It will also be used to provide outcome and process evaluation data on the effectiveness, acceptability and feasibility of the risk reduction intervention. *I have also been asked by contacts at the Medical Research Council to be responsible for completing an abstract and literature review to assist with publication (though I am not aware of a particular journal they hope to submit to).*

Relevant Course Work

PHP1070 Burden of Disease in Developing Countries—Fall 2008

PHP2120 Epidemiology—Fall 2008

PHP2510 Biostatistics—Fall 2008

PHP2075 MPH Analytic Internship—Spring 2008

PHP2040 Applied Research Methods—Spring 2008

Project Dates

May 25-August 3, 2009 (10 weeks)

Other Source of Funding

Foreign Studies Fellowship: Airfare to Cape Town: \$2300 (before taxes)

Detailed Budget

Housing:	175 US Dollars per week
Transportation:	120 US Dollars per week
Food:	<u>140 US Dollars per week</u>
Total:	435 US Dollars per week

**Transportation costs are a bit high because the available housing facilities are almost a 40 minute drive from the work facility (with no public transportation that goes to the facility).*

Location Supervisor

Cathy Mathews, School of Public Health and Family Medicine, University of Cape Town

Weekly Activities

Below is my proposed weekly calendar of activities for my research in Cape Town for summer 2009. The Men's Intervention Study is the study described above and I will be assisting with the secondary data analysis of unidentifiable data. The Women's Intervention Study, though not mentioned above, is almost identical to the Men's Intervention Study, but focuses on young women with multiple older male sexual partners. For the Women's Intervention Study I will be helping the team at MRC merely as an observer to gain additional field experience. *The work I have committed to on the Men's Intervention Study will be my first priority and all experiences listed in relation to the Women's Study will only be completed if time allows.*

Week	Date	Scheduled Activities
1	May 25, 2009	<i>Men's Intervention Study:</i> Complete data entry– 2 study sites X 2 nd follow-up. <i>Women's Intervention Study:</i> Refinement of protocol following IRB feedback (if necessary).
2	June 1, 2009	<i>Men's Intervention Study:</i> Clean and merge data. <i>Women's Intervention Study:</i> Refinement of study protocol following IRB feedback (if necessary).
3	June 8, 2009	<i>Men's Intervention Study:</i> Clean and merge data. <i>Women's Intervention Study:</i> Development of intervention materials and manual following feedback from piloting (pre-May 25).
4	June 15, 2009	<i>Men's Intervention Study:</i> Analysis plan for IBB survey data over 3 time periods. <i>Women's Intervention Study:</i> Observing the training of implementers and community meetings.
5	June 22, 2009	<i>Men's Intervention Study:</i> Analysis plan for process evaluation qualitative interviews. <i>Women's Intervention Study:</i> Help with study site selection and readying.
6	June 29, 2009	<i>Men's Intervention Study:</i> Conduct the analysis. <i>Women's Intervention Study:</i> Observe the recruitment of participants into IBB survey using respondent driven sampling (RDS).
7	July 6, 2009	<i>Men's Intervention Study:</i> Conduct the analysis/ Literature review (HIV interventions for adult males). <i>Women's Intervention Study:</i> Observe the recruitment of IBB participants into intervention.
8	July 13, 2009	<i>Men's Intervention Study:</i> Literature review (HIV interventions for adult males). <i>Women's Intervention Study:</i> Observe the implementation of the intervention.
9	July 20, 2009	<i>Men's Intervention Study:</i> Literature review (HIV interventions for adult males)/ Abstracts for papers. <i>Women's Intervention Study:</i> Process evaluation: observation of focus group discussions and individual interviews with intervention participants.
10	July 27, 2009	<i>Men's Intervention Study:</i> Abstracts for papers. <i>Women's Intervention Study:</i> Process evaluation: observation of focus group discussions and individual interviews with intervention participants.

