Republic of Uganda

UGANDA
HIV Prevention Response and
Modes of Transmission Analysis

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PREVENTION RESPONSE ANALYSIS

Final Report
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Study Team

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David Kaweesa Kisitu, James Okara Wanyama

UGANDA AIDS Commission

UNITING THE WORLD AGAINST AIDS

We encourage countries to know their epidemic because we have learnt over the last twenty five years that the epidemic keeps evolving. It is important for countries to take stock of where, among whom and why new infections are occurring. Understanding this enables countries to review, plan, match and prioritise their national responses to meet these needs.

Dr Peter Piot
Executive Director, UNAIDS

Uganda
HIV Modes of Transmission and Prevention Response Analysis

Study Team

Dr Fred Wabwire-Mangen,[a] Dr Martin Odiit,[b] Dr Wilford Kirungi,[c]
Mr David Kaweesa Kisitu,[d] and Dr James Okara Wanyama[e]

[a] Lead for Task 1 and Lead Consultant
[b] Lead for Task 2
[c] Lead for Task 3
[d] Lead for Task 4
[e] Study Coordinator/Focal Point

This study is the outcome of close collaborative by a team in Uganda, with technical and financial support from the UNAIDS Regional Support Team for Eastern and Southern Africa, and UNAIDS Geneva. The UNAIDS Modes of Transmission model was customized for Uganda, and applied, to better understand pattern of new infections. The model results, together with existing epidemiological data and the conclusions of recently completed studies on the factors driving Uganda's HIV epidemic, are compared with data on HIV funding allocations, to derive recommendations for strengthening Uganda's HIV prevention response. This was part of a set of studies also done in Kenya, Lesotho, Mozambique, Swaziland and Zambia. The other countries focused more on synthesizing existing data and collecting new data to better know each country's HIV epidemic, comparing the epidemic with the national HIV response and funding allocation, also with the aim of improving HIV prevention based on evidence on what works to prevent new infections.

Correspondence Details: Uganda AIDS Commission, P.O. Box 10779 Kampala, Uganda.
Tel: +256-414288065
Email: nadic@uac.go.ug or uac@uac.go.ug
Website: http://www.aidsuganda.org

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Executive Summary

Background and Rational

Uganda's HIV epidemic is severe, mature, generalized and heterogeneous, affecting different population sub-groups. The patterns of transmission of HIV are dynamic and change over time. It is therefore probable that the main risk factors and drivers of the epidemic may have changed over time as evidenced, for instance, by the occurrence of a significant proportion of new infections among discordant couples in union. In order to adapt prevention strategies to changing patterns of risk, we need to regularly monitor the behaviours that put people at risk of infection and how new infections are distributed among risk groups. There is insufficient understanding of the current modes of transmission of HIV in Uganda as well as where and among whom incident HIV infections are occurring. This lack of clear understanding of where new infections are occurring may imply that national HIV prevention plans are not driven by evidence and may result in a mismatch between populations most at need and those that receive the available resources. We therefore conducted a study to describe the current status and drivers of the epidemic; identify the sources of new infections and modes of transmission of HIV in Uganda and review the allocation of prevention resources.

Methods

We used the standard Modes of Transmission methodology as described in the UNAIDS/GAMET guidelines. In brief, we consulted recent reviews of the epidemiology of HIV in Uganda and reviewed recent available data, applied the UNAIDS incidence model to predict the distribution of new infections, used the MoT prevention review tool to describe the current prevention policies and programs and reviewed the current allocation of resources for HIV prevention. We then synthesized the findings from the epidemiologic review with the outputs of the incidence modelling to obtain the "Know Your Epidemic" (KYE) synthesis and the prevention review and resource allocation data to obtain the "Know Your Response" (KYR) synthesis. Finally, the GAMET synthesis process was used to assess whether prevention policies, programs and resources are aligned to the populations in need. The study was implemented by a team of four national experts coordinated by the UAC and the UNAIDS Country Office with technical support from UNAIDS RST. A national Technical Steering Committee provided oversight and a group of epidemiologists and modellers peer reviewed the process.

Findings

Know Your Epidemic (KYE) Synthesis

The HIV epidemic in Uganda is mature, generalized and heterogeneous affecting different population sub-groups and resulting in multiple and diverse epidemics with different transmission dynamics. It is estimated that the overall national HIV prevalence rate was 6.4% in 2005 among men and women aged 15 – 49 years (MoH 2006) and that there were a total of 915,400 people living with HIV and AIDS by December 2005 of whom 530,932 (58%) were women and 109,000 (12%) were children under 15 years (Hladik et. al. 2008). There were an estimated total of 135,300 people newly infected with HIV in 2005 and 76,400 deaths due to AIDS occurred in the same year. The latest UNAIDS Report on the Global AIDS Epidemic (UNAIDS 2008) estimates 940,000 (range 870,000 – 1,000,000) PLWHA in Uganda by December 2007.

The epidemiology review indicates that the previously heralded decline in prevalence from a peak of 18% in 1992 to 6.1% in 2002 may have ended. There is stabilization of prevalence between 6.1 and 6.5% in some ANC sites and even a rise in others. This is accompanied by deterioration in behavioural indicators especially an increase in multiple concurrent partnerships. There has also

been a shift in the epidemic from spreading mainly in casual relationships to also seeing a large proportion of new infections in people in long-term stable relationships. Data from the two population-based longitudinal cohort studies in Uganda i.e the Medical Research Council (MRC) cohort and the Rakai Health Sciences Project (RHSP) cohort show that HIV prevalence and incidence rates might be rising in some population sub-groups in Masaka and Rakai (Shafer et al. 2008; Lutalo et al. 2007).

Incidence modelling reveals that of all new HIV infections in adults (15-49 years) in 2008, 43% were among people in discordant monogamous relationships in the past 12 months while 46% were among persons reporting multiple partnerships and their partners. Commercial sex workers, their clients and partners of clients contributed 10% of new infections. MSM and IDU contribute less than 1%. Mother to child transmission is estimated (using Spectrum) to have contributed about 20,500 new HIV infections. In all (including incidence through MTCT), 37% of infections (adults and children) are attributable to multiple partnerships, 35% occurred within discordant monogamous couples, 18% were due to mother to child transmission while 9% arose in commercial sex networks. There has also been a shift in concentration of the epidemic from younger to older individuals with the highest prevalence for men being among 35 – 39 year olds (9.9%) while for women it is among 30 – 34 year olds (12.1%). Based on the review of the epidemiology of HIV (especially drawing on the analysis undertaken in preparation for the new national strategy – UAC 2006), the risk factors and contextual factors driving the HIV epidemic in Uganda are summarized in the table below.

Summary of Risk Factors and Contextual Factors Driving the HIV Epidemic in Uganda

Risk Factors for HIV Transmission	Contextual factors of the HIV/AIDS Epidemic
• Multiple partners • Discordance and non-disclosure • Lack of condom use • Transactional sex • Cross-generational sex • Presence of HSV-2 & STIs • Intact foreskin • Alcohol and drug use • Behavioural disinhibition due to ART	• Socio-cultural factors • Wealth and Poverty • Low status of women and girls • Human rights, Stigma and discrimination • Inequity and access to prevention, care and treatment

Know Your Response (KYR) Synthesis

The prevention review revealed that **national policies and technical guidelines f**or key HIV prevention services are available, evidence-based and are regularly updated -- particularly for the biomedical services of Prevention of Mother To Child Transmission (PMTCT), HIV/AIDS Counselling and Testing (HCT), condom promotion, blood safety, Sexually Transmitted Infection (STI) treatment, medical infection control and post HIV exposure prophylaxis, and for HIV education in schools. There are national targets and roll out plans for most of these interventions. Uganda's current HIV prevention strategy comprises a comprehensive package of multiple integrated prevention interventions targeting either the general population or specific high risk groups. However, the review found that there are no clear guidelines and policies guiding Information Education Communication (IEC), mass media, behavioural change interventions, targeted services for Most-At-Risk Populations (MARPs) and programmes addressing environmental interventions for HIV transmissions such as Sexual and Gender Based Violence

(SGBV), livelihood support for HIV prevention etc. The role of safe medical circumcision in HIV prevention is well recognised but no policy exists as yet.

Regarding **coverage of prevention interventions,** the review noted that there is a recent increase in coverage of some key prevention services, notably HCT and PMTCT. For instance, the proportion of adults who have ever tested and received their HIV test results increased from 4% in 2000/01 to 11% in 2004/05 and 21% in 2006. A review of articles related to HCT indicates that the coverage of voluntary HIV counselling and testing (VCT) can be improved by using alternative VCT models such as mobile VCT, routine offer of VCT and home-based VCT (Matovu & Makumbi 2007). The number of women receiving PMTCT services increased from virtually none in 2001 to 419,171 in 2007. However, despite Uganda's commitment to accelerate HIV prevention, many people still do not have access to key HIV prevention services. For example: over 75% of adults do not know their HIV sero-status; over 50% of pregnant women cannot access PMTCT service; there are few outreach programmes for MARPs and vulnerable populations; only about one-half of risky sex acts are protected using condoms. Although STI services have been integrated into PHC and are available in 60% of PHC facilities, their quality is still low with less than half of clients being appropriately diagnosed and managed, and there are chronic shortages of STI drugs. Furthermore, in-school and out-of-school youths are not adequately covered by HIV/AIDS education.

Another finding was the **lack of adequate strategic information on coverage** of most HIV prevention services. While sufficient data are available for periodic national outcome and impact evaluation, there are major gaps, especially in knowledge of the size of population groups and corresponding coverage of key prevention services. Process and output level indicators essential for monitoring coverage of programmes are available for biomedical interventions but not for behavioural interventions. This strategic information is necessary to guide performance and identify persistent problems.

Allocation of HIV spending: A total of US $ 234,348,403 was estimated to have been spent on the national response, of which US $ 78,862,351 was spent on HIV prevention interventions in 2006/07. Most funding was from bilateral sources, with Government of Uganda contributing 6% of all resources for the national response. PEPFAR was the major source of funding for prevention interventions, providing 61%. UNICEF provided 5.4%, UNFPA provided 4.6% and DFID provided 3.9%. The greatest proportion of HIV prevention resources are spent on HIV Counselling and Testing (HCT) which accounts for 25%, followed by BCC/Mass Media/ IEC and condom promotion (each nearly 20%) and PMTCT (16%). The greatest effort in prevention is focused on delivery of HIV prevention services which benefit the general population, with biomedical interventions accounting for 48% of the expenditure and 52% being spent on community and behavioural interventions. These spending allocations require to be reviewed because behavioural and community interventions are likely to have the greatest impact in preventing new HIV infections.

Resources for prevention as a proportion of national HIV/AIDS spending increased from 13% in 2003/4 to 17% in 2005/06 and then doubled to 33.6% in 2006/7. However, prevention expenditure for 2006/7 includes HCT interventions, whereas in previous years HCT was categorized as care and treatment. When HCT is excluded, then spending on prevention amounted to US $ 59,217,982 – still an increased share, at just over 25% of total spending on the national response. The initiation of ART interventions in 2003/4 and the subsequent treatment expansion under the "3 by 5"

campaign and push for universal access to ART appear to have shifted attention to care and treatment and reduced the focus on prevention.

Linking the Epidemic to the Response (KYE-KYR) Synthesis

Whereas Uganda has policies and guidelines for many prevention interventions, there is a mismatch between the epidemiology, policies and programs and resource allocation. Despite the evidence on the risk factors and drivers of the epidemic, there are no policies targeting MARPS, circumcision or contextual factors. It is also crucial to note that there are no programs or funding that target concurrent partnerships or marital or co-habiting partnerships especially discordant couples. Funding is not targeted to prevention with positives (there is considerable funding for ART and care).

The KYE and KYR synthesis shows that the greatest need for HIV prevention exists among people with multiple partners whether in casual or long-term martial or cohabiting relationships. Programs such as HCT, IEC/BCC, and condom use targeting the general population cannot be assumed to be sufficient for married or cohabiting couples. Furthermore, the delivery strategies for these interventions do not favor married or cohabiting couples. There is no funding for programs targeting married and cohabiting couples specifically. Secondly, HIV prevention programmes for MARPs (Commercial Sex Workers and their clients, Fishing Communities etc) are poorly funded.

Recommendations

Policy level Recommendations
1. Institutionalize the KYE-KYR MoT methodology in UAC and MoH operations
2. Develop a national policy for the roll-out of safe medical male circumcision
3. Strengthen policies and guidelines for HCT, IEC/mass media, and behaviour change interventions targeting married/cohabiting couples, PLWHA and MARPs
4. Define and implement policies for environmental, societal and other contextual factors
5. Develop guidelines and mechanisms for regular tracking and reporting of resource allocations, disbursements and spending for the national response

Programmatic Recommendations
1. Re-align prevention programmes and resources to the populations most in need
2. Strengthen efforts to prevent HIV transmission from HIV-infected people to their partners.
3. Scale up HIV couple counselling, testing and disclosure of test results
4. Government should invest more of its own resources into the national HIV/AIDS response

Recommendations for Strategic Information Needs
1. Strengthen the National AIDS Documentation Information Centre (NADIC) at UAC and the Resource Centre at MoH for information storage
2. Strengthen M&E systems for provision of better quality programme data
3. National Surveys that provide information on the national HIV/AIDS response (eg. AIS, NASA, DHS) should be conducted regularly and in a coordinated manner
4. A KYE-KYR Modes of Transmission Study should be conducted after the findings of the AIS and NASA surveys are available to help keep track of the changing HIV/AIDS epidemic in the country

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Acronyms and Abbreviations

ABC	Abstinence, Being faithful among those married or co-habiting and Condom use
AIDS	Acquired Immune Deficiency Syndrome
ANC	Ante-natal Care
ART	Antiretroviral therapy
BCC	Behavioural Change Communication
CSW	Commercial Sex Worker
EPP	Estimation and Projection Programme
FGDs	Focus Group Discussions
GAMET	Global AIDS Monitoring & Evaluation Team of the World Bank
HIV	Human Immuno-deficiency Virus
HSV	Herpes Simplex Virus
IDU	Intravenous drug users
KYE	Know Your Epidemic
KYR	Know Your Response
LL	Log Likelihood
MM	Mutually Monogamous heterosexual sex
MoH	Ministry of Health
MoT	Modes of Transmission
MP	Multiple partnership
MRC	Medical Research Council
MSM	Men who have sex with men
NGO	Non-Governmental Organization
OVC	Orphans and other Vulnerable Children
PY	Person Years of observation
RCCS	Rakai Community Cohort Study
RHSP	Rakai Health Sciences Programme
RST	Regional Support Team
SGBV	Sexual and Gender-Based Violence
STD	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
TSC	Technical Steering Committee
UAC	Uganda AIDS Commission
UHSBS	Uganda HIV/AIDS Sero-Behavioural Survey
UNAIDS	Joint United Nations Programme on HIV/AIDS
VCT	Voluntary Counselling and Testing
WHO	World Health Organization

Operational Definitions

Incidence: new infections per population at risk in a specified period of time

Prevalence: the total number of cases of HIV at a point in time per base population

Commercial Sex Worker: person who exchanges sex for money or other items as an occupation

Casual Heterosexual Sex: sex with a non-regular, non-cohabiting partner during the last 12 months

Most-At-Risk Populations (MARPs): Populations in whom there is a concentration of risk behaviours for HIV transmission (notably: unprotected sex with multiple partners, anal sex, needle-sharing) that may then drive the majority of new infections; may include commercial sex workers and their partners, long distance truck drivers, fisher folk, uniformed services, men who have sex with men (MSM) and injecting drug users (IDU)

Transactional Sex: is defined as sex in exchange for money or other items in which the person providing sex does not regard her/himself as a sex worker; it may involve exploitation when the sexual partner is in a vulnerable socio-economic situation

Cross-generational Sex: is defined as sex with a much older partner (an age gap of 10 years or more is usually considered "much older"); in most cases it involves an element of exploitation due to economic and social vulnerability

Sexual Abstinence: The avoidance of sexual intercourse as well as any genital contact or genital stimulation

Risk: the probability that a person may acquire HIV infection

Risk Factor: an aspect of personal behaviour or life-style or an environmental exposure which on the basis of epidemiological evidence is known to be associated with HIV transmission or acquisition

Drivers: the structural and social factors, such as poverty, gender inequality and human rights violations that are not easily measured which increase individuals' vulnerability to HIV infection (UNAIDS 2007b. Other sources define drivers as the main factors resulting in new infections.)

