The AIDS Epidemic in a Low-Income Country: Ethiopia

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Abstract

This review describes the evolving AIDS epidemic in Ethiopia and examines its driving forces within the socioeconomic, cultural and political context. The early concentrated epidemic, which infected mostly high-risk males and commercial sex workers has evolved in recent years into a generalized epidemic affecting all segments of the population. Whereas the pervasive impact of societal poverty persists and recent political unrest poses a new threat to prevention and control efforts, the influence of past wars, gender inequality, and various harmful attitudes and practices in HIV transmission and spread is declining, apparently due to recent awareness, prevention and control initiatives and programs. Spread of HIV from urban to rural areas is facilitated by population movements, widespread prostitution in towns, and lack of education.

More research on transmission patterns and better HIV and behavioral surveillance systems are needed, especially in rural areas and among different socioeconomic and ethnic groups, to more fully determine the dynamics of the epidemic in Ethiopia's diverse population and to develop effective and sustainable interventions.

Keywords: *AIDS epidemic, behavioral, socioeconomic, cultural and political factors, Ethiopia*

Introduction

Two dozen years after the first clinical cases of acquired immunodeficiency syndrome were reported, AIDS has become the most devastating disease humankind has ever faced. AIDS is one of about 30 new infectious diseases, including Legionnaires' disease, hepatitis C, bovine spongiform encephalopathy/variant Creutzfeld-Jakob disease, several viral hemorrhagic fevers, severe acute respiratory syndrome (SARS) and, most recently, avian influenza, that have emerged as a result of profound world-wide changes in human ecology (Weiss and McMichael 2004). Accelerated rural-to-urban migration, social disruption due to war and conflict, changes in personal behavior, human-induced environmental changes, and weak or delayed government responses to disease outbreaks are some of the underlying factors in the creation of conditions conducive to the transmission and spread of these diseases. A better understanding of the evolving social dynamics of emerging infectious diseases may assist us in preventing impending epidemics and reducing current and future risks (Weiss and McMichael 2004).

By the end of 2005, more than 60% of all people living with the human immune deficiency virus (HIV), an estimated 25.8 million, resided in sub-Saharan Africa, a region which has only 10% of the world's population. In 2005 alone, about 3.2 million people in that region became newly infected and 2.4 million died of full blown AIDS disease, which HIV-infected adults develop after an average of 10 years, although other infectious diseases and nutrition greatly affect survival times (Jaffar et al. 2004; UNAIDS 2005). Within sub-Saharan Africa, HIV prevalence is highly varied, suggesting that instead of one African epidemic, there are a number of epidemics of different intensity, pace and impact. The largest number of HIV infections, an estimated 11.4 million,

occurred in the southern Africa sub-region in 2004, where more than 10% of the population in each country except Madagascar and Angola were infected. In East Africa, infection rates in pregnant women attending antenatal clinics were between 5 and 12% in different countries, and in West Africa 1-10%. While there are indications that the epidemic is declining among adults in some East African countries (Kenya, Uganda and Zimbabwe), rates have remained generally stable in West Africa, and prevalence continues to rise in several southern African countries (UNAIDS 2005).

High HIV transmission rates at the individual and community levels in Africa and other parts of the developing world have been attributed to a wide range of behavioral, biological, socioeconomic, cultural and political factors (Accorsi et al. 2005; Cohen 2001; de Walque 2006; Farmer et al. 1996; Mokili and Korber 2005; Setel 1999; UNAIDS 2005). The relative importance of the various factors in fueling the epidemic is for the most part inadequately understood, rendering the development of appropriate and sustainable prevention, treatment, care, and impact mitigating strategies difficult (Shapiro 2002; UNAIDS 2002, 2004).

Recognizing the wide range of socioeconomic factors involved in the AIDS epidemic, the United Nations Development Program (UNDP) launched in 2002 the Millennium Development Project, which set eight millennium development goals, including eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and women's empowerment, reducing child mortality, improving maternal health, reversing the incidence of AIDS and other major diseases, ensuring environmental sustainability, and developing a global partnership for development (UNDP 2005).

The objective of this review is to examine the progression of the Ethiopian AIDS epidemic as influenced by socioeconomic, cultural, political and medical services factors. The experiences and observations of one of the authors, Damen Haile Mariam, as a public health physician teaching in the major teaching/referral hospital in Addis Ababa, of Bernt Lindtjorn as a medical doctor in a hospital in southern Ethiopia, the bibliographic work on HIV and AIDS by Helmut Kloos, Damen Haile Mariam and colleagues (Converse et al. 2006), and the intimate knowledge all three authors have of Ethiopian society pointed out the need for a synthetic overview and provided the impetus for the research. In an effort to provide a comprehensive assessment with a view to informing prevention and control programs, this study integrates individual risk factors and community-level behaviors (World Bank 2006) in the socioeconomic, cultural, political and health services environment to examine the dynamics of the Ethiopian epidemic. It builds on a preliminary review (Kloos and Haile Mariam 2000) and uses both quantitative socioeconomic and epidemiological data (de Walque 2006) and more qualitative cultural, attitudinal, behavioral and historical information (Setel 1999) to provide a broadly based assessment of the evolving epidemic. Data were obtained through PubMed (National Institute of Health) searches online of the medical literature, the review of the social science literature, government and NGO reports, university theses, and two online United Nations newsletters.

The AIDS epidemic in Ethiopia is of particular interest because it has the second largest population (projected 73 million in 2005) in sub-Saharan Africa (World Bank 2005), one of the largest HIV-infected populations in the world (an estimated 1.32 million in 2005) (MOH 2006), has some of the lowest socioeconomic and health indicators, and has recently experienced political unrest. Ethiopia is a low-income country, defined by the World Bank as a country with a per capita GNI (gross national income) of $510 or less in 2005, when Ethiopia's per capita GNI was $110, the second lowest world-wide (World Bank 2005). Largely as a result of recent wars, famines, and misguided government policies, most quality of life and socioeconomic indicators are still low. Mortality in children under five years of age was 123 per 1,000 in 2005, the gender parity ratio (M:F) in primary and secondary schools 69 (the second lowest world-wide), the primary school completion rate was 39%, 91% of all household heads in rural areas had no formal education, and only 6% of all births were attended by skilled health staff (World Bank 2005; CSA and ORCMacro 2006).

Infectious diseases and malnutrition rates remain very high and health services underdeveloped. Between 1986 and 2004, Ethiopia faced food emergencies more than 90% of the time and the prevalence of infectious and nutritional diseases is among the highest world-wide (FAO 2005; Berhane et al. 2006). The Ethiopian population grew faster than the number of health facilities during the 1989-1999 period (MOH 1991, l999), and traditional medicine and home care remain major health resources, especially in rural areas. During famines, coping mechanisms are often exhausted and many rural families cannot obtain medical care (Melese et al. 2001).