References

- Chopra, M., Townsend, L., Johnston, L., Mathews, C., O'Bra, H., Cloete, K., Shaikh, N., Qotole, M. & Kendal, C. (2007). *HIV prevalence and risk behaviours among sugar daddies in Cape Town*. Paper presented at the 3rd South African AIDS conference, Durban 2007.
- Halperin, D.T. & Epstein, H. (2004). Concurrent sexual partnerships help to explain Africa's high HIV prevalence: implications for prevention. *The Lancet*, 364, 4-6.
- Heckathorn, D. (2006). RDSAT, version 5.5. <http://www.respondentdrivensampling.org>. Cornell University, Ithaca, NY
- Heckathorn, D.D., Semaan, S., Broadhead, R.S. & Hughes, J. (2002). Extensions of Respondent Driven Sampling: A new approach to the study of injection drug users aged 18-25. *Aids and Behaviors*. 6(1), 55-68.
- Heckathorn, D. (2002). Respondent driven sampling II: deriving valid population estimates from Chain-Referral samples of hidden populations. *Social Problems*. 49(1), 11-34.
- Heckathorn, D. (1997). Respondent driven sampling: a new approach to the study of hidden populations. *Social Problems*. 44(2), 174-99.
- Jewkes, R. & Cornwall, A. (n.d.) *Stepping Stones. A training manual for sexual and reproductive health communication and relationship skills*. Gender and Health Group, Medical Research Council.
- Jewkes, R., Dunkle, K., Nduna, M., Levin, J., Jama, N., Khuzwayo, N., Koss, M., Puren, A & Duvvury, N. (in press). Factors associated with HIV sero-status in young rural South African women: connections between intimate partner violence and HIV. *International Journal of Epidemiology*.
- Jewkes, R., Nduna, M., Levin, J., Jama, N., Wood, K., Duvvury, N. et al. (2006). A cluster randomised controlled trial to determine the effectiveness of Stepping Stones in preventing HIV infections and promoting safer sexual behaviour amongst youth in the rural Eastern Cape, South Africa: trial design, methods and baseline findings. *Tropical Medicine and International Health*, 11(1), 3-16.
- Jewkes, R., Nduna, M., Levin, J., Jama, N., Dunkle, K., Wood, K. et al. (2007). *Evaluation of Stepping Stones: A transformative HIV prevention intervention*. Medical Research Council Policy Brief, March 2007.
- Kelly, R.J., Gray, R.H., Sewankambo, N.K., Serwadda, D., Wabwire-Mangen, F., Lutalo, T. & Wawer, M.J. (2003). Age differences in sexual partners and risk of HIV-1 infection in rural Uganda. *Journal of Acquired Immune Deficiency Syndromes*, 32, 446-451.
- Kleinschmidt, I., Pettifor, A., Morris, N., MacPhail, C., Rees, H. (2007). Geographic distribution of Human Immunodeficiency Virus in South Africa. *American Journal of Tropical Medicine and Hygiene*. 77 (6), 1163-1169
- Luke, N. (2005). Confronting the "sugar daddy" stereotype: age and economic asymmetries and risky sexual behavior in urban Kenya. *International Family Planning Perspectives*, 31, 6-14.
- Mah TL, Halperin DT. Concurrent Sexual Partnerships and the HIV Epidemics in Africa: Evidence to Move Forward. *AIDS Behav* 2008; Jul 22 [Epub ahead of print].
- Salganik, M.J. & Heckathorn, D.D. (2004). Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology*, 34, 193-239.
- Shisana, O. Rehle, T., Simbayi, L.C., Parker, W., Zuma, K., Bhana, A., Connolly, C., Jooste, S., Pillay, V. et al. (2005). *South African national HIV prevalence, HIV incidence, behaviour and communication survey*. Cape Town; Human Sciences Research Council Press.
- Statistics South Africa (2001). *City of Cape Town – Census 2001 – Khayelitsha*. Accessed on 25th May 2006 from <http://www.capetown.gov.za/censusInfo/Census2001-new/Suburbs/Khayelitsha.htm>.

UNAIDS (2000). *Guidelines for second generation HIV surveillance*. Geneva: UNAIDS/WHO.

UNAIDS. AIDS epidemic update 2003. Geneva: UNAIDS.

<http://www.unaids.org/Un aids/EN/Resources?Publications/corporate+publications/aids+epidemic+update+-+december+2003.asp>.