Vulnerability: results from a range of factors that reduce the ability of individuals and communities to avoid HIV infection

CHAPTER 1. INTRODUCTION AND METHODOLOGY

1.1 Introduction

Background to the MoT Study

Since the identification of the first AIDS cases in Uganda in 1982 (Serwadda 1985), HIV has spread throughout the country resulting into a severe, mature, and generalized epidemic. It has evolved into a heterogeneous epidemic affecting different population sub-groups in Uganda, resulting in multiple and diverse epidemics with different transmission dynamics. As the epidemic evolves, it is important to continuously assess transmission patterns and identify population sub-groups in which new infections are occurring, and understand the risk behaviours for transmission. This enables HIV prevention programs to target the population sub-groups and behaviours that are most important for preventing new infections. The modes of transmission methodology which has recently evolved out of the UNAIDS and World Bank Global AIDS M & E Team (GAMET) Know Your Epidemic and Know Your Response initiatives attempts to provide the evidence base for effective planning (UNAIDS 2007a).

The Modes of Transmission (MoT) Study in Uganda is part of a multi-country study conducted also in Kenya, Lesotho, Mozambique, Swaziland and Zambia. The process involves a desk review or secondary analysis of existing data to determine the epidemiology of incident HIV infections in each country and assess the degree of alignment between where the new cases of HIV are occurring, on the one hand, and the country's prevention policies, programs and resources on the other. The aim is to contribute to an improved understanding of the epidemic and thus help countries become more systematic, strategic and effective in their approach to prevention. The broad goal is to strengthen capacity for systematic synthesis and use of data in prioritization and planning the national HIV response. This process is supported by UNAIDS, in collaboration with the World Bank, UNFPA and the National AIDS Councils in the 6 countries.

Rationale of the Study

The Modes of Transmission (MoT) study is a unique opportunity for Uganda to analyze national evidence of where, in what context and which population groups most new HIV infections are occurring, and conduct an assessment of current allocation of prevention activities and resources to populations most in need. This will test the hypothesis that Uganda is targeting those with increased risk for HIV infection and will help ensure a stronger and more effective national prevention strategy that is evidence-driven. This is expected to have an impact on the HIV epidemic in Uganda. The fundamental question that the MoT study will answer is whether HIV prevention programmes and resources are aligned with the HIV prevention needs. Patterns of transmission of HIV are dynamic and change over time. In order to adapt prevention strategies to changing patterns of risk, we need to regularly reassess behaviours that put people at risk of infection and how new infections are distributed among risk groups. The results of this analysis will form the basis of the development of cost-effective HIV prevention strategies.

The development of the 2007/08 – 20011/12 National Strategic Plan of Uganda has been cited as the most evidence-based, participatory and iterative process in the country's history. The choice of interventions was based on a detailed analysis of the cost-effectiveness of the available interventions. However, there was minimal information available on where the new infections were expected to occur and on the alignment of the prevention programs and resources with where those infections were occurring. The MoT Study provides more detailed information on the epidemiology of new infections and on the alignment of resources to those most in need. It

also provides a useful methodology for generating the evidence base for future national plans and thus strengthening prevention planning, resource allocation and use of data in decision-making.

Hypothesis

Some countries that have reported success in accelerating access to care and treatment are failing to make comparative progress in scaling up prevention. Furthermore, **prevention resources are not always targeted to those populations most in need i.e. where the new infections are occurring.** This is the result of a lack of rigor in reviewing the evidence for decisions on prevention strategies, insufficient understanding of the modes of transmission of HIV and the epidemiology of incident HIV infections, and the lack of a reliable method of estimating incidence from prevalence data at the national level. There is thus poor application of evidence to guide policy makers on how to align national prevention resources with populations most in need of HIV services. This is particularly important in mature HV epidemics like in Uganda, where risk factors and drivers of the epidemic might have changed over time, for instance, a significant proportion of new infections might be occurring among discordant couples in union rather than in casual partnerships as was the case early on in the epidemic. There is therefore a need to conduct a study that will describe the current modes of transmission of HIV in Uganda, identify the source of new infections and review the allocation of prevention resources.

Populations most in need of HIV prevention resources are those that are most at risk for HIV infection. Because of the difficulties in estimating incidence at the population level, factors that increase the risk for new infections and therefore drive the epidemic may not be clearly understood. This lack of clear understanding of where the new infections are occurring may imply that national HIV prevention plans are not driven by evidence and that there is therefore a mismatch between populations most at need and the allocation of resources and focus of programmes. Our hypothesis for this study was that the analysis of incidence would indicate some mismatches in the allocation of resources for prevention and yield suggestions for strengthening Uganda's prevention response.

Study Objectives

The overall objective of the modes of transmission study was to assist Uganda to align its HIV prevention efforts with the best available knowledge of where new cases of HIV are occurring.

The specific objectives were to:

1. Summarize available data on HIV incidence, prevalence and related behaviours stratified by sub-population and geographic location, to characterize Uganda's epidemic.

2. Apply the UNAIDS Incidence Model to generate expected distributions of new infections by mode of transmission.

3. Review current HIV prevention policies, programmes and strategic information by government, civil society and the private sector.

4. Analyse current prevention resource allocation and use, to identify any gaps between current efforts and the priorities implied by the analysis performed in objectives 1 – 3.

5. Identify appropriate recommendations regarding HIV prevention policy, programmatic actions and resource allocation for more effective national HIV prevention

Purpose of the MoT Synthesis Report

This synthesis report is a result of an analysis, combination and integration of the emerging themes arising from each of the 4 different components or tasks of the modes of transmission study. Its primary purpose is to answer the question of whether HIV prevention policies, programs and resources are aligned to those populations where the new HIV infections are occurring. Secondly, it will be used to highlight the need for detailed understanding of the HIV epidemic in Uganda specifically, knowledge of the modes and patterns of transmission, drivers of the epidemic and populations that are most at risk for new infection in order to target HIV prevention interventions to those who need them most. The ultimate outcome will be the use of strategic information by government, civil society and the private sector in HIV prevention programming. It is thus anticipated that the report will be most useful to the Uganda AIDS Commission, the Ministry of Health, AIDS Development Partners, Civil Society and other stakeholders in the national response to the HIV/AIDS epidemic.

Structure of the Synthesis Report

This introductory chapter provides the background, rationale and objectives of the modes of transmission study, and notes the purpose of the synthesis report and the target audience that is expected to benefit from it. It also details the methodology and process used, and explains the challenges encountered during the conduct of the study.

Chapter 2 summarizes the Know Your Epidemic findings from the epidemiology review (Wabwire-Mangen 2008) and the incidence modelling, which describe the status of the epidemic in Uganda with emphasis on the high risk and vulnerable populations and the source of new infections.

Chapter 3 is about the Know Your Response findings which are the outcomes of the prevention program and resource use reviews.

Chapter 4 synthesizes all the parts of the study using a set of questions developed by the MoT UNAIDS/GAMET Regional Support Team. These questions assess the alignment of the prevention resources to the policies and programs; to the drivers of the epidemic and to where the new infections are expected to occur.

Chapter 5 provides recommendations on how these findings can be integrated into policy and practice, how the MoT process can be institutionalized and what changes are required for future MoT studies. Recommendations are made for policy and programme levels as well as for strategic information needs.

1.2 Overview of the Process

In-country planning and partnerships

A team of 4 national consultants was constituted and provided with detailed terms of reference and guidance documents for the assigned tasks. The team included an epidemiologist to review the epidemiology of the HIV epidemic in Uganda (Task 1); an epidemiological modeler to estimate the source of incident infections using the UNAIDS incidence model (Task 2); a prevention specialist to conduct a review of the current HIV prevention policies and programs (Task 3) and a resource analyst to review HIV prevention resource allocation and use in the national response (Task 4). The national team was oriented to the terms of reference, the tasks to be performed as well as the expected deliverables during the first meeting with the Technical

Steering Committee by the UNAIDS Country Office and the Uganda AIDS Commission. One of the consultants, Dr Martin Odiit, had fortunately attended the Regional MoT planning meeting and orientation to the MoT process. It was emphasized from the outset that this study was a partnership between the Uganda AIDS Commission, the Ministry of Health, the UNAIDS and the national stakeholders in the HIV/AIDS response.

Leadership and coordination
The MoT Study in Uganda was led by the Director of Planning at the Uganda AIDS Commission and co-ordinated by a National Programme Coordinator at the UNAIDS Country Office. The UNAIDS Country Coordinator was also involved in overseeing the entire process and participated in consultations with the study team. A national Technical Steering Committee (TSC) was constituted by the national HIV/AIDS prevention committee to guide the team of consultants and oversee the implementation of the study on its behalf. It comprised:

- Representatives from the Uganda AIDS Commission
- Representatives from the Ministry of Health
- Members of the prevention technical working group for development of the HIV/AIDS National Strategic Plan
- Representatives of the national HIV/AIDS prevention committee
- Representatives from the Uganda Bureau of Statistics
- Representatives from UN agencies and development partners, including their contractors (e.g. USG, CDC)

Technical support and capacity-building
Technical support for the MoT Study was provided by the UNAIDS Country and Regional offices as well as the World Bank GAMET Team through regional and country meetings, email exchanges and conference calls. Uganda was fortunate to host the HIV/AIDS Implementers' meeting in June 2008 which provided an opportunity to consult with RST and GAMET staff especially on the synthesis process and development of recommendations.

The MoT Study team, with the approval of UAC and UNAIDS, constituted a peer consultation team to review the process and outputs from the incidence modelling. The peers were selected for their experience with modelling and monitoring the HIV epidemic. They included epidemiologists and modellers from the CDC Uganda, the research collaborations, the Department of Mathematics and the Makerere University School of Public Health. Their comments (via email and in-person) were very useful.

The process of implementing the MoT Study provided a great opportunity for the national team of consultants to build capacity to conduct an assessment of this magnitude. The technical consultations with the UNAIDS Know Your Epidemic Team and the World Bank GAMET Team further enhanced the team's capacity.

Implementation process and deliverables
Although each team member was assigned an individual task, the team agreed that the tasks were inter-related and therefore required a coordinated and integrated effort. The team met weekly to review work accomplished since the last meeting and plan tasks for the next week. During these meetings progress was presented by each team member and emerging trends discussed and agreed. It was quickly realized that the incidence modelling was the core task of the assignment and it determined the direction the other tasks should follow. Task 2 was thus focused on initially

until consensus had been reached on the input data, the model outputs and the pattern of new infections. This was then used to guide the other tasks. The other tasks utilized mainly document reviews to achieve the terms of reference. Sources of relevant documents for review were identified through consultations with key policy and program staff as well as using internet-based search of retrievable sources and websites. Sources included the Uganda AIDS Commission, the Ministry of Health, UNAIDS, WHO World Bank, USAID and peer-reviewed journals accessed via Medline, and well-researched unpublished reports. Information from these documents was analyzed and emerging themes highlighted. Other methods used included secondary data analysis and key informant interviews where indicated.

The study deliverables included an inception report 4 weeks after the initiation of the study, 4 task reports (one each for the epidemiology review, the incidence modelling, the prevention review and the resources review) and this synthesis report summarizing the material presented in more detail in the four task reports, with appropriate recommendations for HIV prevention in the next phase of HIV prevention in the country. These were delivered at time points agreed upon in the inception report.

1.3 Methodology

Epidemiology Review

The main method used was analysis of peer-reviewed published and grey literature. Peer reviewed journal articles were sourced electronically using search engines (Google, PubMed and Medline) as well as other internet-based databases, and websites of major organizations working on HIV/AIDS were browsed for literature relevant to the epidemic in Uganda. Where data from Uganda were not available, regional data were used.

Principal investigators and senior researchers working with the major research collaborations and key experts with HIV/AIDS programs were identified and interviewed as key informants. They were asked about additional data sources on specific topics and for any unpublished literature or papers in press. We were successful in obtaining lists of publications from the research organizations and official reports from the major HIV/AIDS programs.

For the epidemiologic review, secondary data analysis was limited to the ongoing analysis of the Uganda HIV Sero-behavioural Survey (UHSBS) data and the Spectrum estimates of HIV indicator data performed by the Ministry of Health. The major sources of data for the epidemiologic review were the UHSBS, the Demographic and Health Surveys, the Rakai Health Sciences Program and the Medical Research Council longitudinal cohort studies as well as data routinely collected from the ante-natal clinic sentinel surveillance sites.

Incidence Modeling

An excel spread sheet model developed by UNAIDS was applied to estimate the number of new infections by mode of transmission (UNAIDS 2007a). The model assumes that the risk of infection in a susceptible individual is a simple binomial function of the number of partners and number of contacts with each partner i.e. the risk of infection of an uninfected person is derived by combining the risk due to his/her number of partners with the risk due to the number of contacts with each partner. The risk per susceptible individual which depends upon current prevalence within their contacts is then derived taking into account the transmission probabilities in the presence or absence of sexually transmitted infections. By multiplying this by the number

of susceptible individuals at risk in the population, the expected incidence for the coming year is obtained (UNAIDS 2007a). The adult population is divided into specific risk groups:

1.   Individuals in mutually monogamous heterosexual sexual relationships (MM)
2.   Individuals reporting multiple partners (MP)
3.   Partners of individuals reporting multiple partners (PMP)
4.   Sex workers (SW)
5.   SW clients
6.   Partners of SW clients
7.   Medical injections
8.   Blood transfusions
9.   Men who have sex with men (MSM)
10. Female partners of MSM
11. Injecting drug users (IDU)
12. Partners of IDUs
13. No recent risk

Definitions: *Mutually monogamous heterosexual sex* (MM) refers to sex during the last 12 months that occurred with only one partner, in which case the only risk of HIV infection would be through discordance due to infection that occurred over 12 months ago. The mutually monogamous sex risk group is calculated in the model by subtracting the populations belonging to the other risk groups. A commercial *sex worker* was defined as some one who reported exchanging sex for money during the past 12 months. *Clients of sex workers* were defined as persons who reported having paid for sex during the past 12 months. The *multiple partnerships group* is the population that reported sex in the last 12 months with more than one partner minus the population of women that reporting exchanging sex for money and the men that reported paying for sex. In the Uganda Demographic and Health Survey (UDHS) 2006, it is reported that 28.7% of the men and 2.4% of the women aged 15 to 49 years reported multiple partnerships during the 12 months before the survey. The sub population of women that reported sex work was reported as under 0.5% in the Uganda Serobehavioural Survey. In the UDHS 2006, 2.9% of men reported having paid for sex. *No recent risk* were those who reported no sex and no injecting drug use in the past 12 months.