The ruling party of Meles Zenawi established in 1991 an ethnically based federal government with an initial drive toward a free market economy, carried out a decentralization program and provided for national elections. Nevertheless, the Ethiopian People's Revolutionary Democratic Front (EPRDF) party, similarly as the Mengistu Marxist-Leninist regime which it ousted in 1991, retains tight control over regional governments and has not developed into an effective political organization that allows for regional and community autonomous authority or decision making based on democratic principles. Political unrest, human rights violations, and ethnic strife have increased since the May 2005 elections,

which are widely viewed as fraudulent (Clapham 2005), with a resulting decline in public trust of messages over the government media that may include those that are related to initiatives aimed at HIV/AIDS prevention and control.

The HIV/AIDS Epidemic

The Ethiopian HIV/AIDS epidemic shares many features with those elsewhere in Northeast and East Africa. It is currently a general epidemic, defined as more than 1% of the national sexually active adults sero-positive, including more highly infected groups. HIV-1 subtype C virus, is the major strain of HIV in Ethiopia and in most of Africa, which is thought to be associated with heterosexual transmission (Abebe et al. 2001; UNAIDS 2002). An estimated 87% of HIV transmission is through heterosexual contact, 10% by mother-to-child transmission and a smaller proportion is thought to be due to traditional harmful practices (HAPCO 2004), similar to the pattern reported from other African countries, although empirical evidence for the relative contribution of the major transmission routes has not been obtained anywhere (Potterat et al. 2006). Similarly, the risk of HIV transmission through male homosexual intercourse, unsafe injections, various traditional practices, including male circumcision, and other nonsexual exposures in Ethiopia is not known.

The 2005 estimates of the Ministry of Health put the number of HIV infections in Ethiopia at 1.32 million (MOH 2006). While the 3.5% national prevalence rate is lower than those of most East African and all southern African countries, the large size of the Ethiopian population ranks this country among the most afflicted countries in terms of total number of cases (UNAIDS 2005). An unknown number of HIV infected Ethiopians have died, about 134,450 persons (including 20,929 children) in 2005 alone, when there were at least 384,020 AIDS orphans. Life expectancy of the Ethiopian population for 2005 was adjusted downward by 5.0 years to 50.4 years because of AIDS (MOH 2006). In Addis Ababa, an estimated 68% of all deaths in the age group 20-54 were due to AIDS in 2001 (Araya et al. 2004).

The HIV/AIDS surveillance system of the Ministry of Health, like those of other developing countries, is deficient due to lack of resources and infrastructure, rendering analyses of the HIV/AIDS epidemic and the impact of interventions difficult. Based on monthly reports from hospitals, it covers only a small fraction of all AIDS cases nationwide because many ill persons in the rural areas have no access to hospitals. Even if they succeed in reaching hospitals the HIV diagnosis may be reported differently (Kebede et al. 2000). Reniers et al. (2005) estimated that only 20% of Ethiopian adults die in hospitals or clinics. Since 1989, projections of the prevalence of HIV infections in the general population of Ethiopia have been based mainly on infection rates in antenatal clinic attendees (ANC) at an increasing number of sentinel sites, following the practice of other resource-poor countries. Thirteen urban and two rural sites were included in 2000, 28 urban and six rural sites in 2001, 37 urban and 29 rural sites in 2003 and 44 urban and 38 rural sites in 2005. A combination of the increase in the number of sites (especially rural sites, which provided more representative data), use of more advanced statistical analyses, improved data management, and the possible impact of the various intervention programs resulted in a rate decline from 7.3% in 2000 to 3.5% in 2005, which contrasts with the predicted slight decrease during that period from 3.9% in 2000 to 3.5% in 2005 based on computer models (MOH 2004a, 2006). While antenatal data may be a fairly reliable indicator of the true prevalence of infection in the general population, it may lead to over-reporting due to self-selection of clinic attendees with poorer health, better access to services or to underreporting due to the exclusion of many STD-infected women who have become infertile (Assefa et al. 2003; MOH 2002; UNAIDS 2005). The much lower national HIV prevalence revealed by the fairly representative DHS household sample (1.4%) (CSA and ORCMacro 2006) than the ANC sentinel data (3.5%) (MOH 2006) suggests that the latter constitute an overestimate. Similarly, whereas the Ministry of Health estimated the national incidence (the percentage of new infections in the population during one year) as inferred from prevalence data, to be 0.26% for rural areas (MOH 2006), Hladika et al. (2006) put the rate much higher for 2003 (1.7% for towns and 0.46% for rural areas), apparently the result of using different databases. These discrepancies require that the HIV rates presented in this paper be viewed with caution and point out the need for further improvements in HIV/AIDS surveillance.

The Progression of the Epidemic

During the early stage of the HIV epidemic in Ethiopia, female commercial sex workers (CSWs), truck drivers and soldiers appeared to be among those first infected as HIV appeared to spread to towns along major roads. In 1988 and 1989, mean sero-positivity rates among more than 6,000 CSWs in 24 communities throughout Ethiopia were 18 and 29%, respectively, with rates in individual communities ranging from 1% to 38% and the highest rates in the war zone (Mehret et al. 1990a). Truck drivers, epidemiologically linked with CSWs, were another highly infected group (17% prevalence) (Mehret at al. 1990b). In Addis Ababa, prevalence rates in CSWs were 24.7% in 1988, 54.3% in 1990 and 73.4% in 1998, indicating that they continued to increase also in other towns during the 1990s (Mehret et al. 1990c; Aklilu et al. 2001).

Soldiers, high-risk and mobile groups exposed to and spreading HIV through multi-partner sex contacts, were stationed in the 1980s and early 1990s in many Ethiopian towns in the war zone. Troops were also at risk of being infected during emergency blood transfusions (Eshete et al. 1993; Kloos 1993). HIV infection rates in soldiers increased from 2.1% in 1985/86 to 12.0% in 1989 (Gebretensae 2003).

The Ministry of Health (2004a) estimated from ANC data that 10.5% of the adults in urban areas and 1.9% in rural areas were infected with HIV in 2005 (MOH 2006). Trend analysis estimated a gradual increase in the national prevalence rate between 1982 and 2008, marked by a sharp rise in urban rates in the early 1990s and a subsequent spike in rural rates (MOH 2004a). The only other reasonably representative prevalence data for urban populations come from a survey of 10,000 male army recruits from towns throughout the country, 7.2% of whom were positive. Additional extensive HIV prevalence data from rural areas, involving 61,000 male recruits tested in 1999 and 2000, revealed mean infection rates between 3.4 and 4.3% from different regions, with a wider range among administrative zones. The remarkably even distribution in rates among zones, especially in the largely Christian central highland region, again indicates the generalized nature of the epidemic and low rates in the Moslem dominated southeastern Ogaden region and in western Ethiopia, a religious influence, consistent with the low HIV rates reported for Ethiopian Moslem recruits (Abebe et al. 2003) and from several African Moslem societies (Gray 2004). The high rates (above 10%) in Borana and Arsi zones in southern Ethiopia stand out (Abebe et al. 2003), as further discussed below.

