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and  
Global HIV/AIDS Monitoring and Evaluation Team (GAMET)

**The Global HIV/AIDS Program**  
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# HIV / AIDS in Ethiopia

## *An Epidemiological Synthesis*



*April 2008*

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**HIV / AIDS IN ETHIOPIA -  
AN EPIDEMIOLOGICAL SYNTHESIS**

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World Bank Global HIV/AIDS Program

**April 2008**

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## HIV / AIDS in Ethiopia – An Epidemiological Synthesis

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This synthesis and analysis of available HIV epidemiological and response data for Ethiopia was undertaken by the Federal Ministry of Health HIV/AIDS Prevention and Control Office of Ethiopia with the World Bank and other partners. For the first time, all available data and research on the HIV epidemic in Ethiopia were collated and carefully reviewed together, to gain an enhanced understanding of the trends and heterogeneity of HIV in Ethiopia.

The work was funded by the Global AIDS Monitoring and Evaluation Team (GAMET) of the World Bank Global HIV/AIDS Program (GHAP).

### Abstract

**Design/Methods:** A team of local and international experts searched published and grey literature on HIV/AIDS in Ethiopia. They reviewed the Ethiopian, East African and international literature, surveillance and research papers, and consulted with national and international experts. In addition to many years of antenatal clinic surveillance data, two Demographic and Health Surveys (DHS) and two Behavioral Surveillance Surveys (BSS) were available, as well as other studies. No new data were gathered, but new primary analysis was done on data from both the 2005 DHS and BSS.

**Results:** The study uncovered a number of major findings which have implications for policy and practice in the country, including: the epidemic may be less severe, less generalized and more heterogeneous than previously believed, with marked regional variations; the diversity of the HIV epidemic seems to be related to sexual behavior patterns; small towns may be HIV hot-spots that have had marginal attention in HIV prevention efforts to date; traditional high-risk groups such as sex workers seem to be reducing some of their risky behaviors. Young populations, especially never-married sexually active females have the greatest risk of HIV infection in the country; discordant couples are also a concern, pointing to a clear need for couple counseling services which are presently non-existent or rudimentary. The lack of recent data and research, especially on high-risk groups, makes further conclusions difficult, and highlights the clear need for more research.

**Conclusions and Policy Implications:** Trying to produce “single” prevalence estimates for the entire country is inadequate for understanding the scale and heterogeneity of the epidemic. HIV/AIDS programs should not be based on national-level statistics, but need to be more focused geographically, and directed to the regions, districts and/or communities that exhibit higher prevalence rates. This will necessitate new research, and disaggregating data to the district level in order to identify hot spots and communities at higher risk.

**Keywords:** HIV, AIDS, Epidemic, Ethiopia, Response, Policy Analysis, GAMET, HAPCO, World Bank

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## Acknowledgements

The Federal HIV/AIDS Prevention & Control Office (FHAPCO) wishes to thank the World Bank for financial and technical collaboration on the development of this study. Special thanks are due also to the members of the smaller advisory group for the study, representatives of the Ethiopian Health and Nutrition Research Institute (EHNRI), Addis Ababa University Department of Community Health, CSA, The World Health Organization (WHO), the US Centers for Disease Control and Prevention (CDC), the United Nations Joint Special Program against HIV/AIDS (UNAIDS), the United States Agency for International Development (USAID), HAPCO, and the HIV/AIDS prevention task force, who actively participated and provided critical comments for the improvement of the study. Also, we gratefully acknowledge the financial support received from WHO for the technical advisory group meeting.

## Acronyms and Abbreviations

AIDS	Acquired Immuno-deficiency Syndrome
ABC	Abstain, Be Faithful, use Condoms
ANC	Antenatal Care
ART	Antiretroviral Treatment
ARV	Antiretroviral
BCC	Behavioral Change Communication
BSS	Behavioral Surveillance Survey
BTS	Blood Transfusion Service
CBO	Community-Based Organizations
CDC	Center for Disease Control
CI	Confidence Interval
CSW	Commercial Sex Worker
CV	Coefficient of Variation
DFID	Department for International development
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
EHNRI	Ethiopian Health and Nutrition Research Institute
ENARP	Ethio-Netherlands AIDS Research Project
EPP	Estimation and Projection Package
ERCS	Ethiopian Red-Cross Association
FDRE	Federal Democratic Republic of Ethiopia
FHI	Family Health International
FSW	Female Sex Worker
GTZ	Gesellschaft für Technische Zusammenarbeit
HAPCO	HIV/AIDS Prevention and Control Office
HEW	Health Extension Worker
HSV-2	Herpes Simplex Virus-2
IDU	Injection Drug Use
IEC	Information Education and Communication
M&E	Monitoring and Evaluation
MAC-E	Millennium AIDS Campaign for Ethiopia
MOH	Ministry of Health
MSM	Men who have sex with men
MTCT	Mother-To-Child Transmission
NAC	National AIDS Council
NGO	Non-Governmental Organizations
OI	Opportunistic Infection
OPD	Out-Patient Department
OVC	Orphan and Vulnerable Children
PEPFAR	President's Emergency Plan for AIDS Relief
PLHIV	People Living With HIV (includes people living with AIDS)
PMTCT	Prevention of Mother-To-Child Transmission
PR	Prevalence Ratio
SNNP	Southern Nations Nationalities and Peoples
SNNPR	Southern Nations Nationalities and Peoples Region

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SPM	Strategic Plan and Management
STD	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections
TB	Tuberculosis
TPHA	Treponema Pallidum Haemagglutination Assay
UNAIDS	United Nations Joint Special Program against HIV/AIDS
UNDP	United Nations Development Program
UNICEF	United Nations Children Fund
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
WHO	World Health Organization



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## Executive Summary – Key Findings

While HIV/AIDS in Ethiopia has been recognized since the mid-1980's, and regular surveillance has been carried out in recent years through surveys in antenatal clinics (ANC), Demographic and Health Surveys (DHS) and Behavioural Surveys (BSS), there has not hitherto been an attempt to collate this data to provide a synthesis of HIV/AIDS in the country. For this reason, the Federal Ministry of Health (MoH) HIV/AIDS Prevention and Control Office (HAPCO), in collaboration with the World Bank and other partners undertook a study to pull together and synthesize information and data accumulated to date about the HIV/AIDS epidemic in Ethiopia, to identify gaps in knowledge and to correlate current and previous programming with the available evidence on the current state of the epidemic

The analysis is based on a review of the Ethiopian, East African and international literature, an analysis of surveillance and research papers, and consultations with national and international experts. A team of local and international consultants, working in collaboration with HAPCO and the Ethiopian Health and Nutrition Institute (EHNRI), and with the support of the major international donors in the country (World Bank, UNAIDS, WHO, USAID/ PEPFAR, etc.) searched the major published and grey literature written on HIV & AIDS in Ethiopia. No new data were gathered for this report. However, new primary analysis was conducted on data in both the 2005 DHS data and BSS reports.

The study has uncovered a number of major findings related to these objectives, each of which has implications for policy and practice in the country. These are summarized as follows:

### a. The epidemic is highly heterogeneous

Evidence indicates that **the epidemic may be less severe, less generalized and more heterogeneous than previously believed**. It seems to have stabilized or even declined in most of the major urban centers, while increasing in the smaller towns. The rural epidemic appears to be relatively widespread but heterogeneous, with most regions having a relatively low prevalence of HIV, but a few demonstrating prevalence rates above 5%. There are marked regional variations, although these cannot be fully understood due to lack of data. Trying to produce “single” estimates for the entire country has little relevance for understanding the scale and heterogeneity of the epidemic.

**Therefore, HIV/AIDS programs should not be based on national-level statistics, but need to be more focused geographically, and directed to those regions, districts or communities exhibiting higher prevalence rates. This will necessitate conducting research and disaggregating data to the district level in order to identify hot spots and communities at higher risk.**

### b. The epidemic is higher in small towns and market centers

Contrary to expectations, **small towns included in the DHS survey exhibited a higher-than-expected prevalence of HIV compared to bigger towns**. These small towns may be HIV hot-spots that have been neglected in HIV prevention efforts to date. Huge urban-rural differentials have long been noted in the country (with urban areas more affected than rural areas). However, as

the communication and transport infrastructure improves, there is likely to be further mixing of urban and rural populations, with the possibility of further spread of HIV into the rural populations.

**Therefore, prevention, mitigation and treatment programs, including VCT and ART services, which have been located mainly in the larger urban centers, need to be placed in the smaller towns and market centers that have higher-than-expected HIV prevalence levels.**

**Surveillance in rural areas needs to be increased, to provide better estimates of the true HIV prevalence in the country, since Ethiopia's population remains overwhelmingly rural.**

### **c. Geographical variation, with prevalence highest in Gambela**

The diversity of the HIV epidemic in the country seems to be related to sexual behavior patterns as well as by factors that affect transmission such as the presence or absence of male circumcision.

**Gambela region unexpectedly exhibited the highest prevalence of any area -- rural or urban, including Addis Ababa.** Gambela is characterized by a relatively higher magnitude of risky sexual behavior than any other region and male circumcision is less common. These two factors may be responsible for fuelling the epidemic in the region.

**Further research is needed to confirm the reasons for the unexpectedly high prevalence in Gambela Region, and if confirmed, programs need to be developed to target the high-risk populations, including possibly offering male circumcision services.**

### **d. Mixed sexual behavior patterns and trends among the general population**

Data indicates that while risky behavior has leveled off or decreased slightly in recent years, there is still a substantial proportion of the adult population that is engaged in risky sexual behavior, with indications that condom usage and age of sexual initiation, at least for males, is increasing.

**The advances noted in condom use need to be built-upon, with research to determine which strategies and initiatives have accounted for the success, and to extend these strategies to a wider population.**

### **e. Young and unmarried women are at risk**

The young populations, especially never-married sexually-active females, face the greatest risk of HIV infection in the country, with prevalence rates much higher than the average for both urban and rural areas as well as all women of reproductive age. This is associated with an early age of sexual debut and sexual mixing with high-risk older men, on top of their biological and gender-related vulnerability.

**Therefore, prevention and mitigation programs need to be established in this population. Youth-friendly educational and counseling services aimed particularly at girls and young women need to expand in all parts of the country, including school settings, providing not only services but also training in condom negotiating skills and other HIV prevention strategies.**

#### **f. HIV Transmission risk in marriage – discordant couples**

Most of the discordant couples reside in urban areas, and the HIV-negative partners are **perhaps the group at greatest risk of contracting HIV**. Couple counseling services in the country is either non-existent or rudimentary.

**Therefore, services for couple counseling, combined with education on appropriate prevention measures, mainly in urban areas, need to be established as a high priority.**

#### **g. Sex work may be on the rise and sex workers are still at risk**

There has been no biological survey among sex workers in the country in the past decade, and estimating the number of sex workers with reasonable accuracy is virtually impossible. **The scant data suggest that the demand for paid sex is increasing and the median age of sex workers is decreasing; anecdotal evidence suggests that the number of sex workers is on the rise.** Data on the “typology” of sex work is also lacking, as is information on clients. However, there are indications that both sex workers and their clients report increased use of condoms, although whether sex workers are also using condoms with their non-paying clients is a question. But if this were true, sex workers and their clients may not be as at risk for acquisition or transmission of HIV as has been commonly assumed.

**Therefore, research on sex workers is urgently needed to update information that is decades old, including to determine current levels, behaviors, and characteristics. Surveillance and special programs directed at sex workers are the only way to monitor the activities and risks of this population.**

#### **h. More data on other potentially high-risk and vulnerable populations are needed**

The uniformed services, truckers, refugees and displaced people, street children, daily laborers, students and other mobile populations may be among the most vulnerable groups in the country; however **data are lacking to measure accurately the recent spread of HIV in these groups and their role in the further spread of HIV to the general population.** There is some evidence from the BSS that some of these populations may not be as at risk as was suspected, but **further research is needed to corroborate these inferences**

#### **i. Gaps in service delivery remain**

While there have been recent efforts to increase the availability and accessibility of services, in general all preventive and treatment services need to be expanded and made available to a broader population in both the urban and rural areas.

**Services which need expansion include VCT, couple counseling, STI treatment, antenatal and postnatal PMTCT, TB/HIV integration, and services targeted to specific populations, including youth, sex workers, students, migrants, refugees and other displaced populations and the uniformed services.**

#### **j. The need for improved surveillance**

While surveillance has improved in recent years, this study has been constrained by the limitations of the surveillance currently in place. The 2005 DHS is a valuable piece of research, but detailed analysis of its results cannot go further than the limitations of its sampling methodology. **Other studies that could be triangulated with its results are needed to better understand and interpret the findings of the DHS, ANC surveillance studies and the BSS (and many of the conclusions that this study has drawn from them).** The lack of any longitudinal studies or follow-up of cohorts targeting the general population has made it difficult to make accurate estimates of incidence, and studies based on biological determination of HIV status, socio-cultural and contextual factors, STIs, etc. are few in number and lack continuity.

#### **k. The need for more research**

**Most of the epidemiological research papers cited in this report date back more than ten years, and in many cases, information on particular risk groups is based on studies that were undertaken in the early 1990's.** There are gaps in knowledge of recent trends, and it is plain that some programming decisions have been based on out-of-date assumptions about risk groups and patterns of transmission. Research is often given secondary priority to programming imperatives, especially in an emergency epidemic situation, but it should be obvious that:

- ▶ **Epidemiologic research and continued surveillance of known and emerging high-risk groups needs to be prioritized as an additional program activity, and funds need to be made available or solicited for these activities to be carried out by government, academic, and even private research institutions.**



## HIV / AIDS in Ethiopia – An Epidemiological Synthesis

### 1. Introduction – study objectives and methods

#### 1.1 Objectives

With a population estimated at over 77 million, Ethiopia is the second most populous nation in Africa. About 85% of the population lives in rural areas, and approximately one-fifth are aged 15-24 years.

HIV/AIDS was first recognized in the country in the mid-1980's, at about the same time as in other countries in the region. Efforts to collect epidemiological data began shortly thereafter, and there are many studies from the late 1980s and 1990s reporting prevalence data and risk factors in a number of high-risk groups. In recent years, the main source of information about HIV has been antenatal clinic (ANC) based sentinel surveillance, with surveys being conducted and published at two year intervals, most recently in 2005. In addition, useful epidemiological information at national level and for specific communities can be extracted from the Demographic and Health Surveys (DHS) and Behavioural Surveillance Surveys (BSS), the most recent versions of which were also completed in 2005.

It has become increasingly clear that HIV prevention programs in Africa and Asia often prioritize the wrong targets, with a subsequent waste of resources, because of a basic lack of information about who is becoming infected.<sup>1</sup> This is sometimes due to a dependence on surveillance or research that was conducted in the early stages of the epidemic but has not been updated. For this reason, and partly as a result of discrepancies between the most recent ANC and DHS surveys, the Federal Ministry of Health (MoH) HIV/AIDS Prevention and Control Office (HAPCO), in collaboration with the World Bank and other partners, undertook a study to look into the HIV epidemic, its major transmission dynamics and its potential evolution in Ethiopia. The main objectives were to analyze current HIV responses and identify major geographic and thematic priorities that require greater emphasis.

This report aims to:

- Provide an overview of the trends and heterogeneity of HIV in Ethiopia
- Identify geographic areas and communities with elevated HIV prevalence or risk factors in Ethiopia and examine the major explanations for such variations in HIV transmission
- Delineate different HIV transmission patterns in Ethiopia
- Compare and contrast HIV transmission among vulnerable groups and the general population in Ethiopia
- Identify priority geographic areas and populations that require greater emphasis in future national and regional responses
- Based on the analysis, assess and make recommendations to strengthen national commitment and the policy environment.

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<sup>1</sup> Wilson, D; presentation to the 2007 Implementer's Meeting, Kigali, Rwanda June 2007; from [www.aidsmap.com/en/news/](http://www.aidsmap.com/en/news/), July 4, 2007

As will be described in the following pages, the study uncovered a number of major findings related to these objectives, through summarizing and analyzing as much data as it was possible to gather. But it needs to be emphasized that the analysis has been limited by the lack of recent research in the country outside of the routine surveillance activities, tied to the lack of a research policy and identification of specific research issues. **More information is needed to allow a more precise description of the epidemic; simply referring to a “generalized” epidemic is no longer adequate, and does not describe the particular regions, risk-groups or behavior patterns that are driving continued transmission and new case acquisition.**

**As well, many of the findings of this study have policy implications, not only for subsequent monitoring and surveillance of the epidemic, but for the allocation of prevention, treatment and care resources, and the populations to whom they need to be directed.**

## 1.2 Methodology

The analysis is based on a review of the Ethiopian, East African and international literature, an analysis of surveillance and research papers, and consultations with national and international experts. A team of local and international consultants, working in collaboration with HAPCO and the Ethiopian Health and Nutrition Institute (EHNRI), and with the support of the major international donors in the country (World Bank, UNAIDS, WHO, USAID/ PEPFAR, etc.) searched the major published and grey literature on HIV & AIDS in Ethiopia. Local offices and libraries were visited to identify and collect relevant literature on the magnitude of HIV & AIDS, routes of spread, geographic distribution, sexual risk behaviors, biomarkers, AIDS mortality and other related data. Electronic literature databases and websites of organization working on HIV & AIDS were also searched. The reports and literature were evaluated for methodological soundness and relevance to the current work.

As this is a **synthesis** and **collation** of available data, no new data were gathered for this report. However, new primary analysis was conducted on data in both the 2005 DHS data and BSS reports – mainly to generate frequency tables, and some univariate analyses were performed. Multivariate logistic regression analysis was used to examine the relationship between lack of male circumcision and risk of HIV infection, adjusting for a number of behavioral and socio-demographic variables. In some cases, analysis of available data was limited by the lack of access to primary data (for example, not having the primary antenatal surveillance data did not permit further analysis).

The first draft of the document was reviewed by a panel of experts in Ethiopia, and their corrections, comments and suggestions are reflected in this final report. As well, a large amount of information was collated for this report that was not necessarily germane to the discussion at hand. In order that the information not be lost, there are a number of appendices attached to the main text of this report that provide further justification or background for the arguments being put forward.

## 1.3 Analytical framework

A full discussion of the analytical framework applied to this study may be found in **Appendix One**. It should be noted that the analysis in this report focuses on the sexual transmission of HIV infection in Ethiopia. HIV transmission through transfusion of infected blood or blood products

may still occur to a limited degree, but as in most countries, blood safety has been a priority since the early days of the epidemic, and there is little evidence that it is a major contributing factor to HIV transmission. Similarly, there is little evidence in Ethiopia of transmission through unsafe medical injections, and although there may be some transmission through injection drug use, there is an almost-total absence of data on whether this indeed might be a factor in Ethiopia.

The HIV epidemic potential in Ethiopia is generally considered to be high, with increasing levels of economic hardship, expanding urbanization, increased mobility due to labour migration, a history of conflicts and civil disruption and better educational and trading opportunities (all features that have been identified elsewhere as contributors to increased HIV transmission). However, the size and distribution of high risk groups, sexual networks and bridging groups remain largely unknown, making determinations of epidemic potential largely speculative. In fact, any attempt to analyze the epidemiology of HIV in Ethiopia is limited by the lack of sufficient longitudinal, cross-sectional and behavioral data.

#### **1.4 HIV surveillance in Ethiopia**

Ethiopia being a resource-constrained country, the production and utilization of quality data did not receive much attention in the initial response to the epidemic. Instead, the focus was on determining the degree of involvement of well-recognized core risk groups for other STIs, namely female commercial sex workers and truck drivers. However, initial surveys were unlinked and anonymous and provided no detailed information about risk factors.

Between 1990 and 1996 there were barely any systematic surveillance activities at either regional or national levels. The first systematic national report on HIV, produced in 1996,<sup>2</sup> noted the progressive rise of HIV prevalence from 1% in 1989 to 3.2% (urban 12% and rural 1.5%) to an estimated 5.2%, which indicated a generalized epidemic. The rural epidemic remained little understood until the 2005 DHS.

Ethiopia's HIV surveillance systems have been in continuous development, but the development has been piecemeal, and the overall usefulness of the systems has been controversial, with arguments arising over inconsistencies in the methodologies, claims and counterclaims that they are not representative, all apart from the basic problems inherent in the various surveillance methodologies. This came to a head in the past two years with the controversy over the differing results of the 2005 DHS and ANC surveillance reports. A further discussion of this will be found in **Appendix 2**.

The Ethiopian 2005 DHS survey provided the first large-scale population-based estimates at regional and national level. However, it is difficult to interpret the DHS data, partly because it has become apparent that the sample size was not large enough. Another issue in the 2005 DHS was the high refusal rate for blood testing – as high as 24.5% in men, and even higher in some regions (Afar 33%, Somali 36%, Addis Ababa 32%, Dire Dawa 40%). This is a cause for concern, in that refusal to participate in blood testing in a population-based survey can potentially bias the final HIV prevalence estimates.

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<sup>2</sup> MOH. AIDS in Ethiopia. First Edition. 1996

Despite the criticism and sometimes-acrimonious debate surrounding the release of the results from the various surveillance systems, **to date there has not been a proper cost-effectiveness, methodological or other comparative assessment, or a genuine attempt by the various stakeholders to support a single more useful surveillance system.**

## 2. The current status of the epidemic

### 2.1 An increased number of surveillance sites leading to better precision

The HIV/AIDS epidemic in Ethiopia probably began in the late 1970s or early 1980s, with the first hospitalized AIDS patients reported in 1986,<sup>3</sup> and the first sero-survey at a national scale conducted among military recruits in 1984-85 (showing a prevalence of 0.07% among 5,565 people tested).<sup>4</sup> Initially, the epidemic was localized in urban areas, along the major commercial routes and among certain occupational groups. By 1988, high rates of HIV prevalence (17%) were detected among commercial sex workers residing along the main trading roads<sup>5</sup> and long distance truck drivers (13%).<sup>6</sup> In some urban areas, prevalence rates as high as 38% were recorded among sex workers. In Addis Ababa, HIV prevalence rates in female commercial sex workers rose rapidly, from 24.7% in 1988 to 54.3% in 1990.<sup>7</sup> Since then the epidemic has expanded throughout the country into rural areas, especially in areas along road sides.<sup>8</sup>

However, the absence of sero-surveys conducted at repeated intervals using consistent methodology in the same population groups has meant that there is **an almost-total absence of HIV incidence data**. Therefore, sero-prevalence data (and occasional individual population reports) has been the only option to estimate the magnitude and monitor the trend of the HIV epidemic in the country.

The main source of HIV prevalence data in Ethiopia (as in many countries throughout Africa) has been from pregnant women attending antenatal clinics (ANC). HIV prevalence monitoring based on ANC-attending pregnant women in urban Ethiopia was initiated as early as 1989, but was limited until recent years to only a few urban sites. There has been a marked expansion of ANC sites since 2001, and by 2005 the total number of sites had expanded to 82, with 38 urban and 44 rural (**Figure 1**).

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<sup>3</sup> Lester FT, Ayeahunie S, Zewdie D. Acquired immunodeficiency syndrome: seven cases in an Addis Ababa hospital. *Ethiop Med J*. 1988 Jul;26(3):139-45

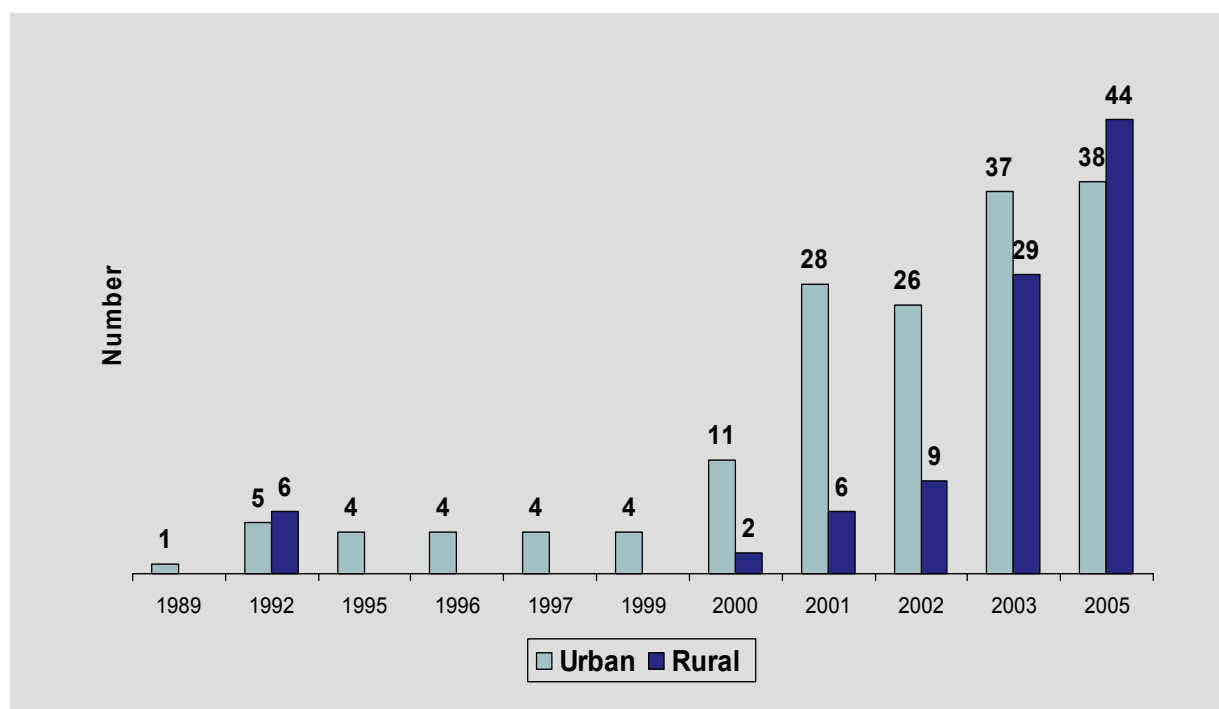
<sup>4</sup> Hailù K, Buttò S, Bekura D, Verani P, Titti F, Sernicola L, Rapicetta M, Pasquini P, Rossi GB. Serological survey of human immunodeficiency virus (HIV) in Ethiopia. *J Med Virol*. 1989 May;28(1):21-4

<sup>5</sup> Mehret, M.; L. Khodakevich; and D. Zewdie. 1990a. HIV-1 Infection and Related Risk Factors among Female Sex Workers in Urban Areas in Ethiopia. *Ethiopian Journal of Health Development* 1990, 4 (2, Suppl.):163–70.

<sup>6</sup> Mehret, M.; L. Khodakevich; and D. Zewdie. HIV-1 Infection Among Employees of the Ethiopia FreightTransport Corporation. *Ethiopian Journal of Health Development* 1990, 4(2, Suppl.): 17–82.

<sup>7</sup> Mehret, M.; L. Khodakevich; and D. Zewdie. HIV-1 Infection and Some Related Risk Factors among Female Sex Workers in Addis Ababa. *Ethiopian Journal of Health Development* 1990; 4 (2, Suppl.): 171–182

<sup>8</sup> Zewde A, Bahiru S, Sanders E, Tilahun T, Beyene A, Alebachew M, Schaap A, Wolday D, Rinke de Wit TF. HIV-1 seroprevalence and subtypes in police recruits from Afar regional state, Ethiopia. *Ethiop Med J*. 2002 Apr;40 Suppl 1:1-10

**Figure 1: ANC-Based HIV Sentinel Surveillance Sites in Ethiopia, 1989 - 2005**

*Source:* Constructed from various reports on HIV in Ethiopia.

The expansion of surveillance sites and the increased number of rural sites has improved the representativeness of the sample, however it is important to note that the main criterion for site selection was availability of functional ANC clinics.<sup>9</sup> The expansion of sites was based neither on population distribution nor knowledge of HIV epidemiology in Ethiopia. As most of the well-functioning ANC clinics are in large and small towns, the urban bias in the sample has not been totally eliminated by increasing the number of sites. In the hopes of clarifying some of the issues, the urban and rural trends will be analyzed separately.

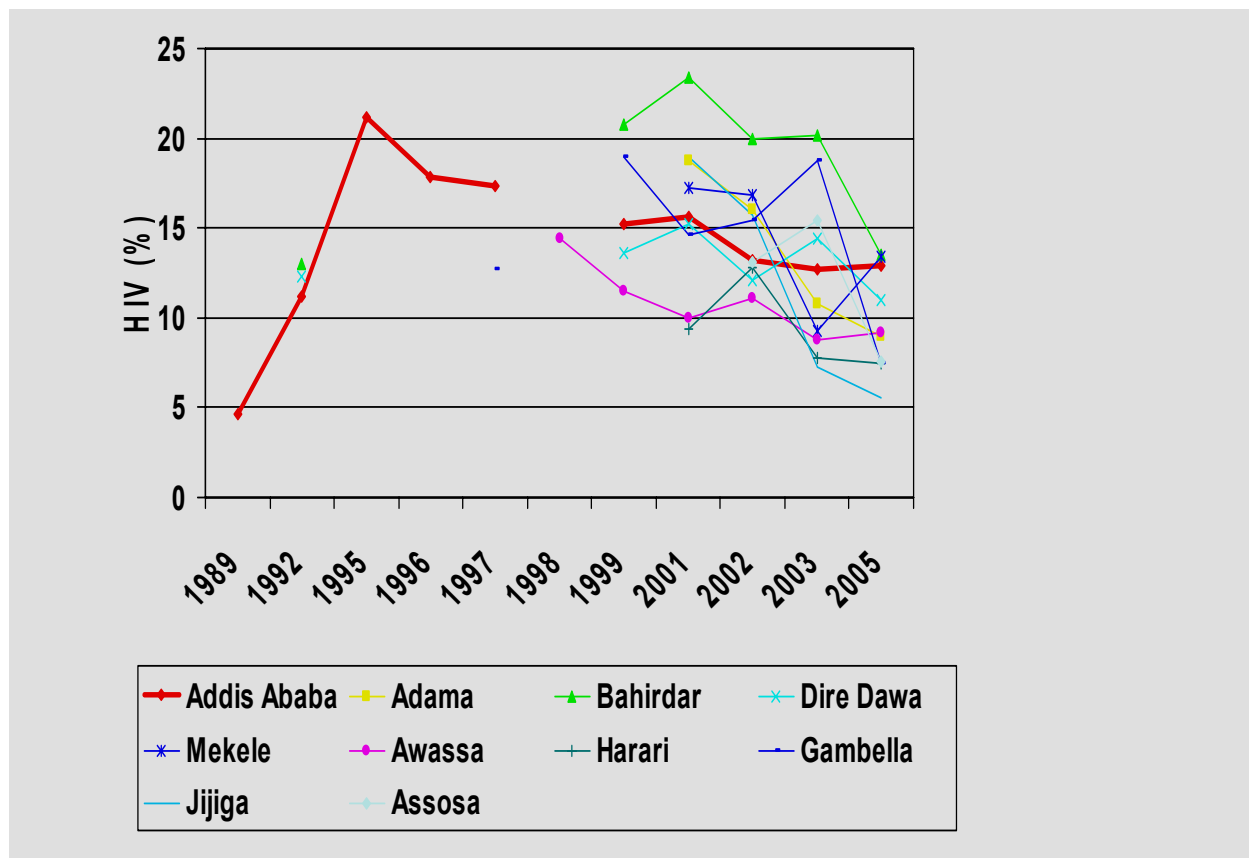
## 2.2 Urban trends 1 – Declining prevalence in the cities

The data obtained from ten urban sites that have been involved in at least three ANC surveillance cycles is shown in **Figure 2**, and reveals declining HIV prevalence since 2000, with very sharp declines in some urban areas.<sup>10</sup> These declines coincided with wider availability of VCT in major urban areas, so self-selection bias due to self-screening before pregnancy and marriage cannot be excluded, although there does appear to be a significant trend.

<sup>9</sup> MOH AIDS in Ethiopia. Fourth Report. 2002

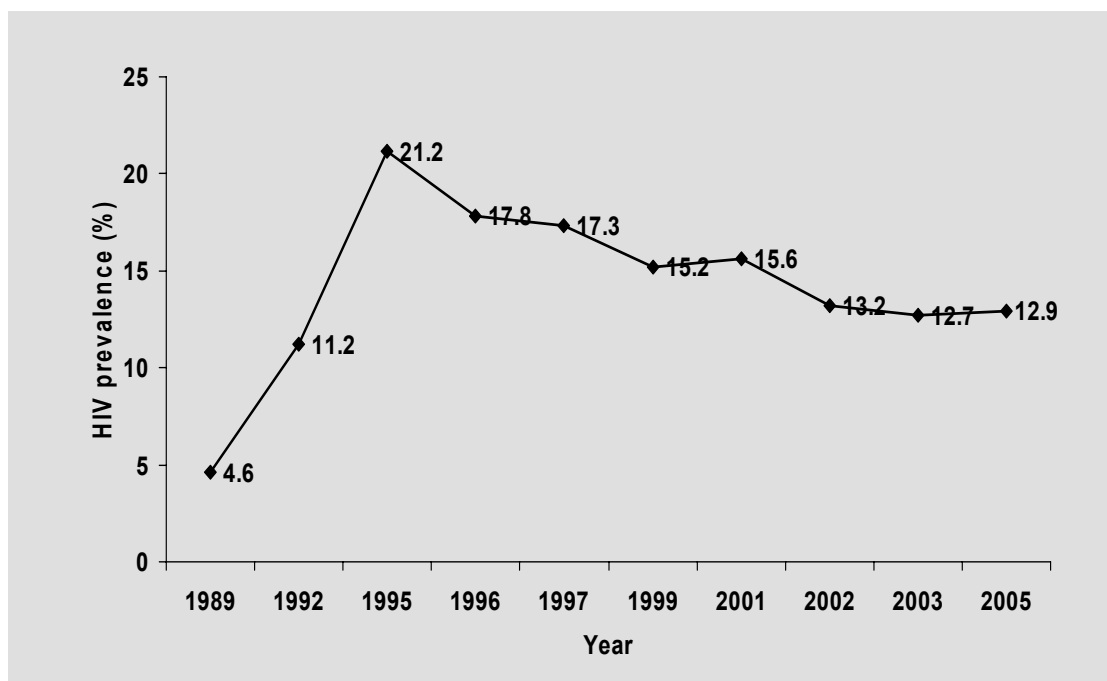
<sup>10</sup> Bahirdar - 23.4% to 13.5%, Adama 18.7% to 9%, Gambella 19.6% to 7.5%

**Figure 2: HIV prevalence trend among women (15-49 years) attending ANC in major urban ANC sites, 1989 - 2005**



Source: Compiled from various AIDS in Ethiopia Reports.