The main data sources used were the Uganda Demographic and Health Survey in 2006, the Uganda HIV/AIDS sero-behavioural survey 2004/05, hot spot mapping studies of commercial sex work, and studies of HIV transmission probabilities by the Rakai Health Sciences Programme. The analyses were preformed in two spreadsheets: the first to assess the distribution of new infections in the overall adult population, including high risk and general populations; and the second to further categorize new infections among those people in the general population who are at risk through casual or mutually monogamous heterosexual sex, by age and gender.

Prevention Review

The prevention programme review was mainly based on systematic review of published and grey literature comprising official programme documents and reports, national HIV prevention policies, technical guidelines, strategic and roll-out plans. Monitoring and Evaluation reports and databases where available were also reviewed, including published and online programme documents and other publications. The review focussed on key prevention interventions, their target, scope and coverage, outputs and outcomes (if known), duration, funding sources and major constraints.

To augment the literature review, key informant interviews and field visits to selected programmes for which documented data were lacking were conducted by a team of five field research assistants with experience in programme monitoring and evaluation who were hired to collect this information, using a standardised checklist. Further information was also collected in various meetings and conferences including presentations at the National AIDS Conference at Munyonyo in March 2008, the MoH ACP planning meeting in Jinja in May 2008, the meeting between MoH and PEPFAR to review the US President's Emergency Plan for AIDS Relief (PEPFAR) semi-annual report in May 2008 and the International HIV/AIDS Implementers Meeting that was held in Kampala, June 2008.

For this review, HIV prevention interventions were categorised by type of intervention while at the same time highlighting the beneficiary groups. The categories were adopted from the UNAIDS MoT study guidelines, as modified later by the UNAIDS Regional Support Team. The categories are not mutually exclusive and have some inevitable overlap. The prevention categories were:

   i.   Mass Media and Information, Education and Communication (IEC)
   ii.   Behavioural Interventions (Social mobilization, Peer education, Life skills and sexuality education, Risk Reduction)
   iii.   Condom promotion including social marketing of male and female condoms
   iv.   Sexually Transmitted Infections (STI) treatment,
   v.   HIV Counselling and Testing (HCT)
   vi.   Prevention of Mother-to-Child HIV transmission (PMTCT)
   vii.   Blood transfusion safety
   viii.   Universal Precautions for infection control in health facilities
   ix.   Medical circumcision
   x.   Environmental Interventions e.g. reduction of sexual violence, livelihood support, medical legal services and legal protection,
   xi.   Other Prevention Services e.g. Targeted services for sex workers, long distance truckers, fisher folk, other most-at-risk population (MARPs) groups, Sexual and Reproductive Health (SRH), Youth Friendly Reproductive Health (YFRHS), Work place-based HIV prevention programmes, HIV Prevention among HIV-infected individuals, family centred HIV Prevention Services, programmes for IDUs and MSM.

For each intervention, we reviewed the existing national policies and technical guidelines, the main programmes by sector (public, CSO/NGO and private), the scope and coverage of their activities and target population and overall achievements at the national level, as well as challenges and constraints. We also reviewed data on the effectiveness of the interventions from published peer-reviewed articles as well as the reports of the epidemiology review (task 1) and the incidence modelling (task 2) for evidence of the source of new HIV infections and assessed the alignment of existing prevention efforts in the country with the emerging evidence on HIV transmission dynamics. This formed the basis of recommendations on the focus of HIV prevention in the next phase of HIV control in the country.

Resources Review

The review of the resources for HIV prevention covered the 2006/07 financial year and focused on service delivery which contributes to reduction in new infections. The review covered the multiple funding modalities including: project-based funding, budget support to the Ministry of Finance, Planning and Economic Development (MOFPED), Line Ministries and to implementing

organisations, basket funding to the HIV/AIDS Partnership Fund and Civil Society Fund as well as technical support.

A desk review was carried out of published and grey literature, secondary data analysis, documentation of HIV/AIDS budgetary allocations, disbursement and expenditure data for the financial year 2006/2007. A joint questionnaire was developed, and used to collect prevention programme data and financial expenditure information from key informants of major prevention programmes in Uganda. After completion of data collection and analysis, a meeting of AIDS Development Partners was convened to cross-check and validate the financial expenditure data obtained.

Data from previous assessments, namely the National AIDS Sector Spending Assessment (NASA) of 2005/6 and the UNGASS resource review of 2006/7 were utilized to establish total spending for the national response. To avoid double counting, information from the source of funding was given priority over information from the implementing partners. Information from the implementer was considered only if it was not provided by the funding source. To harmonize the fiscal years of the Government of Uganda financial year (which runs from July to June) and for the AIDS Development Partners, the average expenditure for the two calendar years 2006 and 2007 was considered.

The prevention categories in task 3 above were adopted for the resource review and these formed the basis of the analysis of the resource spending for prevention. For each intervention, an aggregated total of expenditure from all funding sources was considered.

Synthesizing the MoT Findings

A retreat was held (over two days) to synthesize the modes of transmission study findings. Participants included the 4 task lead consultants as well as the UNAIDS National Program Officer. The retreat began by reviewing and distilling the key emerging messages from the four tasks. A set of synthesis questions was developed and used to distill the messages. The HIV prevention mind-map technique was used to generate a synthesis matrix and identify the gaps in the national response (see Appendix II for the synthesis questions and matrix). The structure of the synthesis report was agreed upon and writing assignments made. The first draft of the synthesis report was reviewed internally by the team of consultants, the UNAIDS Program Coordinator, the UNAIDS Country Coordinator as well as the UAC and MoH prior to submission to the Technical Steering Committee for comments and discussion. A Technical Steering Committee meeting was convened specifically to discuss the synthesis report.

1.4 Challenges Encountered

The epidemiology review indentified a plethora of data describing the epidemiology of HIV in Uganda from various sources including published and unpublished literature, program reviews and M & E reports. The challenge was to identify and present data that was relevant to the assignment and that could contribute to an understanding of the source of new infections, the sub-groups where the infections were concentrated and the drivers of the epidemic. To overcome this challenge, information emerging from the incidence modelling was used to focus the epidemiology review and harmonize both tasks. There was also a challenge in judging the quality of data from the different sources especially the unpublished program reports. We were

guided by the criteria in the MOT guidance document for country teams which emphasize an assessment of key aspects of the methodology and the source of the publication.

The HIV incidence model uses crude groupings of the population according to their main exposure to HIV infection. The results are only as good as the data entered to estimate the size of the group, the current distribution of HIV and other sexually transmitted infections, and the risk behaviours of those within the groups. Even with reliable estimates, the model does not take account of the distribution of behaviours within the risk groups, the patterns of mixing by demographic, social, geographic and economic variables and the influence of specific sexually transmitted diseases. Therefore it cannot generate accurate predictions without a full description of these many complexities. Nonetheless, it does allow the user to identify where most new HIV infections occur and the relative orders of magnitude of new infections within risk groups. Further, it allows programmes to see the type of data required, even for crude predictions. The coverage and focus of the interventions can also be explored and the benefits of both increased coverage and efficacy can be illustrated.

In addition to limited availability of data for CSWs, IDUs and MSMs, the quality of the data collection as well as measurement procedures affects the accuracy of the estimates. For example, women who say that they received money, goods, or favours in exchange for sex in population based surveys cannot be assumed to be or to consider themselves to be sex workers. Data on age mixing in heterosexual relationships were not detailed enough.

The main limitation to the HIV prevention review component of the study was accurate descriptions of coverage of various HIV prevention interventions, especially in the light of limited strategic information for programme outputs and processes. While data on intermediate outcomes and impact of programmes are available for most interventions from population-based, health facility-based surveys, surveillance programmes and mathematical modelling, programme outputs and processes are not usually consolidated by the existing M&E programmes, except for biomedical interventions. For rather diffuse interventions such as IEC mass media, behavioural interventions, environmental interventions etc, this was particularly challenging. The other challenge was delineating the extent to which the so-called underlying factors for HIV transmission such as gender disparities, war and insecurity, poverty, socio-cultural issues etc, and relevant interventions could be counted as HIV prevention rather than specific interventions in their own right. Furthermore, due to limited resources, data also were not collected systematically from sub-national level such as districts or workplaces. It was therefore not possible to describe the coverage of small scale programmes especially in peripheral areas. In addition, although extreme efforts were taken to avoid duplication in programme data -- for instance where the same programme outputs were counted both as donor outcomes as well as outcomes of programme implementers, some duplication may have remained. Lastly, although programme descriptions were based on the type of intervention, some overlaps remained. For instance, all programmes require IEC/BCC and HCT is essential not only for ART programmes, but also for PMTCT, HIV prevention among positives etc.

For the resource review, the major challenge was the absence of a routine system of tracking, monitoring and reporting on spending for the national multi-sectoral response to HIV/AIDS. Expenditure data are scattered in the different implementing organizations/funding sources, and presented in different formats. The funding of the national response is also increasingly taking the approach of mainstreaming and integrated programming. This presented challenges in disaggregating expenditure by the agreed prevention categories. The Government of Uganda

(GOU) funding for the national response is also decentralised and is part of the primary health care conditional grant. The scope of the study did not include generation of primary data on spending at the decentralised level. Therefore estimates of GOU spending at the national level were based on the levels documented in the previous assessment.

Overlap among prevention categories also presented challenges for assigning expenditure to a particular intervention category. This was particularly the case with mass media and Information Education and Communication (IEC) and behavioural change communication Interventions. The same also applied to the sexual and reproductive health category and to adolescent friendly sexual reproductive health.

The confidentiality attached to resource expenditure also presented challenges in accessing financial data. When information was made available, it was not presented in the format or with the details required by the study. This presented difficulties in teasing out allocations especially to similar or overlapping categories. Detailed expenditure by beneficiary population and by production factors was also difficult to come by.

CHAPTER 2. KNOW YOUR EPIDEMIC (KYE) SYNTHESIS

2.1 Status of the Epidemic

Phase, magnitude and potential of the epidemic

WHO and UNAIDS classify HIV epidemics into 4 main groups, depending on the HIV prevalence and major modes of transmission (UNAIDS 2007b). In a *low grade epidemic,* HIV infection is largely confined to high risk groups eg. CSWs, and HIV prevalence has not exceeded 5% in any sub-population. In a *concentrated epidemic,* HIV has spread rapidly in a defined sub-population, but is not well-established in the general population. HIV prevalence exceeds 5% in at least one sub-population but is less than 1% in pregnant women. In a *generalized epidemic,* HIV is firmly established in the general population (prevalence consistently over 1% in pregnant women) and the prevalence in the general population is sufficient to sustain an epidemic independently of transmission from sub-populations at higher risk of infection.In a *hyper-endemic epidemic* HIV prevalence exceeds 15% in the adult population, usually driven by extensive heterosexual multiple concurrent partner relationships with low and inconsistent condom use (UNAIDS 2007b).

Since the first reports of AIDS cases in 1982 in Uganda, HIV has rapidly spread throughout the country resulting into a mature and generalized epidemic with heterosexual contact as the main route of transmission. It has evolved into a heterogeneous epidemic affecting different population sub-groups and resulting in multiple and diverse epidemics with different transmission dynamics. The Uganda HIV Sero-Behavioural Survey (UHSBS) 2004/05 found an overall national HIV sero-prevalence rate of 6.4% among men and women aged 15 – 49 years (MoH 2006) – a generalised epidemic.

UNAIDS (2008) estimates that 940,000 people (range 870,000 – 1,000,000) were living with HIV in Uganda as of December 2007 (table 1). This is broadly consistent with the estimate by Hladik et. al. (2008) using the UHSBS data of 915,400 people with HIV by December 2005 of whom 530,932 were women and 109,000 were children under 15 years. An estimated total of 135,300 people were newly infected with HIV and 76,400 deaths due to AIDS occurred in 2005.

Table 1: HIV/AIDS in Uganda as of December 2007

Number of people living with HIV	*Total*	940,000
	Adults (15-49 years)	810,000
	Women	480,000
	Children < 15 years	130,000
People newly infected with HIV	Total	135,300
	Adults	115,800
	Women	75,768
	Children < 15 years	19,500
AIDS deaths	Total	77,000
Population of Uganda	15-49 years	13,060,787
	Total	28 million

Source: Estimates derived from Spectrum (UNAIDS, 2008; MoH, 2008)

HIV prevalence trends

Figure 1 shows trends in HIV prevalence among women tested at the Ministry of Health Antenatal Clinic (ANC) sentinel surveillance sites. An assessment of trends in HIV prevalence shows three distinct phases between 1989 and 2005. Trends in HIV prevalence in Uganda using antenatal clinic surveillance data have been well described by Asimwe-Okiror et al. (1997), Kirungi et al. (2006) and UAC (2007). HIV prevalence rose steeply between 1989 and 1992 peaking at an average of 18% and then declined precipitously between 1992 and 2002 stabilizing between 6.1 and 6.5 between 2002 and 2005.

Figure 1: HIV prevalence at ANC sentinel sites located in major towns, 1989 to 2005
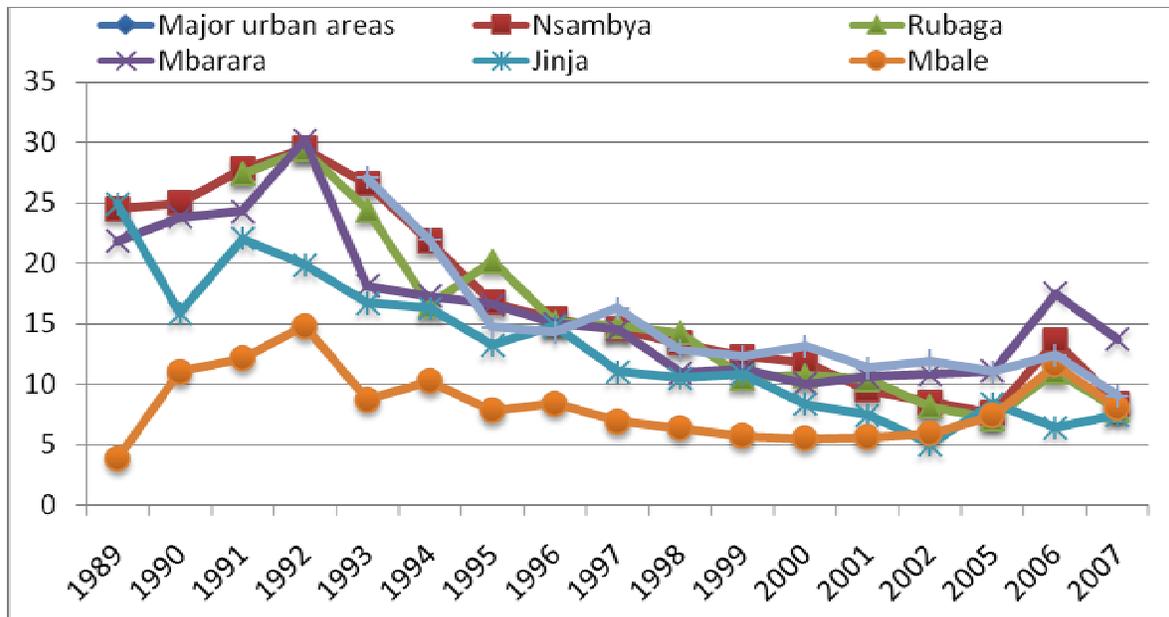
Data from the 2 population-based longitudinal cohort studies in Uganda i.e the Medical Research Council (MRC) cohort and the Rakai Health Sciences Project (RHSP) cohort also show evidence of declining prevalence in the study populations in Masaka and Rakai until 2002/03. However, there is evidence to suggest that prevalence in these cohorts may be increasing. Shafer et. al., (2008) recently examined HIV prevalence, incidence and sexual behaviour trends over the last 16 years in the MRC cohort. They report that HIV prevalence declined from 8.5% in 1990/91 to 6.2% in 1999/00 and thereafter rose to 7.7% in 2004/05 and provisionally to 8.0% in 2005/06. As can be seen in figure 2 below, women had higher prevalence than men in all rounds, but trends do not differ by sex. After a review of several sources of evidence, Kirby (2008) noted that changes in sexual behaviour led to the decline in prevalence of HIV in Uganda in the 1990s. In particular, there was a reduction in the number of sexual partners and breaking up of sexual networks and then increasing condom use reduced transmission with remaining partners. However, since 2000, prevalence trends among HIV pregnant women attending ANC (figure 1) as well as in men and women in the MRC cohort (figure 2) suggest stagnation or a new rise in prevalence. Associated with these trends is a shift towards more risk taking behaviours particularly an increase in multiple sexual partnership and non-spousal sex and decrease in condom use in non-spousal sex among men (Opio et al. 2008).