Changes in the prevalence of HIV infections in urban and rural areas also can provide information on the progression of the epidemic. The rapid spread of HIV in the late 1980s and early 1990s in urban areas, where the epidemic first appeared, stabilized between 1996 and 2000, with approximately as many new infections as people dying from AIDS. The total number of new HIV infections in rural areas estimated from ANC data (which largely represent new infections in young females) surpassed that in urban areas around 1997 (MOH 2004a). This pattern is consistent with relatively faster improvements in awareness of risky behavior in urban populations, further discussed below. According to the 2005 AIDS report of the Ministry of Health (MOH 2006), HIV rates appear to have peaked also in rural areas (in 1999-2001), although Hladik et al. (2006), modeling both ANC and VCT (voluntary counseling and testing) data, concludes that the epidemic continued to expand in rural areas.

The Ministry of Health estimated that HIV prevalence in urban areas declined from 13.5% in 1997 to 12.6% in 2003 (MOH 2004a) and 10.5% in 2005 (MOH 2006). Stronger indications of a recent decline in HIV rates come mainly from four clinics in central Addis Ababa, where HIV prevalence among 15-24 year old ANC attendees decreased from 24% in 1995 to 15% in 2001, together with a drop in syphilis prevalence from 3.2 to 2.2%. However, no declines were reported from outlying areas of the city (Tsegaye et al. 2002). In the absence of spatial and social network analyses of HIV infections at the neighborhood level (Rothenberg et al. 2005), this pattern cannot be explained. The GIS (Geographical Information Systems) program CDC-Ethiopia initiated in 2006 is aiming to build institutional capacity to carry out spatial studies of HIV transmission and may encourage network analysis. HIV incidence declined three-fold between 1997 and 2002 among 1,500 factory workers enrolled in a voluntary counseling and testing (VCT) trial in a suburb of Addis Ababa (Mekonnen et al. 2003). But HIV prevalence did not show a declining trend among non-serial visa applicants between 1993 and 2001 and rates continued to increase among Moslem pilgrims in Addis Ababa (Tegbaru et al. 2004; MOH 2004a). This discrepancy may be explained by differences in risk behavior among different groups, sampling bias or variable reliability of HIV testing (Kebede et al. 2000; Tegbaru et al. 2004). Declining HIV rates and risk behavior have also been reported from several East African countries, notably Uganda, Kenya, and Burundi, but it is too early to consider these recent declines to be a definitive reversal in these counties' epidemics (UNAIDS 2005).

Individual Risk Factors

Age and Gender

The distribution of HIV infection rates by age groups and gender can indicate transmission levels in the sexually active population and thus guide prevention programs. In 2003, the highest HIV infection rates in Ethiopia reportedly occurred in the 15-34 age group. The highest rates in female ANC attendees were in the 15-24 age group (8.6%). Children and adolescents have become increasingly exposed to HIV in recent years, with an estimated 14,000 new infections in the 0-14 age group in 2003 (MOH 2004a). Rates are higher in young females than males, apparently due to a combination of the earlier commencement of sexual activity of females, the older age of their partners, gender-based biological factors (Quinn and Overbaugh 2005), and prenatal and obstetric care/delivery exposures. In 2000, the median age of first sexual intercourse of women aged 20-49 was 16.4 years and for men 20.3 years, indicating the relatively greater vulnerability of teenage girls to HIV infection (CSA and ORCMacro 2001).

The gender ratio of HIV infection in Ethiopia changed around 1990 from male to female dominated rates, with a fe-

male/male ratio of 1.3 in 2003 (MOH 2004a). The age distribution of 16,264 AIDS patients reported to the Ministry of Health for 2003 and of burials in Addis Ababa's cemeteries also reflects the change from male to female dominance of infection, as well as mortality (Araya et al. 2001; MOH 2004a). This gender trend in HIV infection may increase mother-to-child transmission, although no longitudinal epidemiological data are available.

Mother-to-Child Transmission

No reliable data are available on mother-to-child-transmission in Ethiopia, which occurs during pregnancy, at the time of delivery, and through breastfeeding. The only study to date crudely estimated the rate of vertical transmission among HIV-infected mothers to be over 29% (Muhe 1997). Ten percent of the estimated 128,922 new HIV infections in 2005 were in newborns (MOH 2006). Only 50 clients received perinatal mother-to-child transmission services (basic counseling, HIV testing and AZT or NVP treatment) in 2001 at the three existing NGO sites (Garbus 2003). By 2005, there were 658 VCT and 178 PMTCT (prevention of mother-to-child transmission) centers nation-wide. The VCT centers tested 564,351 clients, reflecting the increasingly favorable attitude of mothers toward HIV testing and counseling (MOH 2006; Jebessa and Teka 2005). The proportion of those who reportedly ever had been tested for HIV was higher in the BSS Round Two (in 2005) than in Round One (in 2002) among CSWs (26.0% versus 7.7%), in-school youth (9.3% versus 3.3%), and military personnel (50.8% versus 28.0%) (HAPCO 2006). While no reliable information is available on mother-to-child HIV transmission, all major protective parameters during pregnancy and delivery (availability of family planning services, provision of antiretroviral drugs to mothers and their newborns, safe delivery, and infant feeding counseling and support) are deficient in Ethiopia. The high prevalence (40-80%) of exclusive breast feeding during the first six months in different parts of Ethiopia may have a protective effect, although prolonged or abrupt cessation of breast feeding reported from some areas (CSA and ORC-Macro 2001; Woldegebriel 2002) constitutes a risk of HIV infection (Iliff et al. 2005; Piwoz and Ross 2005). The World Health Organization recommends exclusive breast feeding by HIV-infected mothers in countries with high infant mortality rates where replacement feeding is generally not affordable, feasible, acceptable, sustainable or safe (Piwoz and Ross 2005), as in much of Ethiopia.

Sexually Transmitted Infections (STIs) and Opportunistic Infections

STIs may be a cofactor in HIV infection, possibly suggesting evidence for sexual exposure, and ulcerative STIs such as herpes (simplex) increasing HIV transmissibility. STIs are much more prevalent in Ethiopia than their low rate reported by the Ministry of Health for outpatients in 2001 (2.2%) (MOH 2001) suggests, due to a combination of underreporting associated with widespread asymptomatic cases, the stigmatization of STIs, and lack of a uniform reporting system (Kassie et al. 2006). Surprisingly high STI seroprevalence rates, gonorrhea (40%), genital chlamydia (54%), syphilis (19%), chancroid (13%), and herpes simplex virus type 2 (HSV-2) and hepatitis B virus (HBV) (46%) were found among 730 Ethiopian women attending maternal and child health clinics in Addis Ababa who were still married to their one and only sexual partner, indicating male promiscuity (Duncan et al. 1994a). Several other studies indicate that HSV-2 is widespread and that it may be fueling the HIV epidemic. The same independent predictors of HSV-2 infection were identified in men and women (older age, higher lifetime numbers of sexual partners, positive HIV serology, and positive syphilis serology) (Mihret et al. 2002). Among teenagers attending such clinics in Addis Ababa, gonorrhea, chlamydia infections and syphilis were higher in those with multiple sexual partners, those sexually active by age 15, and those involved in prostitution (Duncan et al. 1994b). In a community-based study in Addis Ababa, significantly more out-of-school adolescents had gonorrhea and chlamydia infections than students, indicating greater exposure risk among poorer adolescents (Taffa et al. 2002). STIs are commonly considered a sign of manhood and sexual prowess in males, which has traditionally impeded prevention programs, which were never a popular health priority in Ethiopia and in other African countries (Larson 1990). Their significance in HIV transmission is indicated by several studies, including one in Uganda, which attributed at least 35% of HIV incidence to STI co-infections (Korenromp et al. 2002). Simulation modeling of the transmission of HIV and six STIs in Uganda concluded that STI management is an effective HIV prevention strategy in populations with a high prevalence of curable STIs, especially during the early stage of the HIV epidemic (White et al. 2004). Nevertheless, the results of all studies of STI cofactors are difficult to interpret due to their failure to control for confounding nonsexual factors.

Thirty-eight percent of all reported TB cases in Ethiopia represented HIV/TB co-infections in 2003, and this rate is expected to increase in the future (MOH 2004a). A study of HIV-infected TB patients in an outpatient clinic in Arba Minch town found extremely high mortality rates and incidence (Jerene and Lindtjørn 2005). A review of the epidemiological significance of TB and other opportunistic infections in Ethiopia (Wolday and Messele 2003), indicates that they contribute to morbidity and mortality especially in rural areas, where they are most prevalent.

HIV Transmission through the Medical Services

The epidemiological significance of contaminated sharps in the health care setting, especially syringes, may be underestimated in Africa (Gisselquist et al. 2002). In Ethiopia, some clinical practices have been associated with hepatitis B, HIV infection and STDs (Khodakevich and Zewdie 1993) but their relative importance is not known. A study of 40 health facilities using a combined survey/observation method found 74% of injections to be unsafe (through accidental injuries, reuse and unsafe disposal of syringes) either to the patient, health worker, or the community and that safety awareness among health workers was low (Wolde Gebriel 2004). The general preference of Ethiopian patients for injections (Haile and Berhane 1997; Wolde Gebriel 2004) further increases the risk of HIV transmission. Injections and other blood exposures, including blood transfusions, may confer considerable HIV risk, but the inconsistent associations between hepatitis B virus (HBV) and hepatitis C virus (HCV) infections (which may also be transmitted sexually) with HIV (Rahlenbeck et al. 1997) require further studies. Ayele et al. (2002) concluded that HCV sexual transmission is not common in Addis Ababa and Priddy et al. (2005) considered overall medical transmission of HIV to be relatively unimportant in Ethiopia, even though some patients brought their own syringes from home, which points to a lack of sterilization. Further studies are also needed on the practices of "injection doctors," mostly inadequately trained health assistants who traditionally gave injections for a wide range of infectious diseases (Slikkerveer 1990).

HIV prevalence of 4-6% has been reported among Ethiopian blood donors in different towns between the mid 1990s and 2005 (Kebede et al. 2000; MOH 2006) but no information is available on HIV risk factors associated with blood transfusions. In 2001, the Ministry of Health established a national blood service strategy mandating the Ethiopian Red Cross Society to operate blood transfusion services nation-wide. By 2001, the nine Red Cross blood banks and nearly all of the 100 hospitals nationwide had HIV testing facilities (National AIDS Council 2001). Their testing capacity and reliability were limited, however. While two-thirds of 42 screening laboratories surveyed in 2001 were capable of performing both ELISA and rapid tests, most of them did not follow specific testing algorithm, and only half performed confirmatory tests. In addition, widespread shortages of reagents and protective materials and poor laboratory management jeopardized the safety of transfusions further (Tegbaru et al. 2002). In 2004, the Ministry of Health, with financial support from PEPFAR and technical support from WHO, started a blood safety program to enhance the adequacy and safety of blood transfusion services nationwide.

Multipartner Sex and Condom Use

Multiple heterosexual partnerships are considered to be the major HIV transmission route in Ethiopia, as in other sub-Saharan African countries (United Nations 2002). The 2000 Ethiopia DHS reported that 1% of married women but 7.4% of married men, 12.9% of unmarried women and 23.2% of unmarried men had multiple sex partners during a 12 month period. Whereas sexual intercourse with multiple partners was more common among urban residents, urban men with at least secondary education and women with little or no education had the highest multi-partner contacts, further indicating the problem of vulnerability among poor females. But education, gender, and place of residence predicted multi-partner sex differently in different regions (CSA and ORCMacro 2001), indicating either a wide range of sexual behaviors in different communities, biased data, or the influence of other factors. According to the 1998 South Africa DHS, for example, only 1.5% of married and 3.9% of unmarried women had two or more partners during a 12 month period, but 16.9% of married and 13.8% of unmarried women had their last sexual intercourse with a person other than their husband or regular partner, respectively (Republic of South Africa 1998), indicating underreporting of the former. The first five demographic and health surveys in Africa that included HIV test results (Burkina Faso, Chad, Cameroon, Ghana and Tanzania) found that men tend to have more extramarital sexual relations than women and that education is usually associated with condom use outside marriage. However, the relationship between infection, wealth and urban living, was also linked with monogamy/polygamy, religion and female circumcision (de Walque 2006). These findings contradict some earlier findings and assumptions and reemphasize the variability and complexity of sexual behavior in different societies.

The Ethiopian Behavioral Surveillance Survey (BSS) First Round, which used both survey and qualitative methods among 10 socioeconomic groups, reported above 90% knowledge of HIV and AIDS in all groups but high rates of risk behavior and low awareness of preventive measures, with the worst scores for rural females. Only 27% of those who had engaged in unprotected sex considered themselves to be at risk of HIV infection, and about two-thirds of the regular drug and alcohol users had recent unprotected sex with a non-marital partner. Whereas males reported to have had similarly aged first sexual partners, females said that their first partner was 5-10 years older than themselves, consistent with the higher infection rates in female adolescents and young women (HAPCO 2002). Improved knowledge, attitude and stigma parameters, including increased condom use with non-regular partners and improved accepting attitude toward HIV-infected people, were reported by the Second Round BSS of 2005 (HAPCO 2006). However, misconceptions

about HIV transmission and comprehensive knowledge and risk perception of being exposed to unprotected sex remained low (HAPCO 2006). The BSS is, besides the sentinel ANC program, a major mechanism of the Monitoring and Evaluation Framework of the National HIV/AIDS Program.

Condom sales in Ethiopia increased about 70-fold in the 1990s, (The Futures Group International 2000) but use rates are still among the lowest in Africa, due to persisting negative attitudes towards their use and it is not known to what extent condoms are being used to prevent pregnancy or STIs and HIV infection. Only 5% of men and 1% of women reportedly used a condom during last sexual intercourse with any partner in 2000, but higher use rates were reported for college and high school students (Kebede et al. 2000; CSA and ORC-Macro 2001, 2006). Among out-of-school youths in Awasa town, only 27.6% of them reportedly used condoms, although more than 90% knew about HIV or AIDS (Taffa 1998). Other studies also reported that recognition of HIV risk and contraceptive use were generally lowest among females, unmarried, less educated people, and rural residents (CSA and ORC-Macro 2001, 2006; Kebede et al. 2000). A psychosocial study of risk and preventive behavior among high school students concluded that greater condom acceptance would be possible if attitudinal barriers (perceived reduction in sexual pleasure, promiscuity and distrust between partners) could be reduced (Mulatu et al. 2000). But there are also deep-seated religious and cultural beliefs in the value of fertility that consider condom use sinful and unacceptable. These values, preached by both Moslem and Orthodox clergy, can only gradually be overcome (Surur and Kaba 2000).

Men who have Anal Sex with Men and Women and Injection Drug Users

Illicit drug use and anal sex are common and closely related in many cities world-wide and associated with stigma, denial and social and legal exclusion of users from HIV services, and human rights abuses, resulting in underreporting of these activities. Male homosexuality constitutes a major HIV transmission route in the Americas, Eastern Europe and parts of Asia but is relatively rare in Africa (UNAIDS 2006). Although anthropologists have reported homosexual behavior in Africa since the 17th century (Brody and Potterat 2003), its occurrence has been underreported as a taboo subject. The review by Brody and Potterat (2003) indicates that homosexuality is common in much of sub-Saharan Africa and that anal sex is a highly efficient mode of HIV transmission. Rising HIV rates in Nigeria have been associated with increasing male homosexuality (PlusNews 2006a). In Ethiopia, hidden male homosexuality and anal sex involving CSWs is said to be well known to take place in certain bars and shops in Addis Ababa. Mehret et al. (1990a) reported occasional penoanal sex involving female CSWs in Addis Ababa, where Hagos (2006) recently documented male homosexual behavior, associating it with socio-cultural and legal-political factors. The fact that denial by society and communities, stigma, discrimination and human rights abuses greatly limits access of homosexual men to prevention and care services (UNAIDS 2006) points to the danger of unsurveillanced HIV risk.

High rates of HIV-contaminated syringes shared by heroin users have recently been reported in Kenyan and Tanzanian coastal towns, where injection drug use is spreading (Beckerleg et al. 2005; McCurdy et al. 2006). In Ethiopia, the major drug abuse problem is the use of alcohol and khat (Catha edulis), the former of which has been associated with HIV infection by several investigators (Seme et al. 2005). However, increasing heroin and cocaine trafficking and use, including hospitalization for intoxications, has recently been reported in Ethiopia, which is becoming a transshipment point in the international drug trade. By 1999, 91.6 kg of heroin, 0.6 kg of cocaine, and several hundred vials of illicit morphine and other narcotics, most of them traded in night clubs in Addis Ababa, had been confiscated by the police and 1,345 consumers and 778 traffickers arrested. Leniency and lack of resources in enforcing the 1957 penal code (which considers the trafficking but not the consumption of illicit drugs a crime) and guidelines for prescribing and dispensing psychoactive drugs have been identified as key factors in spreading drug use (Ethiopian Medical Association 1999). The relationship between injection drug use and HIV has not been studied in Ethiopia.

Communal and Societal Influences on HIV Transmission and Spread

Socioeconomic, cultural and political factors have significantly affected HIV transmission and spread. These factors operate interactively at the individual level (mostly by increasing high-risk sexual behavior) and at the societal level (through population dislocations and social instability, unemployment, poverty, urbanization and prostitution, health policy, and recent wars) (AIDSCAP 2001). Some of these factors have their historical roots in medieval Ethiopia and have become more prevalent since the Italian occupation in the 1930s, and others are associated with the recent wars and sociopolitical changes (Kloos and Zein 1991; Pankhurst 1990).

Poverty

Wealth tends to be positively associated with HIV infection in Africa, as indicated by several national DHSs in sub-Saharan Africa that found opposing influences of lower condom use among poorer, less educated people and higher levels of extramarital relations among wealthier, better edu-

cated groups (de Walque 2006). Contaminated sharps and blood exposure in clinics also tend to involve mostly wealthier groups, who have greater access to formal health care (Gisselquist 2004). Nevertheless, the pervasive effects of poverty have been described at various levels, including increased biological susceptibility to HIV in malnourished populations, lack of education (Fenton 2004) and commercial sex work, as described below. AIDS both causes and generates poverty among high-risk groups such as CSWs, out-of-school youth, refugees, and rural people. Most poor Ethiopian families are malnourished and cannot afford the relatively cheap drugs to treat STIs and opportunistic infections, let alone ART (Kloos 1998). Malnutrition facilitates HIV transmission and the progression of HIV infection to AIDS and in turn exacerbates malnutrition (FAO 2005), loss of income and productivity and thus poverty (Cohen 2001). A consultation of the World Health Organization in Durban, South Africa concluded that "the HIV epidemic is increasingly driven by, and contributes to, factors that also create malnutrition — in particular, poverty, emergencies, and inequalities" (Moszynski 2006, 64), prompting WHO to incorporate nutritional programs as a strategy in its global AIDS program (PlusNews 2005).

Another risk situation in famine-prone areas arises from the insecurity of Ethiopian females fleeing their homes in search of assistance in circumstances where they have few options and tend to be taken advantage of in return for support (IRIN 2003). There is probably more transactional sex in Ethiopia than indicated in the literature but data are lacking (Garbus 2003). These various food and security issues have implications for female vulnerability to HIV infection in refugee and other displaced and poor populations (Holt et al. 2003).