In Addis Ababa, ANC sentinel surveillance system has been in place since 1989 (**Figure 3**), and the data from the same health centers over the ten years from 1996-2005 makes trend analysis possible. As can be seen, a sharp increase in HIV prevalence in the early 1990's was followed by a stabilisation in the late 90's and a modest decline since then, demonstrating a pattern seen in other communities that have passed through the different stages of the epidemic.

**Figure 3: HIV prevalence trend in ANC attending women (15-49 years) in Addis Ababa**

Source: ANC Surveillance Reports.

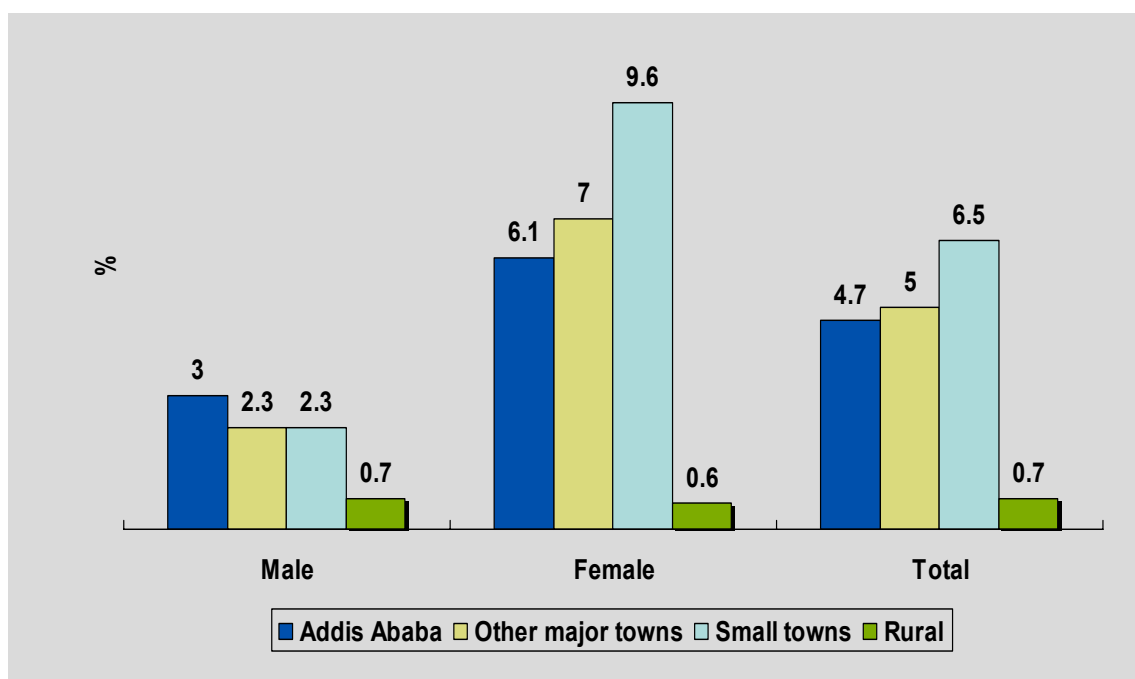
This apparent decline, at least in urban areas, is further corroborated by an analysis of 25 urban ANC sites which have participated in ANC sentinel surveillance since 2001 and could provide prevalence data for 2001, 2003 and 2005. The combined HIV prevalence rate of these sites declined from 12.7% (2001) to 10.5% (2005).<sup>11</sup> Excluding Addis Ababa from the analysis resulted in a more pronounced declining trend in the other urban areas, from 12.9% in 2002 to 9.8% in 2005 ( $\chi^2$  for trend=14.3,  $p=0.00016$ ). However, trend analysis will not take away the potential bias discussed above, and interpretation must be done cautiously. With increasing availability of other services such as ART, the interpretation of prevalence data is getting more complicated.<sup>12</sup>

### 2.3 Urban trends 2 – An elevated epidemic in smaller centers

The 2005 DHS data allow analysis of urban prevalence data separately for “Addis Ababa”, “major towns” and “small towns”. Contrary to expectations, **small towns in the survey exhibited higher prevalence of HIV among women than the bigger towns (Figure 4)**. Overall, HIV prevalence varied significantly ( $p<0.001$ ) by type of residence; the highest being in small towns. Urban prevalence varies substantially by type of residence among females.

<sup>11</sup>  $\chi^2$  for trend=8.1,  $p=0.0045$

<sup>12</sup> With greater numbers of HIV-positive people surviving for many years on ARV therapy, but little change or even some decrease in incidence, the total number of HIV-positive people, and HIV prevalence (the percent of the population that is HIV+) can increase.

**Figure 4: HIV prevalence (%) by type of residence: DHS 2005, Ethiopia**

Source: Authors' analysis of the DHS 2005 data.

Assuming that the DHS data reflect real differences and that disaggregating the data as shown in the above table has not created an artifact; one likely conclusion is that there are high-risk sexual networks operating in these small towns. Another possibility is that in larger urban centers, the high number of DHS respondents who refused HIV testing reduced reported prevalence, and distorted the comparison with small towns.<sup>13</sup>

There are a number of possibilities as to why there might be high risk sexual networks in small towns. Small towns often have market places where rural and urban people meet regularly. Many of the small town residents may be mobile populations, including traders and businessmen, and as a market and commercial point, there would be bars and local drink houses that would attract sex workers both from urban and rural areas. All of this would suggest that many of **these small towns may be HIV hot-spots that have been neglected in HIV prevention efforts to date that focused on larger centers.** The proximity of these small towns to rural areas could pose a risk to hitherto unaffected rural populations.

### *Can anything be inferred about incidence?*

One of the only incidence studies conducted in Ethiopia, the Ethio-Netherlands AIDS Research Project (ENARP) established two cohort sites in 1997 to study the incidence and progression of HIV infection. During follow-up, 19 sero-conversions for HIV antibodies occurred among 1,521

<sup>13</sup> The refusal rate was highest in Addis Ababa at 32%, 29% in other major towns, and 15% in small towns.

Information is not available to determine whether refusing testing is systematically associated with risk profile/sexual behavior, which would help to interpret the survey finding better.



HIV-negative participants, yielding an HIV incidence rate of 0.4 per 100 person-years (95% CI 0.3-0.6). The incidence was higher among females than among males and was highest among young females aged 20-29 years, in whom it was 1.0 per 100 person-years.<sup>14</sup>

However, the observed incidence rate in this population should be interpreted with caution, in that the findings are pertinent largely to the group studied (mostly middle-aged married people working in Ethiopian factories). Whether they would apply to young, unmarried, and under-employed people (who are particularly vulnerable to HIV infection), is not known.<sup>15 16</sup>

In the absence of incidence data, the measurement of HIV prevalence among young women (15-24-years) can serve as a proxy for HIV incidence, on the assumption that they have become infected relatively recently. Changes in HIV prevalence among 15-24-year-olds can therefore reflect recent trends in the epidemic. In Addis Ababa, **HIV prevalence among young women aged 15-24 years has shown a significant decline of 35% between 1996 and 2005**, falling from 20.7% to 13.5% in 2005<sup>17</sup>, ( $X^2$  for trend=23.5,  $p=0.0000$ ), with a particularly sharp decline noted during the period 1996-2002. Recent prevalence data (2003 and 2005) have shown a fairly stable trend.

### **Summary**

The evidence from urban areas appears to indicate **a generalized epidemic that is probably stabilizing or even declining in the major urban centers but may be increasing in the smaller towns.**

In the absence of direct incidence data, the evidence from younger pregnant women also suggests that **there may be fewer new cases.** Urban data from major towns are much better in quality and continuity than rural data (the quality of blood testing in remote areas is just one issue) but they are not free of bias and control of confounding is not exercised to the extent needed to help better interpretation.

However, a stable urban prevalence rate can also result from factors such as equal numbers of people dying of AIDS and being newly-infected, or people becoming sick with AIDS leaving the cities to return to their rural homes. **The lack of any cohorts that have been followed to monitor incidence data** makes these suppositions plausible until further research proves them wrong.

**The epidemic potential in small towns and the possibility of bridging a spread to rural communities appears to be huge and is not being given enough attention.** The epidemic potential size and distribution is not quantified, although various risk groups are identified.

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<sup>14</sup> Mekonnen Y, Sanders E., Messele T. et al. Prevalence and incidence of, and risk factors for HIV-1 infection in Ethiopia. *J Health Popul Nutr* 2005; 23(4):358-368

<sup>15</sup> Cohort participants passed through an HIV risk reduction program encompassing HIV VCT as well as HIV/AIDS education targeting at increasing individual awareness of the disease and behavioral change towards safer sex. A decline in risky sexual behaviors associated with the intervention has been documented

<sup>16</sup> Mekonnen Y, Sanders E, Akililu M, Tsegaye A, Rinke de Wit TF, Schapp Ab, et al. Evidence of changes in sexual behaviours among male factory workers in Ethiopia. *AIDS* 2003, 17:223-231.

<sup>17</sup> MOH/HAPCO. AIDS in Ethiopia. 6<sup>th</sup> Report. 2006

**There is a critical shortage of accurate information to characterize the epidemic using scientifically rigorous analytic techniques.** Data collection strategies are often biased, and despite its ethical importance and necessity, the problem with unlinked anonymous testing is that it is impossible to control for confounding factors in any subsequent data analysis.

## 2.4 Rural trends – not enough recent data

There have been few studies describing the rural HIV epidemic in Ethiopia. Not only are prevalence or incidence data lacking, there has also been little research to describe the dynamics of rural spread or behavioral studies investigating sexual practices or attitudes, sexual networking, the existence of rural sex work, other local or traditional practices that might fuel or inhibit the epidemic, etc. Table 1 summarizes the few rural prevalence studies conducted up to 2002.

**Table 1: Rural Prevalence Studies**

Year	Location	Population Studied	HIV Prevalence Rates
1991	Small rural village near Addis Ababa	Adults	0.4% (1/240) <sup>18</sup>
1993	Six rural sites in Oromia, Amhara, SNNP and Tigray regions	Cross-sectional population-based study	0.0% to 6.6% (mean 1.9%) <sup>19</sup> .
1994	Originated from Gondar, Amhara Region	Emigrants to Israel	2.1% <sup>20,21</sup>
1995	Rural village near Debre-Tabor town, Amhara region	ANC-attending pregnant women	5.7% <sup>22</sup>
1999/2000	Amhara, Oromia, SNNPR, and Tigray regions	61,000 rural male army recruits	3.8% (range 3.2% in SNNPR to 4.3% in Amhara) <sup>23</sup>
2000	Afar Region	Police recruits	6.4% (9.5% of female recruits, and 5.4% of the men)
2002	Afar Region	ANC-attending pregnant women	8%

The rural epidemic is believed to have increased with ex-soldiers returning to their rural homes following the fall of the *Derg* regime in early 1990s. Expansion of rural road networks and education has also allowed easier interaction between urban and rural populations, and HIV has spread from the towns. This also may have been fuelled by high-risk groups such as truck drivers plying the major transportation routes and spending nights with sex workers at stops along the

<sup>18</sup> Sentjens REJH, Sisay Y, Vrieling H, Kebede D, Ader HJ, Leckie G, et al. Prevalence of and risk factors for HIV infection in blood donors and various population subgroups in Ethiopia. *Epidemiol Infect.* 2002, 128, 221-228.

<sup>19</sup> Mehret M, Mertens TE, Caraël M, Negassa H, Feleke W, Yitbarek N, Burton T. Baseline for the evaluation of an AIDS programme using prevention indicators: a case study in Ethiopia. *Bull World Health Organ.* 1996;74(5):509-16.

<sup>20</sup> Pollock S, Ben-Porath E, Fuad B, et al; Epidemiological and serological studies in HIV-infected Ethiopian immigrants to Israel. *Acta Paediatr Suppl.* 1994 Aug;400:19-21.

<sup>21</sup> Living in isolation within a limited sexual network that restricted the spread of HIV into the communities. This is probably true for many remote communities of Ethiopia

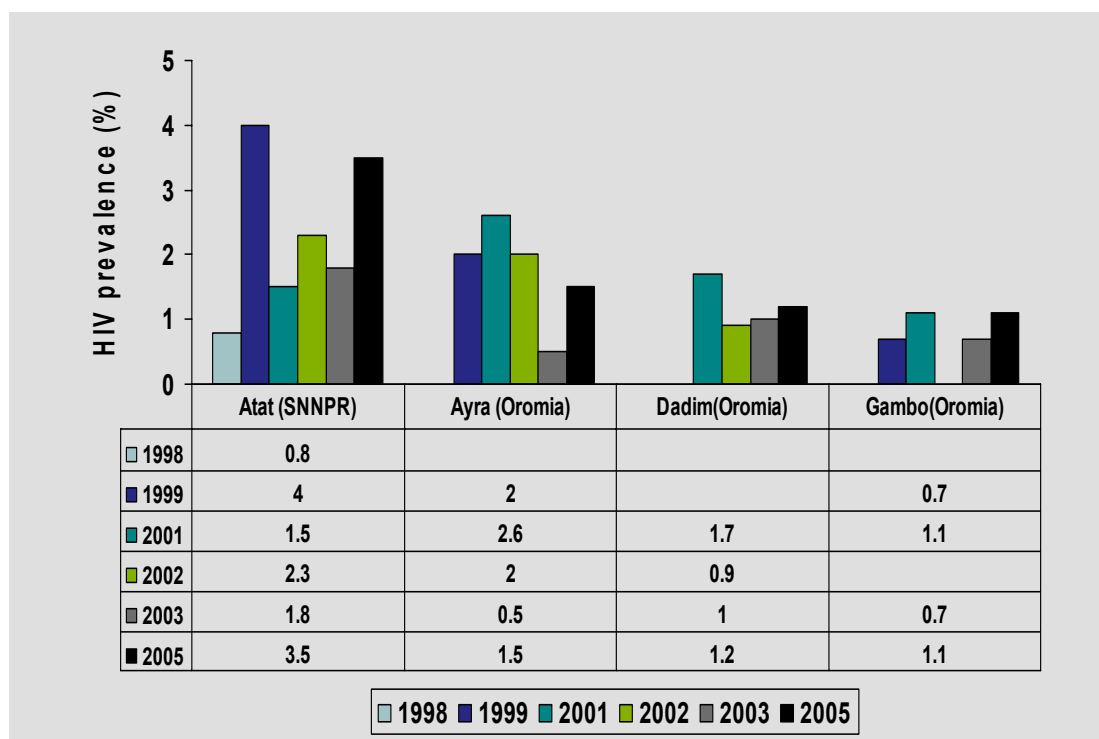
<sup>22</sup> Kidan KG, Fantahun M, Azeze B. Seroprevalence of human immunodeficiency virus infection and its association with syphilis seropositivity among antenatal clinic attenders at DebreTabor Rural Hospital, Ethiopia. *East Afr Med J.* 1995 Sep;72(9):579-83.

<sup>23</sup> Abebe Y, Schaap A, Mamo G, Negussie A, Darimo B, Wolday D, Sanders EJ. HIV prevalence in 72,000 urban and rural male army recruits, Ethiopia, 1999-2000. *Ethiop Med J.* 2003 Jun;41 Suppl 1:25-30

highways. SWs also have clients among the local population, and depending on the price for sex, the number and class of individuals involved in the high risk networks vary.<sup>24</sup>

Selected rural sites with at least four prevalence estimates show no clear pattern, as seen in **Figure 5**. It is also important to note that interpretation of data from these sites is complex as the characteristics and origin of individuals participating in the survey are not described.

**Figure 5: HIV Prevalence in Selected Rural Sites (1998-2005)**



Source: ANC Surveillance Data

At the time of the 2005 ANC survey, the crude HIV prevalence from the 43 rural ANC sites ranged from 0.0% to 8.1%, with a mean of 2.1%. Only six sites showed prevalence rates lower than 1%.

**No systematic surveillance or research has been carried out to accurately estimate HIV prevalence at district level**, and so it is difficult to identify heterogeneity in rural populations. The 2005 DHS survey results make the picture even more difficult to interpret. Out of 8,875 randomly-selected individuals from rural Ethiopia, only 0.6% of women and 0.7% of men tested HIV positive.

Whatever the reasons for the variations between the ANC and DHS data, and there are many (see **Appendix two**), each survey did indeed collect samples that appeared to represent accurately the local population being surveyed. So despite the fact that some of these sample groups demonstrate very low prevalence; it is also true that other representative groups from these populations demonstrate that HIV is circulating in communities, and prevalence is one percent or higher.

<sup>24</sup> [Pickering H, Okongo M, Nnalusiba B, Bwanika K, Whitworth J](#). Sexual networks in Uganda: casual and commercial sex in a trading town. *AIDS Care*. 1997 Apr; 9(2):199-207.

### *Summary*

The general picture is one of **a relatively widespread rural epidemic; some regions have low HIV prevalence, but others demonstrate the signs of a high-level generalized epidemic, with prevalence rates greater than 5%.**

**Analysis that could disaggregate the data to look at prevalence at district, sub-regional or even sub-district level to identify areas that might be considered hotspots can not be done with the current data, and subsequent demographic and behavioral studies need to identify factors that contribute to the higher prevalence at lower administrative levels.**

Although the DHS provides information only at the national and regional level, it would be possible to do some analyses of the available data at “lower” levels, and although the results would probably have wide confidence intervals, at the very least it would be a starting point for generating hypotheses and pointing the way to more detailed (and accurate) studies to try to elicit this important and needed information. Being able to identify potential or actual “hot spots” will assist in preventing infections and containing the epidemic.

### **2.5 Regional trends – Gambela appears to be a hot spot**

Regional variation in the spread of HIV has been noted in Ethiopia since 2000. The large scale study of over 72,000 male army recruits (see **Table 1**) conducted in that year covered the five major regions of the country, and gave the first insight into the heterogeneity of the spread of HIV. The data showed variations in male HIV prevalence across the regions, with urban prevalence rates ranging from 4.3% in SNNPR to 10.5% in Amhara. In contrast, the rural epidemic was not as heterogeneous, ranging from 3.2% (SNNPR) to 4.3% (Amhara).

The 2005 DHS is probably the single most important source of data depicting the recent variation in the spread of HIV across the regions. It used a multi-stage sampling procedure and was intended to provide estimates for the whole country as well as for each of the regions. The DHS was **not** designed to provide separate estimates for the urban and rural parts of each of the regions and only provides separate estimates for the urban and rural parts of the country at national level.

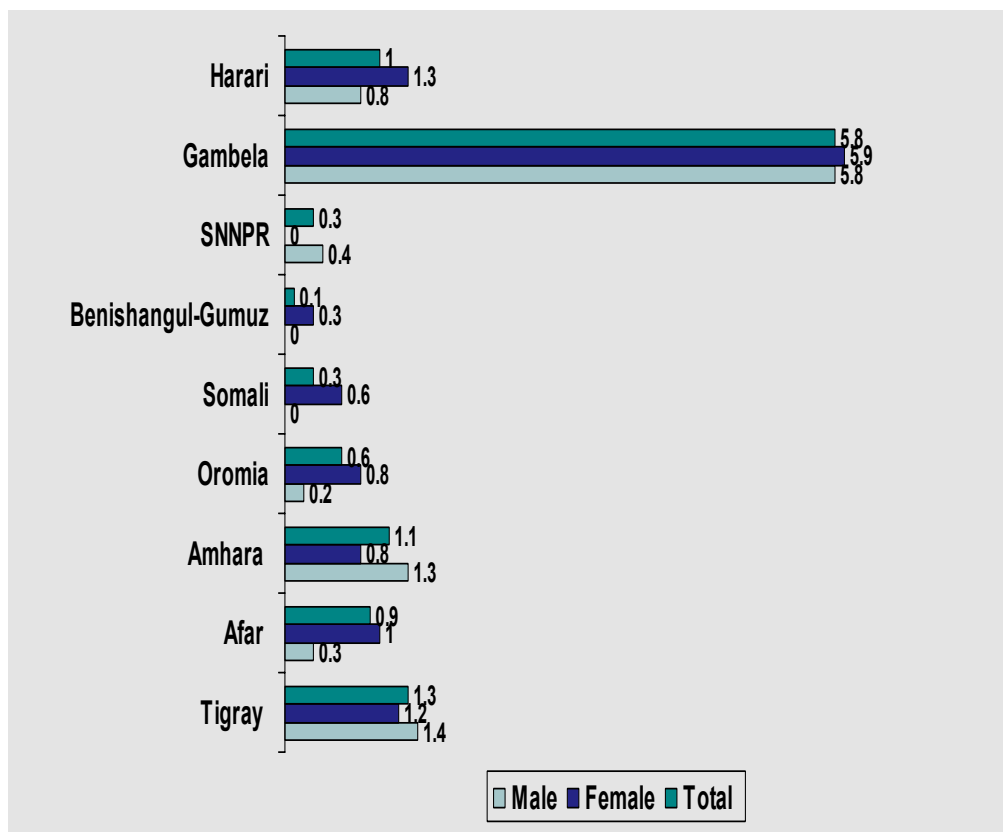
However, an examination of the findings of the 2005 DHS (**Figure 6**) demonstrates an unexpected regional pattern in HIV prevalence, especially compared to the data predicted from the 2005 ANC report and other reports. The rural epidemic is far from homogeneous across regions, although the HIV prevalence estimates in most states (except SNNPS, Benshagul-Gemuz and Somali) was over 1%; indicating a **generalized epidemic**.

While Amhara and Tigray had always been identified as among the most affected regions of the country, prevalence in Amhara compared to other high-prevalence regions was much less than expected. **Of greatest concern is the prevalence of close to 6% recorded in rural Gambela.** Whether one could identify specific hot spots within the region or not does not call into question the inescapable fact that something is happening within the region to push its HIV prevalence rate far above the national average. Further investigation is needed to understand the causes of this, but in

the interim, **interventions including both prevention and care programs should be targeted to Gambela as a priority in addition to the current priority regions based on data from ANC surveillance.**

However, there are many aspects of the DHS data which are questionable, most notably the very low prevalence in SNNPR, high rural prevalence in Gambela, and the 0% prevalence rates for males recorded in Somali and Benishangul. These last figures are highly unexpected and may be due to several methodological factors, including a small sample size or a high refusal rate to be tested particularly among males.

**Figure 6: HIV prevalence by region, DHS 2005, Ethiopia**

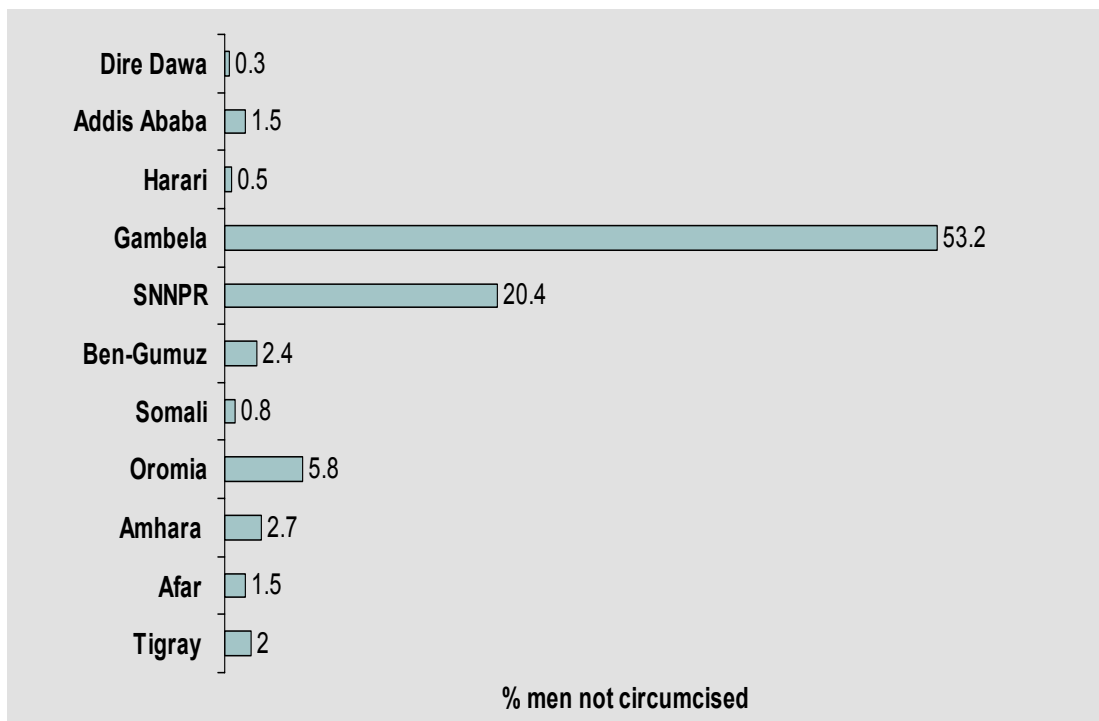


Source: DHS 2005 report

### **Male Circumcision – the reason for the high prevalence in Gambela?**

In most parts of Ethiopia male circumcision is nearly universal, except in Gambela and SNNPR. In Gambella over half of the men (53%) are not circumcised. In SNNPR this was reported to be 20.4%, as shown in **Figure 7**. Given the recent strong evidence on the important role of male circumcision in preventing HIV acquisition, **it is reasonable to assume that the observed high HIV prevalence in Gambela, as compared to other regions in the country, could be largely attributed to the synergistic effect of high levels of risky sexual behavior with a general lack of male circumcision.**

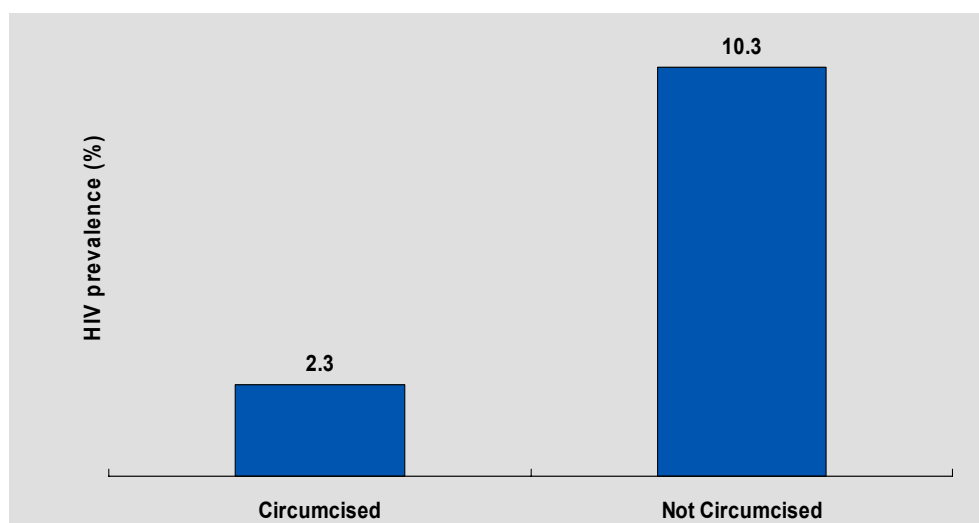
**Figure 7: Proportion men not circumcised by region, DHS 2005, Ethiopia**



Source: EDHS 2005.

This is further corroborated in **Figure 8**, comparing HIV prevalence and circumcision status amongst men in Gambela.<sup>25</sup>

**Figure 8: HIV prevalence by circumcision status among Males in Gambela (n=289)**



<sup>25</sup> This is not weighted prevalence and the interpretation cannot be direct.

## 2.6 The Urban-Rural Differential

In **Table 2** the urban-rural difference in HIV prevalence is quite apparent, but the actual degree of that difference is subject to debate, with the urban: rural ratio in different studies ranging from only 1.9 (male army recruits) to 12.8 (females)

**Table 2: Urban-Rural HIV prevalence differential, Ethiopia**

Data source	Urban	Rural	Urban: Rural HIV Prevalence Ratio
DHS 2005 (Total)	5.5% (n=1664)	0.7% (n=8875)	7.9
DHS 2005 (male)	2.4% (n=684)	0.7% (n=4120)	3.4
DHS 2005 (female)	7.7% (n=980)	0.6% (n=4756)	12.8
ANC 2005 (female: unadjusted)	9.5% (n=11995)	2.2% (n=16252)	4.3
Army recruits 2000 (male)	7.2% (n=61913)	3.8% (n=9713)	1.9

The low HIV prevalence rate documented in rural areas and the huge urban-rural disparities could be explained by one or several of the following hypotheses:

- The rural epidemic could be slow progressing and unevenly distributed – evidence shows that the epidemic did begin in urban areas. HOWEVER, given the twenty-year duration of the epidemic and the movement of populations, one might have expected that there would have been greater diffusion by this time.
- The epidemic may be concentrated in those rural areas closer to urban centers and main roads, and the surveillance system has been preferentially capturing “periurban” rural populations who would have had a higher prevalence, whereas the vast majority of the rural population resides far from urban areas and main roads.
- Access to communication, education facilities and expansion of roads has been rudimentary in many parts of the country, which has contributed to the slow spread of HIV into many rural areas. As communication and transport infrastructure in rural areas improves, along with greater access to education and travel, there is likely to be a further mixing of the urban and rural populations, with the possibility of further spread of HIV into the rural populations.
- There are more sex workers in urban areas than in rural areas, and assuming that their prevalence rates are higher than the general population, this would skew the urban results upwards.
- The larger number of unmarried persons in urban areas.

## 2.7 HIV Hotspots (urban, rural, cross-border) – not enough data

Identification of hot spots could be an important public health strategy to intensify prevention and control activities. But as noted, attempts to estimate HIV prevalence have been limited to ANC surveillance and the 2005 DHS. The ANC surveillance covers 15% of *woredas*/districts in the country, and were selected largely for convenience rather than using probability sampling

techniques. There is doubt whether the ANC sites represent the general population. Some of the very high prevalence areas such as Dessie<sup>26</sup> that were identified in the early phase of the epidemic are left out of the ANC surveillance. And as has been noted, the DHS is technically designed to provide estimates at the national and regional levels. The sample size and sampling procedure do not allow estimating HIV prevalence at a lower administrative level.

It is absolutely vital to pursue this issue in a more systematic way by strengthening the surveillance system by selecting sites using some kind of probability sampling method. **Efforts to identify hotspots are needed, and well-designed epidemiological studies as well as mapping exercises are needed.** At the moment there is not sufficient information available to identify hotspots properly and any attempt to categorize *woredas* in such a fashion prior to obtaining adequate information could be dangerous, considering the possibility of some places being prematurely labeled and stigmatized, while other locations omitted from the priority list could lose attention or provision of services.

### *Summary*

Despite the many limitations of data availability and quality, all data suggest that in urban Ethiopia the HIV epidemic started in the mid-80s, reached a plateau around the mid-90s and stabilized afterwards. **There are a number of indications of declining prevalence in recent years, especially in the larger urban centers** including Addis Ababa and Bahirdar.

The progression of the HIV epidemic in rural Ethiopia cannot be fully described due to a lack of data, but what data are available provide conflicting findings. ANC-based studies, a few small surveys and one large scale study on male army recruits suggested that by 2000 there was a generalized rural epidemic, but the 2005 DHS suggests a limited spread. All studies, however, indicated the fact that **HIV is more prevalent in rural villages closer to urban areas and those located along the main roads.** It is also evident that **there is a great geographic heterogeneity across regions, between urban and rural locations, and probably within regions as well,** making single HIV prevalence estimates of limited value in describing the epidemic. **Of greatest concern is the prevalence of close to 6% recorded in rural Gambela.**

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<sup>26</sup> Meheret M, Khodakevich L, Zewde D et al. HIV-1 Infection and related risk factors among female sex workers in urban areas of Ethiopia. *Ethiop. J. Health Dev.* 1990; 4(2 Special): 163-170.



### 3. Populations at greatest risk

#### 3.1 Women – especially young women

A number of cultural, social and biological factors place women at higher risk than men for HIV infection, and **Table 3** below shows some of the studies in Ethiopia indicating the disproportionately high HIV infection rates in women compared to their male peers.