Figure 2: Trends in HIV Prevalence in the MRC Cohort 1990 to 2005
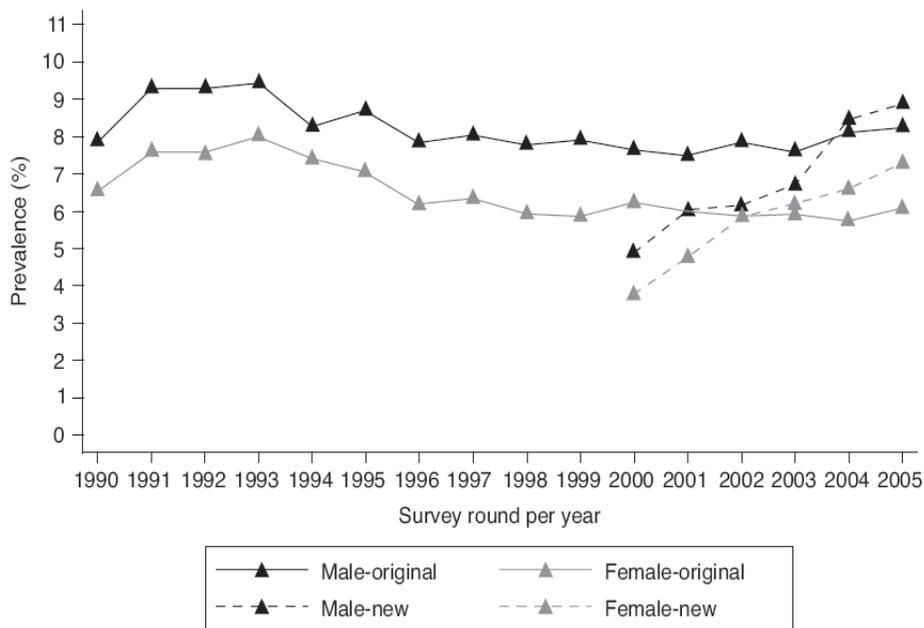
Lutalo et al, (2007) assessed trends in HIV prevalence over a 12 year period in the Rakai Health Sciences Program cohort. They observe an overall decline in HIV-1 prevalence from 17.7% in 1994 to 11.8% in 2006 (p<0.05), especially in men aged 20-49 and women aged 20-29 years, with very little decline seen in women aged 15-19 years (5.5% to 3.7%; p=0.148).

Heterogeneity of HIV prevalence

The Uganda HIV Sero-Behavioural Survey (UHSBS) 2004/05 found heterogeneity in HIV prevalence by geographic location, age, sex and marital status. By geographic location, Central (8.5%), Kampala (8.5%) and North Central (8.2%) regions had the highest HIV prevalence rates. The lowest prevalence rates were in Northeast (3.5%) and Northwest (2.3%) regions (figure 3). HIV prevalence among residents in urban locations was significantly higher (10 percent) than among residents in rural locations (6 percent). This is true for both sexes, though the urban-rural difference is much stronger for women than for men. Prevalence among urban women is 13 percent compared with 7 percent for rural women, and prevalence among urban men is 7 percent compared with 5 percent for rural men.

When data were disaggregated by *age and sex,* it can be seen that prevalence for both women and men increases with age until it reaches a peak, for women at ages 30-34 (12 percent) and for men at ages 35-44 (9 percent) (figure 4). Women are more highly affected than men at younger ages - prevalence in women is considerably higher at ages 15-34; from age 35 and up the age-specific prevalence rates are fairly similar.

Figure 3: Heterogeneity of HIV Prevalence by Geographic Region, 2004/5
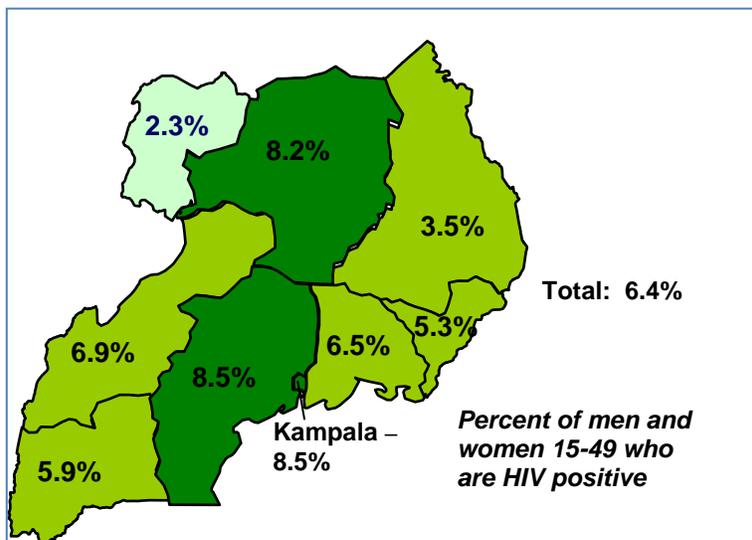
Source: Ministry of Health Uganda (UHSBS, 2004/05)

Figure 4: HIV prevalence by age and sex
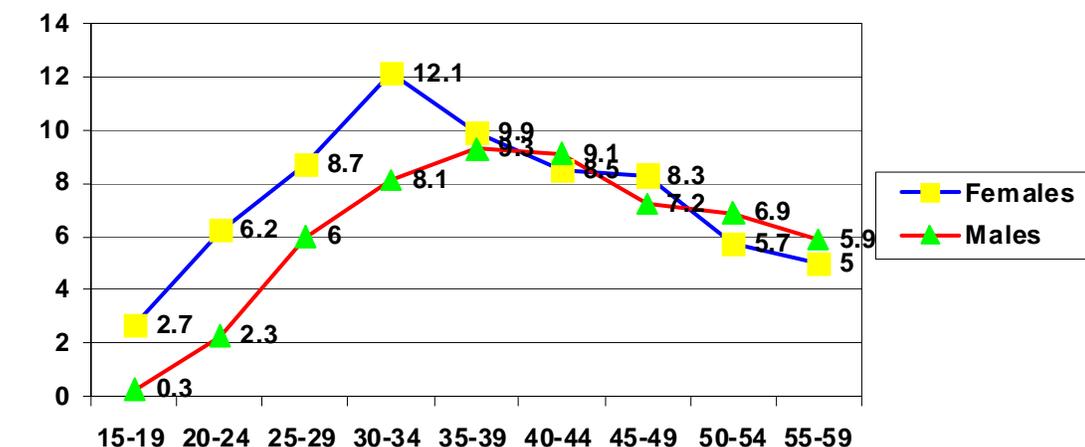
Source: Ministry of Health Uganda (UHSBS, 2004/05)

Marital status showed a significant relationship with HIV prevalence. Those who are widowed had by far the highest HIV prevalence. Almost one-third of women and men who have been widowed are HIV positive, compared with around 6 percent of those who are currently married. Widow inheritance is reported as a frequent socio-cultural practice in rural Uganda --70% of respondents reported that it occurred in their communities (Mabumba et al. 2007). Voluntary counselling and testing is recommended for widows and their inheritor. Inheritance is linked to bride price, but this cultural practice may have to be discouraged or at least stripped of its sexual component. Those who are divorced or separated have an intermediate level of HIV infection (14%), those who have never been in a marital union have a relatively low prevalence (2%).

Assessing HIV incidence

Trends in incidence, defined as new infections per population at risk in a specified period of time, is the most reliable measure for monitoring the HIV epidemic. Reductions in incidence may imply successful behaviour change efforts. However, very few sources of data on HIV at the national level can provide data on incidence. The Ministry of Health employs mathematical

modelling using Spectrum to estimate the number of new infections occurring in each year, estimating that 132,500 new infections occurred in 2007 (UAC, 2008).

Another method is to infer incidence from trends in prevalence among the young age groups especially the 15 – 19 year olds. This is because young adults have recently initiated sex, so duration of infection is generally short and mortality is low. Prevalence in this age group therefore approximates incidence. Annual incidence estimates can be derived using HIV prevalence data among young people by single year of age and assuming that prevalence differences between the age strata represent incident HIV infections (Ghys et al. 2006, Zaba et al. 2000). Some authors have proposed using the BED assay to estimate incidence (Mermin et al 2008). However, the BED assay is thought to over-estimate incidence significantly (Todd et al. 2009) and is currently being validated.

Longitudinal studies are the best for monitoring incidence because they are able to follow the same individuals over many years testing them for HIV infection. They can thus identify new infection when it occurs. The two main longitudinal studies which generate incidence data in Uganda are the Medical Research Council (MRC) cohort and the Rakai Health Services Program (RHSP), formerly called the Rakai Project.

2.2 Sources of new (incident) infections using the Modes of Transmission model

Populations by risk group

The Ugandan population of 13,060,787 aged 15 to 49 years was assigned to risk groups (table 2). Approximately 46% (6,022,317) of the population aged 15 to 49 are mutually monogamous heterosexuals; 14% (1,808,919) are in the multiple partnerships risk group and their partners were 11% of the population (1,417,881). The number of sex workers was estimated to be 32,652 (0.3%) and that of their clients was 189,381 (1.5%). It is estimated that there was a total of 3,949 men who have sex with men, based on self-reports by survey respondents.

Table 2: Populations and Incidence by Mode of Transmission

Mode of Transmission	Total number with risk behaviour	as percent of total population	Incidence per 100,000	New infections, 2008	% of total incidence
Injecting Drug Users (IDU)	994	0.0%	25,911	258	0.28
Partners of IDU	252	0.0%	3,994	10	0.01
Sex workers (SW)	32,652	0.3%	2,550	833	0.91
Clients	189,381	1.5%	3,787	7,172	7.83
Partners of Clients	108,676	0.8%	1,528	1,660	1.81
MSM	3,976	0.0%	14,066	559	0.61
Female partners of MSM	1,569	0.0%	5,889	92	0.10
Multiple partnerships (MP)	1,808,919	13.9%	1,201	21,722	23.73
Partners MP (PMP)	1,417,881	10.9%	1,405	19,925	21.76
Mutually monogamous heterosexual sex (MM)	6,022,317	46.1%	652	39,261	42.89
No recent risk	3,474,169	26.6%	0	0	0.00
Medical injections	13,060,787	100.0%	0	54	0.06
Blood transfusions	134,053	1.0%	0	0	0.00

Overall incidence and distribution of new infections by mode of exposure

Overall, a total of 91,546 new infections were estimated to occur in Uganda in 2008 among the 13.1 million 15–49 year old adult population. This figure is practically the same as the Spectrum estimate of new infections among adults of 91,551, excluding infections due to mother-to child transmission, which was calculated by the Ministry of Health and the Futures Institute.

The modelled distribution of these new infections by mode of exposure is shown in table 2 and figure 5. The bars in figure 5 represent the percentage contribution of each risk group to the total number of new infections in Uganda and illustrate the patterns of infection. Contributions reflect level of risk, and also the relative size of the group. The largest proportion (43%) of new infections occurs in the mutually monogamous heterosexual sex category, which includes almost half the population. Individuals engaged in multiple partnerships (MP) contribute 24% of new infections while the partners of individuals reporting multiple partnerships account for 22%. Sex work (SW) account for 11% of new infections -- of which clients of sex workers contribute 8%, sex workers 1% of all new infections and partners of the clients account for the remaining 2%. Small numbers of infections occur as a result of medical injections, blood transfusions, injecting drugs and through men having sex with men. The incidence rate expressed per 100,000 population per year is 1,201 for individuals with multiple partners (MP), 1,405 for their partners (PMP) 652 for those in mutually monogamous heterosexual partnerships (MM) and 3,577 for sex workers.

Figure 5: Distribution of new infections by mode of exposures
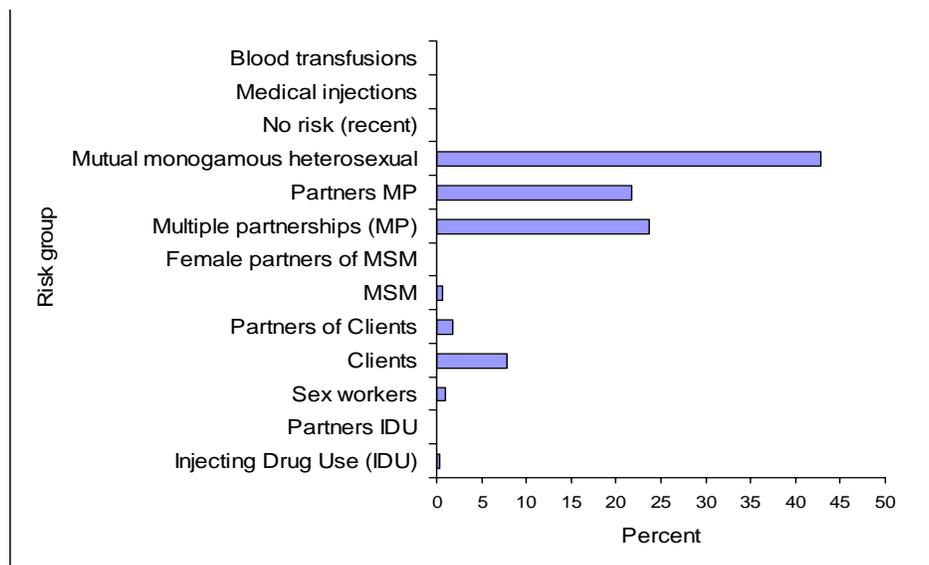
Source: MOT model estimates

Sensitivity analysis

Sensitivity analysis looks at how altering the value of input variables (or assumptions) affects the outcomes. It determines which variable the outcome is most "sensitive" to. In this study, HIV prevalence and behavioural data were not readily available or were roughly estimated for commercial sex workers, MSMs and IDUs. The sensitivity and robustness of the model outputs to different estimates for these risk groups was estimated for variables that had more than one value from different sources or that were not based on nationally representative studies. We used an estimate of 645 sexual acts per year per female sex worker (Kampala-Mombasa Hotspot mapping) and a total number of about 4,000 MSMs (MSM study expert guess x 2) (table 3). When the number of sexual acts per female sex worker per year was increased to 763 (Kampala-

Juba Hotspot mapping), the incidence increased from 91,546 to 91,697 new infections (151 more new infections, an increase of 0.16%). When we reduced the number of MSMs to 2000 (MSM study expert guess) instead of 4,000, the incidence estimate was 91,238 (459 fewer new infections than the selected scenario, a decrease of 0.5%). Application of different estimates for these risk groups resulted in very small changes in the estimates of the percent distribution of new infections and the total new infections. This indicates that the model results are confidently robust.