The low socioeconomic status of Ethiopian females is associated with high divorce rates, customary property inheritance favoring males, low access to health care and education, and heavy workload (Berhane et al. 2001). An estimated 45% of first marriages in Ethiopia end in divorce, mainly the result of early marriage and childlessness (Tilson and Larson 2000). The strong relationship between poverty and HIV infection among female commercial sex workers (CSWs), street children and refugees has been described by Baardson (1993); Tadele (2005) and Pankhurst et al. (2005), who found that half of all CSWs studied supported their families. HIV prevention programs among poor people may be compromised by their social and political exclusion from many HIV prevention programs and their irrelevancy to meeting basic needs. Unmarried Ethiopian youth and the swelling numbers of street children, for example, have no access to VCT services due to socioeconomic barriers (Cohen 2001; Tadele 2005).

War and the Military

Although many African armies have HIV rates several times those of the general population (Tidwell 2002), seven sub-Saharan countries experiencing long periods of civil unrest and war had relatively low HIV rates (Gisselquist 2004), further indicating the major role of soldiers, especially during the early stage of epidemics. The aggravation of numerous nutritional and infectious diseases, including HIV/AIDS, and the spread of prostitution and sexual violence in the war zone during the protracted war with Eritrea has been described by Kloos (1993). The high HIV infection rates in the Ethiopian military described above had been drastically reduced to 6.1% by 2001 using an aggressive prevention program since the mid 1990s. Behavioral change education, distribution of condoms, surveillance and research are the approaches used by the new defense forces. Soldiers have been trained in health and are instructed to educate their home communities after discharge (Gebretensae 2003). Similar programs and encouraging results have also been reported from several South African countries (IRIN 2006a).

Stigma, Denial and Discrimination

Stigma, denial and fear of disclosure due to stigma and discrimination against HIV/AIDS-affected persons contribute to fuelling the epidemic in communities where a sense of unity and integration or connectedness is weak and HIV and AIDS are seen as a framework of transgression, stigma and punishment (UNAIDS 2005). Stigma and discrimination have taken their toll in Ethiopia not only at the work place, in housing, health facilities, schools, and in family and personal relationships but also in the medical services, discouraging people from being tested for HIV (Lindtjørn 2001; UNAIDS 1997; PlusNews 2006b). Nearly two-thirds of 30 traditional birth attendants in Jimma town considered shaking hands with HIV-infected persons risky and stated that AIDS patients should be isolated (Negassa et al. 2001). Another manifestation of the stigmatization of HIV-infected persons is the common failure to indicate on death certificates that patients died of AIDS, which is related to the cultural aversion to informing patients of fatal diseases (Beyene 1994). This aversion is also reflected in the practice of not notifying HIV-positive blood donors of test results. Various organizations, including the Ministry of Health and indigenous NGOs, are addressing the discrimination and stigmatization problem through awareness creation and sensitization activities (MOH 1999). Although the Ethiopian Constitution and the national AIDS Policy protect the rights of HIV-infected persons, they are seldom enforced. Nevertheless, the number of infected persons disclosing their HIV status has increased in recent years (Kassaye et al. 2005) and the widespread perception of HIV positivity being a death sentence has declined largely due to

the expectation of increasing availability of antiretroviral treatment. A UNDP-sponsored project in two rural areas in southern Ethiopia using an innovative community conversations intervention that integrated qualitative and quantitative methods in promoting community discussions and the dissemination of health information reported sharp increases in HIV/AIDS knowledge, change of sexual behavior, and use of voluntary counseling and testing services (VCT) (Gebre and Admassie 2005).

Gender Issues, including Violence against Women and Prostitution

A wide range of traditional attitudes, behaviors, practices, and social norms bearing on sexuality, access to information on and protection against HIV/AIDS, as well as protection of human rights affect HIV transmission and the well being and care of infected persons prevail in Ethiopia. Culturally sanctioned gender roles that circumscribe women's sexual rights in and outside of marriage render them vulnerable to HIV infection (Alemu 2001). A culture of silence prevents women and adolescents from discussing HIV risk and sexuality within their families (Hailemariam 2001) or communities. In this environment, premarital sexuality of female youth is beset with particularly high risks, as revealed by high prevalence of casual sex, infrequent use of condoms, little control over their sexuality, and high rates of illegal abortion among teenagers (Fekadu 2001). Sexual negotiation is similarly curtailed for women. More than 80% of women surveyed during the 2000 DHS stated that a husband is justified in beating his wife for refusing sexual relations with him, arguing with him, or going out without him. Similarly, 13.7% of married Ethiopian women were in a polygynous union, 14.6% in rural and 7.0% in urban communities. Three times as many women lacking formal education than those with secondary education were polygynous (CSA and ORCMacro 2001). The Ministry of Labor and Social Affairs recently reported a sharp increase in another HIV risk factor — trafficking women — due to poverty and unemployment. Trafficked women are particularly vulnerable to various forms of exploitation, including sexual abuse, and usually have little or no access to preventive information or health services (IRIN 2002).

Harmful traditional practices, including female circumcision, violence against women and girls, including child marriage, rape, child sexual abuse, abduction and domestic violence, are widespread in Ethiopia. Female circumcision, which may be an HIV risk factor because of the bleeding and the use of the same cutting instruments on different individuals in some countries (de Walque 2006), was reported by 43 to 100% of Ethiopian women interviewed in different regions during the 2000 DHS (CSA and ORCMacro 2001). While strong resistance to change has been reported from some areas (Berhane et al. 2001; CSA and ORCMacro 2001), there is evidence that this practice is declining as a result of national health campaigns (Spadacini and Nichols 1998; Missailidis and Gebre-Medhin, 2000) and demands by female organizations (Editorial 1999). Abductions (*telefa* in Amharic) of young girls for marriage, which usually involves rape, are still common in rural Ethiopia, with more than half of all brides reportedly abducted in parts of the highlands (Getahun 2001). Abduction carries a stigma that may prevent the victims from returning to their families and communities (IRIN 2004), contributing to rural-urban migration and poverty of females. Sexual violence against females has also been reported among street children (Tadele 2005) and in domestic settings (CERTWID 2004).

Prostitution has a long history in Ethiopia and continues to provide a means of survival for many females in towns. Reviews of the literature indicate that there are up to 150,000 CSWs in Addis Ababa alone (Garbus 2003). Most female commercial sex workers (CSWs) and servants in the towns came as divorcees from rural areas in search of work and a better life, causing lower male/female ratios in urban areas than in most other African countries (Pankhurst 1990; Hailemariam and Kloos 1993). Female dominated and economically caused rural-urban migration also prevails in some Asian countries (Archavanitkul and Guest 1994), but migrations in Ethiopia are not circulatory in nature and provide women with fewer job opportunities besides bar maids, CSWs, and domestic helpers, exacerbating the problem of sexual abuse (Pankhurst 1992). CSWs in Addis Ababa were not only poorer than women still married to their first husband but also had married earlier (Duncan et al. 1994a).