**Table 3: Female-to-Male HIV prevalence ratio: Ethiopia**

Reference	HIV prevalence (%)		HIV prevalence Ratio (female/male)	Target population & Sample size
	Female	Male		
<i>AIDS 1998, 12:315-322</i>	6.9	6.0	1.2	Community-based study (n=3800)
<i>Ethiop Med J, 39, 83-87, 2001</i>	9.5	5.4	1.7	Police recruits (n=408)
<i>JHPN, 2005, 23(4):358-368</i>	12.4	8.5	1.4	Factory workers (n=1700)
<i>AIDS in Ethiopia 5<sup>th</sup> report</i>	19.5	14.4	1.4	VCT clients (n=26,000)
<i>Aids in Ethiopia 6<sup>th</sup> Edition</i>	15.7	11.6	1.4	VCT clients (n=564,351)
<i>Aids in Ethiopia 6<sup>th</sup> Edition</i>	6.7	4.5	1.5	Blood donors (n=28,539)
<i>EDHS 2005, Urban</i>	7.7	2.4	3.2	General urban population
<i>EDHS 2005, Rural</i>	0.6	0.7	0.9	General rural population
<i>EDHS 2005, Total</i>	1.9	0.9	2.1	General population

The higher HIV rates in women seen in these and other data are also seen elsewhere in Africa, and while there are a number of social and biological hypotheses that could explain this, further study is required to elucidate the actual reasons in the Ethiopian context.

Girls are at a much greater risk at early ages because of both biological and cultural factors. **Young girls in Ethiopia are more vulnerable to HIV than boys because of early age at sexual debut, early marriage, sexual abuse and violence** such as rape and abduction.<sup>27</sup> Sexual mixing patterns are more important than the age at sexual debut in putting girls at higher risk of HIV than boys. Many studies have shown that girls in Ethiopia often form sexual relationship with men who are on average ten years older. As well, adolescent girls are at risk because they are unlikely to have had any training or experience in sexual negotiation skills, and are especially vulnerable in situations with older men where age, wealth, physical strength and other power dynamics put them at a disadvantage.<sup>28 29</sup>

Data from the 2000 and 2005 DHS (**Figure 9a and 9b below**) confirm the widely-held belief that girls start sex earlier than boys. The proportions that initiate sex before age 15 and age 18 are significantly higher in females than males. While the proportion of young females that became

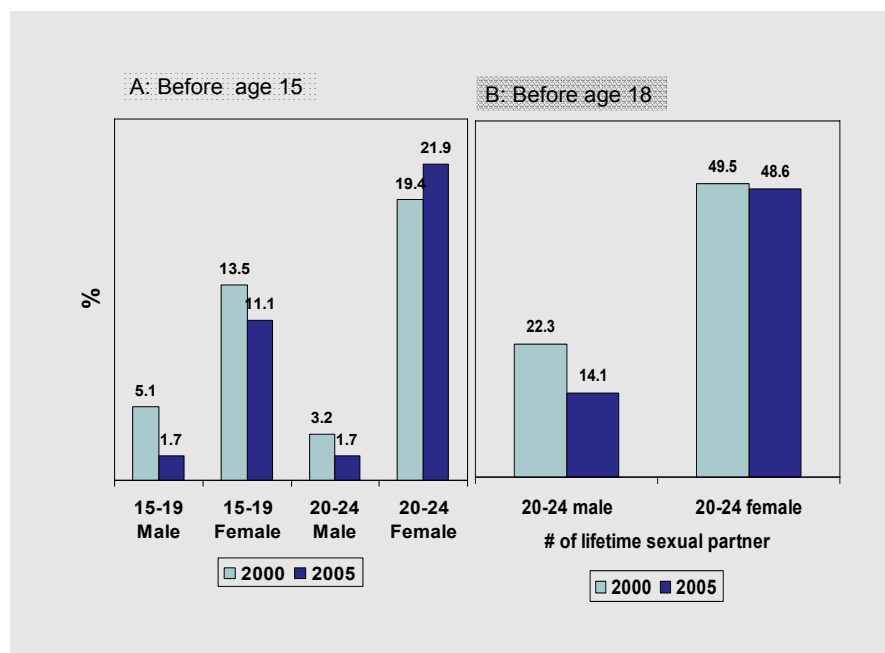
<sup>27</sup> Betenariam W. Gender and HIV/AIDS in Ethiopia. Unpublished document. Sept 2002.

<sup>28</sup> Fekadu Z. Casual sex-debuts among female adolescents in Addis Ababa. *Ethiop J Health Dev* 2001;15(2):109-116.

<sup>29</sup> Taffa N, Klepp KI, Sundby J, Bjune G. Psychosocial determinants of sexual activity and condom use intention among youth in Addis Ababa, Ethiopia. *Int J STD AIDS* 2002;13(10):714-9.

sexually active remained high and nearly stable between the 2000 and 2005 DHS, there was a modest but not significant declining trend among young males.<sup>30</sup>

**Figure 9: Percentage of young men and women who have had sex before age 15 (A) and before age 18 (B), DHS 2000 and 2005: Ethiopia**



As can be seen in **Figure 10, HIV prevalence among young pregnant women (15-24 years) attending 82 ANC sites throughout the country is more than four times the national average (9.1% in urban and 2.4% rural).**<sup>31</sup> This is one point where the DHS and ANC data agree, the DHS finding a similar prevalence rate of 9.1% among sexually active urban women age 15-24, while the rural prevalence rate (1.1%) was less than half the ANC figure (2.4%).

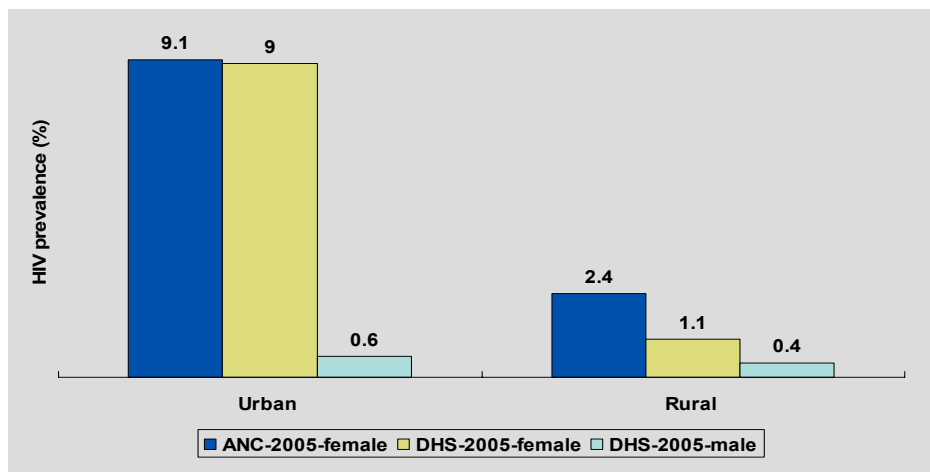
In young males, prevalence rates are lower than 1% in both urban and rural areas. The female-to-male HIV prevalence ratio among young people is about 15 in urban areas and 2.8 in rural areas.<sup>32</sup>

<sup>30</sup> What is curious about Figure 9a is that if one looks at the data historically, the 21.4% of 20-24 year old women who in 2005 stated that they commenced sex before the age of 15 are the same group who in 2000 were the 13.5% of 15-19 year olds who were admitting the same thing. Is this a contradiction, or an example of sampling error that makes the two data points not comparable? Or is it because a 24 year old woman can more easily admit to the truth about her early sex life than a sixteen year old? And why is this apparent contradiction seen only in women and not men? Another possibility is that the differences in responses between 2000 and 2005 in the same age cohort demonstrates the effects of an increasing openness and ability to talk about HIV in Ethiopia, so that women were more able to reveal in 2005 what they could not say five years earlier.

<sup>31</sup> AIDS in Ethiopia: Sixth Report. 2006

<sup>32</sup> This finding is consistent with the observed trend elsewhere in sub-Saharan Africa

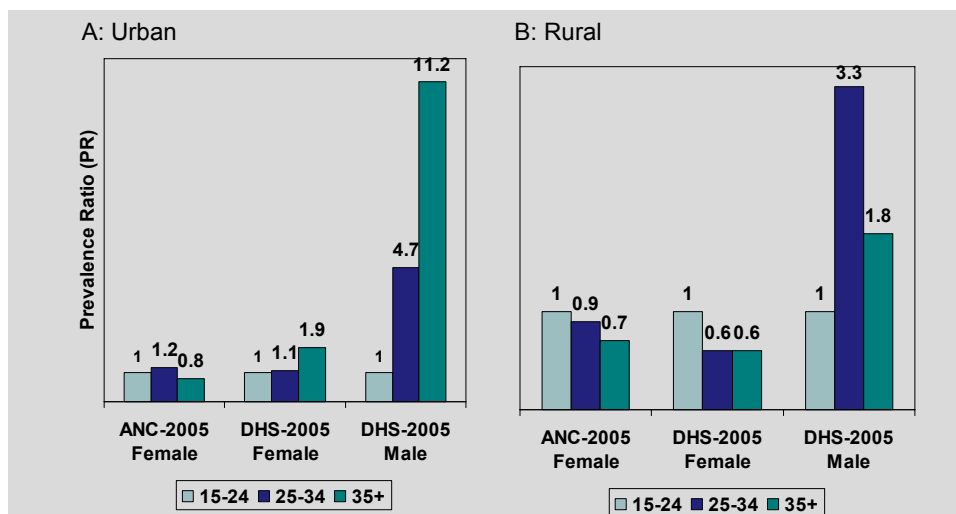
**Figure 10: HIV prevalence (%) among 15-24-year-old who ever had sex, ANC and DHS 2005.**



Higher seroprevalence in younger females is further emphasised in **Figure 11** showing the HIV prevalence ratio (PR) of women and men in different age groups, relative to prevalence in 15-24 year-olds. That younger men have a much lower prevalence than older men is obvious.

For urban women, the DHS and ANC data found consistent results, confirming higher HIV infection rates among young women compared to older women.<sup>33</sup> The rural data clearly indicate the relatively higher concentration of HIV infection among young women, with the DHS data showing a 40% lower infection rate among older women compared to their younger counterparts.

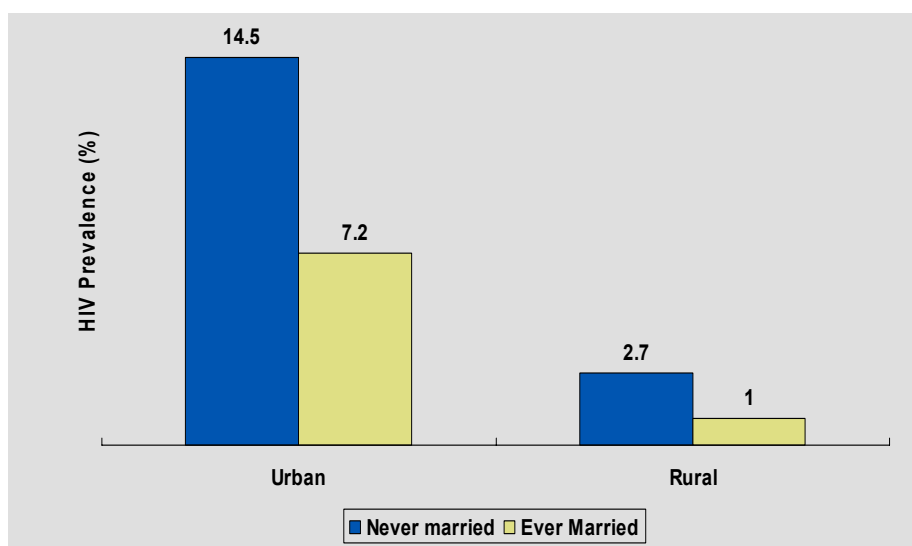
**Figure 11: Ratio of HIV Prevalence rates, 25-34 year-olds and 35-49 year-olds, relative to 15-24 year-old sexually active women, Urban (A) Rural (B); ANC and DHS 2005.**



<sup>33</sup> Women would be expected to show much higher seroprevalence in the 15-24 age group, assuming higher rates of sexual activity as well as accumulated seroprevalence numbers from the younger age group, with a declining prevalence in the 35-49 years group, possibly owing to the drop in fertility of women infected with the virus, removal of AIDS fatalities from the population, and possibly lower levels of sexual activity.

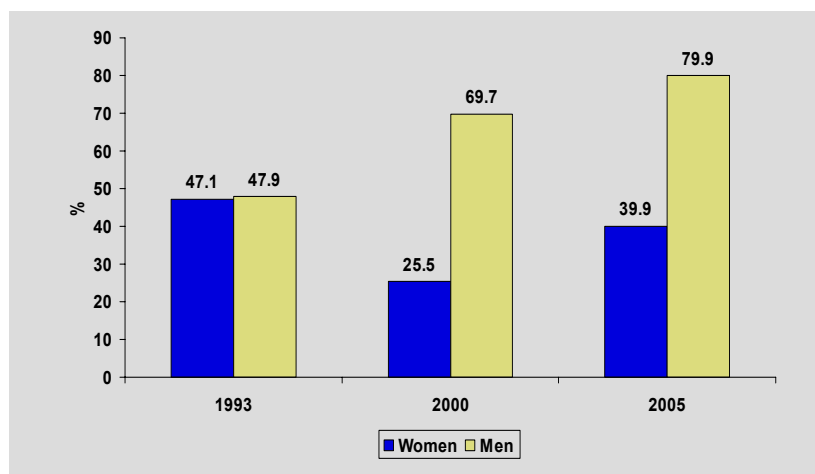
A closer look at the pattern of HIV infection among young women (15-24 years) reveals the **high concentration of HIV infection, especially among sexually active never-married women both in urban and rural areas**, as shown in **Figure 12**. The DHS documented prevalence rates as high as 14.5% among sexually active never-married young urban women, double the rate seen in married young women (7.2%). A similar ratio (2.7:1) was found in the rural areas.

**Figure 12: HIV prevalence (%) among young sexually active women (15-24-year-old), by marital status. DHS 2005, Ethiopia**



One possible reason for this disparity in seroprevalence between men and women can be seen in the data on **condom use**. Condom use with non-regular partners has increased only in men (from 47.9% in 1993 to 79.9% in 2005). In women, not only has condom use remained very low, but it declined between 1993 and 2005, particularly between 1993 and 2000, as shown in **Figure 13**.

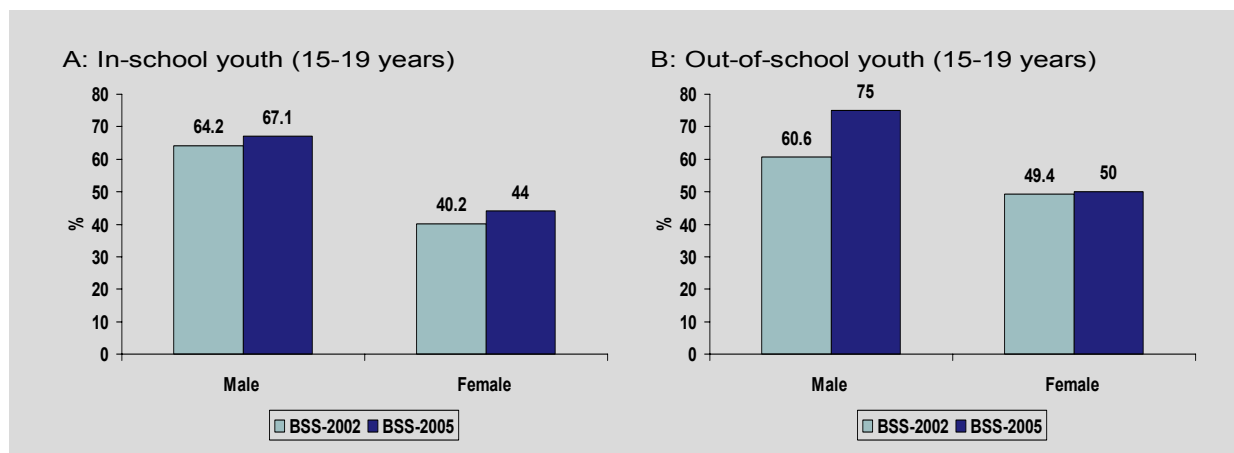
**Figure 13: Proportion who used a condom during last sexual intercourse with a non-regular partner, 1993, 2000, 2005; Urban-Ethiopia**



*Note: The 1993 behavioral survey included 4 major urban areas, namely Addis Ababa, Dire Dawa, Bahir Dar and Awasa. The 2000 and 2005 DHS include data from all urban areas.*

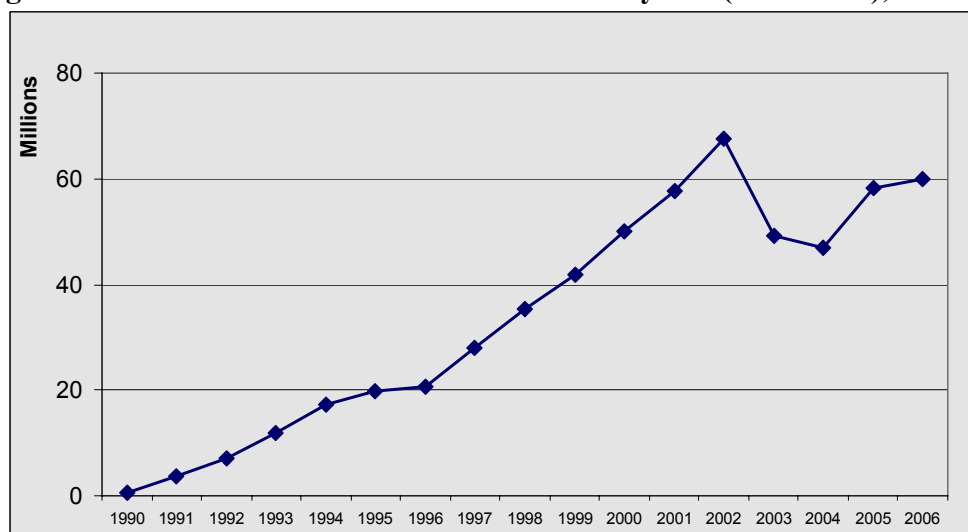
This low condom use by women is further (and more worryingly) corroborated by the data on condom use in youth aged 15-19, taken from the 2002 and 2005 BSS surveys, shown in **Figure 14**.

**Figure 14: Condom use in most recent sex (last year) among youth 15-19, 2002 & 2005, BSS**



**Figure 15** shows the actual number of condoms available increasing year-by-year from the early 90's until about 2002, then a decline for a couple years, but now apparently recovering.<sup>34</sup>

**Figure 15: Condom Distribution over the last 16 years (1990-2006), Ethiopia**



Source: DKT Ethiopia

There are still many unanswered questions, for which no recent data exist, including:

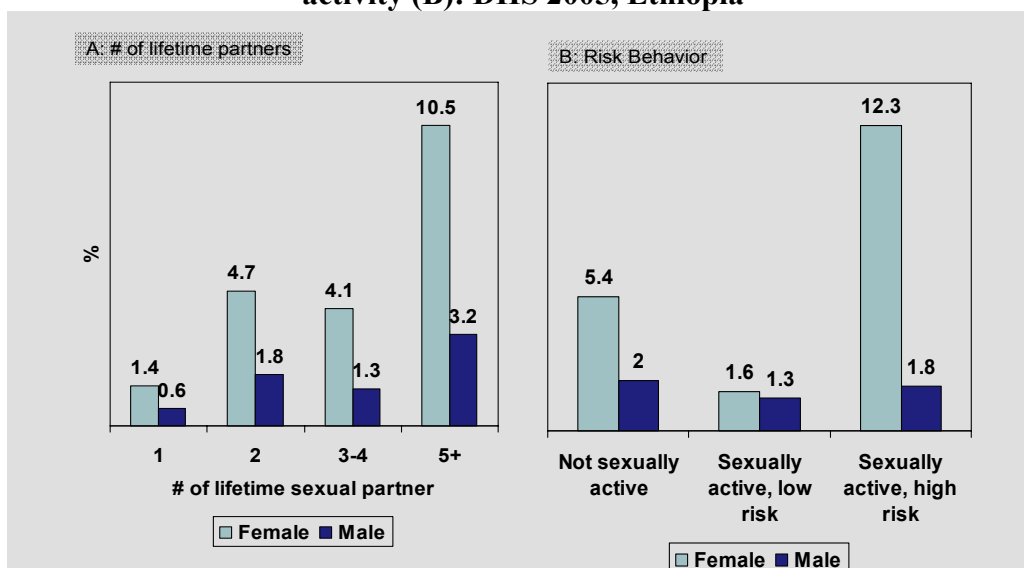
- Condoms are being used, but is this use appropriate and consistent?
- What about the relationships between condom use and HIV/STI prevalence?
- Are there regional differences in condom distribution, and can these be correlated with HIV/STI prevalence?<sup>35</sup>

<sup>34</sup> Information suggests that the decline may have been related to actual shortages in the market, and may not reflect changes in behavior, attitudes or a widespread recidivism, although research is needed to confirm this.

Clearly, more research is needed to explain the contradictory results. If the proportion of men who are using condoms is increasing, but the proportion of women is declining, with whom are these men using their condoms? An immediate answer may be men using condoms with sex workers rather than regular partners, with many non-sex worker women reducing their number of partners, but this is only one possibility. **Perhaps cultural issues are at the root of this, allowing men to have access and use condoms (when they choose), but not allowing women access to them nor giving them the negotiating skills to insist on their use when they are available.**

The DHS 2005 confirms that having five or more partners over one's lifetime is associated with significantly higher rates of HIV infection in both sexes, as seen in **Figure 16**.<sup>36</sup> **The risk associated with a high number of lifetime sexual partners appears much higher for females than males;** the risk of infection for women who reported 2 partners (4.7%) is higher than the risk for men who reported 5 or more partners (3.2%). This observed higher risk among women could be partly explained by their relationship with unfaithful partners, the higher efficiency of HIV transmission per sexual act from an infected man to an uninfected woman, could reflect their lack of negotiation skills in steady or casual relationships, or be a combination of all of these factors leading to their increased vulnerability to HIV infection.<sup>37 38</sup>

**Figure 16: HIV prevalence by number of life time sexual partners (A) and level of sexual activity (B): DHS 2005, Ethiopia**



<sup>35</sup> On the other hand, there is not a straightforward association between condom use and HIV/STI prevalence rates. Available studies (including the DHS) have found higher HIV prevalence associated with higher condom use in most recent sex. In this case condom use is often a proxy for high partner change rate. Condom use in most recent sex does not necessarily imply consistent condom use, which is important for effective protection. Finally, some individuals might have adopted condom use more recently, after they have already become infected.

<sup>36</sup> Central Statistical Authority (CSA) and ORC Macro. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2005.

<sup>37</sup> Mekonnen Y, Yimer G, Messele T. Gender relations and vulnerability to HIV/AIDS in Ethiopia: The role of power in relationship on HIV risk awareness and the ability to communicate and negotiate safer sex. OSSREA. 2005 (Unpublished)

<sup>38</sup> Taffa N, Klepp KI, Sundby J, Bjune G. Psychosocial determinants of sexual activity and condom use intention among youth in Addis Ababa, Ethiopia. *Int J STD AIDS*. 2002 Oct;13(10):714-9.

These associations between sexual behavior patterns and HIV infection in the DHS, although conforming to expected results, should still be interpreted with caution, as they are based on univariate analyses that did not control for potential confounding factors. Factors such as condom use and STDs could play important mediating roles between sexual behavior and HIV infection risk. Further analysis of the DHS should seek to control for these and other potential confounders using multivariate analysis, but it does appear that **women, both married and unmarried, are identifiable as a risk group for acquiring HIV.**

### *Summary*

These data suggest the still **high burden of new HIV infections concentrated among young women, especially those sexually active and never married, both in urban and rural areas.** In contrast, the high infection pattern among young women does not hold for men, with younger men exhibiting lower risk of HIV than their older counterparts both in urban and rural areas.<sup>39</sup>

The observed age pattern of HIV infection in males and females signals the fact that gender affects not only the general level of HIV prevalence, but also the shape of the prevalence curve as a function of age.

### **3.2 Female Sex workers – a risk group where recent data are lacking**

Due to their high HIV prevalence, their increased susceptibility to HIV infection and ability to transmit HIV when co-infected with other STIs, and the broad population groups they reach through their clients, sex workers have long been identified as the ‘core group’ most at risk of both acquiring HIV and transmitting it within a localized or wider sexual network.<sup>40</sup>

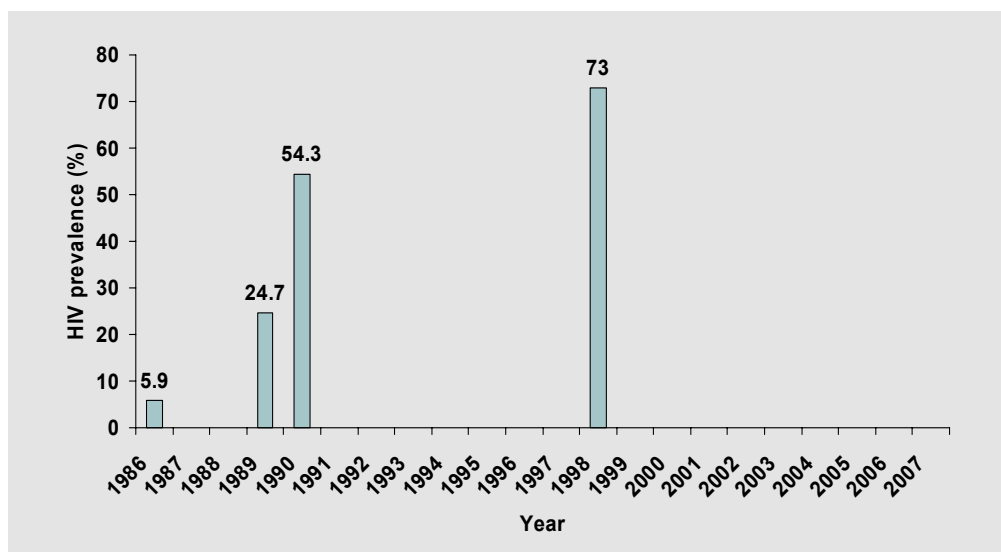
HIV prevalence surveys among sex workers in the country were carried out regularly in the early years of the epidemic, as seen in **Figure 17**, demonstrating an increasing mean prevalence from 1986 to 1998. By 1998, the prevalence had reached 73% among sex workers attending STD clinics in Addis Ababa.<sup>41</sup>

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<sup>39</sup> In the urban area, male HIV prevalence increased linearly and significantly with age (Test for trend;  $p=0.004$ ). Prevalence rates were 4.7 and 11.2 times higher among males age 25-34 and 35 or higher age, respectively, compared to younger males (15-24).

<sup>40</sup> Plummer FA, Negelkerke NJ, Moses S, et al. The importance of core group in the epidemiology and control of HIV-1 infections. *AIDS* 1993, 7:95-102.

<sup>41</sup> Aklilu M, Messele T, Tsegaye A, et al. Factors associated with HIV-1 infection among sex workers of Addis Ababa, Ethiopia. *AIDS* 2001, 15:87-96.

**Figure 17: HIV prevalence among female sex workers in Addis Ababa, 1986-1998**<sup>42</sup>

Regrettably, **in the last decade there has been no HIV prevalence study on sex workers in the country**, which significantly limits our understanding of the epidemiology as well as the recent dynamics of spread of HIV in the population.

As well, **the size of the sex worker population in Ethiopia is not known**. In 1990 it was estimated that about 7.1% (35,000) of the sexually active female population of Addis Ababa were sex workers.<sup>43</sup> Considering the high influx of people into urban areas over the past fifteen years and the increased number of teenage sex workers, and the recent expansion of the number of bars and brothels in the city (and in other towns), the current number of sex workers in the city might be expected to be much higher. Nevertheless, a study by FHI in 2002<sup>44</sup> that attempted to map sex workers in Addis Ababa came up with a much lower estimate than reported in 1990, but also indicated that various other types of **'hidden commercial sex workers' also exist in the country**, mainly in big cities such as Addis Ababa, although the extent is unknown and difficult to investigate.

Available data also indicate that in recent years **much younger women are becoming sex workers (Figure 18)**. Since 1989, the median age of sex workers in Addis Ababa has declined from 31.2 years<sup>45</sup> to 21-22 years.<sup>46 47</sup> Strikingly, about **a third (30.2%) of sex workers in 2005 were in the**

<sup>42</sup> Sources: (1986 Sex workers Prevalence): Ayeahun S, Britton S, Yemane-Berhan T, Fehiger T. Prevalence of HIV antibodies in prostitute and their clients in Addis Ababa, Ethiopia. 3<sup>rd</sup> International Conference on AIDS, Washington, June 1987; Abstract MP 214. (1989 Sex workers Prevalence): Mehret M, Khodakevich L, Zewdie D., Ayeahunie S, Shanko B, Gizaw G, et al. HIV-1 infection and some related risk factors among female sex workers in Addis Ababa. *Ethiop J Health Dev.* 1990c, 4 (2): 171-176. (1990 Sex workers Prevalence): MOH. AIDS in Ethiopia: 1996. Addis Ababa (1998 Sex workers Prevalence): Aklilu M, Messele T, Tsegaye A, et al. Factors associated with HIV-1 infection among sex workers of Addis Ababa, Ethiopia. *AIDS* 2001, 15:87-96.

<sup>43</sup> Mehret M, Khodakevich L, Shanko B, Belete F. Sexual behaviours and some social features of female sex workers in the city of Addis Ababa. *Ethiop J Health Dev.* 1990d, 4 (2): 133-137.

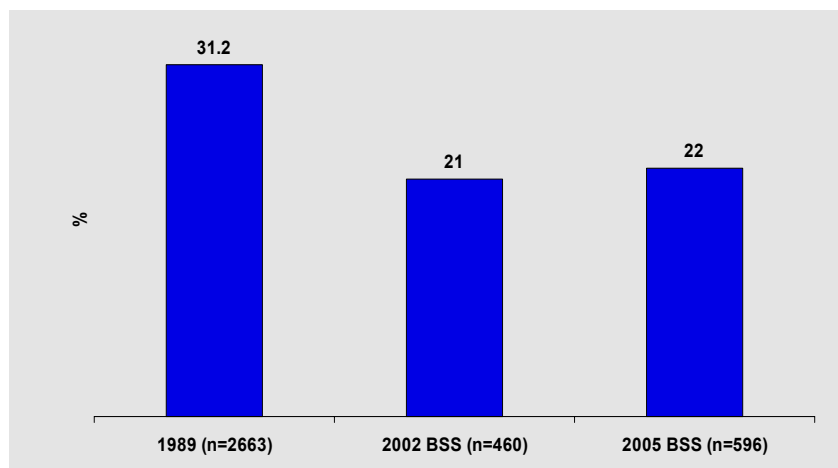
<sup>44</sup> Family Health International-Ethiopia. Mapping and census of sex workers in Addis Ababa. 2002. Addis Ababa.

<sup>45</sup> Mehret M, Khodakevich L, Shanko B, Belete F. Sexual behaviours and some social features of female sex workers in the city of Addis Ababa. *Ethiop J Health Dev.* 1990d, 4 (2): 133-137.



**age group 15-19 years.** The fact that an increasing number of young women in their teens and early twenties are joining the sex trade signals the presence of a huge potential for the spread of HIV among young people in the country, assuming that young female commercial sex workers are also less skilled in defending themselves from “unprotected sexual” exploitation.<sup>48</sup>

**Figure 18: Median age of female sex workers in Addis Ababa: 1989, 2002 and 2005**



The few available studies on sex workers found high HIV infection rates associated with high numbers of sexual partners, the presence of STIs, and not using condoms. In turn, unprotected sex and the risk of STIs are reported to be highly associated with alcohol use, and drinking is a problem among sex workers in the country.<sup>49</sup> **An increasing number of sex workers are seeing five or more partners per week -- 14.7% (1989) to 45.1% (2002) and 34.6% (2005) (Figure 19).** On the other hand, three consecutive surveys from Addis Ababa over the past years have shown a significant rise in consistent condom use, from only 5.3% in 1989 to over 90% in 2002 and 2005.

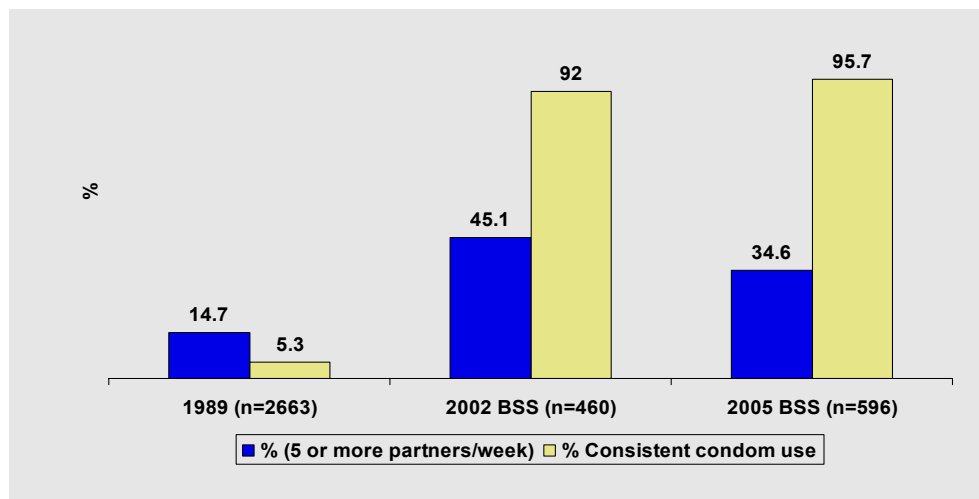
<sup>46</sup> Family Health International: Ethiopia. HIV/AIDS Behavioral Surveillance Survey (BSS)– Ethiopia 2002: Round One. 2002. Addis Ababa

<sup>47</sup> MOH/HAPCO: Ethiopia. HIV/AIDS Behavioral Surveillance Survey (BSS) – Ethiopia 2006: Round Two. 2007. Addis Ababa, [Preliminary Report].