Table 3: Sensitivity analysis using different scenarios

Scenario	Number of sex acts/year/FSW	Number of MSMs	Total adult new infections model output	Comment
1	645	4,000	91,546	Selected scenario
2	763	2,000	91,238	Alternative

Confidence limits based on Monte Carlo Simulation

The degree of uncertainty in the incidence model was analyzed using the Monte Carlo method of specifying ranges for the different input values in the model. The ranges were set at 5% for mean input values obtained from recent representative surveys such as the UDHS 2006 and the Uganda HIV/AIDS sero-behavioural survey 2004-05. We set the range at 20% for data estimated from other countries or non-representative surveys. Using this method, the confidence limits of the median percentage of new infections among individuals reporting mutually monogamous sex was 41%-46%, among those reporting multiple partnerships it was 21% to 27%, and among their partners it was 18 to 21% (figure 6). The pattern of percentages of new infections by mode of transmission was consistent for low, median and high value scenarios indicating that the results of the model are robust.

Figure 6: Percentage of new infections by mode of transmission for low, median and high scenarios created by Monte Carlo simulation
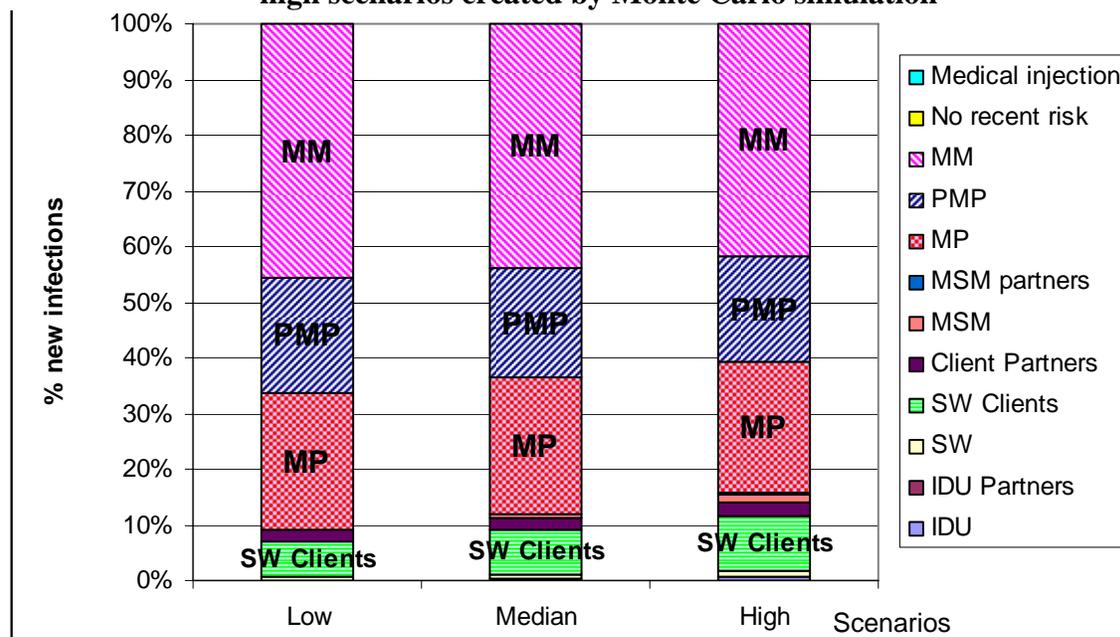
MM- Mutual monogamy in past 12 months   SW – Sex workers
PMP – Partners of individuals with multiple partners   MSM – Men having sex with men
MP – Multiple Partnerships   IDU – Injection drug users

Heterosexual transmission: age-gender distribution

Figure 7 shows the percentages, by age groups and gender, of all estimated new infections among adults in 2008 that are attributable to multiple partnerships or that occur in the mutually monogamous (MM) heterosexual group (i.e., heterosexual transmission, excluding commercial sex). Results were disaggregated for age groups 15-24, and 25 and older. Most of these infections (84%) occur in the 25-49 age group; a considerably larger percentage (47%) occur among women aged 25 to 49 years than among men in this age group (37%). Among these age/sex/risk groups, the highest transmission is expected to occur among people who themselves have only one partner and so may think they have little or no risk of HIV: women aged 25 to 49 years in mutually monogamous heterosexual relationships and women who are regular partners of males engaged in multiple partnerships (28%), and among men aged 25 to 49 years in mutually monogamous heterosexual relationships and men who are regular partners of females engaged in multiple partnerships (20%). Amongst those engaged in multiple partnerships, most new infections will occur among men (17% in those aged 25+ years and 13% in the 15-24 years group), with a much smaller proportion in women (5% for 25+ years and 3% for 15-24 years), reflecting the much smaller numbers of women who report multiple partners.

Figure 7: Distribution of new heterosexual infections (excluding commercial sex) by age, gender, and risk group
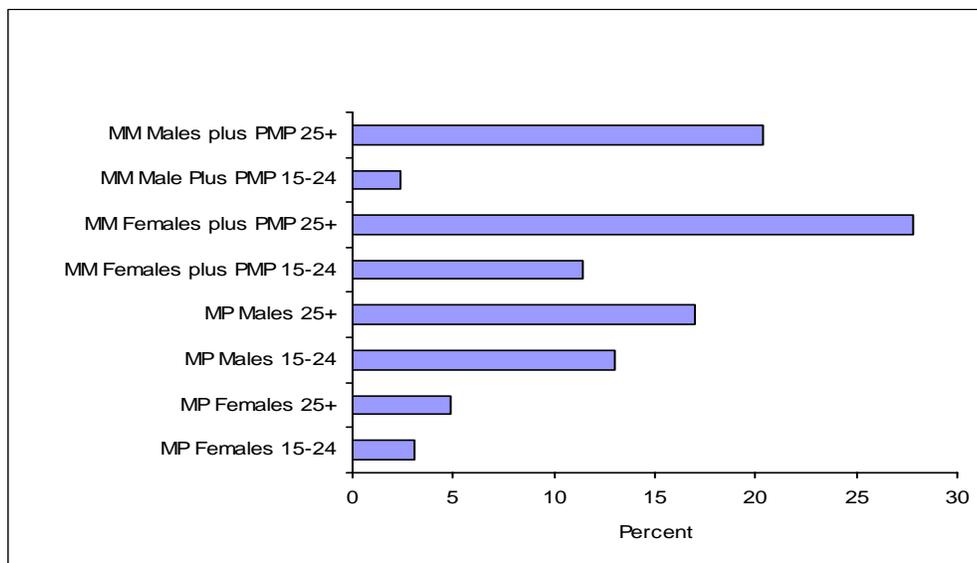
Percentage of new infections by modes of transmission <u>including</u> Mother to Child Transmission

The UNAIDS modes of transmission model only addresses adult incidence. To obtain a more holistic picture of transmission among adults and children, the total of 91,546 adult new infections estimated by the UNAIDS model was summed with the Spectrum estimate of 20,200 new infections in children. Using the total new infections in children and adult as the denominator, percentages of new infections by mode of transmission in 2008 are shown in table 4: 37.3% of all new HIV infections are attributable to multiple sexual partnerships including infections of their regular partners. Couples in mutually monogamous partnerships account for 35.1% of new HIV infections while mother to child transmission accounts for 18.1%. Commercial sex work (including partners of sex, workers, their clients and partners of clients) accounts for 8.7% of new infections.

Table 4: Estimated total incidence (adult and children due to mother to child transmission) by mode of transmission

Mode of Transmission	Percentage of new infections
Multiple sexual partnerships (including partners)	37.3%
Mutually Monogamous partnerships (including partners)	35.1%
Mother-to-Child	18.1%
Sex Work (Including partners, clients and partners of clients)	8.7%
Medical Injections	< 1%
Blood Transfusion	< 1%
IDU and MSM	< 1%

2.3 Factors that influence the rate of new infections

According to UNAIDS guidance document on definitions, a risk factor is an aspect of personal behaviour or life-style or an exposure which on the basis of epidemiological evidence is known to be associated with HIV transmission or acquisition; "drivers" refer to the environmental, structural and social contextual factors, such as poverty, gender inequality and human rights violations that are not easily measured which increase individuals' vulnerability to HIV infection.[1] This study identified the risk factors and drivers fuelling the HIV epidemic in Uganda. They are discussed in the subsequent section below and summarized in table 5.

At the individual level (Risk Factors)

Having **multiple sexual partners** – reporting two or more sexual partners in the last 12 months – is a strong predictor of transmission of HIV (MoH and Macro 2006). The Uganda AIDS Indicator Survey results show a clear association between HIV prevalence and number of sexual partners. Uganda's zero grazing (Stick to your partner) campaigns of the late 1980s had a great impact in reducing multiple partners and HIV transmission, contributing to the decline in prevalence from 18% to 6.4% (Okware et al. 2001). More recently, there is evidence that multiple concurrent sexual relationships are increasing (Opio et al. 2008). In the 2004/05 UHSBS, 25.8% of the adult males reported multiple partnerships in the past 12 months and HIV prevalence among males increased as their number of partners increased (MoH & Macro 2006).

For couples in mutually monogamous sexual relationships, the key factor that influences the rate of new infections is **discordance**. The 2004/05 UHSBS (MoH and Macro 2006) showed that of all couples where at least one partner was infected, about half were HIV discordant. Moreover, most of these discordant married or cohabiting couples are not aware of their own HIV status or of their partner's and therefore are not motivated to take action towards prevention such as using condoms consistently. Studies show that couples who test individually are more likely to disclose to persons other than their spouses and even when they do disclose to their partners they may take as long as two years to do so (Oundo and Siu 2005). Moreover, females may not disclose to their spouses for fear of domestic violence and marital disruption (Koenig et al. 2003). The low level of testing among couples, the lack of disclosure of HIV status to the partner and the low condom use estimated at less than 5 % (MoH and Macro 2006) among mutually monogamous

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[1] "Driver" is sometimes used in a different way, to refer to the factors, behaviours and/or groups responsible for most new infections (as in: "the main factors driving the epidemic"). Some authors (e.g. Poundstone) distinguish between "proximal" or individual and couple level factors, and "distal" social/structural/environmental factors that are beyond the control of individuals and couples.

heterosexual relationships put the uninfected partner in a discordant couple at risk. A study of HIV serostatus disclosure to sexual partners among people living with HIV in Uganda reveals that it results in risk reduction behaviour, increased care-seeking, anxiety relief, increased sexual communication and motivation to plan for the future (King et al. 2008).

Transactional or commercial sex contributed 22% of all new HIV infections that occurred during 2005. The UHSBS 2004/05 asked men whether they had paid anyone to have sex and women whether any man had paid them to have sex -- 0.5% of women aged 15 – 49 said they had been paid to have sex while 1% of men in the same age group said they had paid to have sex in the last 12 months. The percentages seem small – people tend to under-report behaviours that are socially frowned on. If HIV prevalence among sex workers is high, then commercial sex carries a high risk if condoms are not used with each act. Only 58% of clients of commercial sex workers report using condoms during this high risk sexual activity. There is also transmission risk for partners of commercial sex workers and for partners of clients of commercial sex workers. Much cross-generational sex is thought to be transactional. Since older men are much more likely to be HIV-positive (figure 4), cross-generational sex carries a higher risk for young women. The UHSBS estimates 10% of women aged 15-19 who had higher-risk sex in the 12 months preceding the survey had sex with a partner who was 10 or more years older. Age groups 15-17 and 18-19 had roughly the same proportion of young women who had sex with a non-marital, non-cohabitating partner more than 10 years older.

There is both biological and epidemiological evidence for the link between HIV risk and **STIs,** especially those causing ulceration of the genital mucosa such as herpes simplex type II (HSV-2). Herpes simplex infection is very common in Uganda and causes genital ulcer disease which has been associated with increased transmission of HIV (Gray et al. 2001; Serwadda et al. 2003; Wawer et al. 2005; MoH and Macro 2006). Data from the Uganda Sero-behavioral survey indicates that prevalence of HSV-2 was approximately 49% in women and 38% in men aged 15 – 49 years.

There is overwhelming ecological, biological and epidemiological evidence linking **lack of male circumcision** with increased risk of HIV transmission. A meta-analysis of 38 predominantly African studies found that circumcised men were less than half as likely to contract HIV (Weiss 2002). More recently three randomized controlled trials conducted in South Africa, Kenya and Uganda have shown evidence of the efficacy of medical male circumcision ranging from 50 – 60% (Auvert et al. 2005; Gray et al 2007; Bailey et al. 2007). The 2004/05 UHSBS showed that only 25% of the adult male population was circumcised and that HIV prevalence among uncircumcised men was 5.5% which was much higher than among circumcised men at 3.7% (MoH and Macro 2006).

A study conducted on HIV-1 sero-discordant couples in Rakai, Uganda to further understand HIV transmission by **stage of infection** suggests that primary and late stage HIV-1 infection are more infectious than asymptomatic infections (Hollingsworth et al. 2008). However, in a homogenous population, the asymptomatic stage of infection may contribute more to net transmission of HIV-1 over the lifetime of an infected individual because of its long duration.

Factors at the community, societal and structural level (Drivers)

The key factors at the community, societal and structural level which drive the HIV epidemic include socio-cultural factors; wealth and/or poverty; low status of women; human rights, stigma and discrimination as well as inequitable access to HIV services. Social **conflict**, war, and

genocide create an environment for transmission of HIV through displacement of populations, food insecurity leading to transactional or survival sex and rape all of which are compounded by lack of access to health care (Fabiani et. al., 2007; Bukuluki et. al., 2007). This may partly explain the finding of the UHSBS that the conflict area of the north central region to have an HIV prevalence of 8.2% which was only second to the Central region (8.5%), Kampala (8.5%).

Some **cultural expectations** may increase vulnerability and transmission of HIV thus driving the epidemic. These include; condoning early marriages; glorifying non-marital sex and multiple sexual partners; looking for children especially male children outside marriage; expectation to have unprotected sex whatever the circumstance. The transition from an extended family network to the more western nuclear family and the increasing exposure to foreign media as a result of urbanization may have led to the erosion of traditional African family values leading to vulnerability and exposure to HIV transmission.

Both **wealth and poverty** can increase HIV risk and vulnerability independently. Wealth provides disposable income, greater personal autonomy and high mobility, factors which enable indulgence in higher risk sex. The UHSBS showed that the percentage of men who had two or more sexual partners in the past 12 months increased from the middle to the highest wealth quintile and for women the increase in multiple sex partnerships occurred among those in the fourth and highest quintile. It also showed a gradual increase in HIV prevalence rate from 4% among those in the lowest quintile to 9% among the wealthiest quintile (MoH and ORC Macro, 2006). On the other hand, poverty may lead people to resort to commercial sex, transactional sex and cross-generational sex for economic or survival reasons. Some poor and vulnerable people especially girls in difficult economic situations may engage in these sexual activities for survival (survival sex).

The **low status of women and girls** increases their vulnerability to HIV infection. Figure 4 showed the consistently higher HIV prevalence among women in Uganda up till age 35 – 39 years. Cultural values and traditional gender roles increase the vulnerability of women to HIV infection. Traditionally, women are expected to be obedient to men, cannot question infidelity of their husbands nor can they deny them sex. Sex is obligatory for married women, and there is little communication between spouses about sex and no negotiation. Furthermore, gender relations and power dynamics in marriage favour the man over the woman as regards decision affecting economic needs, health care seeking and number and gender of children. In this situation domestic violence is common and may influence risk of HIV transmission (Koenig, 2003).