The trend among African CSWs to enter into prostitution at an earlier age, also reported from Ethiopia, increases the risk of infection due to the biological and socioeconomic vulnerability of adolescents. In Addis Ababa and in Bahir Dar town the mean starting age of CSWs was reportedly between 14 and 16 years, although a quarter of those in Addis Ababa started between 10 and 13 years (Baardson 1993; Ayalew and Berhane 2000). Women's rights advocates have been calling for more aggressive action to abolish sexual exploitation and other social malpractices and inequities that jeopardize female rights and health within the framework of the 1993 National Women's Policy and lobbying by women's organizations has recently prompted parliamentarians to review a draft of the 1957 penal code, which includes provisions addressing some of the practices and conditions that underlie women's poor social and health status (Ashenafi 2004; Mekbib 2001). Another encouraging trend was reported by Pankhurst et al. (2005), who found that a considerable number of CSWs are no longer the passive victims who are not

able to insist on condom use or respond proactively but demonstrate greater assertiveness in their transactions with male customers.

Culturally based Risk Behavior

In spite of the great cultural diversity of Ethiopia, characterized by more than 80 ethnic groups, and the existence of numerous traditional medical beliefs and practices (Vecchiato 1993), few anthropological studies have been carried out on cultural perceptions of and responses to HIV and AIDS and harmful traditional practices affecting both sexes. Lydall (2000) revealed major concerns of the Hamer ethnic group about the expanding epidemic and pointed out some misconceptions about their sexuality. In particular, the notion that Hamer society is characterized by promiscuity as perceived by many highland Ethiopians and Westerners reflects considerable ignorance of Hamer culture, which in fact has a strict tradition regarding sexual relations. Based on their observations of condoms being used by tourists, the Hamer associate AIDS with condoms. Among the Borana Oromo, several traditional practices, particularly affairs with multiple lovers, secret sexual relationships with a married woman, polygamy, marrying the sister of a deceased wife, and widow inheritance by the brother of the deceased husband have been associated with HIV risk (Gebre and Admassie 2005). They may explain in part the high infection rates in Borana Zone mentioned above. These rates are in agreement with higher extramarital sex in other polygamous societies (de Walque 2006).

A survey of harmful traditional practices involving blood letting or skin piercing among 5,752 rural and urban health workers in 19 regions revealed that they were common among most ethnic groups and perpetuated by local healers (Haile Meskal et al. 1994). Male circumcision, uvulectomy, milk tooth extraction, incision of eye lids, blood letting, scarification, tattooing, and tonsillectomy are commonly performed by traditional practitioners under unhygienic conditions (Jeppsson et al. 2003; Tandeter et al. 2001). Some of these practices were associated with hepatitis C infection (Khodakevich and Zewdie 1993) but their HIV risk is not known. The national hepatitis B study reported 90% of male military recruits to be circumcised (Kefenie et al. 1988). Tsega et al. (1988) found that circumcision, scarification, and ear piercing were associated with hepatitis B markers, indicating their potential role in HIV transmission.

Male circumcision, reported to reduce HIV transmission in parts of Africa and other regions since the 1980s, was recently associated with 60% fewer infections among circumcised than uncircumcised men in South Africa (Auvert et al. 2005). High protection was also reported from small sample studies in India, Uganda, and Kenya (Seppa 2005), but a protective effect of circumcision was reported by the Kenya DHS only among the Luo ethnic group (Central Bureau of Statistics et al. 2003). While Auvert's results have been hailed as a harbinger for effective interventions (Hayes and Weiss 2006), and several Southern African countries planned to encourage male circumcision as a preventive measure (IRIN 2006b), they have also been criticized on methodological grounds (Vines 2006; Garenne 2006). These criticisms are consistent with the relatively high HIV rates in Ethiopian towns which, together with study results from five West and East African countries (de Walque 2006), challenge the theory that male circumcision significantly protects from HIV transmission. These results and the report by Brewer et al. (2006) of lower HIV rates in uncircumcised male and female virgins and adolescents older than 17 years in Kenya and Tanzania call for in-depth studies of prevailing cutting and hygiene practices by circumcisers and clinics and demand caution against interventions carried out in unhygienic settings (IRIN 2006b; Brewer et al. 2006). The results of the Ethiopian 2005 DHS, showing 0.9% of circumcised and 1.1% of uncircumcised men to be HIV positive are inconclusive due to the small number of uncircumcised males (CSA and OCR-Macro 2006).

Population Movements and HIV Spread

Population movements, mostly in response to rural poverty, environmental degradation, and war, have been significant in the diffusion of HIV in Ethiopia and elsewhere in Africa. The frequent visits of farmers to towns and markets, the demobilization of soldiers, and increasing motorized long-distance transportation have been identified as major factors in the spread of HIV from the towns to the rural areas (Ismail and Larson 1995; Eshete et al. 1993; Yousuf et al. 2004). This situation is consistent with a hierarchical diffusion pattern of HIV in West Africa, spreading from the largest urban areas to smaller towns and rural areas (Oppong 1998).

The epidemiological significance of other types of rural-rural population movements prevailing in Ethiopia, particularly refugee and resettlement migrations, which are associated with increased risk to HIV through social disruption (Decosas et al. 1995), has not been studied. The exhausted and degraded Ethiopian soil increasingly generates environmental refugees who seek a livelihood in other rural areas or in towns, contributing to the high rural-urban migration rates in Ethiopia (Garbus 2003). The highest rural HIV rates in Ethiopia in 2005 were in a refugee camp (MOH 2006). Ecosystem-linked HIV risk, which has been reported from a number of developing countries (Usher 1992) and international migration (Soskolne and Shtarkshall 2002; Beyene 2000), have not been studied. The potential spread of HIV by refugees, immigrants and other mobile populations has been the subject of many debates and immigration regulations in

an increasing number of countries that tend to blame refugees for spreading HIV (Soskolne and Shtarkshall 2002; Holt et al. 2003).

Prevention and Treatment Programs

The Ethiopian government responded to the epidemic with various policies and interventions. Nevertheless, although Ethiopia started the policy process in 1989, earlier than most African countries, it took much longer (nine years) to complete. Delays have been attributed to both lack of political leadership and the country's limited human, financial, technical, material, and management resources but also to a heavy bureaucracy (Shinn 2001). The Mengistu regime established a National Task Force of Prevention and Control of HIV Infection and AIDS in 1985, soon after the identification of the first HIV cases. The National AIDS Control Program, established in 1988, carried out serological surveys in all major towns, revealing the widespread distribution of HIV infection among high-risk groups and implemented several limited intervention projects (education and mobilization of vulnerable groups and promotion of condoms) (Khodakevich and Zewdie 1993). The impact of these programs on HIV transmission was negligible due to the failure of the political leadership to mount an early and aggressive prevention and awareness campaign as in Uganda, Brazil, Senegal and Thailand (see Parkhurst and Lush 2004), the diversion of resources to the protracted war the Mengistu government was fighting against Eritrea, and the discontinuation of that program with the overthrow of that regime in 1991. The current government issued in 1998 a new National AIDS Policy and established in 2000 the National AIDS Council (2001), charged with the implementation of the 2001-2005 Strategic Plan, which was transformed in 2002 into the HIV/AIDS Prevention and Control Office (HAPCO). This executive agency is currently implementing the Strategic Plan for 2004-2008 (HAPCO 2004). While behavioral change communication, voluntary counseling and testing, treatment, and patient care programs in towns may have been instrumental in the decline of HIV infections in urban ANC attendees, serious constraints have limited the effectiveness of the national program.