<sup>48</sup> Ayalew T, Berhane Y. Child prostitution: magnitude and related problems. *Ethiop Med J* 2000;38:53-63.

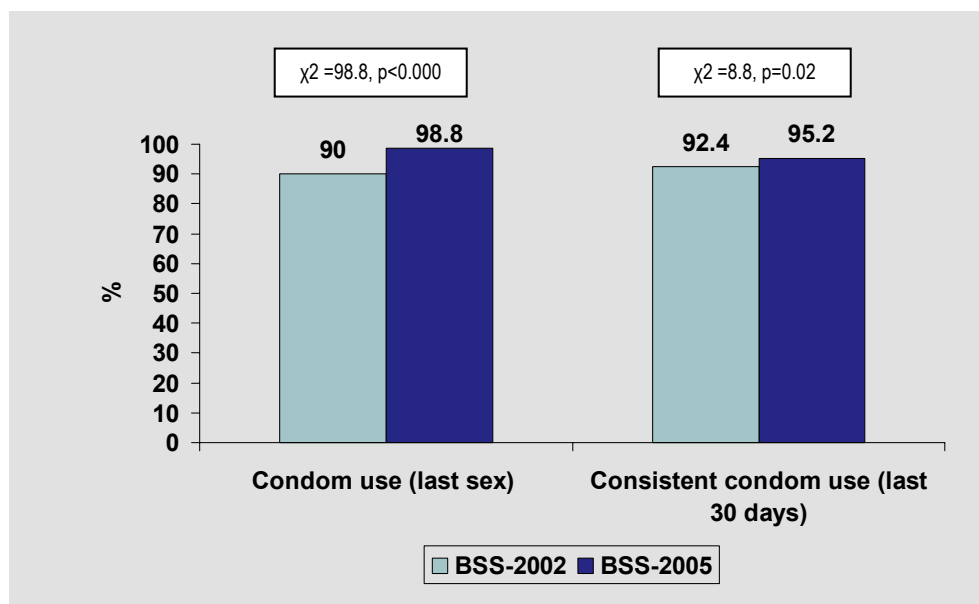
<sup>49</sup> Alem A, Kebede D, Mitike G, Enqusellase F, Lemma W. Unprotected sex, sexually transmitted infections and problem drinking among female sex workers in Ethiopia. *Ethiop.J.Health Dev.* 2006;20(2):93-98

**Figure 19: Proportion (%) of sex workers reporting 5 or more partners per week and consistent condom use in the previous 30 days in Addis Ababa: 1989, 2002, 2005**



As shown in **Figures 19 and 20**, condom use during the most recent sex among sex workers has not only increased significantly since 2002, but has reached almost universal level (~99%) in 2005. Consistent condom use also has shown a significant increase since 2002.

**Figure 20: Condom use with paying partner among Sex Workers, 2002 & 2005 BSS**



The observed high acceptance and use of condoms by sex workers operating in major urban areas of the country might be associated with a parallel reduction in HIV prevalence among sex workers and their clients. It might also play an important role in interrupting HIV transmission from sex workers to their clients and vice versa.

On the other hand, condom use with non-paying partners is relatively low in both of the BSS surveys – 27.1% and 21.7% of sex workers reported not using condom with a non-paying client in

2002 and 2005, respectively. **The low condom use with non-paying clients is an area of concern**, indicating possible HIV transmission between sex workers and their non-paying partners. Of note, however, the proportion of sex workers having sex with a non-paying partner declined significantly from 34.5% in 2002 to 4.2% in 2005.

**Does this increased use of condoms indicate that sex workers may not be as at risk as commonly assumed?** The lack of recent HIV sero-survey data among SWs in the country means that these must remain as hypotheses.

### *Summary*

While all indications are that the number of sex workers in the country has increased in recent years, that their median age is less, and that they are seeing more clients, the fact of the matter is that **the true extent of sex work in Ethiopia is unknown because routine and detailed surveillance of this high-risk population has not been carried out for fifteen years**. It could very well be that the high rates of condom utilization reported by sex workers means that they are no longer one of the primary drivers of the epidemic, but in the absence of accurate and detailed data, this cannot be verified. Clearly, new studies need to be initiated to monitor and measure the progress of the epidemic amongst this vulnerable population.

### **3.3 Discordant couples – a high-risk group not being served?**

Over 2,674 cohabiting couples were tested for HIV in the 2005 DHS. In 97.9 per cent of the cases, both partners tested negative for HIV. Of the remainder, 85% (1.8 percent of the total) were discordant, where one partner is infected and the other is not.<sup>50</sup> **HIV prevalence among cohabiting individuals is notably high in urban areas (10.9%); of whom about 72% (i.e. 7.8% of the total) of the cohabiting couples are discordant**. The observed high discordance in the DHS sample may be a result of several factors, including: the stage of infection, coital frequency, the absence of STIs and differing levels of susceptibility between partners. This remains to be investigated in future studies.

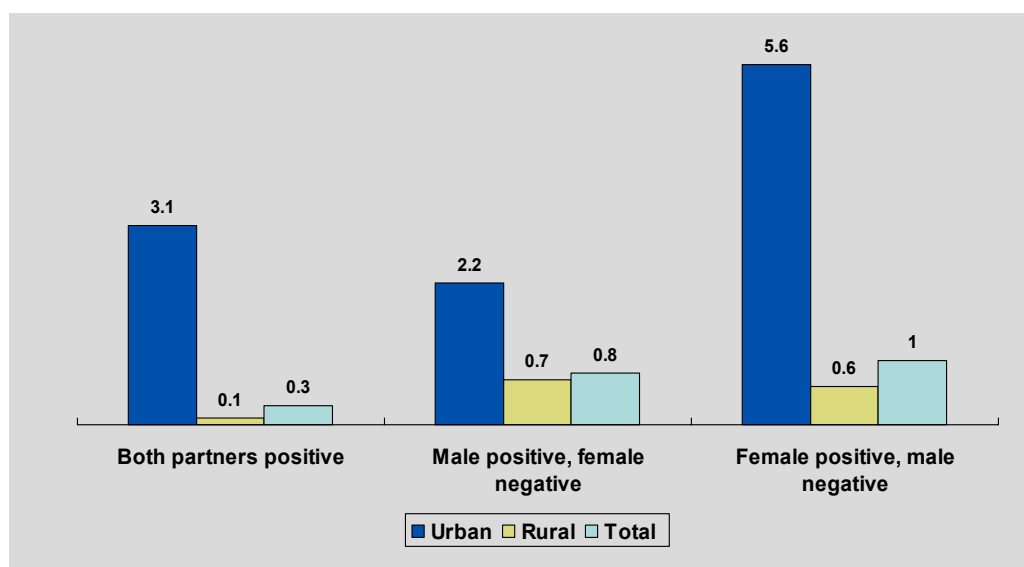
As can be seen in **Figure 21**,

- in total - 1% of HIV-negative married men are living with infected wives  
- 0.8% of HIV-negative married women are living with infected husbands
- Urban: - 5.6% of HIV-negative married men are living with infected wives  
- 2.2% of HIV-negative married women are living with infected husbands
- Rural: - 0.6% of HIV-negative married men are living with infected wives  
- 0.7% of HIV-negative married women are living with infected husbands

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<sup>50</sup> Central Statistical Authority (CSA) and ORC Macro. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2006.

**Figure 21: Among all cohabiting couples, where both were tested, percentage distribution by HIV status, according to type of residence, 2005 DHS, Ethiopia.**



Source: based on analysis of data in the DHS report 2005, page 224

These data appears to indicate that **a significant percentage of urban married men are at high risk of contracting HIV from their already-infected wives. A smaller but still significant percentage of urban married women carry a similar high risk of HIV acquisition from their already-infected husbands.**

There is evidently a level of risk of HIV transmission within marriage that can only be averted through education and behavior change and effected through couple HIV counseling and testing. Nevertheless, **the availability of couple HIV counseling in the country is extremely limited.** Hand-in-hand with the development of couple counseling should be increased efforts to reduce stigma and encourage disclosure. This, however, is also dependent on changes in attitudes and behavior. Long-standing imbalances in gender relationships, power dynamics and the status of women in and out of marriage are issues not to be easily resolved simply by initiating couple counseling services.

### 3.4 Truckers and other mobile workers

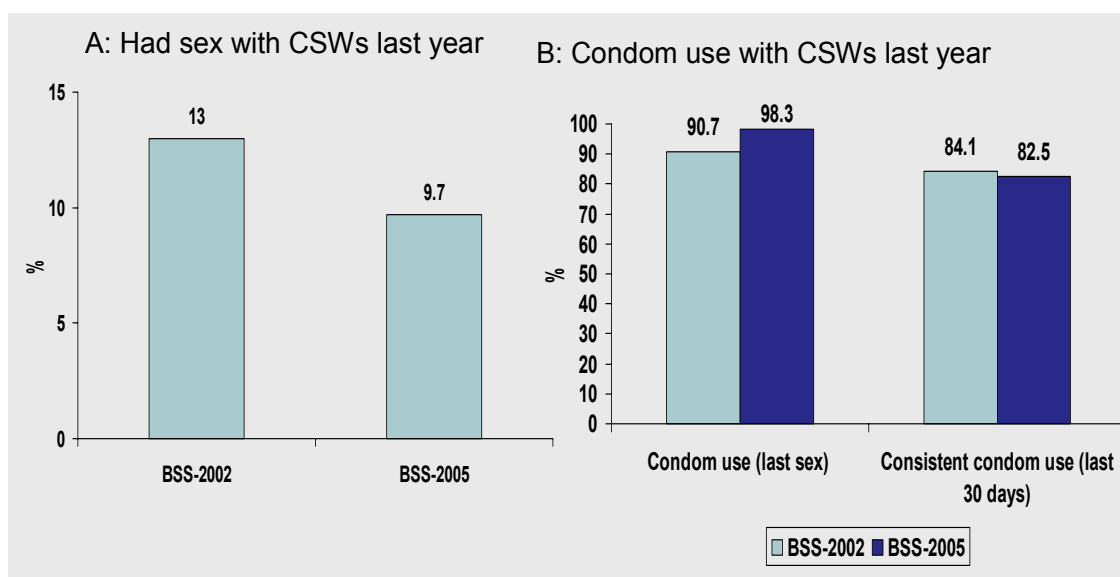
Truck drivers, seasonal workers, civil servants and others who spend a good portion of their time away from home are all populations whose vocations increase their vulnerability to contracting HIV. Their wives and future children are consequently at risk (the more so if the wives and partners of seasonal and migratory laborers resort to sex work to survive while the principal breadwinner is absent).

Long distance truck drivers, in particular, are known to be at increased risk of HIV infection, and may be the group at highest risk next to sex workers. HIV prevalence was already 13% in truck

drivers in 1988,<sup>51</sup> (when the rate in ANC women in Addis Ababa was less than 5%). In 1989 the prevalence among truck drivers increased to 17.3%.<sup>52</sup> Very high prevalence rates were documented in 1994 (40%) and 1995 (26.7%) among drivers in Gondar, Northwest Ethiopia.<sup>53</sup>

The BSSs in 2002 and 2005 sampled truckers<sup>54</sup> operating on the main trading roads of the country. Behavioral indicators surveyed included proportion having paid for sex in the year preceding the survey, condom use during the most recent sex, and consistent condom use in the preceding 30 days. As shown in **Figure 22**, 13% and 9.7% of the truckers reported having paid for sex with sex workers in the last year, in the two surveys. The difference was not statistically significant at  $p < 0.005$ . However, **condom use during the most recent contact with a SW had increased since 2002, and had reached almost universal levels (98.3%) in 2005**. Consistent condom use, however, remained relatively lower and constant between 2002 and 2005 (84.1% and 82.5%, respectively).

**Figure 22: Proportion of long distance truck drivers who reported having had sex with SWs (A) and those who reported condom use with SWs (B) 2002 & 2005 BSS**



A substantial portion of truckers (10%) had engaged in paid sex in 2005. However, the observed high acceptance and use of condoms by truckers is consistent with what has been documented among SWs; and might be associated with a parallel reduction in HIV prevalence among truckers. The lack of recent HIV sero-survey data among truckers precludes further interpretation of this data, but it does suggest that perhaps the assumption that truck drivers are a group at high risk should be

<sup>51</sup> Mehret M, Khodakevich L, Zewdie D. HIV-1 infection among employees of the Ethiopian Freight Transport Corporation. *Ethiop J Health Dev.* 1990b., 4(2): 177-182.

<sup>52</sup> Mehret M, Khodakevich L, Zewdie D, Shanko B. Progression of Human Immunodeficiency Virus epidemic in Ethiopia. *Ethiop J Health Dev.* 1990e, 4 (2): 183-187.

<sup>53</sup> Rahlenbeck SI, Yohannes G, Molla K, Reifen R, Assefa A. Infection with HIV, syphilis and hepatitis B in Ethiopia: a survey in blood donors. *International Journal of STD & AIDS*, 1997,

<sup>54</sup> Sample size for Truckers: n (2002)=746; n(2005)=600.

re-evaluated. At the very least, **more detailed behavioral and prevalence surveys amongst this group are warranted.**

### 3.5 Military and Other Uniformed Services

In the last two decades, Ethiopia experienced prolonged periods of conflict both within and around its borders that involved the recruitment and mobilization of soldiers throughout the country. Following the defeat of the previous government in 1991, nearly half a million personnel were demobilized and scattered all over the country.<sup>55</sup> At that time, the prevalence of HIV infection in demobilized soldiers was estimated at about 12%.<sup>56</sup> Studies in Gondar town, Northwest Ethiopia in 1993-95 documented prevalence rates exceeding 25% among soldiers<sup>57</sup> (compared to rates of 15% or less among other population groups in the same communities).

In the BSS of 2001, soldiers reported the highest number of multiple sexual partners, extramarital sexual affairs, and unprotected sex with non-regular partners. Their knowledge of HIV was also the highest,<sup>58</sup> but it is unclear whether that also translated into a higher-than-average utilization of condoms.

The 2005 ANC provided further insight into the spread of HIV among the uniformed services (Police force and Military)<sup>59</sup> when an HIV prevalence rate of 24.5% was documented among pregnant women attending Federal Police Hospital. The same study found a prevalence rate of 12% among pregnant women attending Federal Force General Hospital in Addis Ababa. Since the two hospitals serve uniformed people and their families, **the observed high prevalence among pregnant women signals the still-high concentration of HIV among uniformed people in the country.** The overall HIV prevalence among pregnant women attending other ANC clinics in Addis Ababa at the time was 12.9%.

However, the BSSs in 2002 and 2005<sup>60</sup> produced somewhat contradictory results in the indicators regarding paid sex and use of condoms. As shown in **Figure 23**, the proportion of ground forces that reported having had sex with sex workers in the last year declined significantly from 76% in 2002 to 59.2% in 2005 ( $p < 0.0001$ ). **Condom use during the most recent sex with a SW not only increased significantly from 2002 to 2005, but also reached almost universal levels (99%).** Consistent condom use also increased significantly between 2002 and 2005, reaching 90%.

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<sup>55</sup> Dercon S, Ayalew D. Where have all soldiers gone: demobilization and reintegration in Ethiopia. *Wld Dev.* 1998, 26:1661-1675.

<sup>56</sup> Kefenie H, Desta B, Mengesha S, Zewdie D, Kebede T; Prevalence of HIV-1 antibodies in patients with sexually transmitted disease; *Ethiop Med J*; 1991 Apr; 29(2):63-9

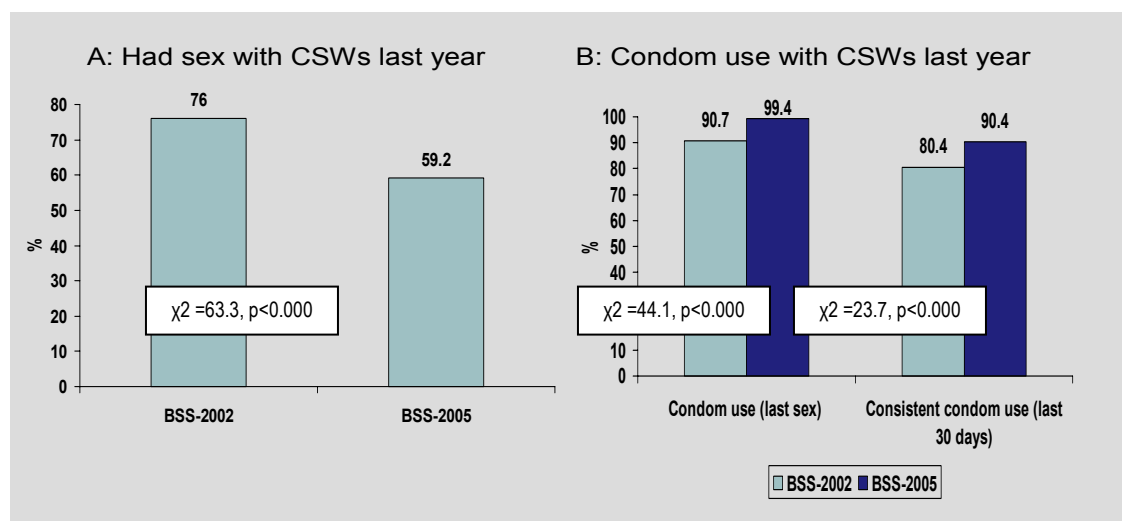
<sup>57</sup> Assefa A, Rahlenbeck S, Molla K, Alemu S. Seroprevalence of HIV-1 and syphilis antibodies in blood donors in Gondar, Ethiopia, 1989-1993. *Journal of Acquired Immune Deficiency Syndromes*, 1994, 7(12):1282-1285.

<sup>58</sup> Family Health International. HIV/AIDS Behavioral Surveillance Survey (BSS)– Ethiopia 2002: Round One. 2002. Addis Ababa, Ethiopia.

<sup>59</sup> MOH. AIDS in Ethiopia. Sixth Report

<sup>60</sup> Sample size for Military:  $n(2002)=746$ ;  $n(2005)=600$ .

**Figure 23: Proportion of military personnel (ground force) who reported having had sex with SWs (A) and those who reported condom use with SWs (B), 2002 & 2005 BSS**



A large portion of the military (~60%) visited SWs in 2005 despite the significant declining trend since 2002. But the reported high condom use by the military is consistent with what has been documented among SWs, and might be associated with a parallel reduction in HIV prevalence among the military. **The lack of recent HIV sero-survey data among military personnel precluded further interpretation of this data, and the ANC data amongst the military spouses is further reason to recommend further research and surveillance to define risks amongst this population.**

### Summary

As can be seen, both mobile workers and the uniformed services are often at high-risk for acquiring and transmitting HIV, but the lack of recent data hinders efforts to describe the current situation in Ethiopia or to prescribe remedies. However, the recent evidence of **high prevalence amongst the partners of uniformed personnel** should be reason to increase efforts to better understand the drivers of the epidemic in these populations.

### 3.6 Clients of sex workers – the key bridging population

Clients of sex workers are often identified as being at high risk for acquiring and transmitting HIV/AIDS and other sexually transmitted infections, as reported elsewhere.<sup>61,62,63,64</sup> As well, a

<sup>61</sup> Ford K, Wirawan DN, Reed BD et al. The Bali STD/ AIDS study: evaluation of an intervention for sex workers. *Sex Transm Dis* 2002; 29:50–8.

<sup>62</sup> Tsunoe H, Tanaka M, Nakayama H, et al. High prevalence of *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Mycoplasma genitalium* in female commercial sex workers in Japan. *Int J STD AIDS* 2000; 11:790–4.

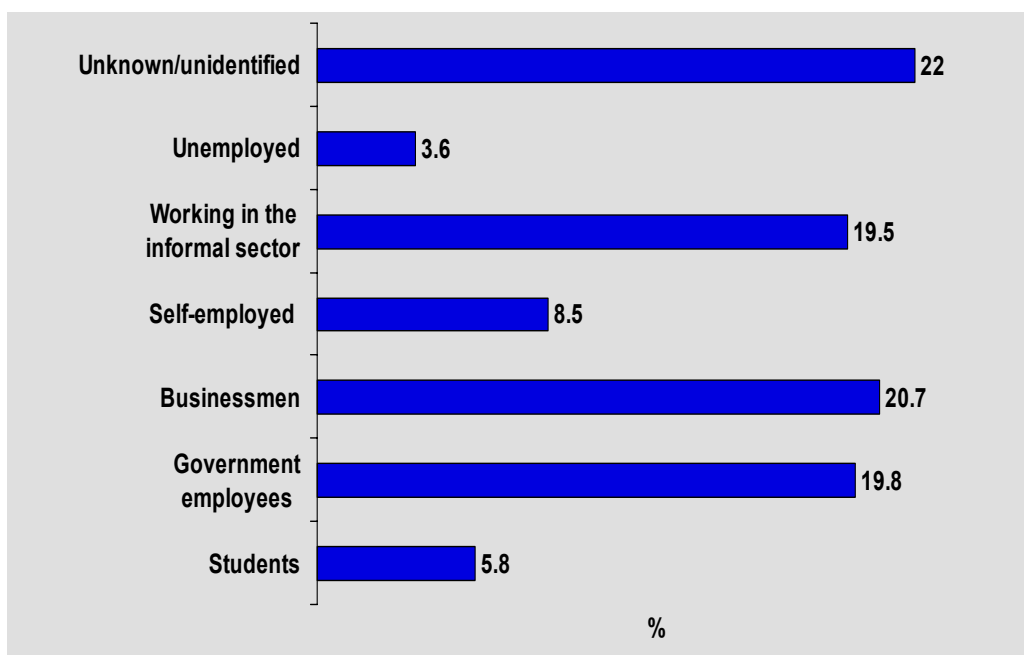
<sup>63</sup> Connolly CA, Ramjee G, Sturm AW, Abdool Karim SS. Incidence of sexually transmitted infections among HIV-positive sex workers in KwaZulu-Natal, South Africa. *Sex Transm Dis* 2002; 29:721–4. virus type 2. *Sex Transm Infect* 1999; 75:49–54

<sup>64</sup> Ma S, Dukers NHTM, van den Hoek A, et al. Decreasing STD incidence and increasing condom use among Chinese sex workers following a short term intervention: a prospective cohort study. *Sex Transm Infect* 2002; 78:110–4.

number of epidemiological and sociological studies in different communities in Sub-Saharan Africa and elsewhere have gathered detailed information on patterns of sex work, sex worker-client contact rates, nonpaying partners, and the prevalence of sexually transmitted infections in these populations.<sup>65,66,67</sup> Despite the magnitude of sex work in the country, and the central role it plays in the spread of HIV, **there is very little relevant information on sex work in Ethiopia. Indeed, no surveillance of this population has occurred in Ethiopia since the early 1990's.**

One study in 2002<sup>68</sup> attempted to identify and characterize client populations of sex workers in Addis Ababa and the results are shown in **Figure 24.**<sup>69</sup> The type of clients differed from area to area and between establishments, but as can be seen the **clients of sex workers cover a broad range of male population groups, representing potential HIV transmission into the wider community.**

**Figure 24: Occupations of clients of establishment-based sex workers, Addis Ababa, 2002 (n=2994)**



Although the recently observed high rates of condom use in commercial sex in the country (**section 3.2 – figures 18 and 19**) might result in a relatively low incidence of HIV infection among sex workers and their clients, this could not be ascertained, as **recent HIV prevalence/incidence data on sex workers and their clients are not available.**

<sup>65</sup> Lowndes CM, Alary M, Meda H, et al. Role of core and bridging groups in the transmission dynamics of HIV and STI in Cotonou, Benin, West Africa. *Sex Transm Infect* 2002; 78(Suppl 1):i69–77.

<sup>66</sup> Morison L, Weiss HA, Buve A, et al. Commercial sex and the spread of HIV in four cities in sub-Saharan Africa. *AIDS* 2001; 15(Suppl 4): S61–9

<sup>67</sup> Aral SO, Lawrence JS. The ecology of sex work and drug use in Saratov Oblast, Russia. *Sex Transm Dis* 2002; 29:798–805.

<sup>68</sup> Family Health International-Ethiopia. Mapping and census of sex workers in Addis Ababa. 2002. Addis Ababa

<sup>69</sup> Despite the fact that the sex workers interviewed found it difficult to identify the occupations of sex clients, as most of them do not ask for this type of information and most clients wanted their identities to remain unknown, most (78%) were able to somehow deduce the occupations of their regular clients.



### *Summary*

The preceding sections demonstrate that **two of the groups at highest risk are young unmarried women and HIV-negative people living with HIV-positive partners**. Conversely, several of the groups traditionally considered at highest risk, including commercial sex workers and their clients, long-distance truck drivers, and people in the uniformed services, are demonstrating evidence of increased condom use and subsequent decreasing HIV prevalence.

This could imply several things, including the recommendation that **prevention programs need to preferentially target these two newly-described high-risk groups** with specific initiatives such as couple counseling, while at the same time not decreasing the prevention efforts aimed at the “traditional” high-risk groups so as to **maintain the gains observed in recent years**.

However, given the evidence that the number of sex workers in the country is high and may be rising, on increased utilization of sex workers, and the decreasing median age of the sex worker population, **more research is needed to inform a policy of increased prevention and treatment activities in this population.**<sup>70</sup> This is reinforced by the reminder that the data in these pages has been gleaned from surveys that did not specifically target these populations, and that **focused surveillance and research in these high-risk groups has been lacking for the better part of a decade**.

On a more general level, the lack of evidence in fully understanding the dynamics and interrelationships of the various risk groups means that **more research is needed to identify the contemporary risk groups to better inform prevention and control policies in the country**.

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<sup>70</sup> The CDC Ethiopia and the Ethiopian Public Health Association (EPHA) are currently undertaking an epidemiological and behavioral survey among most at-risk population including sex workers in the Amhara region; findings would hopefully improve our understanding the recent spread of HIV among sex workers and their clients.

#### 4. Evidence for behavior change – Summary of risk factors and regional variations

Despite the long history of HIV/AIDS in Ethiopia, only a few studies have managed to analyze the various risk factors for HIV infection. Despite the absence of much local data, all indicators are that the significant risk factors for HIV transmission in Ethiopia are much the same as other countries in the region, with **sexually transmitted infections (STIs) and sexual behaviors** of different forms being the most important. What is lacking are studies specifying some of the contextual determinants of HIV infection in the country.

**A review of the few available studies indicated that behavioral factors associated with a high risk of HIV include a high number of lifetime partners and the rate of partner change,<sup>71</sup> as well as the well-known risky behaviors of casual relationships or sex with sex workers. A summary of these studies may be found in Appendix 3.**

On a national level, the DHS data demonstrate the relationship between recent sexual activity and HIV infection. Respondents who were sexually active and had high risk sex in the 12-month period before the survey were more likely to be HIV-infected than those who were either sexually active with low risk or not sexually active. **The differential is especially large for women (see section 4.1)**, with the small number of women who report a higher-risk sexual encounter being over seven times as likely to be HIV positive as women who had sex but not with a higher-risk partner, and more than two times as likely to be HIV positive as women who did not have sex during the 12-month period. The comparatively high prevalence among the latter group of women is possibly because many are widowed or divorced or separated women who, as was shown earlier, have much higher than average risk of HIV infection.

However, there does appear to be a decreasing level of high-risk behaviors, comparing the data from the 1993 large scale behavioral survey<sup>72 73 74</sup> with the results of the 2000 and 2005 DHS studies<sup>75 76</sup>, as shown in **Figure 25**.

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<sup>71</sup> The rate of partner change is important, in that because it has been shown that viral load (and therefore infectivity) are highest in the first few weeks of infection, one needs to distinguish whether one is dealing with serial (multiple partners, but only one at a time) or concurrent (multiple partners during the same time period) partnerships in terms of assessing HIV risk (<sup>71</sup> Halperin DT, Epstein H; Concurrent sexual partnerships help to explain Africa's high HIV prevalence: Implications for prevention; Lancet 2004 363:4-6)

<sup>72</sup> Mehret M, Mertens TE, Carael M, Negassa H, Feleke W, Yitbarek N, et al. Baseline for the evaluation of an AIDS programme using prevention indicators: a case study in Ethiopia. WHO Bull. 1996, 74(5):509-516.

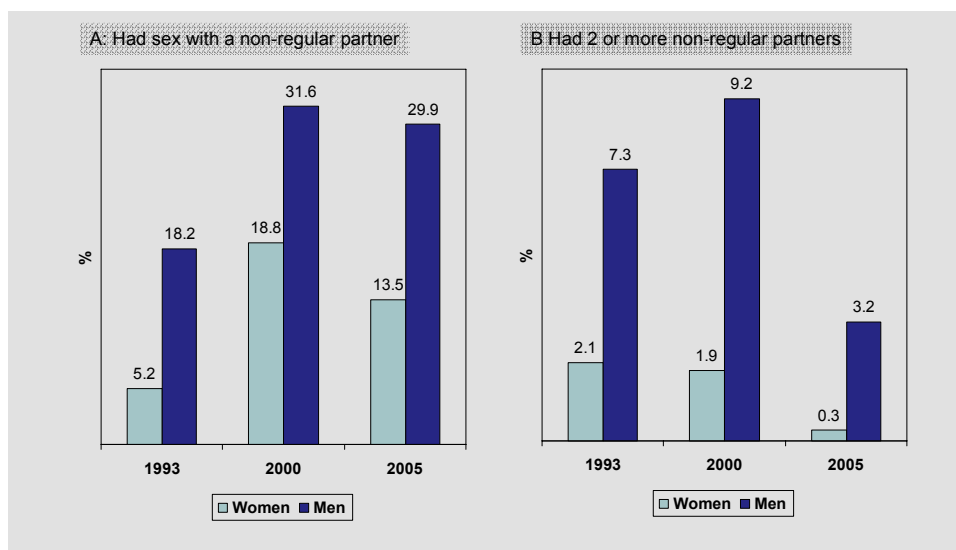
<sup>73</sup> Versnel M and Berhane Y, Wednte J. Sexuality and contraception among never married high school students in Butajira, Ethiopia. Ethiopian Medical Journal 2002;40(1):41-51.

<sup>74</sup> The 1993 study surveyed the general adult population in four of the major urban areas of the country (Addis Ababa, Dire Dawa, Bahir Dar and Awassa), and was the first large scale baseline survey in urban Ethiopia that collected behavioral data using standard HIV prevention indicators, covering 6,885 respondents in the age group 15-49 years.

<sup>75</sup> Central Statistical Authority (CSA) and ORC Macro. Ethiopia Demographic and Health Survey 2000. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2001.

<sup>76</sup> Central Statistical Authority (CSA) and ORC Macro. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2006.

**Figure 25: Proportion of people sexually active in last 12 months who had sex with a non-regular partner (A) and 2 or more non-regular partners (B): 1993, 2000, 2005: Urban Ethiopia**

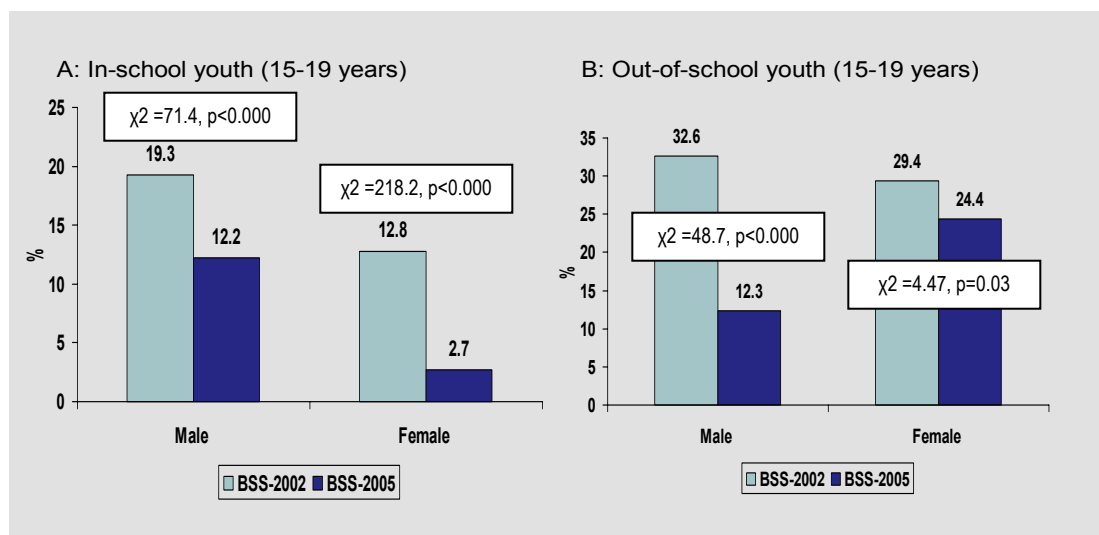


It appears that the rate of high risk sex (i.e. sex with a non-regular partner) increased from 1993 to 2000 in both sexes, with a slight decrease between 2000 and 2005.<sup>77</sup> However, assuming that the 1993 rates for four higher-risk cities were greater than the rate for the whole country, the increased rates of sex with a non-regular sexual partner seen in 2000 and 2005 would be even greater. What is interesting is that the proportion of women having multiple sexual partners in the past twelve months has been decreasing consistently over time, which may very well reflect overall changes in sexual behavior.<sup>78</sup>

This decrease in risky behavior is corroborated in data from the BSS surveys of young people, as demonstrated in **Figure 26**. Between 2002 and 2005, the proportion of youth (15-19 years) that reported having ever had sex declined significantly in both in-and out-of-school youth, with the most notable decline recorded among in-school females (from 12.8% in 2002 to 2.7% in 2005,  $p < 0.000$ ) and out-of-school males (from 32.6% in 2002 to 12.3% in 2005,  $p < 0.000$ ). Despite the observed significant decline, out-of-school females (15-19 years) still appear to be the most sexually active of all groups in 2005, with nearly a quarter of them reporting being sexually experienced.