Table 5 : Summary of Risk Factors and Contextual Factors Driving the HIV Epidemic in Uganda

Risk Factors for HIV Transmission	Contextual Factors of the HIV/AIDS Epidemic
• Multiple partners • Discordance and non-disclosure • Lack of condom use • Transactional sex • Cross-generational sex • Presence of STIs esp. HSV-2 • Intact foreskin • Alcohol and drug use • Behavioural disinhibition due to ART	• Socio-cultural factors • Wealth and Poverty • Low status of women and girls • Human rights, Stigma and discrimination • Inequity and access to prevention, care and treatment

CHAPTER 3. KNOW YOUR RESPONSE (KYR) SYNTHESIS

3.1 A Review of the HIV Prevention Response in Uganda

Policies, Strategy and Guidelines

This review highlights Uganda's successes and shortcomings in its HIV prevention strategy. It is clear that the country is committed to re-invigorated HIV prevention and a roadmap has been developed to achieve this (UAC, 2006). **National policies and technical guidelines** for key HIV prevention services particularly biomedical services of PMTCT, HCT, condom promotion, blood safety, STI treatment, medical infection control, post HIV exposure prophylaxis and HIV education in schools are available, evidence-based and are regularly updated. National targets and roll out plans for most interventions have also been developed.

However, there are no clear guidelines and policies guiding IEC, mass media, behavioural interventions, targeted services for MARPs and programmes addressing environmental interventions for HIV transmissions such as sexual and gender-based violence (SGBV), livelihood support for HIV preventions etc. National targets for these interventions are less clear and there is no clear roadmap for rolling them out either.

In line with current recommendations for HIV prevention in countries with generalised epidemics, Uganda's current **HIV prevention strategy** outlined in the country's second Health Sector Strategic plan 2006-2010 and the National HIV/AIDS Strategic Plan 2007/08-2011/12 comprises multiple interventions targeting either the general population or specific high risk groups. These comprise educational interventions and social mobilisation for behaviour change; promotion of condom use especially during high risk situations such as casual sex, for discordant couples or sex with partners of unknown HIV sero-status; HIV counselling and testing; prevention of peri-natal transmission of HIV; treatment and control of sexually transmitted infections; and ensuring blood transfusion safety. Other interventions include medical infection control and injection safety, post-HIV exposure prophylaxis for health workers and community programmes as well as programmes addressing environmental interventions such as socio-cultural factors, sexual and gender-based violence, poverty and livelihood support. Integration of HIV prevention into other key services such as sexual and reproductive health services, provision of youth friendly HIV prevention and sexual reproductive health services, HIV prevention targeted to most-at-risk (MARP) groups as well as HIV-prevention among HIV-infected people also constitute part of the HIV prevention package in the country. Furthermore, the country is committed to piloting and rolling out new HIV prevention technologies with scientifically proven efficacy: the role of safe medical circumcision in HIV prevention is well recognised and policy discussions and consultations are underway for its careful introduction.

Prevention services

The country has made good **progress in rolling out key HIV prevention services**. For instance HCT, PMTCT, blood transfusion safety, STI treatment, condoms, HIV/AIDS education in schools are available in all districts in the country. Condom procurement and distribution statistics show a progressive increase from 28.3 million in 1999 to 130.7 million condoms procured and distributed in 2007 (Table 6). A major development is the recent increase in coverage of these key prevention services, notably HCT and PMTCT. For instance, the proportion of adults who have ever tested and received their HIV test results increased from 4% in 2000/01 to 11% in 2004/05 and 21% in 2006. The number of women receiving PMTCT

services increased from virtually none in 2001 to 26,484 out of a total of 91,000 estimated HIV-positive pregnancies (MoH 2008), which is 29% of those who need the PMCTC services. The number of service delivery points had increased to 568 by the end of 2007 (table 7). There have been similar improvements in screened blood for transfusion, the number of students receiving AIDS education in schools, etc. Treatment access has increased, helping prevent infections by reducing viral load and infectiousness. The number of AIDS patients on ARVs increased from 67,000 in 2005, to 111,232 at the end of 2007 (MOH 2008). However, coverage – the percent requiring ARVs who were receiving them – increased only slightly from 34.4% to 35.7%, because the number of people needing treatment rose from 194,900 to 312,000.

Table 6: Annual Condom Procurement and Distribution by Various Partners in Uganda

Agency	Millions of condoms per Year (1999-2007)								
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Ministry of Health	12	39	33	55	66	30	Na	67.8	80
Social Marketing									
MSI	12.3	12.7	11.9	17.7	19.1	5.1	Na	18.2	20
PSI	4	10.2	10.5	5.9	5.1	4	Na	5	12
AFFORD							Na	16.5	18.7
Total	28.3	61.9	55.4	78.6	90.2	39.1	Na	107.5	130.7

Source: Ministry of Health. Na: Not Available

Table 7: Coverage of PMTCT Service Delivery by level of Facility:

Health Facility Level	Total	Number (%) providing PMTCT	
		Dec. 2006	Dec 2007
Hospitals	101	95 (94%)	98 (97%)
Health Centre IV	165	143 (87%)	151 (92%)
Health Centre III	905	183 (20%)	258 (29%)
Health Centre II	1887	32	61
Total up to HC III	1171	421 (36%)	507 (43%)

Source: Ministry of Health

Figure 8 shows national coverage of PMTCT services by source of support. As can be seen from the figure, the bulk of support for PMTCT is from development partners. This support is variable in intensity -- support to some districts is substantial, but other districts receive insufficient support to provide the full complement of PMTCT services including infant formula, linkage with other services for treatment, care and support as well as family planning and reproductive health. Eighteen districts – most in the West Nile region -- have been left without any support after donor projects ended, leaving a gap in coverage.

Figure 8: Coverage of PMTCT service delivery by source of support, 2007

PMTCT Support: August 2007

EGPAF: = 23 districts	**NUMAT:** = 9 districts	**PREFA:** = 6 districts
UNICEF: = 23 districts	**UPHOLD:** = 11 districts (Proposed 11 new; drop 2)	

Districts without any support:

Moyo, Adjumani, Nebbi, Kibaale, Kiboga, Nakasongola, Luwero, Kumi, Bukedea, Sironko, Kapchorwa, Bukwo, Butaleja, Busia, Kalangala, Ntungamo, Kanungu and Kisoro
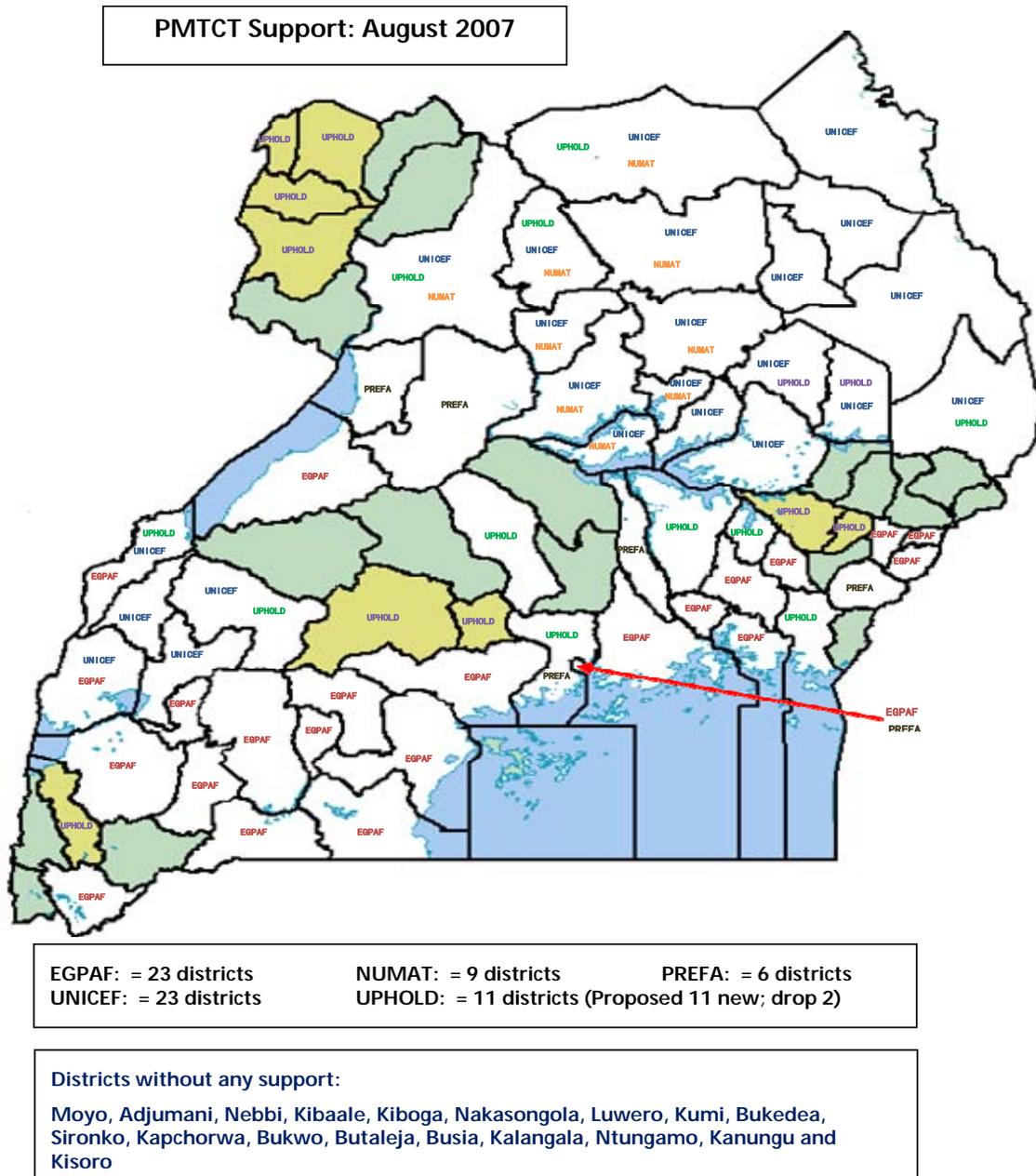
Source: MoH STD/ACP

In spite of Uganda's commitment to re-invigorated HIV prevention, many people still do not have access to key HIV prevention services. For instance, over three quarters of all adults, including many people living with HIV do not know their HIV sero-status. Services for PMTCT currently reach less than half of pregnant women and their uptake is sub-optimal, which limits the number of paediatric infections averted. There are few outreach programmes for MARPs and vulnerable populations (including sex workers, long distance truckers, fisherfolk, and street children). Although condom use has increased, its coverage (only about one-half of risky sex acts) has not yet reached the critical levels necessary for it to impact on population level HIV transmission. Condoms are also not sufficiently targeted to MARPs where they are most effective. Although STI services have been integrated into PHC and available in 60% of PHC facilities, their quality is still low with less than half of clients being appropriately diagnosed and

managed, and there are chronic shortages of STI drugs. HIV/AIDS education programs for in-school and out-of-school youths is not yet widespread, reaching 19,000 teachers taught to impart life skills, and tertiary and secondary school students are less served. Out-of-school youth are also not sufficiently reached. It has also been recently observed that many of the adolescents living with HIV are sexually active (33%) or desire to be in relationships (44%) but engage in poor preventive practices (Birungi et al. 2008). However, counselling programs for adolescents living with HIV encourage abstinence from sex and relationships. Programs need to strengthen preventive services and widen the scope of options available to adolescents.

The coverage of some services has either declined or not changed recently. Outreach services for MARP groups, prevention among HIV-infected people, youth-friendly RHS, and programmes addressing the underlying factors for HIV transmission such as gender inequalities, sexual and gender-based violence, socio-cultural norms etc, have not been sufficiently rolled out and their coverage remains sub-optimal. Furthermore, there is evidence of stagnation and even apparent reversals in uptake of preventive sexual behaviours and increase in risk-taking behaviour especially among young men.

This review found that socio-demographic and behavioural population groups that currently have the highest HIV prevalence and incidence such as urban residents, older adults, married/cohabiting and wealthy individuals do not currently constitute the focus of HIV prevention programmes that often tend to focus on young and unmarried individuals and residents of rural areas.

Although IEC/BCC services are widespread, they are intermittent; tend to favour mass media rather than interpersonal communication, and their focus is poorly aligned to sexual behaviours such as multiple partnerships and HIV discordance that have been demonstrated to be responsible for most incident HIV in the country. There are also significant urban-rural and regional differences in coverage of priority programmes.

Another finding is the lack of adequate strategic information on coverage of most HIV prevention services. While sufficient data are available for periodic national outcome and impact evaluations, there are major gaps, especially in knowledge of the size of population groups and corresponding coverage of key prevention services. Process and output level indicators essential for monitoring coverage of programmes are available for biomedical interventions such as HCT, PMTCT, condoms, blood transfusion safety, but such information is not well consolidated for other interventions especially behavioural interventions, IEC-mass media and programmes for environmental factors. This strategic information is necessary to guide performance and identify persisting problems.

Although national HIV prevention policies, technical guidelines and targets have been developed collaboratively with stakeholders, the review found that they are not yet sufficiently disseminated. As a result, target setting at programme implementation level is not informed or always designed to meet national targets. In some instances, national guidelines are not followed. It was unclear how national institutions guide strategic planning at implementation level to meet the national targets. Furthermore, the focus of some of the HIV prevention services such as HCT emphasises diagnosis rather than HIV prevention, leading to missed opportunities for HIV prevention.

It was apparent that currently, the direction of prevention efforts is not fully aligned to interventions that have the greatest evidence of effectiveness. In some instances, more priority is given to interventions for which the evidence of potential impact is quite weak. For instance, more effort in IEC/BCC is focussed on mass media rather than social mobilization that has a demonstrated impact on behaviour change. In addition, IEC/BCC messages are not sufficiently focused on reducing multiple and concurrent sexual partnerships where the evidence for transmission is strongest. Sexual abstinence and faithfulness programmes are well supported but the former is only practical among young people (who contribute relatively few infections), while the latter is most fruitful where both partners are not HIV-infected. Furthermore, IEC messages are often not holistic, with excessive promotion of one component at the expense of others, especially among programmes for youths. For instance, messages against cross-generational sex are abundantly promoted, but no alternatives are provided. Condom promotion is not sufficiently targeted to MARPs where its potential impact is greatest.

There are concerns about the advocacy for abstinence only programs for youth (Cohen & Tate, 2005). With evidence of sexual activity among youth including those known to be HIV infected (Birungi et al. 2008), it is recommended that a wider range of HIV prevention options be availed to the youth. Related to this, funding conditionality that a fixed proportion of HIV funds must be allocated to abstinence-until-marriage programs needs to be repealed, in light of evaluations finding them ineffective.

We also found that funding of some key prevention services such as condoms, social mobilisation and IEC-mass media has been erratic in recent years and uncertain in the future. This has caused serious disruptions in delivery of some of these services, particularly condoms and HIV test kits. Funding for other programmes by external donors is largely project-based with serious inequities. For instance, there are districts that don't have any support for PMTCT while support for other districts recently wound up or will soon end when projects such as AIM, MAP and UPHOLD end.