The major weaknesses of the national HIV/AIDS program identified by HAPCO (2004) include low implementation capacity of the health sector, education sector and communities, lack of focus on priority intervention areas and target groups, limited coverage of prevention and care services, duplication of effort and wastage of resources, and growing dependency on outside support instead of community empowerment and mobilization, and inadequate leadership. Delays in program implementation, partly due to lack of administrative and managerial capacity, were reported as early as 2002 by the United Nations (Editorial 2002). Studies at the district level illustrate the difficulty of rendering the administrative system the current government inherited from the Mengistu regime more cost-effective and receptive to innovative changes, including stronger community participation and implementation of programs in a timely manner (World Bank 2001). Some delays, particularly in the importation of antiretroviral drugs, were due to a power struggle between the Ministry of Health and the National AIDS Council over leadership in program implementation. Unlike in Uganda and Brazil, where leadership emerged from civil society to guide effective government responses to the HIV epidemic (Berkman et al. 2005; Parkhurst and Lush 2004), advocacy for governmental responsibility for national health was weak in Ethiopia and programs were implemented in the traditional top-down manner, with little community input. Heavy dependence of Ethiopia on foreign aid (US $1.9 billion annually, constituting more than one-third of the government's entire budget), further reduces local ownership and the sustainability of the AIDS as well as other programs (IRIN 2005).

Ethiopia's policy of ethnic federalism has been described by Shinn (2001) as a structural blessing and a curse for the national HIV/AIDS program. He notes that while the National AIDS Council is an organization essential for the implementation of the program at all levels of government, down to the village level, the ballooning numbers of qualified staff and administrators render coordination difficult. Decentralization permitted the shift of health resources from the center to the regions, districts and even individual peasant associations, enabling some regional centers and rural communities to develop HIV/AIDS programs (World Bank 2001; Federal Democratic Republic of Ethiopia 2002). Nevertheless, most rural areas remain in economic backwater and antenatal coverage, a good indicator of female health status, did not change significantly between 1996/97 and 2003/04 (MOH 2004b). Similarly, the ongoing transition from a health system dominated by the public sector to a mixed model of service delivery, together with weak accountability mechanisms and the erosion of professional norms has been associated with performance problems and corruption (Lemma et al. 2004). Increasing evidence that the AIDS epidemic in sub-Saharan Africa cannot be controlled by ART alone, without integration with viable prevention methods and programs and coordination between programs (Baggaley et al. 2006), points to another challenge Ethiopia is facing. For example, although ART reduced AIDS mortality and tuberculosis incidence in a hospital in southern Ethiopia (Jerene et al. 2006) and ART programs are expanding, some patients returned home due to depletion of reagents and other

supplies necessary for CD4 counts. This situation is largely due to lack of coordination between central, regional and local health institutions and increasing dependence of hospitals on international organizations.

Limited amounts of antiretroviral drugs became available on the black market or were purchased illegally in pharmacies in Addis Ababa around 2000, mostly by wealthy individuals in Addis Ababa (Shinn 2001). The Ethiopian government procured and distributed generic drugs free to some clinical pilot projects, NGOs and government commercial drug retailers starting in 2003. According to the monthly Ministry of Health reports on ART coverage, 45,595 individuals, or 16.4% of the estimated 277,757 persons requiring treatment, were officially receiving ART by the public health services at 132 sites in August 2006. This included a relatively small proportion (6.7%) of the 24,201 children in need of ART, even though children are considered one of the most vulnerable groups (MOH 2006). While this is a long awaited start, only 0.3% of HIV-infected pregnant women received ART in 2005 (UNAIDS 2006). Moreover, lack of health resources to administer and monitor ART, and poor morale and performance of health workers (Lindelow and Serneels 2006), including increasing departures of government employees for jobs with NGOs, are serious constraints in operating and up-scaling the program. Several organizations caring for children orphaned by AIDS that lack the resources to provide them with ART use nutrition instead in an attempt to keep them healthy (PlusNews 2006c). These and other constraints make it very unlikely that the goal of providing universal access to ART for all AIDS patients by 2008 under the government's Accelerating Access to HIV/AIDS Treatment in Ethiopia program (MOH 2006) can be achieved.

Conclusion

The AIDS epidemic in Ethiopia illustrates the tremendous challenges a least developed nation faces in responding to this unprecedented disaster. The still meager epidemiological and behavioral data for urban and rural populations, males and females, and different socioeconomic and cultural groups indicate that poverty (through commercial sex work, lack of education, rural living, and malnutrition), stigma, gender inequalities (through various socioeconomic and cultural traditions and practices), lack of health and educational services, and population movements are driving forces of the Ethiopian AIDS epidemic. The role of maternal factors, male circumcision, blood transfusion and several other risk behaviors and practices, as well as religion and polygamy is poorly known in the absence of representative national HIV linked socioeconomic and behavioral data. Recent reports of reductions in high-risk sexual behavior and HIV infection rates in some urban and rural populations call for follow-up epidemiological surveillance and monitoring with a goal of determining the extent of any changes in these and other communities. They also warrant examination of persisting impediments to upgrading and up-scaling intervention programs to the regional and national levels. In view of the high epidemic potential in the poorer and less informed rural populations, there is a need to accelerate the scaling up of the HIV surveillance program and technical support services such as diagnostic centers and voluntary counseling and treatment services. But further progress in prevention and control will also require greater political stability and good governance creating an enabling environment in which the public, civil society and international partners can jointly generate the capacity and resources necessary for an effective response to the epidemic.

This review also points out the need to empirically measure the relative importance of several sexual and nonsexual transmission routes which appear to be common in Ethiopia. Transmission through male and female circumcision and various other traditional microsurgical procedures, penile-anal sex, perinatal routes, as well as nutritional factors are still poorly understood and injection drug use is an emerging problem (Kloos et al. in press). In-depth examinations of sexual contact and social networks and specimens from index cases and their infected contacts may help to determine their epidemiological significance (Brewer et al. 2006) and facilitate the development of a comprehensive prevention and control program. More accurate assessment of the dynamics of the AIDS epidemic and its determinants will also require further improvements in surveillance methods.

Endnote

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