<sup>77</sup> As has been noted, one must compare the 1993 data and the two DHS surveys with some caution, in that besides the differing survey methodologies, the DHS covered all urban Ethiopia, while the 1993 survey focused only on the four major towns of the country, where there were presumably higher HIV prevalence rates as well as a high concentration of sex workers and other vulnerable population.

<sup>78</sup> One can argue that the observed increase in risky sexual behavior over the years is affected by the diversity in the type of urban populations studied during the 1993 and the two DHS surveys. As a matter of fact, the observed increase in risky behavior could have been larger had it been possible to compare temporal data on sexual behavior only in the four major towns. For example, while 13.5% of the women and 29.9% of the men from all urban Ethiopia reported to have had non-regular partner in the 2005 DHS, the corresponding figures for Addis Ababa was 15.7% and 44.4%, respectively, which are higher than the average for all urban Ethiopia. This means the observed temporal trend could represent an underestimation of the true trend.

**Figure 26: Proportion of youth (15-19 yrs) reporting having ever had sex, 2002 and 2005 BSS**

It should be emphasized that while “having sex with a non-regular partner” is not the only measure of risky sexual behavior (and there are dangers in making too many comparisons between different surveys), one can make inferences such as those being postulated here. Given the paucity of serial behavioral data in the country, a synthesis such as this is an attempt to extract data from different sources and come up with plausible explanations, recognizing the data limitations and the possible biases in comparing data from different points in time and different sources.

However, while risky sexual behavior appears to have increased markedly in the 1990’s and leveled off or decreased slightly since then, **a substantial proportion of the adult and youth population continues to engage in risky sexual behavior.** This means that without continued focus on prevention, there is still a huge potential that the epidemic may continue to be a threat to public health in Ethiopia.

### Can sexual behavior explain the regional variations?

Risky sexual behavior is the most important variable in determining HIV risk, but it can be culturally-specific, and the DHS 2005 data allow some investigation of regional variations in sexual behavior. **Section 3.5 and Figure 6** noted the variation in prevalence between different regions of the country, and these regional prevalence rates were correlated against the magnitude of the different behavioral indicators at regional level, using univariate analysis of the risk factors for HIV infection from the DHS 2005 data. Several relationships were identified,<sup>79</sup> including:

- Being sexually active among the never married
- Having risky sexual behavior in the year preceding the survey
- High number of sexual partner in lifetime (for males)
- Having sex with sex workers (for males)
- Sexual initiation before age 18

<sup>79</sup> DHS 2005 (Final report): pp 219-221

Tables demonstrating these relationships can be found in **Appendix Four**, and provide ample proof that **there is indeed a geographic heterogeneity to Ethiopia's HIV epidemic**. Within each region there is likely to be further geographic variation, and population-based research at the community level is necessary to uncover some of these variations. **It is only at the district or sub-district levels that the localized concentrated epidemics that may be fuelling the national prevalence data will be discovered.**

### **The continued importance of STIs**

STIs have been a well-recognized health problem in Ethiopia for centuries, but due to a combination of associated stigma and lack of properly organized services they have always been underreported. Very few studies have been conducted on STIs in Ethiopia (these are summarized in **Appendix 3**), thus the true magnitude remains unknown. However, the unequivocal evidence that has been gathered elsewhere demonstrating the multiple associations between STIs and HIV infection and transmissibility should be all the proof needed to recommend that **improved and accessible STI prevention, diagnosis and treatment programs combined with increased surveillance (including case reporting as well as monitoring antibiotic resistance patterns) should be prioritized** as one of the important components of HIV prevention activities.

### **Blood transfusion, injections and traditional practices**

It is thought that infected blood transfusions have played an insignificant role in the spread of HIV in Ethiopia. A recent study tested several hundred randomly-selected stored blood samples, using a gold-standard Western Blot Assay, and found no evidence of HIV infection in the samples, confirming both the quality of the blood used by the transfusion services and the efficiency of the blood screening system.<sup>80</sup> Similarly, an analysis of used needles and syringes (both disposable and re-usable) in health institutions showed no HIV RNA, indicating that medical injections are not a major means of HIV transmission in the country.<sup>81</sup>

However, as private health facilities in the country have been expanded, there have also been an increasing number of illegal local injectors who practice the service in their own premises. There are reports of poor handling and reusing of needles and syringes by local injectors, raising concerns about the possibility of HIV transmission via contamination.<sup>82</sup> Further details on this may be found in **Appendix 3**.

### **Other potential high-risk groups**

A number of populations have been found in other countries to be potentially at risk for HIV, and the fact that they have not been discussed in this report is a reflection of the lack of information about them. For example:

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<sup>80</sup> Teferi M, Tsehaynesh M, Beyene P, et al. Determination of HIV-1 prevalence among blood donors and associated risk factors of HIV-1 infection in Addis Ababa. Abstracts of the 15th Annual Conference of the Ethiopian Public Health Association, Gondar, 2004; Abstract

<sup>81</sup> [Priddy F](#), [Tesfaye F](#), [Mengistu Y](#), [Rothenberg R](#), [Fitzmaurice D](#), [Mariam DH](#), [del Rio C](#), [Oli K](#), [Worku A](#). Potential for medical transmission of HIV in Ethiopia. *AIDS*. 2005 Feb 18;19(3):348-50.

<sup>82</sup> Keeping the promise? A study of progress made in implementing the UNGASS DoC on HIV/AIDS in Ethiopia. Panos, July 2006. Addis Ababa

- **Refugees and Displaced persons:** Little research has been done specifically on displaced persons in Ethiopia, but as part of ANC surveillance in 2005, HIV prevalence was recorded at about 13% in Dima Refuge Camp,<sup>83</sup> considerably higher than the national average.
- **Prison populations:** the only data on HIV prevalence among prisoners are from 1990 in Dire Dawa (n=450), indicating a prevalence of 6.0 percent.<sup>84</sup>
- **Men who have sex with men:** this population is essentially unstudied in Ethiopia. After many years of denial, evidence is emerging about MSM populations in other East African countries, so it is likely that they exist in Ethiopia as well, and are probably at even greater risk because of stigma and lack of access to services.
- **Injection drug users:** this population is also unknown and unresearched in Ethiopia, but is one of the groups at highest risk in other countries.
- **College and Pre-college Students:** in recent years a number of new training and higher learning institutions have opened. These sites and their student populations have not been studied, but there is some anecdotal evidences suggesting widespread unsafe sexual practices.

### **Summary**

**Sexual behaviors are determined by a number of socio-economic and cultural factors,** including, but not limited to, traditional practices and norms supporting high-risk behavior, gender roles, poverty, population movement, urbanization, war and conflict, etc. And once again, **there is a lack of recent and reliable data that could help to unravel which of these factors are of primary importance in various Ethiopian locations.**

It is also true that the data cited here can only provide information on heterogeneity at a regional or urban/rural level (although analysis of individual ANC sites can give clues to the location of hot spots). Research at district level in India<sup>85</sup> has demonstrated that heterogeneity can exist within districts, with sexual networking, presence of SWs and other high-risk factors varying enormously even between neighboring villages, and there is some evidence that this type of local heterogeneity in health matters may also exist in Ethiopia.<sup>86</sup>

**Clearly, more research is needed that combines surveillance with detailed community mapping and behavioral studies to identify locally relevant risk behaviors, localize hotspots as sites for priority interventions, and describe the socio-economic and cultural contexts that determine sexual behavior patterns in the country.**

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<sup>83</sup> MOH. AIDS in Ethiopia. Sixth Report

<sup>84</sup> Kebede Y, Pickering J, McDonald JC, Wotton K, Zewde D. HIV infection in an Ethiopian prison. *Am J Public Health* 1991;81(5):625-7..

<sup>85</sup> Moses S, Blanchard J, Kang H et al; *A Case Study in Heterogeneity: Bagalkot District, India* in AIDS in South Asia; World Bank Publication 2006, pp 44-50

<sup>86</sup> Berhane Y, Wall S, Kebede D, et al. Establishing an epidemiological field laboratory in rural areas- potentials for public health research and intervention. *Ethiop.J.Health Dev.* 1999; 13(Special Issue):1-47.

## 5. Response to the epidemic

A history of the response to HIV/AIDS in Ethiopia is described in **Appendix 5**. A number of services, initiatives and strategies have been launched and put into operation in the country, under the auspices of the various relevant Ministries and Departments. What needs to be answered, however, is **whether the services and programs are operational, are effectively reaching their target population, and given the evidence of the status of the epidemic as described in these pages, whether the most appropriate and efficient use is being made of the limited resources available for targeting those most affected by the epidemic and most in need.**

### 5.1 VCT services

Voluntary HIV counseling and testing for the larger community started in Ethiopia after the National HIV/AIDS policy was launched in August 1998, and VCT guidelines were developed in 2000. The service is provided in public, private and NGO health settings and limited free standing and Youth friendly services. In 2000 there were only 60 sites providing HIV counseling and testing, almost all VCT services were located in Addis, and there was a severe lack of trained HIV/AIDS counselors. By March 2003 the number had increased to 279 and currently there 968 functional HIV counseling and testing sites. The number of people up taking VCT annually increased from about 10,000 clients in 2002 to nearly 500,000 in 2005.

Currently different international organizations are assisting the government in the expansion and scaling up of VCT services. However, most of the VCT sites remain concentrated in Addis Ababa and major towns of the country.

Provider initiated counseling and testing at different out patients departments was introduced in TB clinics at the end of 2005, and more than 330 health facilities offer provider initiated counseling and testing at TB clinics.

In late 2006, the Millennium AIDS Campaign for Ethiopia (MAC-E) was launched. Through an intensified Social Mobilization effort, increasing the capacity at entry points and ensuring adequate availability of ARTs, an accelerated increase in uptake was targeted. The results for the first month of the campaign for VCT showed a great increase in HIV Counseling and testing, with more than 160,000 counseled and tested.

Challenges and constraints to the VCT program have been identified as:

- VCT not well conceptualized by most program implementers and coordinators
- No uniform approaches to VCT implementation.
- Training programs are not standardized
- Management information systems are not well developed
- Lack of uniformity in testing procedures
- Shortage of test kits and laboratory supplies
- Quality assurance of counseling and HIV testing services practically do not exist
- Referral networking not well organized

- VCT-linked services are not well developed especially post services
- Lack of strong coordination of the VCT service
- Lack of VCT implementation guide

Analysis of VCT clients shows a higher prevalence of female clients, many of them sex workers. The 2002 BSS indicated that Female Sex Workers (FSWs) are most likely to use the service. **VCT services are not reaching the male population.**

Given the evidence presented in this document, the following shortcomings are also apparent:

- **A lack of VCT services in the small towns and market centers where the evidence points to a high HIV prevalence and potential for transmission into the rural areas**
- **A lack of VCT services targeted at young women and youth**
- **A focus on VCT services for individuals, and no program aimed at couple counseling.**

## 5.2 Prevention in high-risk groups

Despite the adoption of strategies to reduce vulnerability among specific groups including sex workers,<sup>87</sup> actual implementation is still lagging behind. In the 1980s, the Ethiopian Government started a rehabilitation program for sex workers that included vocational skills training and provision of work in various factories. The initiative lacked motivation and eventually failed, partially because the felt needs of the sex workers were not considered in planning the project.<sup>88</sup>

**Few services are currently available for sex workers in major Ethiopian towns.** Some nongovernmental organizations (NGOs) have implemented skills-training programs for sex workers to enable them to exit the sex industry,<sup>89</sup> but the scale of these services remains small. Others, particularly those working with young sex workers, have set up drop-in centers where a range of services are provided including education, recreation, washing facilities, rights advocacy, preventive and curative health services.<sup>90,91</sup> One NGO recently established a program for distributing female condoms to provide sex workers with greater control in negotiating condom use with clients.<sup>92</sup> However, these services generally rely on repeated contact over a period of time and, sometimes, formal registration with an organization.

Van Blerk (2007) studied sex workers mobility in Ethiopia and concluded that sex workers in Ethiopia have high mobility, which further complicates efforts to reduce HIV risk and vulnerability

<sup>87</sup> HAPCO and FMOH. Ethiopian Strategic Plan for the multisectoral HIV/AIDS response, 2004-2008. Addis Ababa. December 2004.

<sup>88</sup> Family Health International-Ethiopia. Mapping and census of sex workers in Addis Ababa. 2002. Addis Ababa.

<sup>89</sup> Van Blerk L. AIDS, mobility and commercial sex in Ethiopia: Implications for policy. *AIDS Care*, 2007, Vol 19(1): 79–86

<sup>90</sup> Cherkosie, A. (2000). Situation analysis. Report on commercial sexual exploitation of children in East Africa. Addis Ababa: ECPAT International.

<sup>91</sup> Family Health International-Ethiopia. Mapping and census of sex workers in Addis Ababa. 2002. Addis Ababa

<sup>92</sup> Betemariam, W. (2002). Gender and HIV in Ethiopia. Unpublished report, Ministry of Health Technical Working Group on HIV/AIDS, Addis Ababa.



targeting this group. The paper advocates that **policy approaches need to take account of the high mobility of sex workers** in three ways: first, by exploring ways for girls to access information and maintain contact with support structures while moving between places of work; second, by building the capacity of sex workers to take greater control over decision-making in their day-to-day lives and third, by developing outreach strategies for taking services into bars and red-light areas.

As well, the evidence in this document indicates that **a focus on sex workers as the primary high-risk group, while necessary, may lead to a lack of program focus on other identified groups at risk, including young and unmarried women, discordant couples and students. Prevention programs targeting these groups need to be initiated with some urgency.**

### 5.3 Prevention of Mother-to-Child Transmission

Prevention of mother-to-child transmission (PMTCT) was not part of the HIV/AIDS Policy of Ethiopia endorsed in 1998.<sup>93</sup> However, the Strategic Framework for the Multisectoral Response to HIV/AIDS later incorporated PMTCT among its key prevention strategies, a national PMTC Guideline was issued in late 2001,<sup>94</sup> and the program started to scale up in 2003. Beginning as a pilot project in four hospitals, by March 2007, 105 hospitals and 248 health centers were providing PMTCT services. The national ARV Guideline, which was endorsed in 2003 and revised in 2004, promotes free provision of PMTCT drugs to pregnant women who test positive.<sup>95</sup>

However, **to date only about 2% of HIV positive pregnant women needing PMTCT have benefited from the service.** In 2006, only 2,028 pregnant women received Nevirapine, of whom a complete course of Nevirapine for mother and infant was provided to 1,341, in accordance with the nationally approved protocol.<sup>96</sup>

Surveys have demonstrated **a very low level of awareness and knowledge about the possibility of HIV transmission from infected mother to child**, with most people not being aware of the existence of antiretroviral medication to reduce the risk of MTCT. In the 2002 BSS, less than 10% of the general population knew about the possibility of MTCT of HIV and the availability of preventive medication.<sup>97</sup> By the 2005 DHS this had risen to 21.2% of women and 25.7% of men who knew that the risk of MTCT could be reduced through the use of drugs during pregnancy,<sup>98</sup> but this still reveals a widespread lack of knowledge, and could perhaps help to explain the low rate of ANC and PMTCT service utilization in the country.

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<sup>93</sup> EFDRE. Policy on HIV/AIDS of the Federal Democratic Republic of Ethiopia [EFDRE]. Addis Ababa. August 1998.

<sup>94</sup> MOH and NACS. National guideline on the PMTCT of HIV in Ethiopia. Addis Ababa. November 2001.

<sup>95</sup> MOH, HAPCO and DACA. Guideline for use of ARV drugs in Ethiopia. Addis Ababa. February 2003.

<sup>96</sup> HAPCO. Annual HIV/AIDS Monitoring and Evaluation Report: 2005/2006. Addis Ababa

<sup>97</sup> Family Health International. HIV/AIDS Behavioral Surveillance Survey (BSS)– Ethiopia 2002: Round One. 2002. Addis Ababa, Ethiopia.

<sup>98</sup> Central Statistical Authority (CSA) and ORC Macro. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2006.

One study in Ethiopia estimated the rate of MTCT in the range of 29%-47%,<sup>99</sup> which is comparable to the rates documented in other sub-Saharan African countries. As noted earlier, the 2005 ANC based sentinel surveillance found HIV prevalence rates exceeding 10% in most urban sites, with prevalence rates as high as 20% recorded in some urban sites.<sup>100</sup> This very high HIV prevalence rate among pregnant women coupled with persistently high fertility (about 6 children per woman)<sup>101</sup> must certainly result in a large number of HIV-infected births in the country. Therefore, **the urgency of the need to scale up PMTCT services in Ethiopia cannot be over-emphasized.**

But the **PMTCT program has been identified as the program with the most critical programmatic gap.** Besides the low uptake of services and low levels of knowledge already noted, the main challenges to increase access and provide quality PMTCT services include:

- Limited number of health facilities offering PMTCT services
- Lack of integration of PMTCT into MCH services, poor linkages to other HIV/AIDS services
- Staff shortages and high attrition rates among health care providers.
- Lack of space and shortage of PMTCT supplies
- Lack of effective M&E tools and utilization of PMTCT reporting formats
- Lack of expansion of PMTCT to private and NGO health facilities
- Low male partner involvement.

#### 5.4 Care and support

While a number of policies, strategies and guidelines concerning care, support and treatment have been issued by the national government, it is civil society organizations in Ethiopia that have been at the forefront of providing care and support services to PLHIV and orphans and vulnerable children (OVCs). Since January 2005 the government of Ethiopia through its national policy on ARV drugs has encouraged international initiatives on ARVs in the country.

The number of patients on ART before 2005 was only 9,000 and these were mainly paying patients. Free ART rollout was launched in January 2005, and since then the number of sites reporting has reached 202. Initially ART was only available at hospitals but since June 2006 the service has expanded to include health centers. ART uptake as of March 2007 was 78,700 with a monthly ART uptake of around 3,500 (the total target for the end of 2006 was 100,000 and universal access planned by 2010).

The fact that the program is lagging behind its targets makes the goal of universal access even more challenging. As the numbers in care increase, gaps in the system are becoming apparent. Existing **care and support services remain inadequate in the face of growing demands for the service.**

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<sup>99</sup> Muhe L. A four-year cohort study of HIV sero-positive Ethiopian infants and children: clinical course and disease patterns. *Ethiop Med J.* 1997; 35(2):103-115.

<sup>100</sup> MOH. AIDS in Ethiopia: Sixth Report. 2006

<sup>101</sup> Central Statistical Authority (CSA) and ORC Macro. Ethiopia Demographic and Health Survey 2005. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2006.

There is in general a shortage of community- and home-based care providers, and the care and support programs offered by NGOs, PLHIV groups and CBOs has been constrained by lack of funding and other capacity limitations. As well, there is a great disparity in the implementation of HIV and AIDS care and support between Addis Ababa and other regions of the country.

At the clinical level, management of opportunistic infections in HIV/AIDS patients is considered minimal. More importantly, despite the improvement in the number of people on ARV treatment, the number of people on treatment is 50% short of the target and it is estimated that **despite the ARV program being free, only 10% of PLHIV who need ART are accessing it**. Some blame a lack of advocacy and public education for this, while others note that the population residing in the countryside and small towns do not have easy physical access to ARV treatment, as most facilities providing ART are in big cities and major urban areas.

## 5.5 TB/HIV services

TB/ HIV collaborative work was initiated in Ethiopia in 2004 as a pilot project in six hospitals and three health centers. Based on the lessons learned from these pilot sites, the collaborative work has been expanded to more than 330 health facilities (hospitals and health centers). Like the rest of HIV related activities, this also is supported by different partners. Major expansion of the collaborative work occurred since 2006. The percentage of TB patients who receive HIV counseling and testing has increased from 10% to more than 80% in most health facilities. TB/HIV patients are referred to an ART unit where they get the appropriate OI treatment, prophylaxis and ART if eligible. Patients seen at ART clinics are also screened for TB and referred to TB clinics if diagnosed with TB.

However, the referral system is not yet well established between the TB care and HIV care givers, and the M&E system is not strong, so it really is not known what percentages of TB/HIV patients who require service actually receive them. **The gap between what is supposed to happen in service delivery and what is actually happening (as is the case with PMTCT) may be huge.**

## 5.6 Treatment of STIs

The National HIV/AIDS Policy recognizes STD prevention and control as one of the strategies to prevent HIV.<sup>102</sup> The policy emphasizes three key strategies in STI prevention and control: (1) comprehensive management of STI patients including risk reduction, counseling, and education; (2) improving the quality of STI services in the public and health sectors and development and promotion of treatment guidelines; and (3) special emphasis to vulnerable groups. In 2001, a national STI treatment guideline was developed based on WHO syndromic management guidelines.<sup>103</sup>

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<sup>102</sup> MOH. AIDS in Ethiopia. October 2002.

<sup>103</sup> Ministry of Health [MOH]-Ethiopia. National guideline for the management of sexually transmitted infections using the syndromic approach. December 2001. Addis Ababa.

STI services provided in Ethiopia are integrated with the Out-Patient Departments (OPDs) of Internal Medicine as well as Gynecology and Obstetrics Departments or Maternal and Child Health (MCH) services. However, since STI services involve the counseling and education of patients on top of diagnosing and prescribing of treatments, it is often difficult for health workers to provide comprehensive STI patient management (e.g. counseling on partner referral) in the OPDs partly due to high workload.<sup>3</sup>

A recent study by CDC/EPHA<sup>104</sup> in selected urban and rural areas identified a number of barriers that limit the utilization of STI services in the country, operating at individual, community, health facility, and policy/program levels. These include:

- *Policy level* - Inadequate policy on STDs at both the national and regional level; lack of a national IEC/BCC strategy on STD prevention/control, limited awareness of health managers and programmers on the various aspects of STD prevention/control needs
- *Facility level* – space problems, shortage of basic functioning diagnostic equipment, failure to implement syndromic management guidelines, lack of BCC/IEC materials, poor record-keeping, lack of confidentiality.
- *Provider level* – lack of training; health workers lack basic patient counseling and education skills; health workers are judgmental to patients with STDs.
- *Patient level* – urban patients buy STI drugs to treat their disease without consulting health care; government facilities seen as the last resort; fear of stigma, judgmental clinic staff, breach of confidentiality, long waiting times seen as barriers to attending clinics.

### 5.7 Behavioral Change Communication (BCC)

The AIDS resource centre opened in 2001 and has been providing information on HIV, AIDS, other STIs and TB. The centre also runs a hotline and produces communication materials on various issues related to HIV/AIDS. Several NGOs have made HIV/AIDS prevention and control an integral component of their rural development work.

BCC in the country has included a wide range of activities: public education campaigns, VCT promotion, NGO-led peer education programs, and radio programs aimed at reducing stigma and promoting discussion on HIV/AIDS, gender inequality, harmful traditions, and cultural taboos. There are programs targeting taxi drivers, the police force, agricultural development agents and farming communities, and young people. Print-based serial dramas are used in peer group discussions for educating university students, the National Defense Force and the Federal Police.

Several campaigns have also been undertaken in Ethiopia addressing HIV/AIDS and reproductive health issues including marriage by abduction, spousal communication, and HIV/AIDS. Stage plays, video documentaries, contests for the best short stories and poems that address HIV/AIDS and reproductive health issues, training for journalists in covering health-related issues, capacity building workshops for playwrights, theatre experts and media practitioners working on HIV/AIDS,

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<sup>104</sup> CDC/EPHA. A Targeted Evaluation of Barriers to STI Partner Management in Ethiopia, March 2006, Addis Ababa

family planning and reproductive health, support to youth clubs are some of activities on the area of BCC.<sup>105</sup>

The two national behavioral surveillance surveys (BSS) discussed in this report have found some indications of behavior change,<sup>106</sup> but **the high rates of unprotected sex, continued HIV incidence, and low utilization of VCT, PMTCT, and ART services, among other things, demonstrate that there is still much to be done.**

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<sup>105</sup> Warren Parker, Asta Rau and Penny Peppas, HIV/AIDS Communication in Selected African Countries, Interventions, Responses and Possibilities, © SIDA 2006

<sup>106</sup> BSS round two draft report.

## 6. Discussion and recommendations

This report was commissioned in order to pull together and synthesize information and data accumulated to date about the HIV/AIDS epidemic in Ethiopia, to identify gaps in knowledge and to correlate current and previous programming with the available evidence on the current state of the epidemic. The following is a summary of the main findings of this report, with recommendations on activities that should be undertaken as a matter of urgency.

### a. The status of the epidemic

Evidence from both the most recent ANC and DHS surveys indicate that **the epidemic may be less severe, less generalized and more heterogeneous than previously believed**. It seems to have stabilized or even declined in most major urban centers, while increasing in smaller towns.

The scale of the epidemic in rural areas cannot be fully described due to a lack of data, and the available data provide conflicting findings. While ANC-based studies and a few small surveys suggest a generalized epidemic in rural Ethiopia, only limited rural spread is implied by the findings of the 2005 DHS. Despite this, the rural epidemic appears to be relatively widespread but heterogeneous, with relatively low HIV prevalence in most regions, but a few regions demonstrating prevalence rates greater than 5%.

The epidemic in the country is not homogeneous across regions, although it cannot be fully understood due to lack of data. Available data revealed a marked regional variation in HIV in the country, and trying to produce “single” estimates for the entire country has little relevance to understand the scale and heterogeneity of the epidemic.

**Because of the heterogeneity of the epidemic, HIV/AIDS programs should not be based on national-level statistics, but need to be more focused geographically, and directed to those regions, districts or communities exhibiting higher prevalence rates. This will necessitate conducting research and disaggregating data to the district level in order to identify hot spots and communities at higher risk.**

### b. The epidemic in small towns and market centers

The epidemic potential in small towns, where there is the possibility of bridging the spread to rural communities, appears to be huge and has not been given enough attention in prevention efforts to date. Contrary to expectations, **the small towns involved in the DHS survey exhibited a higher-than-expected prevalence of HIV compared to the bigger towns**. These small towns may be HIV hot-spots that have been neglected in HIV prevention efforts to date that have focused on larger centers.

**Prevention, mitigation and treatment programs, including VCT and ART services, which have been located mainly in the larger urban centers, need to be placed in the smaller towns and market centers that exhibit higher-than-expected HIV prevalence levels.**

Huge urban-rural differentials have been noted since the advent of HIV in the country, with urban areas disproportionately more affected than rural areas. Findings from the DHS and BSS suggest that multiple sexual partners and extramarital sex are not as common in rural communities, which may partly explain the variation in HIV. However, as communication and transport infrastructure in rural areas improve, along with greater access to education and travel, there is likely to be a further mixing of urban and rural populations, with the possibility of further spread of HIV into the rural populations.

**Surveillance in rural areas needs to be increased, not only to monitor the spread of the epidemic, but also to continue to provide better estimates of the true prevalence of the epidemic in the country whose population remains overwhelmingly rural. Such efforts also need to target urban areas that potentially have a role in the transmission of HIV to the nearby rural areas.**

### **c. Geographical variation, particularly in Gambela**

Analysis of the DHS data revealed that the diversity of the HIV epidemic in the country seems to be related to sexual behavior patterns and to factors that affect transmission such as the presence or absence of male circumcision. Nevertheless, **the socio-cultural contexts and determinants of sexual behavior in the regions are not well understood.**

Gambela region unexpectedly exhibited the highest prevalence of any area -- rural or urban, including Addis Ababa. Gambela is characterized by a relatively higher magnitude of risky sexual behavior than any other region and male circumcision is less common. These two factors appear responsible for fuelling the epidemic in the region.

**Further research is needed to confirm the reasons for the unexpectedly high prevalence in Gambela Region, and if confirmed, programs need to be developed to target the high-risk populations, including the possibility of offering circumcision services.**

### **d. Sexual behavior patterns and trends among the general population**

Data from the BSS and DHS indicate that while risky behavior climbed precipitously in the 1990's, it has leveled off or decreased slightly since then. But there is still a substantial proportion of the adult population that is engaged in risky sexual behavior. However, there are indications that condom use and age of sexual initiation are increasing, at least among males.

**The advances noted in condom use need to be built upon, with research to determine which strategies and initiatives account for the success, and then extending these strategies to a wider population.**

### **e. Young and unmarried women are at risk**

Young people, especially never-married sexually-active females carry the greatest risk of HIV infection in the country, with prevalence rates much higher than the average for both urban and

rural areas or for all women of reproductive age. This is associated with an early age of sexual debut and sexual mixing with high-risk older men, on top of their biological and gender-related vulnerability.

**Prevention and mitigation programs need to be established in order to reduce the epidemic potential in this population. Youth-friendly educational and counseling services aimed particularly at girls and young women need to expand in all parts of the country, including school settings, providing not only services but also training in condom negotiating skills and other HIV prevention strategies.**

#### **f. HIV transmission risk in marriage – discordant couples**

The 2005 DHS found that 2.1% of married individuals were HIV positive. Of these, the vast majority (85%) were found to be in discordant couples, with one partner HIV-positive and the other HIV-negative. Most discordant couples reside in urban areas, and are **perhaps the group at greatest risk of contracting HIV from their own spouses**. Couple counseling services in the country are either non-existent or rudimentary.

**Services for couple counseling, combined with education on appropriate prevention measures, mainly in urban areas, need to be established as a high priority.**

#### **g. Sex work appears to be on the rise and sex workers are still at risk**

Commercial sex workers have been regarded as the core high-risk group for HIV transmission and the epicenter of the HIV epidemic in Ethiopia. However **there has been no biological survey among sex workers in the country in the past decade**, which significantly limits our understanding of the epidemiology and recent dynamics of spread of HIV in the population.

Anecdotal evidence suggests that the number of sex workers is on the rise in Ethiopia. Young girls in their teens and early twenties are joining the industry each year. Sex work in the country has evolved over the years; and it has now been recognized as having different forms, although data on the “typology” of sex work is also lacking. The demand for sex workers also appears to be increasing. However, information on clients of sex workers and other most-at-risk groups is scanty.

However, some data indicate that both sex workers and their clients are reporting an increased use of condoms, although many fewer sex workers report also using condoms with their non-paying clients. **It is possible that sex workers and their clients are using protective measures and may not be as at risk for either acquisition or transmission of HIV as has been commonly assumed.**

**Research to update information on sex workers, including determinations of the current levels, behaviors, and characteristics of sex workers in the country is urgently needed. Surveillance and special programs directed at sex workers are the only way to monitor the activities and risks of this population, and dependence on data that is decades old is neither effective nor evidence-based.**



### **h. Other high-risk and vulnerable populations**

Data from the early days of the epidemic, as well as anecdotal evidence suggested that the uniformed services, truckers, refugees and displaced people, street children, daily laborers, students and other mobile populations were the most vulnerable groups in the country. However, **data are lacking to measure accurately the recent spread of HIV in these groups and their role in the further spread of HIV to the general population.** There is some evidence from the BSS that some of these populations may not be as at risk as was suspected, based on condom usage with sex workers by truck drivers and uniformed services, but **further research is needed to corroborate these inferences.**

### **i. Gaps in service delivery**

The need to develop couple counseling services is noted above. While there have been recent efforts to increase availability and accessibility of services, in general all preventive and treatment services need to be expanded and made available to a broader population in both urban and rural areas.

**Services which need expansion include VCT, STI treatment, antenatal and postnatal PMTCT, TB/HIV integration, and services targeted to specific populations, including youth, students, sex workers, migrants, refugees and other displaced populations, and the uniformed services.**

### **j. The need for improved surveillance**

This study has been constrained by the limitations of the surveillance methods currently in place. The 2005 DHS is a valuable piece of research, but detailed analysis of its results cannot go further than the limitations of its sampling methodology. Other studies that could be triangulated with its results are needed to better understand and interpret the findings of the DHS, ANC surveillance studies and the BSS (and many of the conclusions that this study has drawn from them). The lack of any longitudinal studies or follow-up of cohorts drawn from the general population has made it impossible to make accurate estimates of incidence, and studies based on biological determination of HIV status, socio-cultural and contextual factors, STIs, etc. are few in number and lack continuity.

There is a huge information gap on sex workers and other putative high-risk groups due to a lack of surveillance or research for over a decade. Neither the size of the sex worker population nor the recent epidemiology of HIV/AIDS in this population is known. **This information is crucial for planning HIV prevention as well as care and support programs.**

**The following are all necessary and needed surveillance projects:**

- Comprehensive and serial biological and behavioral data on a representative sample, using a mix of quantitative and qualitative methods in order to monitor the course of the epidemic and plan appropriate interventions.
- Research that combines surveillance with detailed community mapping and behavioral studies to identify locally relevant risk behaviors, identify “hot spot” sites for priority

interventions, and describe the socio-economic and cultural contexts that influence sexual behavior patterns in the country.

- Epidemiological and behavioral surveys among most at-risk populations, especially sex workers and their clients, either as stand-alone studies or integrated into the national surveillance system.
- More research work is needed to understand the rural epidemic and the dynamics between the rural and urban epidemics. The role in the rural epidemic played by urban areas, locally-relevant high-risk groups and socio-cultural factors requires proper investigation.
- Expand ANC sentinel sites to the underserved rural population in order to better understand the heterogeneity of the epidemic.
- Some critical socio-demographic information, such as parity, previous HIV testing, educational and marital status, need to be collected routinely as part of the ANC sentinel surveillance system, in order to better interpret HIV prevalence trends.
- Strengthen the STI surveillance system with an emphasis on private health facilities, pharmacies and drug vendors.
- Mapping of high-risk populations
- Surveillance at the district and sub-district level in areas identified as hot spots, such as Gambela
- Conduct community-based behavioral surveys to understand risks and identify hot spots.

#### **k. The need for more research**

What should be evident is that while surveillance has improved in recent years, most particularly through the increase in ANC sentinel sites and the national statistics afforded by the DHS and BSS surveys, **most of the epidemiological research papers that have been cited in this report date back more than ten years, and in many cases, information on particular risk groups is based on studies that were undertaken in the early 1990's.** There are gaps in knowledge on recent trends, and it is plain that some programming decisions have been based on out-of-date assumptions about risk groups and patterns of transmission. Research is often given secondary priority to programming imperatives, especially in an emergency epidemic situation, but:

- **Epidemiologic research and continued surveillance of known and emerging high-risk groups needs to be prioritized as an additional program activity, and funds need to be made available or solicited for these activities to be carried out by government, academic, and even private research institutions.**

## APPENDIX 1 - Analytical Framework

The analytical framework for this report considers two fairly well-known concepts in HIV epidemiology: epidemic potential and epidemic phase. **Epidemic potential** deals with identifying the size and distribution of high-risk subpopulations, while **epidemic phase** describes the timing of the progression of the epidemic from inception to peak and through to decline. Knowledge of when HIV was introduced and how it has progressed and spread within vulnerable subpopulations and the general population is necessary in order to assess epidemic phase, as well as an understanding of the biological and behavioral HIV-associated risk in vulnerable subpopulations and in the general populations with whom they interact.

Over the course of HIV's introduction into new communities, a variety of epidemic patterns have been observed, associated with both sexual transmission (heterosexual and homosexual) and also through injection drug use (IDU).<sup>107</sup> In many circumstances, HIV is introduced and reaches a certain saturation level in different **high-risk (core) subgroups** (characterized by high levels of sexual or other HIV-related risk behavior), before diffusing at differing rates and to varying extents into the 'general', low-risk (non-core) population.<sup>108</sup> The outward spread of HIV from the core groups depends on the existence of '**bridging populations**' - individuals who interact with both high-risk (core) and low-risk (non-core) sectors of the population<sup>109 110</sup> and who 'seed' infections in the low-risk population. The extent of initial outwards spread is determined by the nature, degree and frequency of interaction between the core, the bridge and the 'general' population (which will influence **rates of exposure** to HIV), and by the presence or absence of co-factors, which influence the per act **transmission probability**<sup>111</sup> of HIV. The subsequent scale of HIV transmission within the 'general' population then also depends on levels of risk behavior (mixing patterns) and co-factors in that population itself.

In Ethiopia, as in the rest of sub-Saharan Africa, the dominant mode of HIV spread has been through heterosexual transmission. Under certain conditions, heterosexual spread of HIV can be rapid and explosive. Such rapid heterosexual spread is in some situations largely confined to high risk (core) groups, whereas in others it can become generalized to significant proportions of the population.

Factors influencing the extent of sexual spread of HIV are complex, and there are very diverse sexually-driven epidemic patterns. However, an analysis of the size and distribution of key high-risk

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<sup>107</sup> UNAIDS (2002). Report on the global HIV/AIDS epidemic. Geneva: UNAIDS.

<sup>108</sup> Over, M., & Piot, P. (1993). HIV infection and sexually transmitted diseases. In D. T. Jamison, W. H. Mosley, A. R. Measham & J. L. Bobadilla (Eds.), *Disease control priorities in developing countries* (pp. 445-529). New York: OUP.

<sup>109</sup> Morris, M., Podhisita, C., Wawer, M. J., & Handcock, M. S. (1996). Bridge populations in the spread of HIV/AIDS in Thailand. *AIDS* 10, 1265-1271.

<sup>110</sup> Lowndes, C. M., Alary, M., Meda, H., Gnintoungbe', et al. (2002). Role of core and bridging groups in the transmission dynamics of HIV and sexually transmitted infections in Cotonou, Benin, West Africa. *Sexually Transmitted Infections* 78 (Suppl I), i69-i77.

<sup>111</sup> Mathematical modeling demonstrates that epidemics are sustained when more cases are continually being generated – the Reproductive Number. This is dependent on the transmission probability, which itself is dependent on a number of factors, including the duration of infectiousness, the rate of change of sexual partners, as well as the proportion of susceptible individuals in the population. In situations of rapid transmission, an observed slowing in the rate of prevalence increase may be due in part to the reduced proportion susceptible in the population (Anderson RM, May RM; *Infectious diseases of humans: dynamics and control*; Oxford Univ Press 1991)

subpopulations (sex workers and their clients, IDUs, MSMs, etc.) can provide an assessment of the **epidemic potential** in a given area – the extent of maintaining and amplifying the epidemic beyond the spread within the networks that are directly linked to these high-risk populations.<sup>112</sup>

In Ethiopia, as elsewhere, female sex workers (FSW) have been identified as probably the dominant high-risk core group. FSWs become infected with HIV through sexual contact with HIV-infected clients or other non-commercial partners. They in turn transmit HIV to their clients and other sex partners. Several outcomes are then possible:

- (a) Some infections transmitted to male sexual partners of FSW will be **‘dead-end’**, i.e. will produce no further infections, if these men do not have other female sex partners;
- (b) Some infected male partners will then infect their (non-sex worker) partner, but the infection will not proceed beyond their infected partner – this is referred to as a **“truncated epidemic”**.
- (c) Some infections will be transmitted back to the FSW population and fuel increasing HIV incidence in this core group, by men having sex with more than one FSW. As well, the infected men will also infect their (non-sex worker) partner/s who may be part of a local high-risk network. This is referred to as a **local concentrated epidemic**. The prevalence within these local networks is very high, and a local concentrated epidemic could result in an HIV prevalence in the general population exceeding one percent (and perhaps as high as three percent) if the sizes of the high-risk population are large enough. Two examples where this could arise would be situations where there are a large number of sex workers, or a very high proportion of men are clients of sex workers.<sup>113</sup> An epidemic will remain concentrated if it is driven primarily by high-risk groups and effective programs for reducing transmission in these groups are initiated.
- (d) The infection which begins in the local high-risk networks spreads into the wider community and becomes a **generalized epidemic**. HIV infection is transmitted to the low-risk general population by male clients (or other sexual partners) of female sex workers who also have sex with women in the low-risk population (people such as long-distance truckers and their assistants have been implicated in playing this role). This is the **bridge** between the core group of FSWs and the general population of non-FSW women. An epidemic is generalized when transmission occurs outside of these high-risk groups and would continue despite interventions within the high-risk group.

In some situations, **low level** epidemics occur, when HIV prevalence remains low in both vulnerable subpopulations and the general population.

Factors that will influence the scale of sexual HIV transmission outwards from FSWs include : (a) HIV prevalence and incidence among FSWs; (b) stage of HIV infection and consequent viral load; (c) the extent and patterns of sexual mixing and rates of partner change of FSWs and their sex partners; (d) levels of sexual risk behavior in these partnerships, including condom use rates and type of sex; (e) sexually transmitted infection (STI) type and prevalence in FSWs and their sex partners; (f) male circumcision rates; (g) other potential co-factors influencing transmission

<sup>112</sup> Moses S, Blanchard J, Kang H et al, AIDS in South Asia: Understanding and Responding to a Heterogenous Epidemic; World Bank Publication, 2006

<sup>113</sup> Moses et al, *ibid*

probability. High levels of concurrency, and of proportions of people in the primary infection stage of HIV may fuel rapid transmission of HIV due to presence of very high viral titres which may dramatically increase per act transmission probability.<sup>114 115 116</sup>

Within the general population, a distinction can be made between heterosexually-acquired HIV infections that occur as a result of ‘**first-wave**’ HIV transmission outwards from FSWs, and **self-sustaining** heterosexual epidemics. The size and behavior of the bridging population and co-factor levels (including STI prevalence and male circumcision rates), will determine the scale of first-wave transmission, and can also initiate self-sustaining heterosexual epidemics through seeding of infections in ‘productive’ networks within the general population. STI prevalence, male circumcision rates, sexual mixing patterns, concurrency and sexual risk behavior *within* the general population will then be crucial in determining the scale of heterosexual HIV spread.

Epidemiological evidence suggests that differences in transmission probability and sexual behavior are important in explaining epidemic variations in Africa. High rates of male circumcision in some regions may have reduced the spread of HIV and other STIs, whereas ulcerative STIs (especially genital herpes) were more common in high-prevalence cities in East and Southern Africa.

The analysis in this report focuses on the sexual transmission of HIV infection in Ethiopia. HIV transmission through transfusion of infected blood or blood products may still occur to a limited degree, but as in most countries, blood safety has been a priority since early in the epidemic, and there is little evidence that it is a major contributing factor to HIV transmission. Similarly, there is little evidence in Ethiopia of transmission through unsafe medical injections, and there is an almost-total absence of data on whether there may be some transmission through injection drug use in Ethiopia.

Although the HIV epidemic potential in Ethiopia is generally considered to be high, with increasing levels of economic hardship, expanding urbanization, increased mobility due to labor migration, a history of conflicts and civil disruption and better educational and trading opportunities (all features that have been identified elsewhere as contributors to increased HIV transmission), the size and distribution of the high risk groups, sexual networks and bridging populations remain largely unknown, making determinations of epidemic potential largely speculative. In fact, any attempts to analyze the epidemiology of HIV in Ethiopia are limited by the lack of sufficient longitudinal, cross-sectional and behavioral data.

**A recommendation that can be made at the outset, even before analysis of the available data, is that it is vital to collect comprehensive and serial biological and behavioral data on a representative sample using a mix of quantitative and qualitative methods in order to**

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<sup>114</sup> Koopman, J. S., Jacquez, J. A., Welch, et al The role of early HIV infection in the spread of HIV through populations. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology* 1997 ;14, 249-258.

<sup>115</sup> Jacquez, J. A., Koopman, J. S., Simon, C. P., & Longini, I. M., Jr (1994). Role of the primary infection in epidemics of HIV infection in gay cohorts. *Journal of Acquired Immune Deficiency Syndromes* 7 , 1169-1184.

<sup>116</sup> Hu, D. J., Subbarao, S., Vanichseni, S., et al (2002). Higher viral loads and other risk factors associated with HIV-1 seroconversion during a period of high incidence among injection drug users in Bangkok. *Journal of Acquired Immune Deficiency Syndromes* 30, 240-247.

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**determine the epidemic potential and the epidemic phase in Ethiopia, and more accurately monitor the course of the epidemic and plan appropriate interventions.**

## APPENDIX 2 – Surveillance Issues

A shocking jump in HIV prevalence from less than 5% (reported in various small-scale studies 1984-1987) to 17% observed during the 1988 nation-wide urban-based survey among female sex workers<sup>117</sup> heralded the probability of a generalized epidemic. No data were available on the rural population as a whole or the non-high-risk general population in the urban setting. One study tried to identify the bridging population between rural and urban areas, and documented high risk sexual behaviors in specific rural-residing subgroups (ex-soldiers, merchants and students) who frequently traveled into urban communities.<sup>118</sup>

ANC-based surveillance has been used to produce estimates of prevalence in the general population and to make projections using the EPP model since 1996, not necessarily because it was the best approach but because it was regarded as the most feasible and affordable system.<sup>119</sup> Although sentinel surveillance in principle needs to use a consistent methodology with little or no changes, attempts in Ethiopia to improve weaknesses in the system by increasing the number of sites and the urban-rural mix<sup>120</sup> have made interpretations and comparison of findings very difficult. **Figure A21** below shows the changes in the number and distribution of ANC sites over the past decade. Another major criticism of the ANC- based surveillance system is that it does not represent the majority of the rural population. Thus, estimates produced in each ANC round have had to be interpreted without reference to the findings of the previous round(s).

The three most important criticisms of ANC surveillance in Ethiopia are:

- a) ANC surveillance data are used to estimate population prevalence but it does not even represent all pregnant women. In Ethiopia, the majority of pregnant women do not attend antenatal clinics -- estimated national ANC coverage was only 40.8%<sup>121</sup> during the 2004 survey. Not much is known about pregnant women who do not attend ANC or conversely those women who do choose to attend. Further, there is evidence that increasing numbers of women are availing themselves of ANC services at private facilities and clinics, which are excluded from ANC-based surveillance.
- b) Most ANC sites are in small towns or urban areas and fail to represent remote rural areas which more truly reflect the country as a whole. The small towns where these clinics are found are not typical of rural settings; they have higher levels of economic activity and probably are associated with higher HIV prevalence.
- c) Even if the entire universe of pregnant women were sampled, there are still questions as to how accurately that reflects the general population, and there are sound arguments for three conflicting positions: that it is an accurate proxy measurement; that it overestimates the prevalence in the general population; or conversely that it is an underestimate.

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<sup>117</sup> Mehret M and Khodakevich L. Surveillance of Human Immunodeficiency Virus Infection in Ethiopia. *Ethiop.J.Health Dev.* 1990;4(2, Special issue):101-105.

<sup>118</sup> Shabbir I, Larson CP. Urban to rural routes of HIV infection spread in Ethiopia. *J Trop Med Hyg.* 1995 Oct 98 (5):338-42.

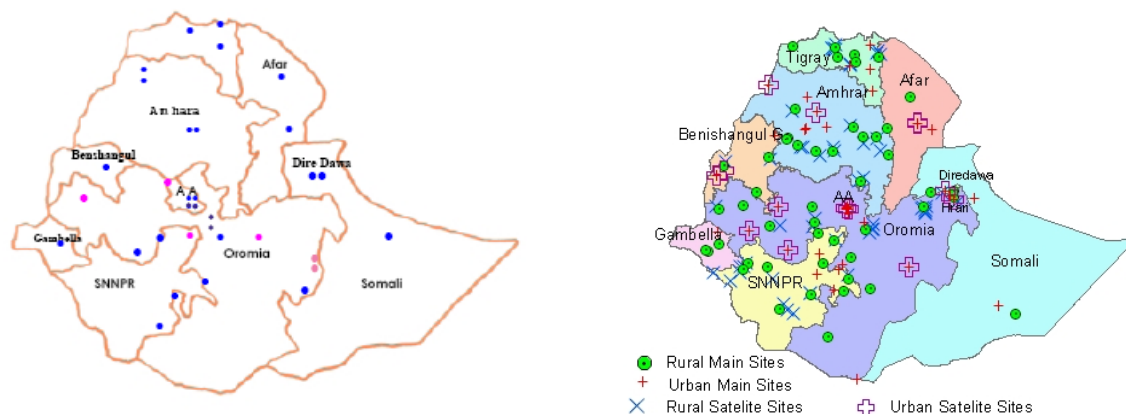
<sup>119</sup> World Health Organization (WHO) and UNAIDS (2003). Reconciling clinic based surveillance and population-based survey estimates of Saharan Africa. Geneva, Switzerland: WHO and UNAIDS.

<sup>120</sup> MOH. AIDS in Ethiopia. Sixth Report. 2006

<sup>121</sup> MOH. Health and Health Related Indicators. 2003/04.

The question remains unresolved, but it is a reminder that ANC surveillance, while it may be the best that is available, in the end is a convenience sample that needs to be carefully interpreted. The methodological changes that have been made at various times in order to increase rural representation have complicated the interpretations of national trends. The surveillance sites have never been monitored in detail to detect changes in client characteristics that might influence the estimates.

**Figure A2-1 –Maps depicting distribution of ANC sites in Ethiopia 2001, 2004**



ANC surveillance Sites in 2001

ANC surveillance Sites in 2004

Source: AIDS in Ethiopia reports.

The Behavioral Surveillance Survey (BSS) is another relatively large-scale survey that produced useful information on sexual and other HIV-related risk behaviors in selected subpopulations. Two rounds of the BSS have been held in 2002 and 2005, with ten different population groups studied: in-school youth (aged 15-19), out-of-school youth (aged 15-24), uniformed services, transport workers (truckers, intercity bus drivers, minibus drivers and their assistants), farmers, pastoralists, factory workers and female sex workers. The BSS approach is useful to monitor trends in selected subpopulations, but generalizability of the results is limited, and there are always concerns as to whether the responses are genuine or not, especially when correlated with the ANC or DHS data.

### ANC versus DHS data – what to believe?

As has been described, one of the major issues that led to the commissioning of this report were the discrepancies and contradictions in the findings of the 2005 surveillance statistics (largely based on data from antenatal clinic sites) and the 2005 Ethiopian Demographic and Health Survey (DHS). Both surveys reported less-than-expected prevalence rates, but the differences between the two reports were significant, and led to a number of meetings and consultations in-country to try to resolve the differences and arrive at a mutually-agreeable “point prevalence” estimate for the country.<sup>122</sup>

What needs to be understood is that neither survey represents a true cross-section of the Ethiopian population. A truly national cross-sectional and representative sampling has not been attempted,

<sup>122</sup> Agreement on a point prevalence of 2.1% was reached in April 2007.



and while the methodologies for each survey method make allowances in their calculations that are supposed to account for the fact that they are less-than-perfect, the inherent or contingent problems with each methodology may have had a profound impact on the HIV prevalence results. Below, some of the major methodological and analytical issues in the DHS and ANC reports are discussed.

### *1. The ANC data*

According to WHO,<sup>123</sup> the primary utility of antenatal clinic data is the assessment of trends in HIV prevalence, but data are often used to estimate the level of HIV prevalence as well. When ANC surveillance data are used for HIV prevalence estimation in the general population, the following three assumptions are made:

- Prevalence among pregnant women offers a reasonable approximation of prevalence among the general adult population
- Under-representation of more remote rural clinics can be compensated by a downward adjustment of estimates outside of major urban areas by a factor of 20%
- Computing sex-specific estimates of HIV prevalence assumes that the female-to-male ratio is 1.2 to 1 in mature epidemics.

As will be seen, there is some question as to whether any of these criteria hold true in Ethiopia, or whether any data exist to substantiate these assumptions.

In order to use ANC surveillance for HIV prevalence estimation in the general population, it is critical that consistent methods and tools are maintained, beginning with the continuing participation of the same clinics. Even when using the same clinics, the population covered can differ over time due to variations in outreach services, administrative changes or socioeconomic changes. Thus, the population under surveillance needs to be monitored carefully.

In Ethiopia, the number of sites as well as the urban-rural mix has been increasing over time.<sup>124</sup> The latest round included satellite sites to increase the rural representation and achieve the required sample size in a reasonable time period (sites for 2006 estimates: 38 urban and 44 rural sites plus 16 urban and 56 rural satellite sites). This is in contrast to 2001, when data were collected at 6 rural sites and 28 urban sites.

One of the most basic problems limiting the ability of the ANC surveillance to be applied to the entire population is that it does not even represent the universe of all pregnant women (let alone all women, or all women and men). In Ethiopia, the majority of pregnant women do not attend antenatal clinics, with an estimated national ANC coverage of only 40.8%<sup>125</sup> during the 2004 survey. Not much is known about pregnant women who do not attend ANC's. Conversely, with increasing attendance at ANC not much is known about the characteristics of women who do choose to attend – who are the ANC “new clients”? Further, there is evidence that increasing

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<sup>123</sup> World Health Organization (WHO) and UNAIDS (2003). Reconciling clinic based surveillance and population-based survey estimates of Saharan Africa. Geneva, Switzerland: WHO and UNAIDS.

<sup>124</sup> MOH. AIDS in Ethiopia. Sixth Report. 2006

<sup>125</sup> MOH. Health and Health Related Indicators. 2003/04.

numbers of women are availing themselves of ANC services at private facilities and clinics, which are excluded from ANC-based surveillance. Finally, the rate of HIV testing in these various ANC surveillance sites is not known, nor do we know the characteristics of women who aren't tested or who refuse testing.

The location of the surveillance site is the second critical factor. The Ethiopian Ministry of Health has identified several criteria for the location of ANC surveillance sites,<sup>126</sup> including access to a laboratory and a certain minimal client base. This by definition limits most sites to small towns or urban areas and fails to represent remote rural areas which more truly reflect the country as a whole. Most clinics in these small towns are not typical of rural settings; such areas have higher levels of economic activity and probably are associated with higher HIV prevalence. To compensate for that, satellite sites were included in the system, but these are also likely to distort the trend.

Even if the entire universe of pregnant women were sampled, there are still questions as to how accurately that would reflect the general population, and there are sound arguments for arguing three different points of view:<sup>127</sup>

- it is an accurate reflection - obtaining data on the sero-status of pregnant women ages 15 to 49 gives a reasonable estimate of the status of males in the corresponding age groups. HIV prevalence among pregnant women provides an estimate of the prevalence rates among those who caused the pregnancy.
- It overestimates the prevalence in the general population – biological reasons give females a higher probability than males of contracting HIV, other things being equal.
- It underestimates prevalence in the general population - one of the effects of HIV is to reduce fertility by approximately 30 percent. Thus, a woman with HIV is less likely to be pregnant than a woman without the infection.

The question remains unresolved, but it is a reminder that the ANC surveillance may be the best that is available, but in the end it is a convenience sample that needs to be carefully interpreted. The methodological changes that have been made at various times in order to increase rural representation have complicated interpretation of national trends. The surveillance sites have never been monitored in detail to detect changes in client characteristics that influence the estimates.

The ANC surveillance system can still be useful in Ethiopia because of its feasibility and availability of data in short intervals. If the methodology is standardized it is also very useful in

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126 “For health facilities to qualify as sentinel surveillance sites they need to meet certain requirements. Selection of sentinel sites takes into consideration the following as prerequisites (MOH AIDS in Ethiopia. Fourth Report. 2002):

- Sustainable antenatal services
- Access to a functional laboratory (ensuring adequacy of personnel, equipment, and supplies)
- Adequate client volume for a required sample size (250 to 400)
- Regular blood drawing for other routine services: for instance, syphilis screening, haemoglobin , etc.
- Sustainable supply of RPR for syphilis screening
- Commitment of the regional, zonal and Woreda health bureaus to coordinate and carry out sentinel surveillance in a sustainable manner at specified intervals”

127 MOH. AIDS in Ethiopia. Fourth Report. 2002

monitoring HIV trends in specified geographic areas and population groups. Population-based national estimates are expensive and complicated and cannot be undertaken frequently.

## 2. *The DHS data*

It would seem that the Demographic and Health Surveys (DHS), while not specifically focusing on HIV/AIDS, would still provide a more accurate picture of the prevalence rates in the country because of their more wide-ranging methodology. In reality, the results of the 2005 DHS raise more questions than they answer, most often because of results that do not correlate with other data and previous studies.

### a) **The Coefficient of Variation**

The Coefficient of Variation (CV) is the standard error of an estimate divided by the value of the estimate itself, and is **a measure of the accuracy of an estimate**. The value of the CV depends on the sample size, the sampling design and variations in the population, and gives a good indication how much sampling error is included in statistics whose values are calculated from probability samples. A CV approaching zero reflects highly accurate sampling, and occurs when the population variation is small, the sample design is efficient or the sample size is large enough. The CV is especially important for assessing how reliable sub-population estimates are (i.e. regional estimates). Thus, while national estimates are often from a large enough sample to make the CVs appear reasonably low, CVs calculated for each region may be a better measure of the data's reliability.

Estimates with higher CVs often are suppressed because the sampling variability is too high for the estimate to be considered reliable. For example, according to a guide<sup>128</sup> developed jointly by UNAIDS, UNICEF, UNESCO and ORC Macro, it is highly recommended to use CVs to assure the reliability of indicators. The guide [Page 36] stated that *“One of the advantages of using CVs as measures of reliability is that they are scale-less, permitting comparisons with other estimates that are measured in entirely different units. Often national statistical offices will advocate basic quality guidelines that say that estimates having CVs greater than 35% should not be used to draw statistical inferences and should not be released to the public”*. With this in mind, it is instructive to analyze the CV's calculated from the 2005 DHS, as shown in **Table A2-1**.

It can be seen that for both men and women there are nine out of 11 regions where the CV exceeds 20%. In 5-6 regions the CV exceeds 35% and in three regions the CVs were greater than 50% (it was not possible to estimate CVs in two regions for men because no HIV infection was reported<sup>129</sup>). At the national urban/rural level, the CVs were high, but within acceptable limits.

<sup>128</sup> “Guide to the Analysis and Use of Household Survey and Census Education Data” ISBN 92-9189-016-2

<sup>129</sup> The exceptionally low HIV prevalence rate in SNNPR (0.2%) and the prevalence values of zero (0.0%) reported for Somali (men) and Benishangul-Gumuz (men) are further causes for concern. Was this affected by the refusal of HIV positive persons to participate in the survey? By the small sample size? The DHS recommends that further surveys are needed, but there is no indication that this has been done.

**Table A2-1: Coefficient of variations (CVs), by region, urban/rural and total**

Region	CV (Relative Error)	
	Women	Men
Tigray	52.2	45.5
Affar	36.4	22.1
Amhara	25.0	32.4
Oromiya	18.6	50.6
Somali	69.7	n/a (prevalence=0.0%)
Ben-Gumuz	0.462	n/a (prevalence=0.0%)
SNNP	76.1	58.2
Gambella	39.2	24.1
Harari	27.9	38.9
Addis Ababa	18.1	26.5
Dire Dawa	34.3	55.9
Urban	13.6	27.9
Rural	24.1	24.7
Total	11.6	18.3

n/a: not applicable

Source: EDHS 2005 report (pp. 275-288)

This leads to the conclusion that most of the regional HIV prevalence estimates in the DHS 2005 are less reliable. At the very least, more research is needed to explain such high CV values for most of the regions. For example, the CV for SNNPR of 76.1% (women) and 58.2% (men) is extremely high, as is the CV for women in Tigray and Somali, and for men in Tigray, Oromiya, and Dire Dawa.

#### **b) The high refusal rate**

In the 2005 DHS, the refusal rate for HIV blood testing was high – greater than 20%. In men it was as high as 24.5%, with the refusal rate even higher in some regions (Afar 33%, Somali 36%, Addis Ababa 32%, Dire Dawa 40%).

This is a cause for concern, in that refusal to participate in blood testing in a population-based survey can potentially bias the HIV prevalence estimates. The effect of non-response on HIV prevalence can be determined by comparing differences in characteristics (socio-demographics, sexual behavior, mobility, etc.) between those who were tested for HIV and those who were not. In the EDHS 2005, attempts were made to adjust the prevalence rate for non-response (Final report, page 229-230). But the non-response analysis appears unclear and incomplete, with no details given on which variables were considered in the adjustment, the criteria for selecting these variables, and modeling issues, among other things. The most important information missing in the report is a comparative analysis, using both univariate and multivariate analysis of those tested and not tested.

### c) The high sex ratio

In the 2005 DHS, the female/male ratio of HIV infection was 2.1 nationally, with a ratio of 3.2 in the urban areas. This ratio seems unnaturally high, when compared to data from other studies in Ethiopia, as shown in **table A2-2** below, or compared to other African countries with similar epidemics, as shown in **table A2-3**.

**Table A2-2: Studies on HIV prevalence ratio (female/male) in Ethiopia**

Source	HIV prevalence (%)		HIV prevalence Ratio (female/male)	Target population & Sample size
	Female	Male		
<i>AIDS 1998, 12:315-322</i>	6.9	6.0	1.2	Community-based study (n=3800)
<i>Ethiop Med J, 39, 83-87, 2001</i>	9.5	5.4	1.7	Police recruits (n=408)
<i>JHPN, 2005, 23(4):358-368</i>	12.4	8.5	1.4	Factory workers (n=1700)
<i>AIDS in Ethiopia 5<sup>th</sup> report</i>	19.5	14.4	1.4	VCT clients (n=26,000)
<i>Aids in Ethiopia 6<sup>th</sup> Edition</i>	15.7	11.6	1.4	VCT clients (n=564, 351)
<i>Aids in Ethiopia 6<sup>th</sup> Edition</i>	6.7	4.5	1.5	Blood donors (n=28, 539)
<i>EDHS 2005, Urban</i>	7.7	2.4	3.2	General urban population
<i>EDHS 2005, Rural</i>	0.6	0.7	0.86	General rural population
<i>EDHS 2005, Total</i>	1.9	0.9	2.1	General population

**Table A2-3: HIV prevalence ratio from other African countries**

DHS Survey/country	HIV prevalence Ratio (female/male)
Burkina Faso, 2003	0.9
Tanzania, 2005	1.2
Uganda, 2005	1.4
Zambia, 2002	1.4
Mali, 2001	1.5
Rwanda, 2005	1.6
Cameroon, 2004	1.7
Ghana, 2003	1.8
Kenya, 2003	1.9
Guinea, 2005	2.1
Ethiopia, 2005	2.1
Senegal, 2005	2.3

Source: DHS prevalence surveys; 2001-2005

As can be seen, other studies from Ethiopia, though few, show a female-to-male ratio of HIV prevalence ranging between 1.2 and 1.7. The DHS ratio of 2.1 for the whole country and 3.2 for the

urban areas is one of the highest observed across a number of sub-Saharan African countries where DHS + surveys were implemented during the period 2001-2005. Of particular concern is the very high urban prevalence ratio (3.2) in the EDHS. It is difficult to reconcile this with the available evidence and the fact that sexual transmission is the predominant mode of HIV transmission in the country. Is the lower prevalence in men another result of a higher refusal level for HIV testing among high risk men compared to their female counterparts? Or are other factors at work? An in-depth non-response analysis could again clarify these questions.

### 3. Trying to compare the ANC and the DHS data

The 2005 DHS report attempts to compare its results with the 2005 ANC surveillance, but the examples given are not exactly comparable. For example, the report states that data from the DHS on HIV prevalence by ANC attendance status and HIV prevalence by distance to ANC Site (DHS Report pp 225 and 226) are comparable and that “*The HIV rate for the EDHS respondents is identical to that found in the 2005 ANC Surveillance round (3.5%)*”.

These statements were derived from Figures 14.2 and 14.4 of the report that compared those who “Had ANC at health facility” in the DHS versus the ANC result, and those who lived within fifteen kilometers of the health facility. But the table does not make the comparison separately for urban and rural areas. Since those who “Had ANC at health facility” were heavily dominated by the urban population, the comparison is confounded by residence. Without stratifying the data by urban/rural residence, the comparison is misleading and may lead to invalid generalizations.

Further, the report states that “*HIV infection levels increase with education ....*” and also “*Both women and men in the highest quintile of wealth index have substantially higher rates of HIV infection...*” (page 217 and Figure 14.4). This finding also requires a lot of caution, as the analysis failed to stratify by residence. The rural population is less educated and has lower economic status than the urban, and also a lower HIV prevalence rate. This situation would confuse the relationship between wealth and education on the one hand; and HIV prevalence on the other. A separate analysis for rural and urban areas would clarify whether or not the supposed relationships hold.<sup>130</sup>

### 4. Are the changes real or an artifact?

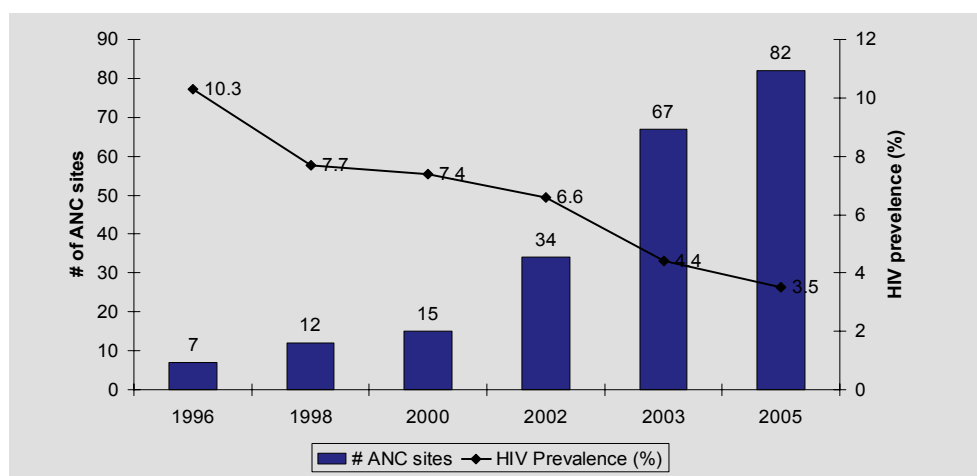
The basic question to which one keeps returning is whether the declining prevalence in ANC data is indeed the result of evolution of the epidemic, following actual behavior change, or whether it is an artifact as a result of changes in the sampling methodology and sample size. One interesting finding can be seen when one graphs the prevalence of the ANC surveillance against the number of ANC surveillance sites, as shown in **Figure A2-2**. Has there indeed been a decreasing prevalence since the year 2000, or has the increasing number of antenatal sites resulted in better sampling and a prevalence rate that is closer to “reality”?

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<sup>130</sup> This reminds us of another long-standing controversy in the epidemiology of the Ethiopian epidemic, namely that reclassification of some areas with high prevalence from rural to urban have had the effect in the past of changing the national data.

A close examination of the trends produced from the EPP model over the last three reports,<sup>131</sup> reveals that every time the number of sites increase, the estimated overall trend starts from a lower level and ends at a lower level. This makes the overall interpretation very complicated and unwarranted conclusions can easily be drawn by those unfamiliar with the technical details of sampling and estimation methodologies.

**Figure A2-2: Estimated national HIV Prevalence against number of ANC sites, Ethiopia, 1996-2005**

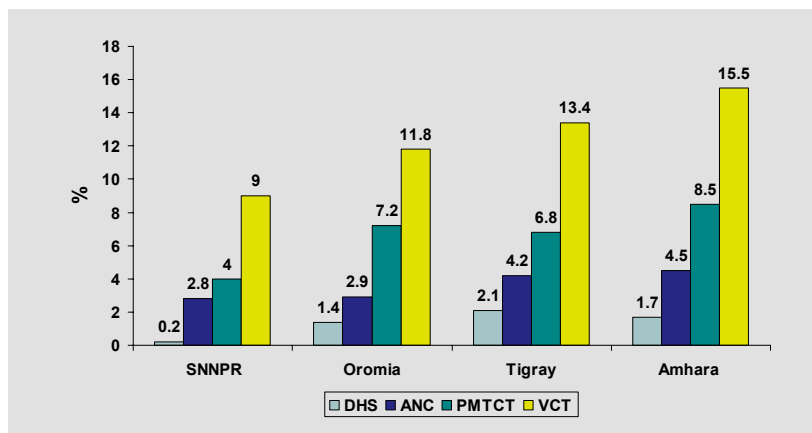


Source: AIDS in Ethiopia Reports.

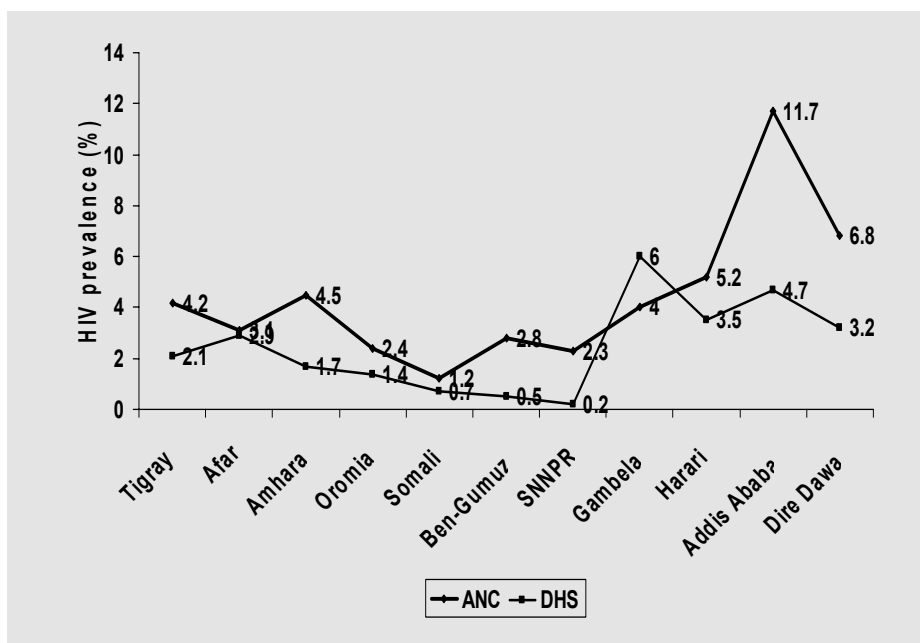
It should be repeatedly emphasized that simply because prevalence data from different surveys differ considerably does not mean that one survey is “wrong” and another one “right”. **Figure A2-3** below charts the prevalence rates seen in four different regions based on different surveys, and **Figure A2-4** compares the DHS and ANC data across all regions. As can be seen, despite the very wide differences in prevalence recorded by the different surveys, the **differences** between the surveys are maintained by and large across the four regions, suggesting that whatever the limitations of the various methodologies, they each maintain an internal consistency, and are probably valid within their individual limitations. Thus, it would be unwise to dismiss out-of-hand any of the surveys; but rather to try to analyze the factors that have led to the differences between the DHS and ANC data.

<sup>131</sup> AIDS in Ethiopia, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> Reports (2002, 2003, 2005)

**Figure A2-3: Proportion HIV positive, difference sources in major regions, Ethiopia, 2005.**



**Figure A2-4 : Regional HIV prevalence – DHS versus ANC, 2005, Ethiopia**





## APPENDIX 3 – A Summary of Behavioural and Epidemiological Studies

### A3.1 Sexual Behavior Studies

The study by Sentijens et al<sup>132</sup> in the early days of the epidemic (1991, but not published until 2001) based on a sample of nearly 5,000 individuals of varying socio-demographics, found a significantly higher HIV infection rate (20% vs. 5.7%) associated with risky sexual behavior<sup>133</sup> (Adjusted OR, 5.8; 95% CI, 4.7-7.2). This finding is alarming because of the large proportion of the study population (39%) reporting risky sexual behaviors. The study did attempt to control for some of the potential non-sexual routes of HIV transmission, but it failed to provide disaggregated analysis by type of population group and gender. The study groups included blood donors, pregnant women, urban and rural population, health care workers, and STD clients, who conceivably might have had varying sexual behavior patterns and risk profiles, so disaggregating the analysis might have yielded more informative results before attempting to extrapolate conclusions to the general population.

Between 1995 and 1996, four cross-sectional sero-surveys were carried out, covering factory workers near and around Addis Ababa as well as residents of Addis Ababa.<sup>134</sup> The surveys included 1,656 males and 870 females. HIV prevalence ranging from 2.9% to 11.7% was documented in the different population groups. In a multivariate analysis, higher HIV infection rate was significantly associated with higher number of lifetime sexual partners and casual sex in men, but not in women.

Mekonnen et al (2005)<sup>135</sup> found a significant rise in HIV infection rates with an increasing number of lifetime sexual partners. HIV prevalence was 5.8% among men who reported 4 or fewer sexual partners in their lifetime; and 9.5% and 12.7%, respectively, for those who reported 5-19 and 20 or more partners in their lifetime. This relationship persisted in multivariate analysis that adjusted for several indicators of socio-demographics and STDs. The risk of HIV infection was estimated to be 1.6 and 2 times higher, respectively, among men who reported 5-19 and 20 or more partners in their lifetime compared to those who reported 4 or fewer partners.

Notably, the reporting of multiple sexual partners appears quite high among these men, with 41.2% and 17%, respectively, reporting 5-19 and 20 or more partners in their lifetime. There was also a “dose-response” relationship between the number of lifetime sexual partners and the prevalence of HIV infection among females, ranging from 12.1% among those with 4 or fewer partners to 20% among those with 20 or more partners, although the association was not statistically significant, mainly due to the small proportion of women (n=24, 6.4%) who reported having five or more partners. Casual<sup>136</sup> sex was significantly associated with a very high prevalence of HIV among

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<sup>132</sup> Sentijens REJH, Sisay Y, Vrieling H, Kebede D, Ader HJ, Leckie G, et al. Prevalence of and risk factors for HIV infection in blood donors and various population subgroups in Ethiopia. *Epidemiol Infect.* 2002, 128, 221-228.

<sup>133</sup> Risky sexual behavior was defined as having one or more of the following risk factors in the preceding 6 months: (1) two or more sexual partners (2) no use or irregular use of condom (3) history of one or more STDs, and (4) sexual contact with a sex worker

<sup>134</sup> Fontanet et al, 1999 (Abstract) *Ethiop Med J*, 1999, 37(Supp 1): 107

<sup>135</sup> Mekonnen Y, Sanders E., Messele T. et al. Prevalence and incidence of, and risk factors for HIV-1 infection in Ethiopia. *J Health Popul Nutr* 2005; 23(4):358-368

<sup>136</sup> Casual sex is defined as having sex with a non-marital or non-cohabiting partner

females in multivariate analysis (Adjusted OR, 6.4; 95% CI, 1.0-46.2), although only 6 out of 372 had casual sex in the last year. Of the six women who reported having had casual sex, 3 were found to be HIV positive. In males, higher HIV risk was also associated with casual sex although the association waned after adjusting for the number of lifetime sexual partners in a multivariate analysis. Of note, about 9% of the men reported recent casual sex.

The study by Mekonnen et al (2005) is limited by the fact that the findings are pertinent largely to the group studied: mostly middle-aged (mean age=33 years) and married people working in Ethiopian factories. Whether they would apply to young, unmarried, and under-employed people, who are particularly vulnerable to HIV infection, is not known.

All the studies collected behavioral data through structured interviews. One may question the validity of self-reported sexual behavioral data collected this way.<sup>137</sup> Despite assurances of privacy and confidentiality during the interview, participants of the study may misreport sexual behavior,<sup>138</sup> which might bias results. There could be a possibility of recall bias in reporting the number of lifetime partners as well. Finally, since the studies are based on cross-sectional design, a causal relationship between exposures and outcome variables is difficult to establish. Only prospective studies permit assessment of the causal relationship between various risk factors and HIV infection.

Multiple heterosexual partnerships are the major risk behaviour for the spread of HIV infection. A high level of commercial sex has traditionally been seen to be the major driving force, in which up to 73.7% prevalence was reported.<sup>139</sup> High levels of vulnerability of sex workers for increased risk of acquiring HIV infection within a short time of commencing the business have been shown in Ghana and elsewhere,<sup>140</sup> making **targeted interventions among sex worker populations one of the key components to prevent the spread of the epidemic.**<sup>141 142</sup>

Extramarital relationships are also common, with high rates of sexually transmitted infections reported among women still married to their first husband in Addis Ababa supporting this argument.<sup>143</sup> High rates of HIV infection among antenatal care attendants also show the **risk to married people who may themselves be monogamous.** A qualitative study in rural Butajira demonstrated women's powerlessness to protect themselves from potential unwanted exposures, including from their husbands, and the difficulty of controlling their teenage children's sexual contacts. It also showed that people in rural areas do not have the knowledge and confidence to use

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<sup>137</sup> Ankrah EM. AIDS: methodological problems in studying its prevention and spread. *Soc Sci Med* 1989;29:265-76.

<sup>138</sup> Versnel M and Berhane Y, Wednte J. Sexuality and contraception among never married high school students in Butajira, Ethiopia. *Ethiopian Medical Journal* 2002;40(1):41-51.

<sup>139</sup> Aklilu M, Messele T, Tsegaye A *et al* . Factors associated with HIV-1 infection among sex workers of Addis Ababa, Ethiopia. 2001;39(30):261.

<sup>140</sup> Nebie Y, Meda N, Leroy V, et al. HIV infection among sex workers in Accra: need to target new recruits entering the trade. *J Acquir Immune Defic Syndr* 2001 Dec 1;28(4):358-66.

<sup>141</sup> Alary M, Mukenge-Tshibaka L, Bernier F, et al. Decline in the prevalence of HIV and sexually transmitted diseases among female sex workers in Cotonou, Benin, 1993-1999. *AIDS* 2002 Feb 15;16(3):463-70.

<sup>142</sup> Ghys PD, Diallo MO, Ettiegne-Traore V, et al. Increase in condom use and decline in HIV and sexually transmitted diseases among female sex workers in Abidjan, Cote d'Ivoire, 1991-1998. *AIDS* 2002 Jan 25;16(2):251-8.

<sup>143</sup> Duncan ME, Tibeaux G, Pelzer A, et al. Socioeconomic, clinical and serological study in an African city of prostitutes and women married to their first husband. *Soc Sci Med* 1994;39:323-333.

condoms.<sup>144</sup> A number of recent studies from other African countries have clearly demonstrated the impact of gender imbalances on increased vulnerability to HIV infection.<sup>145 146 147 148</sup>

There have been few behavioural studies in Ethiopia, certainly not enough to establish any changes over time, and those that are available followed different methodologies, limiting the ability to make direct comparisons.<sup>149</sup> While the most effective interventions are those that have identified the most-at-risk groups and designed appropriate strategies,<sup>150</sup> the paucity of data in Ethiopia has made the full exploration and tracking of the most at-risk populations difficult. **Thus, more studies that cover wider geographic areas using standardized methodologies are needed.**

### A3.2 Mother-to-Child Transmission

Routes of transmission other than sexual and mother-to-child have hitherto not played an important epidemiological role in the transmission of HIV in Ethiopia,<sup>151</sup> and what studies there are have confirmed the association of HIV in Ethiopia with either sexual activity or perinatal transmission. A community-based study in Addis Ababa in 1994 on 3,853 randomly selected individuals aged 0-49 years found 2 out of 242 children (0.8%) under age 5 years who were HIV positive. There was no HIV infection detected in the age group 6-13 years, but 3% of the males and 6% of the females aged 15-24 years were found to be positive (**Figure A3-1**). The study reported an overall HIV prevalence of 7% among adults aged 15-49.<sup>152</sup> In 2000, Mengistu and Jones<sup>153</sup> found a low HIV infection rate (2 out of 141) among urban primary school students age 10-14 years in Northwest Ethiopia, during a time when prevalence rates as high as 15.1% were reported among pregnant women attending ANC.<sup>154</sup>

<sup>144</sup> Nordfjell E. Perceptions of sexually transmitted diseases and HIV/AIDS: a study from rural Ethiopia. [MPH Essay] Nordic School of Public Health. Goteborg, Sweden.

<sup>145</sup> Gaillard P, Melis R, Mwanyumba F, et al. Vulnerability of women in an African setting: lessons for mother-to-child HIV transmission prevention programmes. *AIDS* 2002 Apr 12;16(6):937-9.

<sup>146</sup> Tiendrebeogo S, Dao B, Ouangre A, et al. Sexual and reproductive life of women informed of their HIV seropositivity: a prospective cohort study in Burkina Faso. *J Acquir Immune Defic Syndr* 2001 Dec 1;28(4):367-72.

<sup>147</sup> Mbizvo MT, Kasule J, Mahomed K, Nathoo K. HIV-1 seroconversion incidence following pregnancy and delivery among women seronegative at recruitment in Harare, Zimbabwe. *Cent Afr J Med* 2001 May;47(5):115-8.

<sup>148</sup> Mill JE, Anarfi JK. HIV risk environment for Ghanaian women: challenges to prevention. *Soc Sci Med* 2002 Feb;54(3):325-37.

<sup>149</sup> Kebede D, Aklilu M, Sanders E. The HIV epidemic and the state of its surveillance in Ethiopia. *Ethiop Med J* 2000;38(4):283-302.

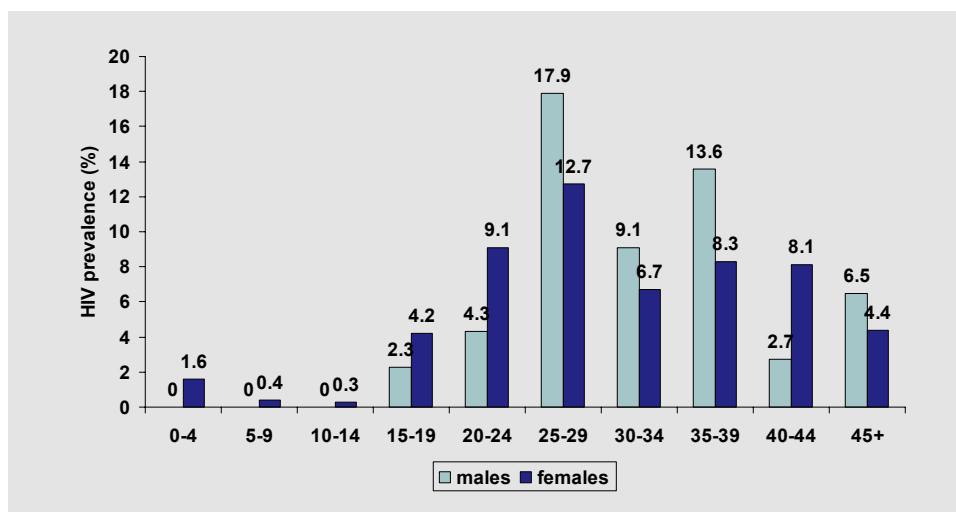
<sup>150</sup> Piot P & Seck AMC. International response to the HIV/AIDS epidemic: planning for success. *Bulletin of the World Health Organization*, 2001, 79: 1106–1112.

<sup>151</sup> During the period 1986-1996 it was repeatedly observed in all surveys that there was a virtual absence of AIDS cases in the age group 5-14 (AIDS in Ethiopia. Second Edition. 1998)

<sup>152</sup> Fontanet AL, Messele T, Dejene A, Enquselassie F, Abebe A, Cutts FT, et al. Age-sex-specific HIV-1 prevalence in the urban community settings of Addis Ababa, Ethiopia *AIDS* 1998, 12: 315-322.

<sup>153</sup> Mengistu G, Jones J. Low prevalence of HIV in the “windows of hope” age group in Northwest Ethiopia. *Ethiop. J. Health Dev*; 2003; 17(1):85-87.

<sup>154</sup> AIDS in Ethiopia: Sixth Report. 2006

**Figure A3-1. HIV prevalence by age and sex, Addis Ababa, 1994**

Source: Fontanet et al, 1998

### A3.3 Sexually Transmitted Infections (STIs)

In general, very few data are available on STIs in Ethiopia. STI surveillance is practically non-existent although case reporting is part of the integrated surveillance effort.<sup>155</sup> The few available data indicated that **the reported number of STIs has increased over the past two decades.**<sup>156</sup>

A survey on sex workers in 1990 in Addis Ababa,<sup>157</sup> reported that HIV prevalence was nearly double among sex workers who reported a previous episode of STD compared to those who did not (40% vs. 21%). A laboratory investigation of STDs among these sex workers revealed that 28.1% had *Neisseria gonorrhoea*, 20.6% *Trichomonos vaginalis*, 14.7% *Candida albicans*, and 9.9% *Gadenerella vaginosis*. Syphilis (TPHA) was detected in 37.3% of the sex workers.<sup>158</sup> While the study provided a useful insight into the causative agents of STDs at the time, it failed to investigate the possible association between the different types of STDs and HIV infection.

Studies in different population groups, including sex workers,<sup>159</sup> truckers, factory workers,<sup>160</sup> pregnant women attending ANC,<sup>162</sup> and blood donors<sup>163</sup> have reported positive associations between Syphilis and HIV infections.<sup>164</sup>

<sup>155</sup> Kassie A, Shume A and Kloos H. Sexually Transmitted Infectious. In: Berhane Y, Hailemariam D and Kloos (Eds): The Epidemiology and Ecology of Health and Disease in Ethiopia. Shama Books, Addis Ababa, Ethiopia. 2006:387-445

<sup>156</sup> Zewde A, Bahiru S, Sanders E, Tilahun T, Beyene A, Alebachew M, et al. HIV-1 seroprevalence and subtypes in police recruits from Afar Regional State, Ethiopia. *Ethiop Med J*, 2002, 40(Suppl 1): 1-10

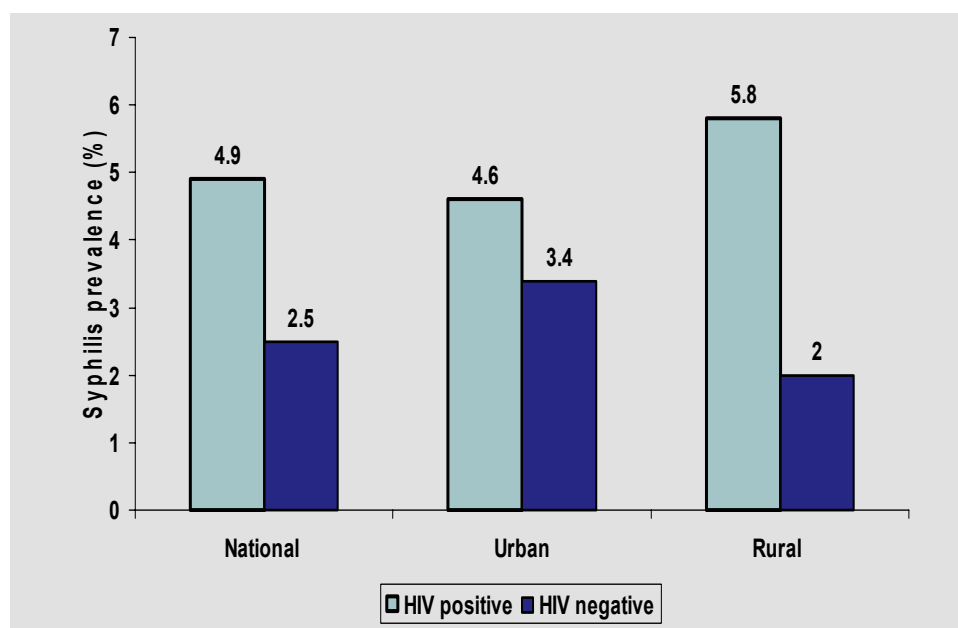
<sup>157</sup> Mehret M, Khodakevich L, Zewdie D et al. HIV-1 infection and some related risk factors among female sex workers in Addis Ababa. *Ethiop J Health Dev*.1990c, 4 (2): 171-176.

<sup>158</sup> Geyid A, Tesfaye HS, Abrha A, et al; Isolates of STD causative agents from sex workers Addis Ababa (A preliminary report). *Ethiop. J. Health Dev*. 1990, 4 (2):155-162.

<sup>159</sup> Aklilu M, Messele T, Tsegaye A, Biru T, Mariam DH, Van Bethem B, et al. Factors associated with HIV-1 infection among sex workers of Addis Ababa, Ethiopia. *AIDS* 2001, 15:87-96.

Findings of the 6th round national sentinel surveillance study revealed a nearly double HIV prevalence rate among pregnant women with antibodies against Syphilis infection (HTPA) compared to those without it (4.9% vs. 2.5%) (**Figure A3-2**). The association between the two infections was more apparent in women in rural than in urban areas.

**Figure A3-2: Syphilis prevalence by HIV status, Ethiopia, 2005**



Source: AIDS in Ethiopia 6<sup>th</sup> Report

The roles of other sexually transmitted diseases, especially HSV-2, have also been investigated. HSV-2 is known to facilitate HIV transmission, but its role may not always be causal<sup>165 166</sup> as HIV infection increases susceptibility to HSV-2 infection.<sup>167</sup> Two cross-sectional surveys among the general community of Addis Ababa and factory workers found very high prevalence of HSV-2

<sup>160</sup> An alarmingly high HIV prevalence rate (85%) was documented among sex workers with active syphilis in 1998 in Addis Ababa. The corresponding rate for those without active Syphilis was 67.1%.

<sup>161</sup> Mekonnen Y, Sanders E., Messele T. et al. Prevalence and incidence of, and risk factors for HIV-1 infection in Ethiopia. *J Health Popul Nutr* 2005; 23(4):358-368

<sup>162</sup> Kidan KG, Fantahun M and Azeze B. Seroprevalence of Human Immunodeficiency Virus Infection and its association with Syphilis seropositivity among antenatal clinic attendees at Debretabor rural Hospital, Ethiopia. *East African Medical Journal*, 1995, 72(9):579-583.

<sup>163</sup> Assefa A, Rahlenbeck S, Molla K, Alemu S. Seroprevalence of HIV-1 and syphilis antibodies in blood donors in Gondar, Ethiopia, 1989-1993. *Journal of Acquired Immune Deficiency Syndromes*, 1994, 7(12):1282-1285.

<sup>164</sup> For example, Mekonnen's study (2005) on 1,679 factory workers participating in an HIV cohort study in two factories found three times the risk of HIV infection among individuals with Syphilis (TPHA), and the observed risk did not vary by gender.

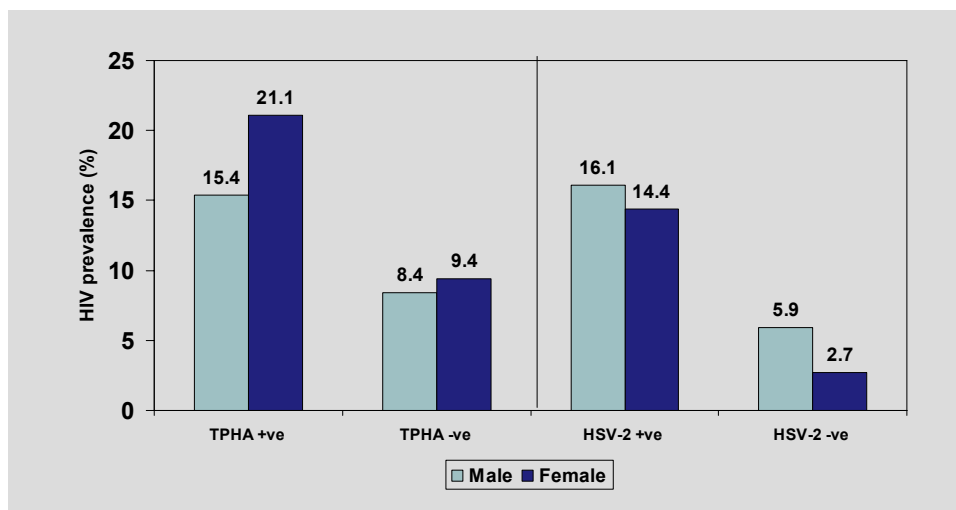
<sup>165</sup> Nelson KE, Eiumtrakul S, Celentano D, et al. The association of herpes simplex virus type 2 (HSV-2), *Haemophilus ducreyi*, and syphilis with HIV infection in young men in northern Thailand. *J Acquir Immune Defic Syndr Hum Retrovirol* 1997;16:293-300.

<sup>166</sup> Hook EW, 3rd, Cannon RO, Nahmias AJ, et al. Herpes simplex virus infection as a risk factor for human immunodeficiency virus infection in heterosexuals. *J Infect Dis* 1992;165:251-5.

<sup>167</sup> Weiss HA, Buve A, Robinson NJ, et al. The epidemiology of HSV-2 infection and its association with HIV infection in four urban African populations. *AIDS* 2001;15(Suppl 4):S97-S108.

among the population (44.7% in factory workers, 32.3% general community<sup>168 169</sup>). These studies also found nearly 4 times higher risk of HSV-2 infection among patients with HIV compared to those without HIV, as demonstrated in **Figure A3-3**.

**Figure A3-3: HIV prevalence (%) by Syphilis (TPHA) and HSV-2 status, Factory Workers, 1997-2001**



Source: Mekonnen et al, 2006)

#### A.3.4 Blood Transfusions, Injections, Traditional Practices

The potential risks of HIV transmission through blood transfusion or dirty needles is well-established, and may occur in clinical or illicit settings, and also in traditional practices involving skin cutting. It is thought that infected blood transfusions have played an insignificant role in the spread of HIV in Ethiopia. A recent study tested several hundred randomly-selected stored blood samples, using a gold-standard Western Blot Assay, and found no evidence of HIV infection in the samples, confirming both the quality of the blood used by the transfusion services and the efficiency of the blood screening system.<sup>170</sup> Similarly, an analysis of used needles and syringes (both disposable and re-usable) in health institutions showed no HIV RNA, indicating that medical injections are not a major means of HIV transmission in the country.<sup>171</sup> However, as private health facilities in the country have expanded, there have also been an increasing number of illegal local injectors who practice the service in their own premises. There are reports concerning poor

<sup>168</sup> Meheret W, et al. Herpes Simplex Virus Type 2 Seropositivity among urban adults in Africa: Results from Two Cross-sectional surveys in Addis Ababa, Ethiopia. *Sexually Transmitted Disease*. 2002: 175-181.

<sup>169</sup> Kebede Y, Dorigo-Zetsma W, Mengistu Y, Mekonnen Y, Schaap A, Wolday D, Sanders EJ, Messele T, Coutinho RA, Dukers NH. Transmission of herpes simplex virus Type 2 among factory workers in Ethiopia. *J Infect Dis*. 2004 Jul 15;190(2):365-72.

<sup>170</sup> Teferi M, Tsehaynesh M, Beyene P, et al. Determination of HIV-1 prevalence among blood donors and associated risk factors of HIV-1 infection in Addis Ababa. Abstracts of the 15th Annual Conference of the Ethiopian Public Health Association, Gondar, 2004; Abstract

<sup>171</sup> Priddy E, Tesfaye F, Mengistu Y, Rothenberg R, Fitzmaurice D, Mariam DH, del Rio C, Oli K, Worku A. Potential for medical transmission of HIV in Ethiopia. *AIDS*. 2005 Feb 18;19(3):348-50.

handling and reusing of needles and syringes by the local injectors, raising concerns about the possibility of HIV transmission via contamination.<sup>172</sup>

To date, however, only one study has attempted to investigate the role of medical and traditional practices in the transmission of HIV in Ethiopia. Carried out in 1991 (although the results were not published for ten years), the study involved nearly 5000 individuals of varying socio-demographics (Sentijens et al, 2001).<sup>173</sup> After adjusting for different forms of sexual behaviors, condom use and STDs in a multivariate analysis, a history of repeated injections remained amongst the factors independently associated with the risk of HIV infection, although it was of borderline statistical significance (OR=1.3; 95% CI, 1.0-1.5), but the study did not find any association between traditional medical practices (e.g. tattooing, eyebrow incision, circumcision, uvulectomy/ tonsillectomy) and HIV infection. While the findings provide some clue into the potential for HIV transmission via unsafe injection, it does not provide any evidence on the causal relationship between repeated injection and the risk of HIV infection in the study group.<sup>174</sup>

Given the multiple risk factors for transmitting HIV, some attention must be given to ensuring safe injection practices. What little evidence exist shows that the risk in Ethiopia is currently small, but with a potential for escalation, and the resources available for its surveillance are far from satisfactory.<sup>175 176</sup>

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<sup>172</sup> Keeping the promise? A study of progress made in implementing the UNGASS DoC on HIV/AIDS in Ethiopia. Panos, July 2006. Addis Ababa

<sup>173</sup> Sentijens REJH, Sisay Y, Vrielink H, Kebede D, Ader HJ, Leckie G, et al. Prevalence of and risk factors for HIV infection in blood donors and various population subgroups in Ethiopia. *Epidemiol Infect.* 2002, 128, 221-228.

<sup>174</sup> The study was cross-sectional by design and suffered from the inherent limitations of such studies, it being well known that cross-sectional studies are less suitable for studying risk factors for HIV infection. Furthermore, the receipt of repeated injections for an individual might be a result of frequent episodes of illnesses, which is a common phenomenon among AIDS patients.

<sup>175</sup> Haile D and Berhane Y. Injection Practice in North Western Ethiopia. *Ethiop Med J* 1997, 35(2):117-125.

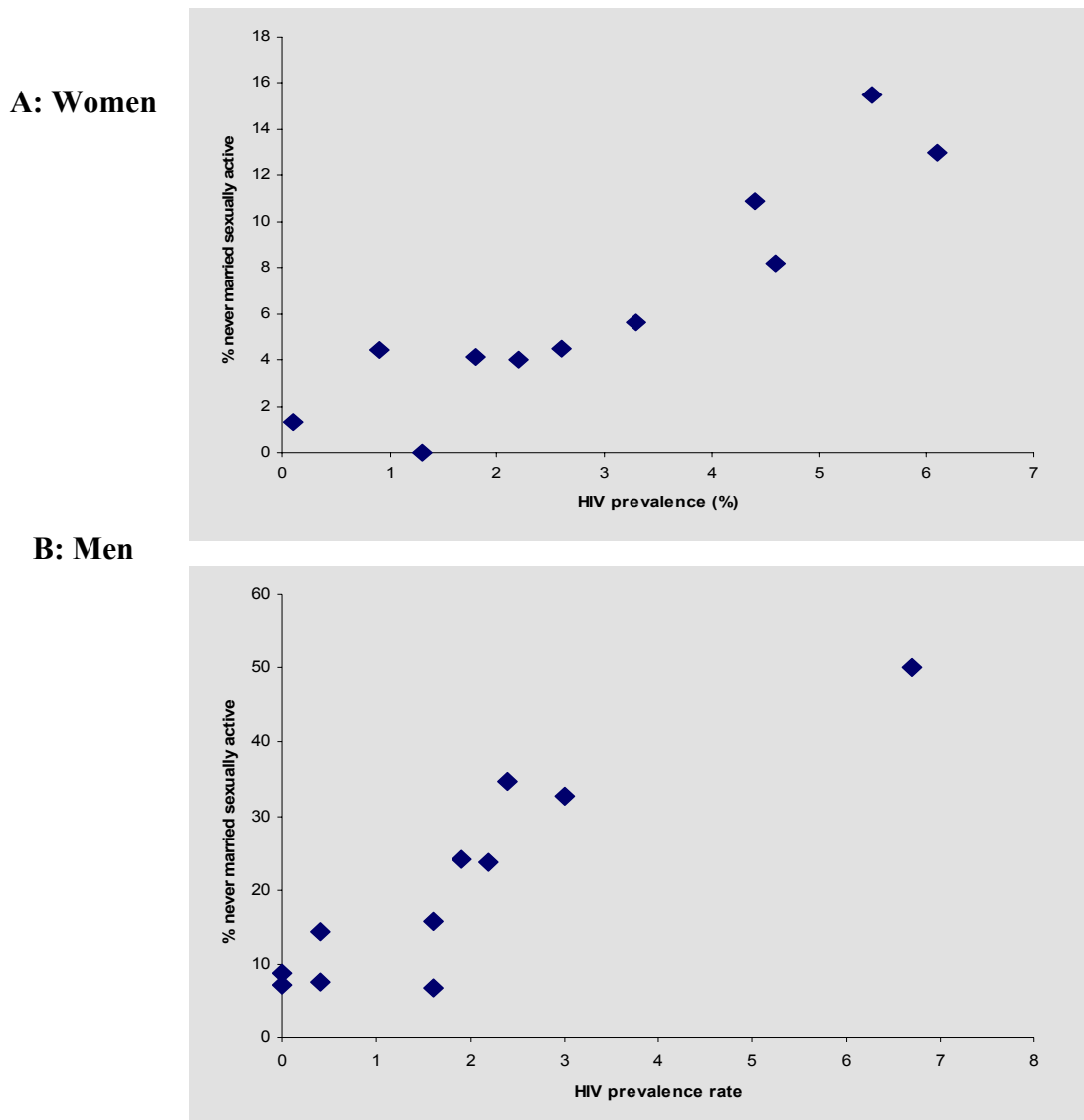
<sup>176</sup> Berhane Y and Millogo J. Report of Injection Safety Survey in Ethiopia. Ministry of Health. November 2000. Addis Ababa, Ethiopia.

### APPENDIX 4 – Regional Variations

Risky sexual behavior is the most important variable in determining one’s HIV risk, and it can be culturally-specific. The DHS 2005 data allow some investigation of regional variations in sexual behavior. **Section 3.5 and Figure 6** noted the variation in prevalence across different regions of the country, and these regional prevalence rates were correlated against the magnitude of different behavioral indicators at regional level, using univariate analysis of the risk factors for HIV infection from the DHS 2005 data.

a) ***Being sexually active among the never married*** – Figures A4-1 (A and B) below clearly show a significant trend for both men and women across the regions.

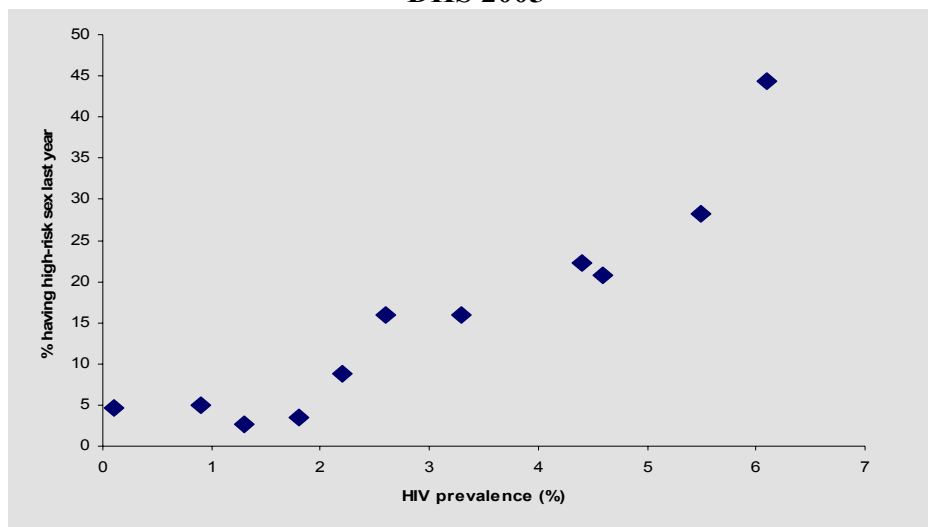
**Figure A4-1: Regional HIV prevalence versus proportion never married, sexually active, DHS 2005 (A: Women; B: Men)**





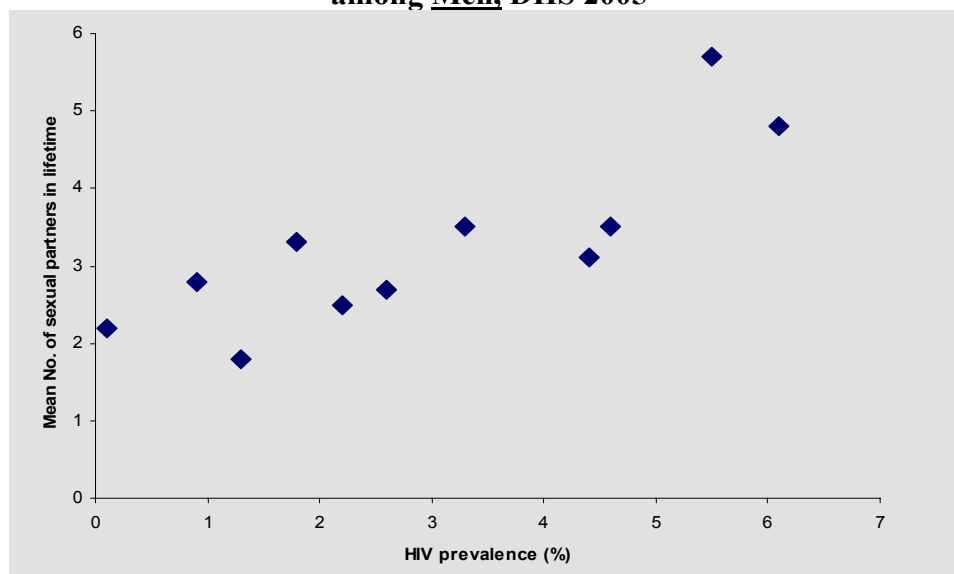
b) ***Having risky sexual behavior in the year preceding the survey*** – A strong correlation between regional prevalence rates and prevalence of high-risk<sup>177</sup> sexual behavior was noted only in men, as shown in **Figure A4-2** (female graph not shown). This supports the claim that males are responsible for bringing HIV infection home.<sup>178</sup>

**Figure A4-2: Regional HIV prevalence versus incidence of high risk behavior among Men DHS 2005**



c) ***High number of sexual partners in lifetime (for males)*** – again, this correlation was only seen in males, as seen in **Figure A4-3**

**Figure A4-3: Regional HIV prevalence versus mean number of sexual partners in lifetime among Men, DHS 2005**



<sup>177</sup> Sexual intercourse with non-marital, non-cohabiting partner

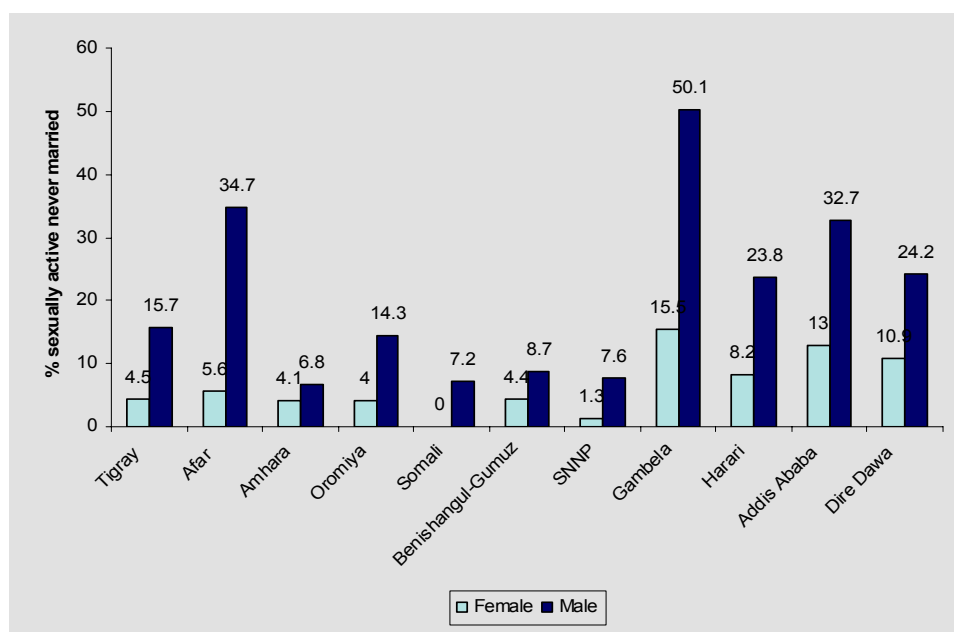
<sup>178</sup> Berhane Y, Gossaye Y, Emmelin M, Hogberg H. Women' health in rural setting in societal transition in Ethiopia. *Social Science and Medicine* 2001; 53(11):141-155.

- d) **Having sex with sex workers (for males)** - some positive correlations (but less strong) were noted between incidence of commercial sex and HIV prevalence (**graph not shown**). This may suggest that there are other sexual networks that are more important than SWs, or the definition of SW is not standardized
- e) **Sexual initiation before age 18** - There is some correlation between age at sexual debut and HIV prevalence rates, particularly in males (**graph not shown**). The correlation was less strong, however. And surprisingly, no correlation was seen in the female data.

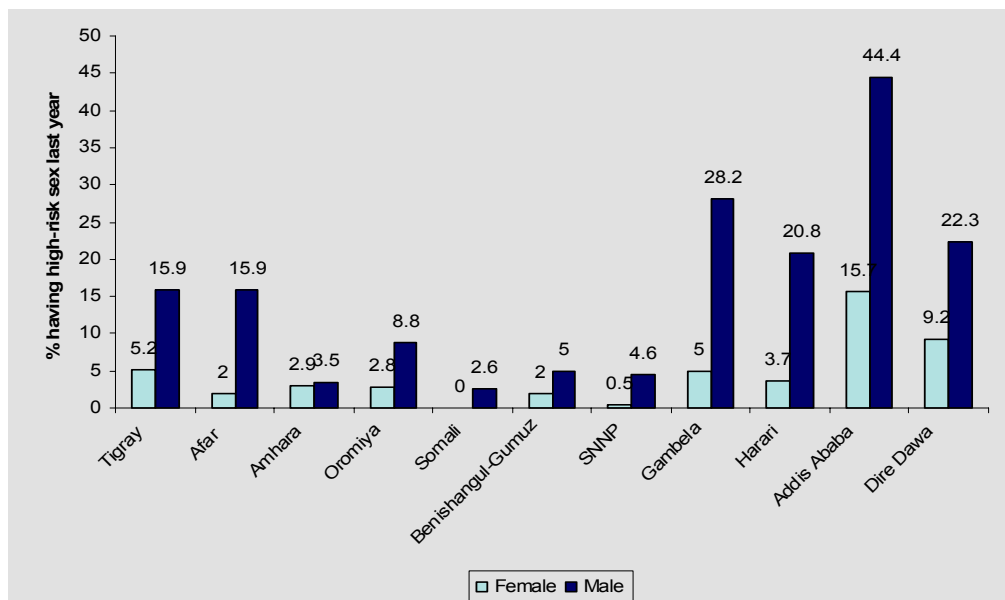
### Risky sexual behavior correlates with region differences in prevalence

Comparing **Figures A4-4 to A4-7** below with **Figure 7** (page 18) provides some corroboration of the variation in the prevalence of the different indicators of sexual behavior across the regions, with the behavioral indicators generally showing a similar pattern to HIV prevalence. Regions with high HIV prevalence rates tended to exhibit a relatively high proportion of their population who are never married-sexually active, with a high number of lifetime partners, having high-risk sexual behavior, and a high incidence of sex with sex workers.

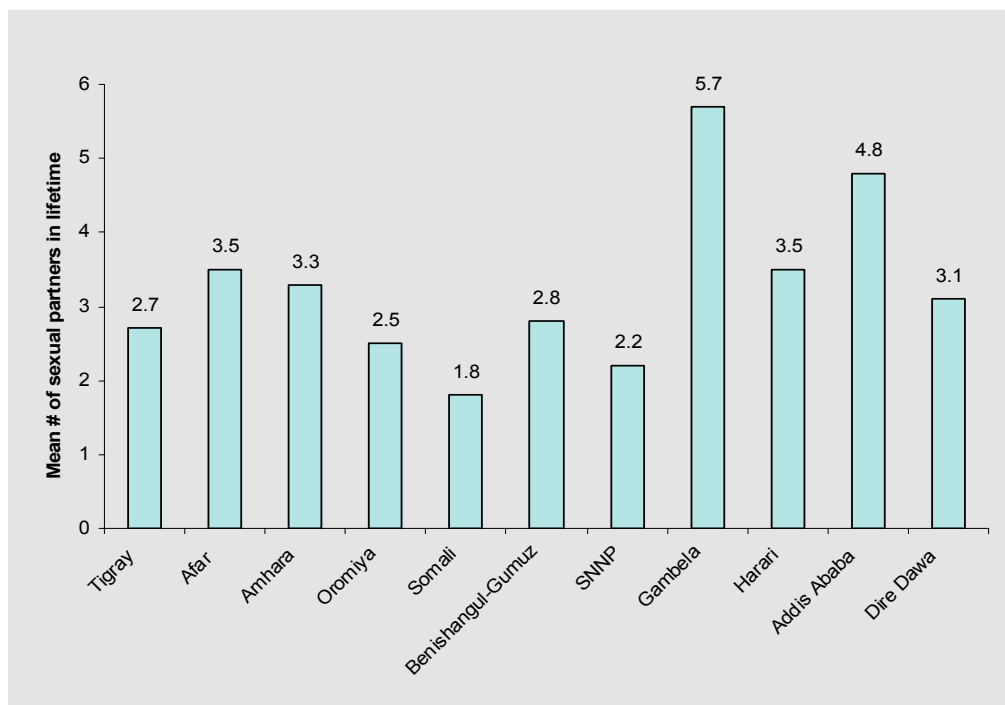
**Figure A4-4 Proportion sexually active-never married by region, DHS 2005**



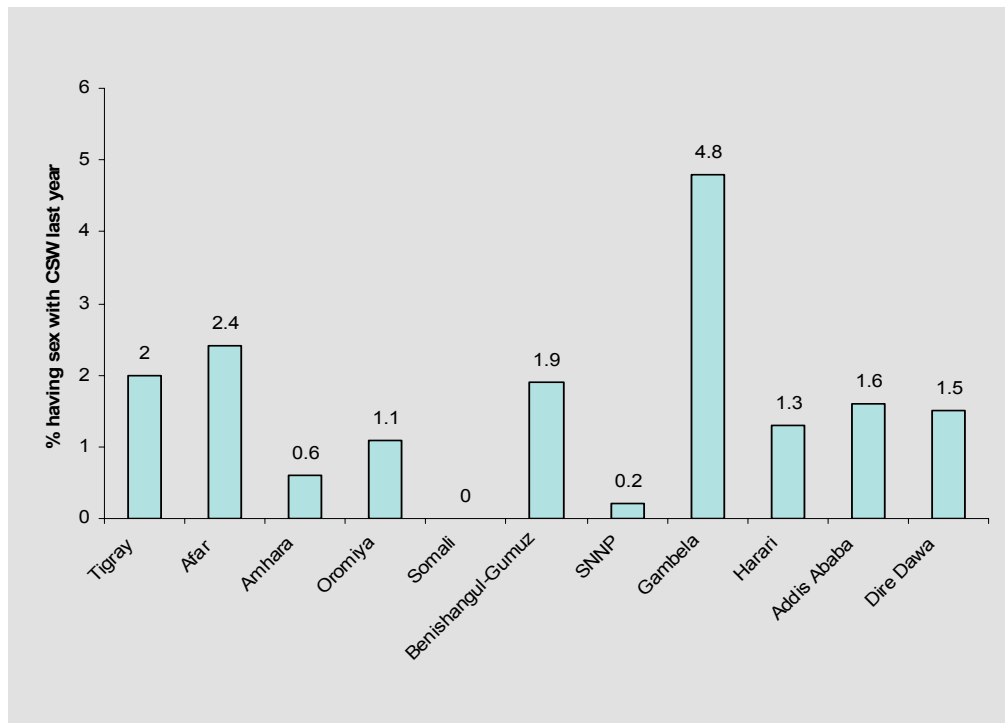
**Figure A4-5 Proportion having high risk sex last year by region, DHS 2005**



**Figure A4-6 Mean number of sexual partners in lifetime among Men by region, DHS 2005**



**Figure A4-7 Proportion of Men reporting having had sex with sex workers last year by region, DHS 2005**



## APPENDIX 5 – The History of the Response to HIV/AIDS in Ethiopia

The response to the AIDS epidemic in Ethiopia has been a collective effort of the government, multilateral and bilateral donors, national and international non-governmental organizations, community-based organizations, faith-based organizations, the private sector, associations of PLHIV and individuals. These efforts have taken different shape and intensity during the course of the epidemic. This brief account is an attempt to summarize the response and results in different time periods.

### Pre 1985:

This is when the epidemic is believed to have started spreading widely in the country. Although prevalence was extremely low (0.07%), HIV infection was detected among military recruits<sup>179</sup> and later on AIDS patients were reported from an hospital in Addis Ababa in 1986.<sup>180</sup> However, the Government and the public at large denied the presence of the epidemic. The response was limited to establishing a national HIV/AIDS taskforce at the Ministry of Health.

### 1985-1989:

At the end of 1985 the government of Ethiopia issued the first AIDS control strategy. Based on that, in 1987, the government established an HIV/AIDS department within the Ministry of Health responsible for directing and coordinating implementation of the AIDS control program.<sup>181</sup> The MOH also developed a short and medium term plan in 1987. In 1988, an HIV surveillance system was established. In 1989, the Health Bureau of the Addis Ababa City Administration began HIV sentinel surveillance. There were also efforts to conduct sero-surveys in Addis Ababa and other major urban centers among core risk groups. AIDS case reporting began soon after the establishment of the HIV/AIDS department within the MOH in 1987. In 1989, the MOH drafted a four-point policy statement on AIDS prevention.<sup>182</sup>

The interventions at this stage were inadequate in scale (mainly concentrated in Addis Ababa), largely ineffective in implementation; lacked sufficient stakeholder involvement in planning and implementation, especially at the community level; were poorly or not at all coordinated or integrated across sectors and among service providers; and received relatively low priority within government, society in general, and the international community, with a resultant low level of allocated financial and human resources.

A series of surveillance activities among risk populations was initiated based on voluntary testing.<sup>183</sup> Only about 7000 individuals received counseling for testing; these were mainly

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<sup>179</sup> [Hailu K](#), [Butt0 S](#), [Bekura D](#), [Verani P](#), [Titti F](#), [Semicola L](#), [Rapicetta M](#), [Pasquini P](#), [Rossi GB](#). Serological survey of human immunodeficiency virus (HIV) in Ethiopia. *J Med Virol*. 1989 May;28(1):21-4

<sup>180</sup> Lester FT, Ayehunie S, Zewdie D. Acquired immunodeficiency syndrome: seven cases in an Addis Ababa hospital. *Ethiop Med J*. 1988 Jul;26(3):139-45

<sup>181</sup> Zewdie D, Gizaw G, Khodakevich L, Degifie G, Wernette M. Development and Management of the AIDS Control Programme in Ethiopia. *Ethiop. J. Health Dev* 1990;4(2):87-96.

<sup>182</sup> Lisa Garbus “HIV/AIDS in Ethiopia” Country AIDS Policy Analysis Project, AIDS Policy Research Center, University of California San Francisco (April, 2003)

<sup>183</sup> Mehret M, Khodakevich L. Surveillance of Human Immunodeficiency Virus Infection in Ethiopia. *Ethiop. J. Health Dev* 1990;4(2):101-105.

individuals with multi-partner sexual contacts and truckers.<sup>184</sup> Condom promotion was done among sex workers in Nazareth as a pilot project.<sup>185</sup> Health education campaigns were launched with frightening messages resulting in wide spread misconceptions about HIV/AIDS and planting seeds for a generalized stigma and discrimination against PLHIV.

### **1990s:**

The first draft of a national policy was written in 1991, though not approved until 1998.<sup>186</sup> There were very few data indicating the level or progression of the epidemic in the 1990s even among the high risk groups. The Ethiopian Red Cross Society-Blood Transfusion Service (ERCS-BTS) has been collecting and reporting HIV prevalence data among blood donors and those reports were indicating decreased HIV prevalence among blood donors; however, it was believed that this trend was due to increasingly effective prescreening procedures in the transfusion services. Data also indicated that heterosexual and MTCT transmission account for almost all HIV infections in the country. There were few data available on whether harmful traditional practices contributed to HIV. HIV transmission via unsafe injections appeared to be very low.

Although HIV/AIDS prevention activities started in the early 90s, they were focused primarily in Addis Ababa. In 1993, HIV/AIDS/STI prevention and control activities were decentralized to the regional health bureaus. The HIV/AIDS/sexually transmitted disease (STD) Control Team within the MOH was organized to provide technical assistance to regional offices, and coordinate activities and policies from a national perspective.

The HIV/AIDS policy is comprehensive and emphasizes broad areas of prevention, care, and support. It also targets vulnerable groups. However the implementation capacity of regional health bureaus was very low due to severe shortages of human resources and organizational capacity limits following decentralization.

### **The following summary can be made about this period:**

Overall this period can be characterized as the least organized. The period passed without making any large scale impression:

- Funding: limited funding no Global Fund, no MAP, no PEPFAR funds
- Implementation/coordination: No HAPCO, after 1992 MOH had only 7 people to work on HIV/AIDS and there were limited implementing partners
- AIDS policy issued for the first time
- Comprehensive country report on HIV/AIDS produced: the 1<sup>st</sup> and 2<sup>nd</sup> report of AIDS in Ethiopia supported by the Policy Project
- No guidelines for STI, IP Blood Safety, VCT, PMTCT, ART, OI surveillance, M and E, TB/HIV as well no training materials for these

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<sup>184</sup> Kidan AG, Belete F, Negassa H. Response to Counseling of HIV Carriers and AIDS Patients in Ethiopia. *Ethiop. J. Health Dev* 1990;4(2):87-96.

<sup>185</sup> Belete F, Larivee C, Kidan AG, Fisehaye T, Fisehaye A. Social mobilization and condom promotion among sex workers in Nazareth, Ethiopia. *Ethiop. J. Health Dev* 1990;4(2):219-224.

<sup>186</sup> Federal Democratic Republic of Ethiopia. Policy on HIV/AIDS of the Federal Democratic Republic of Ethiopia. Addis Ababa, August 1998.

- Information: HIV almost absent from billboards, newspapers, TV and Radio. No AIDS Resource Center, No AIDS Hotline; mostly IEC, almost no BCC. Not targeted or comprehensive.
- Programs: very limited, mainly in Addis; Blood safety only in Addis, no TB/HIV, PMTCT or ART
- Laboratory: no rapid tests, no CD4, no viral load.

### **2000 onwards**

The National AIDS Prevention and Control Council was established in 2000 and charged with implementing the Strategic Framework for the National Response to HIV/AIDS in Ethiopia for 2000-2004.<sup>187</sup> The council, chaired by the president of Ethiopia and comprising members from government, NGOs, religious bodies, and civil society, has declared HIV/AIDS a national emergency. The Council has seven standing committees and implements national policy through 10 general strategies:

1. Information, Education and Communication (IEC), Behavioral Change Communications (BCC)
2. Condom Promotion and Distribution
3. Voluntary Counseling and Testing (VCT)
4. Management of Sexually Transmitted Infections
5. Blood Safety
6. Universal Precautions
7. Prevention of Mother to Child Transmission
8. Care and Support
9. Legislation and Human Rights
10. Surveillance and Research

The National HIV/AIDS Prevention and Control Office (HAPCO) was established by proclamation in June 2002, and replaced the National AIDS Council (NAC). This was important, and provided an enabling environment and ample opportunities for all those already involved and potential actors in the prevention and control of HIV/AIDS to align for a concerted effort.

The overall goals of the policy and the strategic framework were to reduce HIV transmission, reduce associated morbidity and mortality; and reduce burdens on individuals, families, and society at large. The response to the epidemic was designed to address the direct causes as well as the underlying factors influencing the course of the epidemic. In 2003 a multi-sectoral implementing mechanism was in place from the national to the grassroots levels.

An important development that took place in 2005 concerns the launching of the Strategic Plan. On the 24<sup>th</sup> of January 2005, the Federal Democratic Republic of Ethiopia (FDRE) launched the second Strategic Plan for Intensifying Multi-Sectoral HIV/AIDS Response (2004-2008),<sup>188</sup> along with the Free Anti-Retroviral Treatment Program and a number of documents strategically important for the Strategic Plan implementation, namely: Social Mobilization Strategic Document; Anti-Retroviral

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<sup>187</sup> National AIDS Prevention and Control Council. Framework for the National Response to HIV/AIDS in Ethiopia for 2000-2004. NAC, 2000.

<sup>188</sup> HIV/AIDS Prevention and Control Office. Framework for the National Response to HIV/AIDS in Ethiopia for 2004-2008. HAPCO, 2004.

Therapy Implementation Guidelines; and the report “AIDS in Ethiopia – Fifth Edition”.<sup>189</sup> The new Strategic Plan builds upon achievements so far, and takes into consideration lessons learned through the implementation to date of the response to HIV/AIDS in Ethiopia.

The Strategic Plan for Intensifying Multi-Sectoral HIV/AIDS Response (2004-2008) is based on guiding principles such as: multi-sectoralism, empowerment, shared sense of urgency, gender sensitivity, involvement of PLHIV, result oriented interventions and best use of resources through allocation, harmonization, efficiency and accountability.

Capacity building, community mobilization and empowerment, integration with health programs, leadership and mainstreaming, coordination and networking and targeted response constitute the *Six Strategic Issues* that are the core of the Strategic Plan and Management (SPM). The SPM assigns a new and bigger role for the health sector. New arrangements for coordination of the response to HIV/AIDS have been introduced. Under the new arrangements, the Federal Ministry of Health is spearheading the leadership of the National Response to HIV/AIDS. The Federal level HAPCO and Regional HAPCO will be directly accountable to the Federal Ministry of Health and Regional Health Bureaus respectively.

The Free ART rollout program was launched on January 2005. This followed the first Road Map 2004 – 2006, which created a managerial focus centered on the rollout of ART while stressing the importance of embedding ART into the comprehensive HIV/AIDS care approach in order to succeed. A second Road Map covering the years 2007- 2008 has been developed with detailed planning, and projecting longer-range targets to 2010.

The Ethiopian Government has continued to show its leadership during implementation of the first Road Map by making timely decisions and pursuing changes to facilitate achieving the ambitious targets. Reality checks are being applied and analysis conducted to understand cause and effect. Examples of constraints being removed are the abolishment of the ART community committee in August 2005, the approval of the introduction of a non-medical cadre under HAPCO; the community counselor, free ART provision by the private sector and changes in existing guidelines to facilitate quantum leaps.

The Federal HAPCO has been limited to national and regional levels, to focus on coordination, resource mobilization and multi-sectoral monitoring and evaluation (M&E). Regional HAPCOs coordinate interventions at zonal, woreda and kebele levels through the health infrastructure at these levels without opening separate offices. Zonal and woreda health offices and health extension agents at kebele level are to directly coordinate and implement the multi-sectoral HIV/AIDS response at their respective levels.

Strategic priorities of the response include prevention, PMTCT, treatment and care. As part of the HIV prevention efforts a number of innovative approaches have been adopted. These include:

- Establishment of AIDS resource centers;
- Implementation of a Health Extension Program;

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<sup>189</sup> Ministry of Health/ HAPCO. Accelerated access to HIV/AIDS Prevention, Care and Treatment in Ethiopia Road Map for 2007 – 2008. Health Programs Department, HAPCO, 2007.



- Expansion of PMTCT; and
- Establishing resource centers for youth and youth clubs.<sup>190</sup>

Among these, the Health Extension Program launched by the MOH in 2003 deserves particular attention. The program represents an innovative community-based approach directed at creating healthy environment as well as healthful living by introducing health extension service delivery. Two female health extension workers will be trained and assigned to a health post to provide outreach services to households in their respective rural kebeles. Addressing HIV/AIDS issues makes up a significant part of the health extension workers' responsibilities. There is a plan to train about 25,000 health extension workers over the five-year program period and place them in about 12,500 rural kebeles. The first batch of 2,800 Health Extension Workers (HEWs) has been trained in the four large regions (Amhara, Oromia, SNNPR and Tigray) and has started work in the respective kebeles.

Major successes of the HIV/AIDS response (2001-2006) in Ethiopia include:

- An increased level of awareness and positive trends in behavioral change;
- An increased demand for voluntary counseling and testing (VCT);
- An increasing trend in condom distribution and utilization;
- Integration and expansion of VCT;
- Initiation of prevention of mother-to-child transmission and anti-retroviral services;
- Positive trends in openness, and reduction of stigma and discrimination; and
- Encouraging trends in involvement of PLHIV in the response.

Compared to the magnitude of the epidemic, the achievements gained so far are very modest and the national response still faces serious challenges. As identified in the Ethiopian Strategic Plan (2004-2008),<sup>191</sup> the challenges affecting the full implementation of the SPM include:

- Consensus around the new implementation arrangement i.e. the spearheading role of the MOH and the coordinating functions of HAPCO;
- Resource availability and absorption/utilization capacity;
- Addressing the growing service demand and sustainability;
- Rapid expansion of the epidemic to the rural areas; and
- Adequate number of qualified and committed manpower at all levels but mainly at regional and woreda levels.

### **Multi Sectoral Response**

Since the start of 2000, numerous donors have been funding HIV/AIDS activities in Ethiopia: WHO, Global fund, UNICEF, UNAIDS, UNDP, World Bank, USAID, Ireland Aid, DFID, Netherlands Government, Norwegian Government, CDC, GTZ, Japan, and the Italian Cooperation. There are also many other agencies, faith-based organizations and NGOs involved in HIV/AIDS in Ethiopia such as FHI, CARE Ethiopia, Action AID, Dawn of Hope and Mekdim Ethiopia HIV

<sup>190</sup> A Theodros, Comprehensive review of the progress achieved in realizing the targets set out in the declaration of commitments on HIV/AIDS, a speech made at United Nations, 2<sup>nd</sup> of June, 2006.

<sup>191</sup> HIV/AIDS Prevention and Control office. Ethiopian Strategic Plan for Intensifying Multi-Sectoral HIV/AIDS Response (2004 - 2008). HAPCO, 2004.

Positive Persons, Christian Relief and Development Agency and AIDS Orphans National Association.<sup>192</sup>

Starting in 2003, the Emergency Plan for AIDS Relief (PEPFAR) became the second largest donor for HIV/AIDS in Ethiopia.<sup>193</sup> The Emergency Plan response includes:

- Leveraging and complementing resources and commitment of other partners, including international donors and Ethiopia's public and private sectors;
- Expanding work with new partners, particularly nongovernmental, community-based and faith-based organizations to ensure coverage and foster sustainability;
- Mobilizing private health care providers for quality prevention, treatment and care;
- Supporting development of national prevention, care and treatment guidelines and protocols, establishment of the structure and systems for effective implementation of the HIV/AIDS program, and human capacity building through training and site level support;
- Strengthening Ethiopia's military HIV/AIDS response with program services for civilian communities around rural military health establishments, as well as active duty personnel and their dependents.

Civil society in Ethiopia remained weak and underdeveloped. Nevertheless, since 2003 civil society has been mobilized against HIV/AIDS. More than two national and various local PWHIV associations provide an array of HIV/AIDS services. Some influential religious leaders publicly support action against HIV/AIDS (though not condom promotion and use), and faith-based organizations are providing HIV/AIDS services. Numerous NGOs and CBOs provide support to AIDS orphans and other vulnerable children.

The current status of the HIV/AIDS program is summarized in the following table:<sup>194</sup>

<b>Program area</b>	<b>Guideline/training</b>	<b>National program</b>
Surveillance	Yes	Yes
VCT	Yes	Yes
Laboratory	Yes	Yes
ART	Yes	Yes
PMTCT	Yes	Yes
TB/HIV	Yes	Yes
STI	Yes	Yes
Blood Safety	In progress	Yes
Community planning	Yes	Yes
M and E	Yes	Yes
BCC	Yes	University students, Police, military, MARPS
Social mobilization	Yes	Yes

<sup>192</sup> Lisa Garbus “HIV/AIDS in Ethiopia” Country AIDS Policy Analysis Project, AIDS Policy Research Center, University of California San Francisco (April, 2003)

<sup>193</sup> PEPFAR Ethiopia, country Profile, 2007. [http://www.etharc.org/publications/Eth\\_pepfar\\_profile\\_07.pdf](http://www.etharc.org/publications/Eth_pepfar_profile_07.pdf)

<sup>194</sup> CDC-Ethiopia unpublished reports, 2006.

Over the last three years (2005 – 2007), three million people were counseled and tested. In 2007 alone 1.9 million people were tested. Testing and counseling has tremendously increased in 2007 to three times that seen in previous years, largely due to the millennium AIDS campaign launched in November 25, 2006. Currently 1005 public and private health facilities are providing HIV counseling and testing (HCT).

As of end of June 2007, 1.9 million people were counseled and tested at 1005 hospitals and other health facilities (160,000 per month currently); PMTCT services had been provided to 76, 582 pregnant women at 105 hospitals (6,700 per month currently); ART to 78,700 people at 128 hospitals (4,000 per month new patients currently); ABC prevention reached 9,440,000 people (466,000 per month currently); 1,292,000 laboratory tests at 114 labs (74,000 per month currently); over 45,400 (5,100 per month currently) health care and other workers were trained in HIV/AIDS/TB/STI; over 100 materials including guidelines, training materials, brochures, videos, etc. were developed on surveillance, VCT, CT, STI, Laboratory, PMTCT, ART, TB/HIV, community planning, monitoring and evaluation, and blood safety.

Overall, there have been tremendous changes in the last five years in HIV/AIDS prevention, care treatment. There are changes in the public and leadership and changes in the epidemic profile; there are indications of declining prevalence and rate of progression.

## APPENDIX 6 – List of Documents Consulted

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