The review also noted the weak linkages between prevention, care and treatment services. For instance, PMTCT and HCT services that diagnose HIV infection are not sufficiently linked to HIV/AIDS treatment including ART. In addition, most HIV prevention services are also not linked to SRH.

Circumcision has been demonstrated to significantly impact HIV acquisition among men and its high potential for reducing HIV transmission is immense, yet two years since this evidence was confirmed, very little has been done to roll it out. In preparation for a roll out of medical male circumcision, MoH performed an assessment of facilities providing male circumcision services. Table 8 shows that only 6% of the facilities surveyed were performing medical male circumcision, of which only 71% had all the items required for the service. The average number of circumcision performed per facility per month was only 2.

Table 8: Availability of male circumcision services in public and private facilities in Uganda, 2007

Facility Characteristics	Percentage of Facilities			N
	% Performing Male circumcision	% Performing Male Circumcision that have all items required	Median Number of circumcisions performed per month	
Ownership				
Public	4	65	2	373
Private	13	78	2	119
Region				
Central	7	72	2	98
Kampala	39	60	3	9
East Central	6	88	0	78
Eastern	5	79	0	49
North East	4	43	0	41
North Central	5	82	0	37
West Nile	6	91	0	37
Western	6	37	0	60
South West	6	83	2	83
All facilities	6	71	2	491

Source: Adapted from the Preliminary MoH Service Provision Assessment Report, 2007

3.2 A Review of HIV/AIDS Expenditure

Resources for the National Response

A total of US $ 234,348,403 was estimated to have been spent on the national response, of which US $ 78,862,351 was spent on HIV prevention interventions in the year 2006/07. The bulk of the funding was from bilaterals, with Government of Uganda contributing 6% (figure 9 shows amounts in US$). Between 2003/04 and 2006/07, funding from the bilaterals (mainly PEPFAR) increased more than ten-fold.

Figure 9: **Trends in Financing of the National Response by Source**

Funding Sources	Government	Bilaterals	Multilaterals	All Other Internationals	Total
2003/4	6.0	15.4	17.0	-	38.4
2004/5	7.0	57.2	39.1	-	103.3
2005/6	13.0	127.2	15.1	-	155.3
2006/7	13.4	176.4	26.6	17.9	234.2
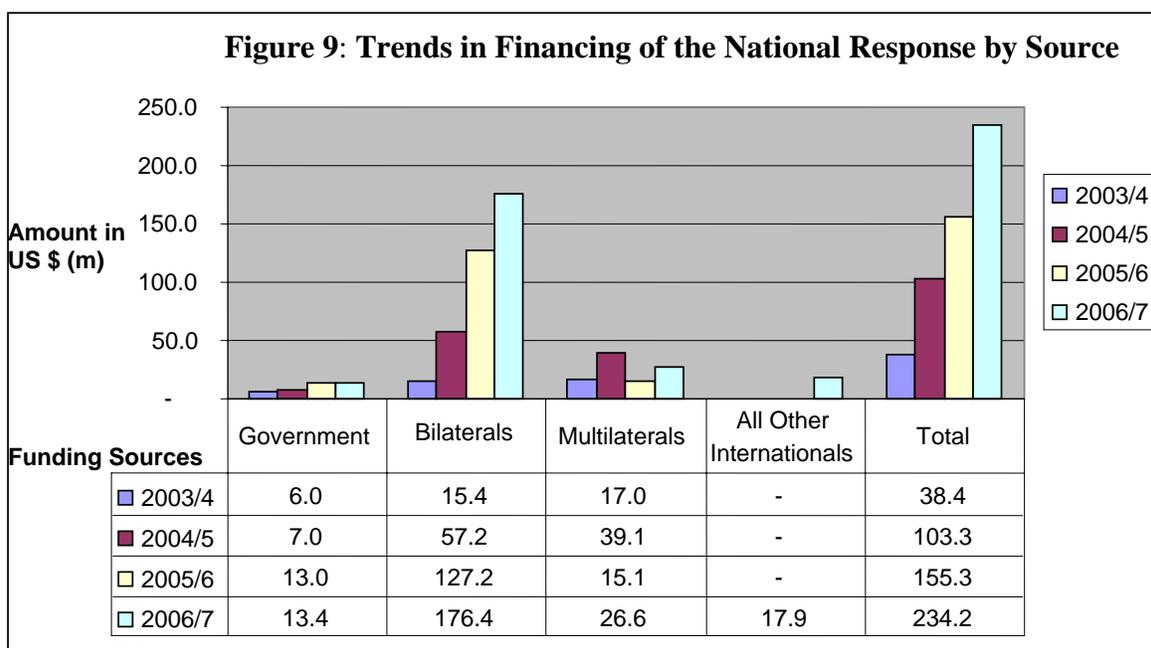
Source: Sector Based Assessment of HIV/AIDS Spending in Uganda, November 2006.

About one third of all resources are spent on prevention (table 9). Reflecting their share of total funding, the resources for prevention were mainly available from the AIDS Development Partners (ADPs) and most especially from the bilaterals. The expenditure figures provided show PEPFAR as the major source of funding for prevention interventions, providing 61.2%. UNICEF provided 5.4% while UNFPA provided 4.6 %, and DFID provided 3.9%.

Table 9: Expenditure on Prevention by Source of Funding, 2006/07

	Total Funding of the National Response	Expenditure on Prevention	%
Government	13,393,817	4,463,907	33.3%
Bilaterals	176,452,966	53,574,567	30.3%
Multilaterals	26,579,592	12,325,214	46.4%
All other International	17,922,028	8,498,663	47.4%
Total	234,348,403	**78,862,351**	**33.6%**

Source: Data collected as part of the MOT resource review

Distribution of the resources among the prevention interventions

With regard to the distribution of the resources, the greatest proportion of the resources are spent on HIV Counselling and Testing (HCT) which accounts for 25%, followed by BCC/Mass Media/ IEC (20%), condom promotion (18%) and PMTCT (16%), (figure 10 and Table 10). The main focus is on HIV prevention services for the general population.

Figure 10: Distribution of Prevention Resources by Intervention
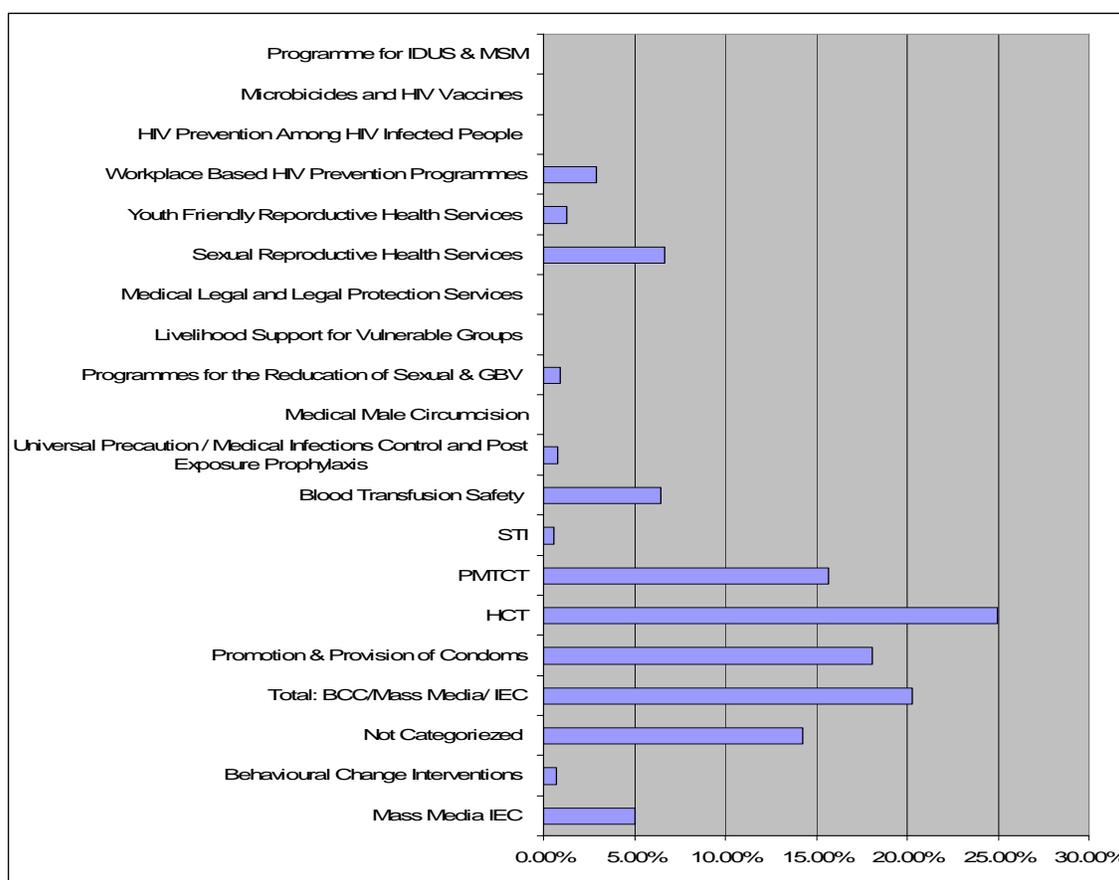
Source: Data collected during the prevention review of the MOT, July –October 2008

Table 10: Summary of Prevention Resources by Intervention and Source of Funding

	Prevention Category	Target Population	2006/7 Expenditure (US $)	% of Prevention Resources	Source	Remarks
1	**HIV Testing and Counselling**	General Population	19,644,369	24.91%	WHO, UNFPA, UNHCR, Global Fund, DFID, PEPFAR, SIDA, Italian Funds, GTZ CSF, GOU	Also covers HCT programme for fishing communities who are among the MARPS
2	**Behavioural Interventions/ Mass Media / IEC**	General Population	16,039,030	20.34%	PEPFAR, UNFPA, WHO, UNAIDS, UNDP, UNHCR, UNESCO, ILO, IRISH Aid/ DCI, SIDA, DANIDA, ITALIAN FUNDS, GTZ, CSF, AFFORD & GOU	
3	**Condom Promotion**	General Population	14,238,932	18.06%	UNFPA, UNHCR, Global Fund, PEPFAR, DFID, Italian Funds, Australian Aid, NORAD, GTZ and GOU	
4	**PMTCT**:	Pregnant Women	12,368,534	15.68%	WHO, UNICEF, UNHCR, WFP, PEPFAR, DFID, Italian Funds & GOU	Almost half is WFP food for pregnant women
5	**Blood safety**:	General Population	5,077,437	6.44%	UNHCR, PEPFAR, & GOU	Includes expenditure on civil works for regional blood bank centres
6	**Post exposure prophylaxis and Medical Infection Control**:	Health Workers	611,763	0.78%	WHO, UNHCR, Global Fund, PEPFAR, DFID & GOU	
7	**STI treatment**:	General Adult Population	422,556	0.54%	UNHCR, Pfizer & GOU	
8	**Circumcision**:		7,267	0.01%	UNAIDS	
10	**Environmental interventions**:					
10.1	Sexual and Gender based violence		720,186	0.91%	UNFPA, UNHCR, UNAIDS & GOU	
10.2	Livelihood support for vulnerable populations		0	0		
10.3	Medical and legal protection for vulnerable populations		0	0.00%	WHO & GOU	
11	**Any other programmes not included in the above list**:					
11.1	Prevention among HIV-positives	PLWHA	2,294,654	2.91%	UNFPA, UNAIDS, WFP, Care International	
11.2	HIV Prevention among most-at-risk populations (MARPS)		0	0		
11.3	Work-place HIV prevention programmes	Plantation Workers	1,031,133	1.31%	ILO, GTZ, Australian Aid, & GOU	

11.4	Sexual Reproductive Health Programme		5,230,000	6.63%	WHO, UNFPA, German Foundation for World Population (DSW) Reproductive Health Uganda & GOU	
11.5	Adolescent Friendly Sexual Reproductive Health Programmes	Adolescent Youth	1,176,484	1.49%	UNAIDS, UNFPA, UNHCR, SIDA, Int. Council of Management of Pop Programmes, GOU	
11.6	Potential new HIV prevention technologies such as microbicides, vaccines		0	0		
11.7	Potential for HIV prevention among MSMs and IDUs (if evidence for their role in HIV transmission becomes available)		0	0		
	Grand Total		78,862,351			

CHAPTER 4. LINKING THE RESPONSE TO THE EPIDEMIC

Are HIV prevention policies based on the latest available evidence and global best practice?

The KYR synthesis found that Uganda has well articulated policies for most of the biological prevention interventions. The policies are on the whole guided by the latest evidence on effectiveness and global best practice. The prevention interventions which are well covered by evidence-based policies include: condoms, HIV counselling and testing (HCT),[2] PMTCT, control of sexually transmitted infections, blood safety, infection control, post-exposure prophylaxis and health education in schools.

For the behavioural preventive interventions either policies are non-existent, or are very diffuse or do not target specific population groups. No policies, guidelines or strategies exist for IEC/mass media, or behaviour change interventions. Furthermore, these interventions are diffusely implemented to the general population without specific targeting of population sub-groups. There is overwhelming evidence on the efficacy of medical male circumcision as a preventive intervention for HIV transmission. Many countries in sub-Saharan Africa including Rwanda, Zambia Botswana have moved quickly to develop policies or implementation guidelines for its roll out. Unfortunately, Uganda (where 2 of the 4 efficacy trials were conducted) is moving more slowly.

Most-at-risk populations (MARPs) including commercial sex workers, uniformed services, fishing communities, truck drivers, MSMs and IDUs were found in the 2006 review of evidence to play a role in the occurrence of new infections (UAC 2006). There are no policies or guidelines for the implementation of interventions in these groups neither are there any services for them.

Environmental, societal and contextual factors are diffusely defined with no specific policies.

Do HIV prevention policies and programmes respond to the key risk factors and drivers of the epidemic?

The KYE synthesis summarized the key risk factors and contextual factors driving the epidemic in Uganda while the KYR synthesis described the prevention policies and programmes that constitute the national response for HIV/AIDS. Multiple sexual partners -- whether among persons in casual relationships or long-term marital or cohabiting relationships -- are a major risk factor for new infections, and a reduction in number of partners was absolutely crucial to Uganda's early prevention success (Kirby, 2008). HIV transmission through casual relationships including behaviours such as transactional and cross-generational sex can be prevented through consistent and correct condom use. National policies and guidelines for condom use are in place and being implemented. What is required is to intensify education on proper and consistent use of condoms, integrating this effort with post-test counseling and targeting behaviour change interventions especially to discordant couples and people with multiple partners. Policies and guidelines also exist for STI management including HSV-2.

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[2] Emerging evidence does not indicate a preventive effect from HCT through reducing risk behavior, but it continues to be categorized as a prevention intervention.

There are no policies or guidelines targeting prevention of transmission of HIV among persons in long-term marital or cohabiting partnerships. There are no policies that specifically address counselling and testing before or during marriage, condom use by discordant couples, or reduction of multiple concurrent partners among married or cohabiting couples. Although there is no strategic information on MARPs, this population needs to be considered in developing policies and services for HIV prevention.

Is funding for HIV prevention allocated to where it is most needed?

The resource allocation review showed that 25% of the prevention resources go to HCT, 20% to BCC mass media and IEC, 16% to PMTCT and 7% to blood safety (the biggest prevention categories). The first two, i.e. HCT and BCC/mass media/IEC are diffuse interventions and are not well targeted towards specific population groups. Condom promotion mainly targets casual relationships. Although blood transfusion is not a major mode of transmission of HIV, adequate resources should continue to be allocated to this intervention so as to continue averting infections through blood transfusions.

From the KYE and KYR synthesis, *the greatest need for HIV prevention exists among person with multiple partners whether in casual or long-term martial or cohabiting relationships*. Programs such as HCT, IEC/BCC, and condom use targeting the general population cannot be assumed to be sufficient for married or cohabiting couples. Furthermore, the delivery strategies for these interventions do not favor married or co-habiting couples.

Most-at-risk populations (MARPs) such as commercial sex workers, uniformed services, fishing communities, truck drivers, MSMs and IDUs are population groups with great transmission potential and are under-serviced.

A review of the resource allocation for HIV prevention shows that there is no funding for programs targeting married and cohabiting couples specifically. Secondly MARPs are not funded at all. Another gap that was identified is that funding is not targeted to prevention with positives (PWP) but rather to ART and care.

CHAPTER 5. RECOMMENDATIONS

Policy level Recommendations

Evidence-based Planning and Decision Making

i)   The Know Your Epidemic Know Your Response Modes of Transmission methodology should be institutionalized in the Uganda AIDS Commission and Ministry of Health operations. This is will facilitate regular monitoring of changes in the transmission dynamics of HIV and generate information that can be used to align prevention efforts to areas of greatest need.

ii)   The capacity to use the KYE-KYR Modes of Transmission methodology should be developed and strengthened at the national level structures in the HIV response.

iii)   The GRIPP concept should be institutionalized and the process of translating evidence generated by research studies and the HIV/AIDS monitoring and evaluation system into practice and policy strengthened.

iv)   Surveys for Most-At-Risk Populations with both serological and behavioural components should be institutionalised and conducted regularly (at least every 2 to 3 years) to improve data availability and data quality for application of the MOT model.

Development of New Prevention Policies and Guidelines

i)   A national policy, a communication strategy and implementation guidelines for the roll-out of safe medical male circumcision should be developed as a matter of urgency and integrated into the other components of the HIV prevention package and health services delivery. Infrastructure development and human resource capacity development for the roll out should be given priority.

ii)   Policies and guidelines for HIV counselling and testing, IEC/mass media, and behaviour change interventions should be reviewed and strengthened with a view to targeting the following population sub-groups:
   a. Persons in long-term marital or co-habiting partnerships
   b. Discordant couples
   c. Persons living with HIV and AIDS
   d. Most at risk populations (MARPs) including commercial sex workers, uniformed services, fishing communities, truck drivers, MSM and IDUs

iii)   Legal impediments to the inclusion of most-at-risk populations (MARPs) including commercial sex workers, MSMs and IDUs in the HIV/AIDS national response should be reviewed.

iv)   Policies and guidelines for environmental, societal and contextual factors that play a role in the transmission of HIV should be better defined and implementation strategies clearly elaborated.

v)   Specific guidelines and targets for programmes addressing gender inequality and harmful gender norms should be developed, disseminated and programmes rolled out.

vi) Guidelines and mechanisms for the regular tracking and reporting of resource allocation, disbursement and spending for the national response should be developed and institutionalized at every level of the national response.

Programmatic Recommendations

Prevention Programming

i) Prevention programmes and efforts should be re-aligned to where the new infections are occurring and to the populations most in need. HIV prevention programmes should balance interventions, giving priority to interventions that have the potential for the greatest impact on HIV transmission at this stage of the epidemic. These include reduction of number of sexual partners, HIV-discordance, medical male circumcision and consistent condom use especially in high risk sexual and among most-at-risk population groups.

ii) Targeting of prevention interventions to populations most in need should be improved. HIV prevention programmes should increasingly focus on population groups with disproportionately higher prevalence and incidence of HIV infections, but that currently don't constitute the focus of HIV prevention programmes. These population groups include urban residents, older individuals, married working, wealthy men and women, residents of northern Uganda and MARPs.

iii) HIV prevention among HIV-infected people should be strengthened taking advantage of the expanded opportunities for HIV/AIDS care and treatment to integrate HIV prevention into all HIV/AIDS treatment, care and support programmes.

iv) HIV counselling and testing should be scaled-up with improved coordination of partners and increased emphasis on couple counselling and disclosure of HIV test results.

v) Evidence-based planning and programming should be encouraged. IEC/mass media and behavioural change interventions, use of strategic information should be strengthened to ensure that the interventions are evidence-based, adequately based on behavioural theory and focus on behaviours that are responsible for the majority of new infections.

Resource Allocation and Alignment

i) HIV prevention resources should be aligned to those population groups in which new HIV infections are occurring. This does not mean that there should be re-allocation of available prevention funding, but rather it highlights the need to mobilise additional resources and expand the focus and attention to include those individuals/ groups that may not have been targeted before

ii) Government should invest more of its own resources into the national HIV/AIDS response generally but into HIV prevention interventions specifically. The meager 6% invested by government is not acceptable

iii) Additional resources for HIV prevention and capacity building of public and private sector partners involved in HIV prevention efforts across the country should be ensured

Recommendations for Strategic Information Needs

i) The generation, storage and sharing of strategic programme information should be improved. A one-stop repository for strategic information on the epidemiology and national response should be developed preferably by strengthening the National Documentation Information Centre at the Uganda AIDS Commission

ii) The national Health Management Information System and the Resource Centre at the Ministry of Health should be strengthened to collect, process and disseminate routine health data on program implementation. A link between routine sources of information and research and/or periodic surveys should be developed at the Resource Centre.

iii) There should be a mechanism for research projects and collaborations on HIV/AIDS to provide data on the HIV epidemic to both NADIC and the Resource Centre

iv) M&E systems should be strengthened to provide more comprehensive coverage data, better reporting, and more information on the quality of services. Regular aggregation of M&E data and dissemination to all stakeholders should be supported to promote utilisation of these data.

v) National Surveys that provide monitoring information on the national HIV/AIDS response should be conducted regularly and in a coordinated manner. These include
    a. The AIDS Indicator Survey (AIS) – every 3 years
    b. National AIDS Spending Assessment (NASA) – every 3 years
    c. Demographic and Health Survey (DHS) – every 5 years

vi) A KYE-KYR Modes of Transmission Study should be conducted regularly every 3 years after the findings of the AIS and NASA are available to help keep track of the changing HIV/AIDS epidemic in the country.

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APPENDICES

Appendix I: Uganda Modes of Transmission Study Technical Steering Committee and Peer Consultative Group

Technical Steering Committee	
Name	**Agency**
Prof John Rwomushana	UAC/ Chair
Grace Murindwa	UAC/ Co-chair
Rose Nalwadda	Study Coordination UAC
James Okara Wanyama	Study Coordination, UNAIDS Uganda
Madraa Elizabeth	MoH
Alex Opio	MoH
Joshua Musinguzi	MoH
Mr. Enginyu Samuel	MoH
Rev. Sam Ruteikara	NPC
Margaret Achom	CDC
Wolfgang Hladik	CDC
Mai Harper	UCC, UNAIDS Uganda
Nuwagira Innocent	WHO
Rosemary Kindyomunda	UNFPA
Peer Consultative Group	
Philippa Easterbrook	Infectious Diseases Institute
Wolfgang Hladik	Centers for Disease Control
Fulgentius Baryarama	Centers for Disease Control
Kenneth Muniina	Medical Research Council
Leigh Anne Shafer	Medical Research Council
Nazarius M Tumwesigye	MU School of Public Health
Danstan Bagenda	MU School of Public Health
Joseph Mugisha	MU Dept of Mathematics
Paul Mugambi	National Academy of Science

Appendix II: Synthesis Questions and Summary Matrix

Synthesis Questions:
- Are HIV prevention policies based on the latest available evidence and global best practice
- Do HIV prevention policies and programmes respond to the key drivers of the epidemic
- Is funding for HIV prevention allocated to where it is most needed

Summary of Synthesis of Modes of Transmission Study Task Reports

Source of all (adults and children) new HIV infections (%)	Required policies for prevention	Existence of policy	Programme coverage	% spent of prevention	Comments	Recommendation
Mutual Monogamous sex in past 12 months sex (35%)	Regular couple counseling Testing	Yes	Low (<10% per year) coverage	HCT general population in (25%)	Associated with PMTCT and no advocacy for regular CT. Essential as an entry point to care and treatment and prevention in case of discordance.	Scale up couple counseling and testing including collection of data using existing HMIS tools
	Pre-marital counseling and testing	No policy	Very low		No systematic national programmes	Institutions responsible for matrimony e.g. churches, state organs, traditional leaders should be counsel couples to test before marriage
	Disclosure	Yes	Low		High for ART clients (82%). Most couples do not know the recent HIV status of their spouse	Persons in partnership should be obliged to disclose their status if they test alone
	Condoms	Yes but not targeting marriage	Very low (4-5%) in marriage	Condoms general population (18%)	Condom use in marriage is very low but appears to increase with knowledge of ones status. However, condom use may not be consistent even in situations of discordance	Condom use in marriage where there is discordance and as family planning method need to be scaled up
	Faithfulness	Yes	General awareness but no focused programmes	BCC/Mass media/IEC (20%)	Programs address the general population but are not tailored for specific interaction with married or cohabiting individuals	Need focused behavioural change programmes e.g. Need more interpersonal counseling and fora for married couples. Further involvement of religious and traditional institutions

Source of all (adults and children) new HIV infections (%)	Required policies for prevention	Existence of policy	Programme coverage	% spent of prevention	Comments	Recommendation
	Manage-ment of Discordant relationships	No policy guidelines	Low (<10% per year) coverage	HCT general population in (25%)	Discordance has been shown to be high (50%) among couples were at least one is HIV infected.	Home based counseling and testing
	STIs	Treatment guidelines	No specific programme	STI treatment (1%)	There has been a shift of emphasis away from STI management	Revive STI control programmes
Multiple partnerships plus their partners (37%)	Reduction in number of partners	No clear policy guidelines	Low coverage of BCC interventions	BCC/Mass media/IEC (20%)	Multiple partnerships appear to be an important source of new infections.	Make partner reduction the cornerstone of prevention
	Increased targeted condom use	Yes	Low (4-5%) coverage of condom use	Condom use in general population (18%)	About half the population report not using a condom during sex with a non-regular partner	Scale up consistent and correct condom use especially for non-regular, non-spousal sex and among discordant relationships
	HCT and disclosure	Yes	Low (<10% per year) coverage	HCT in general population (20%)		
	MMC	No policy guidelines	No programme	Approx. 0% of prevention	Reduces acquisition of HIV by male but should be promoted as a package	Development of policy guidelines and strengthening the health system to scale up male circumcision especially among the younger uninfected population
Commercial sex (9%)	BCC, Condom promotion etc	No policy guidelines	Limited coverage e.g. livelihood programme. Kawempe programme addresses	0%	Very few targeted programmes and the few are not comprehensive to include condoms, STI treatment, HCT, Peer education. Absence of regular surveys to assess HIV status and behaviour	Scale up nationally programmes for sex workers and their clients and organize regular (every 2 to 3 year) surveys of HIV and behaviour

Source of all (adults and children) new HIV infections (%)	Required policies for prevention	Existence of policy	Programme coverage	% spent of prevention	Comments	Recommendation
			only 400 sex workers. 58% condoms use in commercial sex			
MSMs (<1%)	BCC, Condom promotion etc	No policy guidelines	No programmes	0% of prevention	Scanty data available on size of population	Size estimations to be carried out
IDUs (<1%)	BCC, Condom promotion etc	No policy guidelines	No programmes	0% of prevention	Scanty data available on size of population	Size estimations to be carried out
PMTCT (18%)	HCT, PMTCT, BCC	Yes	Under 50% of HIV+ pregnant mothers	16% of prevention	Low coverage and low male involvement	Scale up coverage
Blood transfusion (0%)	HIV screening of blood	Yes	100% blood units screened	6% of prevention	Good coverage that explains the prevention of blood transmission.	Maintain support for screening of blood transfusion units
Medical Injections & PEP	Infection control and PEP	Yes	Medical Injections 96% new needles per injection	1% of prevention	Good coverage of medical injection safety but low coverage of PEP	Scale up PEP

General comments

- Most prevention funds are being directed towards the young people
- Programmes specifically targeting married and cohabiting couples are lacking. Most IEC/BCC and condom programmes address the general population.
- Need to first clearly define the prevention packages for married and cohabiting couples
- Special programmes for commercial sex workers and their clients are not of large scale and comprehensive.
- Programmes addressing discordance are lacking
- There are no policy guidelines and programmes for MMC.

Conclusion

There is a mismatch between where the new infections are occurring and where prevention is being emphasized. However, it must be noted that the observed mismatch may be due to the success in programmes addressing the groups that are not having most new infections. For instance, the peek of infection used to be among the youth but has now shifted to the older and married or cohabiting. This could be a result of the current efforts addressing the youth. Transmission attributable to blood transfusion may be low due to the investment in HIV screening. In this regard, as we recommend the scale up of prevention efforts towards the married and cohabiting, we should not reduce our support to the programs targeting the youth otherwise we may loose our successes in this population bracket. Innovative behavioural change programmes that target partner reduction and consistent and correct use of condoms in discordant and non-regular relationships need to be explored and scaled up.

Appendix III: Uganda Modes of Transmission Incidence Model

Adult Risk Behaviour	Male	Female	Total number with risk behaviour	Prevalence of HIV (%)	Number HIV+	Prevalence of STI (%)	Number of partners per year	Number of acts of exposure per partner per year	Percentage of acts protected (%)	with STI	No STI	Incidence	% of incidence	Incidence per 100,000
Injecting Drug Use (IDU)	0.02%		994	30.0%	298	9.5%	4	90	50%	NA	0.01	258	0.28	25,911
Partners IDU		0.00%	252	7.5%	19	NA	1	108	4%	0.0048	0.0012	10	0.01	3,994
Sex workers		0.50%	32,652	47.2%	15,412	30.0%	129	5	58%	0.0048	0.0012	833	0.91	2,550
Clients	2.90%		189,381	8.5%	16,097	27.7%	4	27	58%	0.0042	0.0011	7,172	7.83	3,787
Partners of Clients		1.66%	108,676	7.5%	8,151	NA	1	108	4%	0.0048	0.0012	1,660	1.81	1,528
MSM	0.06%		3,976	43.0%	1,710	11.0%	5	24	56%	0.0400	0.0100	559	0.61	14,066
Female partners of MSM		0.02%	1,569	7.5%	118	NA	1	108	4%	0.0048	0.0012	92	0.10	5,889
Multiple partnerships (MP)	25.80%	1.90%	1,808,919	9.6%	173,656	14.9%	2	60	20%	0.0042	0.0011	21,722	23.73	1,201
Partners MP	0.76%	20.95%	1,417,881	7.5%	106,341	NA	1	108	4%	0.0048	0.0012	19,925	21.76	1,405
Mutually monogamous heterosexual	41.96%	50.26%	6,022,317	5.0%	301,116	10.4%	1	108	5%	0.0045	0.0011	39,261	42.89	652
No risk (recent)	28.50%	24.70%	3,474,169	5.0%	173,708	6.1%	0	0				0	0.00	0
Medical injections	32.40%	43.90%	13,060,787	6.7%		NA	2	1	96%	NA	0.001	54	0.06	0
Blood transfusions	1.02%	1.03%	134,053	1.2%		NA	1	1	100%	NA	0.9	0	0.00	0
TOTAL ADULT POPULATION	100.00	100.00	13,060,787	6.10	796,626						Total incidence	91,546		701

Total incidence in **partners** of high-risk individuals | 21,687 | 23.690 | 1,419

For further information contact: