Bibliography on HIV/AIDS in Ethiopia and Ethiopians in the Diaspora: The 2012 Update

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Introduction

This is the eleventh annual update of the bibliography on HIV/AIDS in Ethiopia, which we are pleased to present as the apparently only annual bibliography on HIV/AIDS in Africa. It includes, like all previous issues, published and unpublished research on HIV/AIDS and related health conditions and issues, particularly other sexually transmitted infections, tuberculosis, and socioeconomic, behavioral and cultural conditions, gender violence, sexuality, family planning, relevant policy and interventions. As in previous updates, all references are listed under eight main headings: basic biomedical research; epidemiological, behavioral, socio-economic and cultural research; impacts research; treatment, care and clinical research; h; prevention research; health services and health policy research; health informatics, monitoring and evaluation research; and HIV/AIDS research on Ethiopians in the Diaspora. Section 9 lists again pertinent websites. The text preceding each list of references briefly summarizes patterns and trends and highlights key findings of studies presenting new approaches, concepts or tools.

The introduction of new topics and issues will hopefully encourage research into neglected, but relevant and promising areas of research. We want to emphasize that increasing complexity and integration of programs makes the categorization of references more difficult and recommend that readers interested in any one area of research review also other sections in this update.

We used the same methods as in previous updates to identify and catalog the references, except that only the PubMed/MEDLINE database as well as POPLINE, PsycLit, Global Health, CINHAL, Sociological Abstracts, EconLit, and Web of Science, using the search term "Ethiopia and HIV". The Ethiopian Journal of Health Development, which is not indexed in the PubMed/MEDLINE database, was manually reviewed for relevant articles. This update includes all abstracts concerning Ethiopia presented at the 19th International AIDS Conference in Washington DC in July 2012. Additional online searches were made on websites of major national and regional HIV/AIDS resource centers, mostly http://www.etharc.org, and international organizations (http://www.unaids,com). We also included all relevant theses and dissertations prepared in different departments of Addis Ababa , Gondar, Hawassa and Mekele universities. In addition we have included pertinent abstracts from the Ethiopian Medical Association and Ethiopian Public Health Association and also the American Public Health Association meetings.

This update includes 432 references, 431 from 2012 and 1 from 2011. This represents a 13% decrease compared to the 2011 update; approximately 155 (35.8%) are published articles or book chapters, 122 (28.2%) conference presentations, 147 (34.0%) master's theses, 5 (1.2%) PhD dissertations and 3 (0.7%) unpublished reports by different agencies and organizations.

PubMed search terms: Ethiopia AND HIV AND 2012[dp]; Ethiopia AND aids AND 2012[dp] for Figure 1. For Figure 2 these search terms were used as well as Ethiopia AND tuberculosis, or Ethiopia AND malaria, or Ethiopia AND schistosomiasis.

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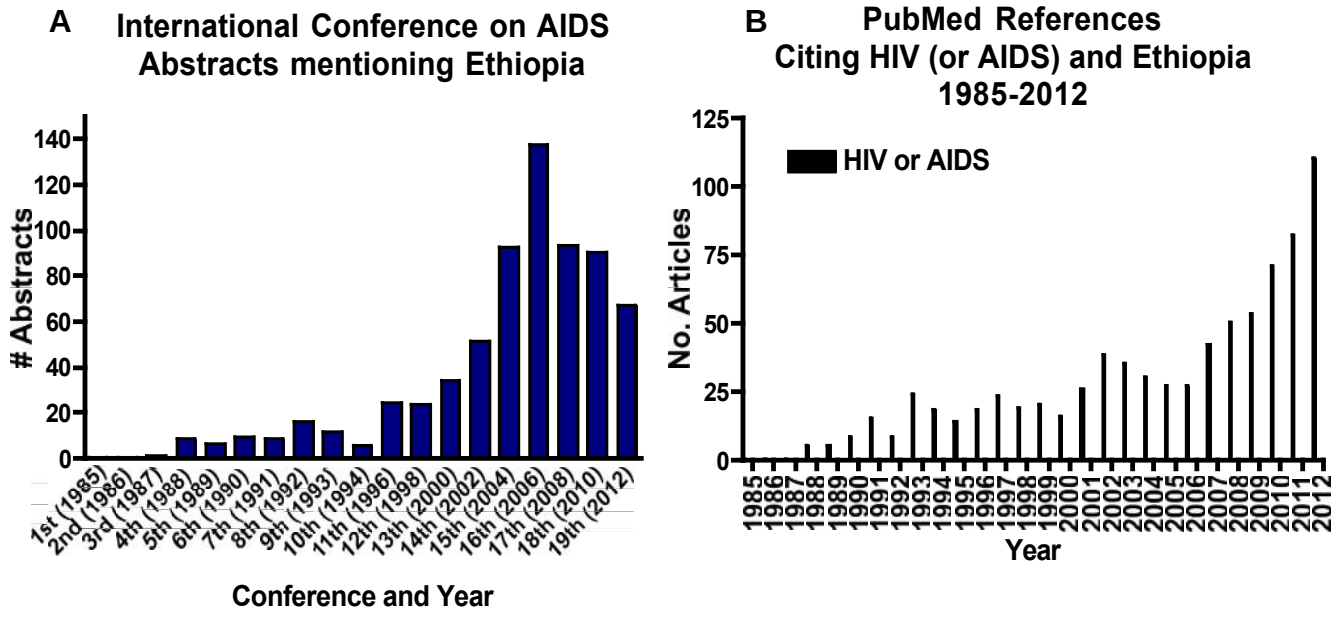
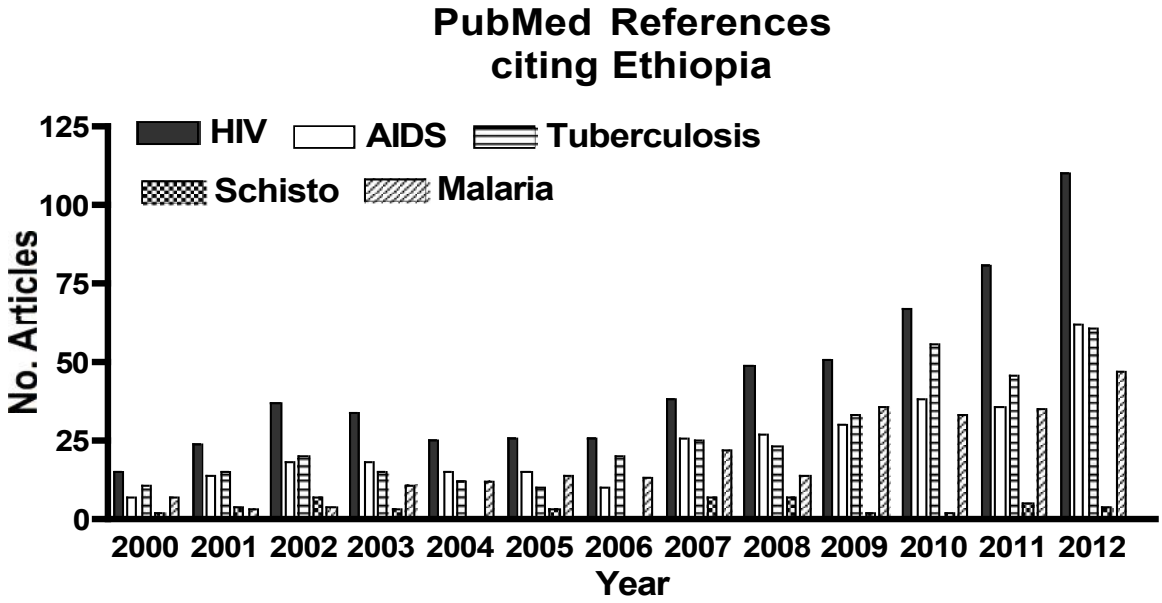


Figure 1: **Presentations at the International Conference on AIDS (A) and Publications cited in PubMed (B) concerning Ethiopia and HIV or AIDS. The increase in presentations in recent years now seems to be followed by an increase in material becoming full-length manuscripts. The highest number of presentations (137) was in Toronto in 2006; conferences in Bangkok, Mexico City, and Vienna all had ~90 presentations*. There was a decline in attendees (presentations, 67) in Washington, possibly because of visa issues.**

***A. Conference locations: 1st (Atlanta, 1985), 2nd (Paris, 1986), 3rd (Washington, 1987), 4th (Stockholm, 1988), 5th (Montreal, 1989), 6th (San Francisco, 1990), 7th (Florence, 1991), 8th (Amsterdam, 1992), 9th (Berlin, 1993), 10th (Yokohama, 1994), 11th (Vancouver, 1996), 12th (Geneva, 1998), 13th (Durban, 2000), 14th (Barcelona, 2002), 15th (Bangkok, 2004), 16th (Toronto, 2006), 17th (Mexico City, 2008), 18th (Vienna, 2010), 19th (Washington, 2012).**

Figure 2: **In 2012, there was a large increase in the number of publications concerning HIV (from 81 to 110), and also increases in AIDS (from 36 to 62, though all of the latter also mentioned HIV), tuberculosis (from 46 to 61)**



and malaria (from 35 to 47) in Ethiopia. Again, only a relatively small number of publications (4) concerned schistosomiasis.

Section 1. Basic Biomedical Research

This section covers laboratory-based biomedical research, including studies on HIV structure, replication, and host immune responses; co-infection with other agents; development and testing of laboratory procedures; and other related laboratory studies.

In this year's update, there are 20 citations listed under Basic Biomedical Research. Over half of these are theses, one PhD thesis on HIV and 11 MSc theses (2,3,6,9,13,14-18,20). All of the MSc theses are pertaining to different aspects of tuberculosis, although

one focused on non-tuberculous mycobacteria, while the PhD thesis by WE Abegaz (1) characterized HIV-1 genomes and determined antiretroviral drug resistance in Ethiopian strains. Drug susceptibility testing is critical for selecting appropriate chemotherapy for both patients with HIV and *M. tuberculosis*. The MSc thesis of MG Worku (20) evaluated the drug susceptibility pattern of *Mtb* isolates collected from a community-based survey in Ethiopia. It is to be hoped that both of these studies will be published, as the information is important for maintaining the best clinical practice. There are two studies by Mihret et al. (11,12) concerning *Mtb* isolates in Addis Ababa. They seem to have studied the same set of patients. However, the distribution of strain types reported is somewhat different. In both reports, the "ill-defined" T genotype accounted for approximately half of the genotypes. The second most-common genotype is the Central Asian followed by Haarlem and Latin American-Mediterranean. There was one isolate of the Beijing genotype, sometimes considered to be more virulent and/or more prone to drug resistance. It is to be hoped that these reports can be reconciled and that the typing techniques can be perfected to enable better epidemiological analysis of tuberculosis transmission in Ethiopia.

Deribew *et al.* (5) found that tuberculous lymphadenitis in rural Ethiopia with low HIV prevalence was due to *M. tuberculosis* rather than *M. bovis* and was non-significantly more common in females. All cases were HIV seronegative.

Wondimeneh *et al.* (19) found that total lymphocyte count is not a satisfactory surrogate for CD4 cells counts because it would miss nearly a quarter of cases with low CD4 counts and thus the patients would not receive necessary antiretroviral treatment. This finding supports previous findings in the literature that the total lymphocyte count tends not to change because of compensatory increases in the CD8+ T lymphocyte population.

Although there seems to be a reduction in recent years in the number of basic science references in the bibliography, there are also a number of publications cited in other sections that have used basic science techniques that are more readily translated into informatics and treatment uses. Examples of these include studies on lipidemia and liver injury after anti-HIV treatment (e.g., Tadewos *et al.* and Yimer G. *et al.*) and also molecular typing of mycobacterial isolates (Garedew *et al.*) as well as studies to determine reference CD4 and CD8 values (Abera *et al.*). In previous years, such studies most likely would have been found in this section because they could not be readily adopted in public health and clinical practice. It is encouraging that work can now be moved more rapidly from bench to bedside.

1. Abegaz WE (2012) Genomic characterization of HIV-1 isolates from Ethiopian patients: Baseline studies on antiretroviral drug resistance and sub-type variations [PhD Thesis]: Addis Ababa University.
2. Addis Y (2012) Comparison of tuberculosis skin test (TST) and Quantiferon-TB Gold for latent tuberculosis [MSc Thesis]: Addis Ababa University.
3. Dejene E (2012) Molecular characterization of *Mycobacterium tuberculosis* complex isolated from extra pulmonary tuberculosis patients and their animals in Fentale Agro-Pastoral District. [MSc Thesis]: Addis Ababa University.
4. Delatorre EO, Bello G (2012) Phylodynamics of HIV-1 subtype C epidemic in East Africa. PLoS One 7: e41904.
5. Deribew A, Abebe G, Apers L, Abdissa A, Deribe F, Wolde Michael K, *et al.* (2012) Prevalence of pulmonary TB and spoligotype pattern of *Mycobacterium tuberculosis* among TB suspects in a rural community in Southwest Ethiopia. BMC Infect Dis 12: 54.
6. Girmachew F (2012) Isolation and Identification of nontuberculsis Mycobacteria from clinical specimens referred to national TB reference laboratory, Ethiopia [MSc thesis]: Addis Ababa University.
7. Habtewold A, Amogne W, Makonnen E, Yimer G, Nylen H, Riedel KD, *et al.* (2012) Pharmacogenetic and pharmacokinetic aspects of CYP3A induction by efavirenz in HIV patients. Pharmacogenomics Journal.
8. Hardwick RJ, Amogne W, Mugusi S, Yimer G, Ngaimisi E, Habte Wold A, *et al.* (2012) Beta-defensin genomic copy number is associated with HIV load and immune reconstitution in sub-Saharan Africans. J Infect Dis 206: 1012-1019.
9. Mekala AG (2012) In Vitro anti-microbial activity of selected medicinal plants against *Mycobacterium tuberculosis* and *Mycobacterium bovis* strain [MSc Thesis]: Addis Ababa University.
10. Mihret A, Bekele Y, Aytenew M, Assefa Y, Abebe M, Wassie L, *et al.* (2012) Modern lineages of *Mycobacterium tuberculosis* in Addis Ababa, Ethiopia: implications for the tuberculosis control programe. Afr Health Sci 12: 339-344.
11. Mihret A, Bekele Y, Bobosha K, Kidd M, Aseffa A, Howe R, *et al.* (2012) Plasma cytokines and chemokines differentiate between active disease and non-active tuberculosis infection. J Infect 66: 357-365.
12. Mihret A, Bekele Y, Loxton AG, Jordan AM, Yamuah L, Aseffa A, *et al.* (2012) Diversity of *Mycobacterium tuberculosis* Isolates from new pulmonary tuberculosis cases in Addis Ababa, Ethiopia. Tuberc Res Treat 2012: 892079.
13. Muleta KG (2012) Performance of LED microscopy in diagnosis of pulmonary tuberculosis in HIV positive individuals in Addis Ababa [MSc Thesis]: Addis Ababa University.

14. Sahle SN (2012) Performance evaluation of urine Determine TB Lipoarabinomannan Antigen (Determine TB LAM Ag) test for the diagnosis of pulmonary tuberculosis suspects with and without HIV co-infection in Addis Ababa, Ethiopia [MSc thesis]: Addis Ababa University.
15. Sahle SN (2012) Evaluation of the same day diagnosis of TB microscopy in comparison to the spot-morning-spot methods and knowledge attitude and practice of health personnel towards the use of the same day diagnosis of TB in selected health institutions in Addis Ababa, Ethiopia [MSc thesis]: Addis Ababa University.
16. Solomon S (2012) Comparative analysis of performance, feasibility and cost of PREVI Fluo TB by using LED microscopy in TB and in HIV-TB co-infected patients at St. Paul's General Specialized Hospital, Addis Ababa, Ethiopia [MSc Thesis]: Addis Ababa University.
17. Tessema TB (2012) Molecular characterization of *Mycobacterium tuberculosis* complex isolated from tuberculosis lymphadenitis cases at Dessie Private Hospital, South Wollo, Ethiopia [MSc Thesis]: Addis Ababa University.
18. Weldu Y (2012) Comparative evaluation of a two-reagent cold staining method with the Ziehl-Neelsen method for the diagnosis of pulmonary tuberculosis at Mekele University Hospital, Tigray, Ethiopia [MSc Thesis]: Addis Ababa University.
19. Wondimeneh Y, Ferede G, Yismaw G, Muluye D, Alem M, Asfaw F (2012) Total lymphocyte count as surrogate marker for CD4 cell count in HIV-infected individuals in Gondar University Hospital, Northwest Ethiopia. AIDS Res Ther 9: 21.
20. Worku MG (2012) Drug susceptibility pattern and genotypic diversity of *Mycobacterium tuberculosis* isolate collected from community-based survey in Ethiopia [MSc Thesis]: Addis Ababa University.

Section 2. Epidemiological, Behavioral, Socio-economic and Cultural Research

This section includes studies on the epidemiology of HIV and other opportunistic infections, AIDS and related diseases, and risk and protective behaviors. It also covers research on the biological, psychosocial, socioeconomic, cultural, structural, and other contextual determinants of HIV transmission and prevention.

In this eleventh update we will start this section with a brief review of the HIV epidemic in Ethiopia as a testimony to Ethiopia's commitment to prevent its spread and ameliorate it and as background to the research published in 2012. According to the Country Progress Report on HIV/AIDS, 2012 by the HIV/AIDS Prevention and Control Office (HAPCO), an estimated 790,000 persons were infected with HIV in 2011, with an adult prevalence in 15-49 year olds of 1.4%, and 950,000 orphans were of parents who had died of AIDS. As a result of the rapid up-scaling of the antiretroviral treatment (ART) program, nearly 60% of PLHIV with CD4 counts below 350 received ART in 2011. Ethiopia is one of the few countries in Sub-Saharan Africa that achieved more than a 25% decline in new HIV infections, as revealed by a decline of new infections among ANC attendees from 5.6% in 2005 to 3.5% in 2007 and 2.6% in 2011 (HAPCO 2012, reference no. 26 in the Prevention Research section). A review of Private Health Sector Health data revealed similar declines in HIV rates among high-risk women (divorced, separated, widowed and/or engaged in transactional sex), from 7.7% in 2005 to 4.5% in 2010 (103). The number of women and men who were tested 12 months prior to the survey increased from 1.9% and 2.3% in 2005 to 20.0% and 20.7% in 2011, respectively (HAPCO 2012, reference no. 26 in the Prevention Research section). Increased knowledge and behavioral change also contributed to the decline in HIV infection rates. The percentage of men and women who said that HIV can be prevented by using condoms increased from 35.6% and 17.1% in 2000 to 81.5% and 55.9% in 2011, respectively, and the proportion of men and women who stated that a healthy looking person can be HIV-infected increased by 37.2% and 54.7%, respectively. The highest infection and the lowest knowledge/behavioral levels were reported from rural areas, less educated, and poorer and older persons, and the less developed regions of Somali and Afar (39; Ethiopian Demographic and Health Survey 2001 (not listed). These findings corroborate and update those reported by the Behavioral Surveillance Surveys (BSS) of 2002 and 2005.

In spite of these encouraging achievements, a number of major challenges persist. While the incidence of new infection is declining, it may be increasing in some most-at-risk population groups (MARPs), particularly people who inject drugs and men who have sex with men (MSM), in those who are currently not covered by the HIV/AIDS program; utilization of PMTCT remains low; and new population groups at high risk (such as young girls, domestic workers, laborers and waitresses engaging in transactional sex) are emerging (HAPCO 2012, reference no. 26 in the Prevention Research section). All these and additional MARPs, including government employees, female sex workers and transient populations residing temporarily in towns (businessmen, long-distance truck drivers, migrant workers and cross-border populations) and secondary school and college girls engaging in intergenerational sex for money and gifts) are concentrated in towns, at large infrastructure development (road construction and hydroelectric) sites (45, HAPCO 2012, reference no. 26 in the Prevention Research section). Little is known about the risk behavior of these various groups and their sexual networks. In addition to reducing HIV transmission in the general population by 50% by 2015, HAPCO set the targets of eliminating mother-to-child transmission of HIV by 2015 and reducing HIV transmission by 50% among people who inject drugs, carrying out a national survey of MSM in 2012, increase the number of PLHIV on ART to 15 million by 2015 and reduce tuberculosis deaths in PLHIV

by 50% (HAPCO 2012 reference no. 26 in Prevention Research section).

This section contains 119 references and is relatively shorter than the earlier updates, due to the placement of references with an intervention component in the Prevention Research, Treatment, Care and Clinical Research and Health Services and Public Policy Research sections and because of the relative increase of the Treatment, Care and Clinical Research and Health Informatics, Policy and Evaluation sections. We made this change in an attempt to streamline the various sections towards increasing the accessibility of references to researchers working on different HIV/AIDS interventions. The most frequently researched issues vary somewhat from those in the last update. They were on a) prevalence, distribution and risk factors of HIV, TB, hepatitis, intestinal helminthes, and other co-infections (1–4, 6, 7, 9, 11, 14, 16, 20, 22, 23, 28, 30, 31, 35, 40, 47, 49-51, 56, 60, 61, 63, 66, 77, 82, 85, 92–96, 105, 106, 109, 113-119,), including three studies of drug-resistant TB (76, 89, 90); b) socioeconomic, cultural, psychological, occupational, and structural factors of HIV-related risk (10, 19, 23, 33, 37, 38, 60, 74, 83, 98, 102); c) KAP studies of HIV/AIDS, STIs and TB (13, 17,18, 44, 54, 55, 67, 80), including an assessment of changes in awareness of HIV/AIDS in Ethiopia after 3 decades of interventions (71); d) fertility desire and family planning of PLHIV, some of them on ART (42, 65, 86, 108, 111) and e) substance abuse involving alcohol and khat (*Catha edulis*) and HIV risk (20, 29, 34, 46, 75, 97). Most of these topics have been treated in earlier updates.

Whereas the infection rates and behavioral parameters of five most-at-risk populations (MARPs), namely commercial sex workers, men in uniformed services, long-distance truck drivers, out-of-school youth, mobile workers and refugees and other cross-border populations have been widely covered in the literature, little is known about four emerging MARPs: young women engaging in sex with older men in exchange for money and gifts, female domestic workers, daily laborers and waitresses. Deribew (45) reported HIV infections in migrant laborers working at the Gilgel Gibe Hydroelectric Plant indicating, together with earlier reports of HIV infections in migrating labor populations, the need for HIV monitoring both migrant labor and indigenous populations at large infrastructure projects. An additional two MARPs for whom information is urgently needed are people who inject drugs and men who have sex with men (MSM) because of their potentially high transmission potential. Both these groups are the focus of a study by HAPCO, the results of which are scheduled to be published in 2013 (reference no. 26 in the Prevention Research section). Another study (87) found an HIV prevalence of 2.5% among students of Dire Dawa University and implied that university students might also constitute an emerging MARP.

Six studies shed new light on the impact of HIV-related stigma, which continues to prevent many people from being tested and treated and causes much suffering and discrimination against people living with and those affected by HIV/AIDS. The most extensive study on stigma carried out in Ethiopia involved a national representative sample of 3,360 PLWHA, and published by the Network of Networks of HIV Positives (16) and reported elsewhere (32). Focus group discussions and questionnaire results showed that self-blame for being HIV positive, low self esteem, withdrawal from family and friends, loss of personal freedom, impacts on physical and emotional health, burden on family and children, losing friends and displacement were the most commonly reported forms and impacts of self stigma. Gossip, systematic avoidance, boycotting the goods and services of PLHIV, dismissal from work, demotion, denial of promotion, increase in house rent, eviction and denial of dental care were allegedly the most common forms of external stigma. Nearly 40% of the respondents had lost their job or income and 24% had been refused employment because of their HIV status within the year prior to the survey. In regard to HIV testing, most PLHIV, both in urban and rural areas, reported that they decided to be tested on the recommendation of health professionals based on clinical check-ups. Stigma prevented most study members to disclose their HIV status to their children, community leaders, religious leaders, work colleagues, friends, and neighbors (16). In another survey 561 adults from 250 randomly selected households in the town of Arba Minch and surrounding villages, 80% of respondents agreed with ≥ 1 negative statements indicating blame or shame towards PLWHA and 41% agreed with ≥ 1 negative statements associated with distancing themselves from PLWHA. Stigmatizing attitudes were associated with being female, living in a rural village, and knowledge gaps about HIV transmission, prevention, and treatment. The authors recommended stigma reduction programs that address knowledge gaps as well as promoting community norms of compassion for PLWHA. Three studies examined a hitherto neglected aspect of stigma and discrimination, namely the marginalization and exclusion of PLHIV from pastoral care and by their faith communities. In one of the studies, 23% of PLHIV and 9% of those affected reportedly experienced discrimination from their faith communities (12). The other study, comparing experiences of PLHIV in towns in Ethiopia (Adigrat), Kenya (Mombasa) and Zambia (Ibenga), found one-third of the 2,863 HIV-infected respondents to be allegedly discriminated against, more than twice as many of them females than males (70). Although a 12-month plan of action to reduce stigma was initiated in each of these communities, the prevailing high levels of stigma among faith leaders, which impeded some surveys in Zambia (48), point out the need for researchers to develop appropriate approaches to study this important issue.

Disclosure of HIV status is an increasingly important HIV prevention strategy for a number of reasons,

including its potential contribution to reduction of HIV transmission risks to sexual partners and increased opportunities for the HIV infected individuals to access care, treatment, prevention, and social support services. As a result, partner services have become a critical component of HIV prevention programs. Four studies addressed issues surrounding disclosure of HIV status (5, 25, 52, 57). In two studies that reported level of disclosure, between 81-86% of HIV positive survey participants indicated that they had already disclosed their HIV status to their primary sexual partners (25, 57). These studies also identified fear of abandonment, break-up in relationship and stigma as barriers to disclosure. Being on ART or in care and receiving follow-up counseling and support were among the factors that facilitated disclosure (52, 57). The fourth study (5) involved 172 parents or caregivers of HIV-infected school-age children who were being treated in a hospital in Addis Ababa. The researchers found that only 16.3% of HIV-infected schoolchildren knew their diagnosis. While older age was associated with disclosure, the caregivers' fear of negative consequences on the children was associated with non-disclosure, the researchers recommended that caregivers need to be provided with the necessary knowledge and skills on how to look after children who know their HIV status. These studies underscore the need for further research on levels and determinants of disclosure of HIV status and effective strategies to facilitate early and safe disclosure of HIV status to sexual partners, to children living with the virus, and to caregivers, family members, and other social network members.

Another four studies examined various aspects of HIV testing and the experiences and intentions of discordant and homologous couples. Two studies of refusal of provider initiated counseling and testing services have conceptual and operational merit. In one study in 4 health facilities in Jimma Town, slightly more than half of 296 clients of PICT refused testing due to a combination of misconceptions and misunderstandings, which may be remedied through enhanced self-efficacy and provider encouragements (79). In 4 health facilities in Gambela Region, 25.0% of ANC clients refused HIV testing mainly because of cultural norms restricting free female use to health services in an indigenous ethnic group (53). Other studies have shown that in addition to information and education provided during pre-test sessions, HIV/AIDS services need to be contextualized in different cultural communities to ensure acceptability and sustainability of services. Temam (107) reported HIV rates among discordant couples**.** A study of the experiences of heterosexual discordant couples using grounded theory elucidated their struggle to conceptualize their illness, accept the diagnosis and manage their illness (110). The use of grounded theory, which is widely used in the social sciences, may assist in disentangling the complex web of challenges faced by discordant couples**.** Bonnenfant *et al*. (36) studied the relationship between HIV test results and fertility intentions of VCT couples, which may provide useful information for client counseling.

In this section, three studies (15, 68, 73) addressing issues surrounding abortion are included, in part because abortion implies unprotected sex, potential exposure to HIV through illicit or unhygienic practices, and significant reproductive and social risks to young girls and women. Each of the studies examined the experiences and beliefs of women and health service providers regarding abortion since the 2005 liberalization of abortion laws in Ethiopia. Amare (15) presented findings from a pilot program that provided comprehensive abortion care to 5,000 women in Tigray. The participants of the study found the service provided to them as highly satisfactory, and the authors concluded that such programs are more likely to reduce abortion-related morbidity and mortality. Another study examined the attitudes and the engagement of obstetricians, gynecologists and policy makers in the abortion law reform process (68). The third study examined young unmarried Ethiopian women's narratives of abortion decision-making with the aim of identifying local, historical and cultural factors associated with the dilemmas of and cultural resources for abortion decision-making. Access to safe, acceptable, and legal abortion services will continue to be a significant reproductive healthcare need for young girls and women in Ethiopia. Further research on the interface between abortion service needs, fertility desires, and HIV transmission risk among people living with HIV/AIDS is warranted.

Two studies examined biomedical aspects of HIV/AIDS epidemiology. In a PhD thesis, Meseret (88) evaluated the role of virologic, immunological and other host factors in resistance to HIV infection, which may serve as a model for studies in different population groups with and without ART experience. Abera *et al*. (6) presented immunological and hematological reference values for a population of healthy, HIV-negative adults in Bahir Dar Town.

The remaining publications in this section address issues surrounding validation of the verbal autopsy method for people who died of AIDS (91), communication about HIV/AIDS and reproductive health between youth, parents, peers and teachers (58), and harmful traditional practices in HIV vulnerability (84) (all three issues were addressed in earlier updates), and the association between people's living arrangements and their sexual behaviors in various countries in addition to Ethiopia and socioeconomic settings (112). The latter study may inform health educators and housing authorities planning healthy and safe housing environments. The persisting socio-economic problems facing Ethiopia, including food insecurity, climate change, migration, and poverty, and their potential impacts on health status of its population in general and people living with HIV/AIDS are discussed in several papers (64, 72, 101, 102). Bendavid *et al.* (26) showed a direct relationship between HIV

development assistance and the decline of all-cause adult mortality in PEPFAR focus countries, including Ethiopia. Berhan and Berhan (27) reviewed the literature of the impact of ART on sexual behavior in sub-Saharan Africa, an issue addressed in the Ethiopian context in the Treatment, Care and Clinical Research section. Cherie and Berhane (40) reported on the prevalence of anal sex among high school students, a practice that carries high HIV transmission risk and should thus be highlighted in health promotion programs. A master's thesis examined maternal viral load, CD4 counts and time of HIV transmission (21), all important factors in MTCT.

1. Abajobir AA (2012) Determinants of risky sexual behaviors and unmet reproductive health needs among technical and vocational college students in East Gojam Zone, Amhara Regional State [MPH Thesis]: Addis Ababa University.
2. Abdissa S (2012) Prevalence of endometrial TB and molecular characterization of isolates among patients undergoing endometrial biospsy at Tikur Anbessa Hospital [MSc Thesis]: Addis Ababa University.
3. Abebe DD (2012) Prevalence of *Mycobacterium tuberculosis* infection among selected community controls and household contacts of pulmonary tuberculosis cases in Addis Ababa [MSc Thesis]: Addis Ababa University.
4. Abebe G, Deribew A, Apers L, Abdissa A, Deribie F, Wolde Michael K, *et al*. (2012) Tuberculosis lymphadenitis in Southwest Ethiopia: a community based cross-sectional study. BMC Public Health 12: 504.
5. Abebe W, Teferra S (2012) Disclosure of diagnosis by parents and caregivers to children infected with HIV: prevalence associated factors and perceived barriers in Addis Ababa, Ethiopia. AIDS Care 24: 1097-1102.
6. Abera B, Alem A, Cherent A, Kibret M (2012) Immunological and hematological reference values for apparently healthy HIV-negative adults in Bahir Dar Town, Ethiopia. Ethiop J Health Develop 26: 152-159.
7. Abera S, Dukessa T, Abebe G. Intestinal helmenthiasis and tuberculosis co-infection among tuberculosis suspects visiting Jimma University Hospital; 2012 48th Annual Conference of the Ethiopian Medical Association. February 22-24, 2012; Addis Ababa. Abstract no. 4.
8. Abera SF (2012) Incidence and risk factors for tuberculosis among adult patients living with HIV/AIDS in Mekele Hospital, Mekele, Tigray, Ethiopia [MSc Thesis]: Mekele University.
9. Abose AA (2012) Prevalence of nosocomial infection and associated factors [MPH Thesis]: Addis Ababa University.
10. Abostetugn AE (2012) Assessment of risky sexual behavior, risk factors associated with It and parents communication of It among young in Dilla Town, SNNPR, southern Ethiopia [MPH Thesis]: Addis Ababa University.
11. Addis K (2012) Incidence and predictors of tuberculosis among adult people living with HIV at University of Gondar Referral Hospital [MPH thesis]: Gondar University.
12. Ademe Asres Y, Degefu Y, Hows J, Kaybryn J, Jones HS. What people living with and affected by HIV want from their faith leaders: reflections and data on stigma experienced by faith communities in Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract THPE458.
13. Alemie GA (2012) Exploration of healthcare workers' perceptions on occupational risk of HIV transmission at the University of Gondar Hospital, Northwest Ethiopia. BMC Res Notes 5: 704.
14. Ali J. Viral hepatitis co-infection in newly diagnosed HIV-1 recent and long standing infections among VCT attendees, Addis Ababa, Ethiopia.; 2011. 22nd Annual Conference of the Ethiopian Public Health Association. October 31st – November 3rd, 2011. April 2012; Addis Ababa. Abstract no. 8.2.1.
15. Amare R. Comprehensive abortion care (CAC): An investigation of women's acceptance and satisfaction with a pilot CAC program in Tigray, Ethiopia 2012. 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. pp. Abstract no. 256040 .
16. Anonymous (2011) Network of networks of HIV positives in Ethiopia. The People Living with HIV Stigma Index: Ethiopia. Addis Ababa, Networks of Networks of HIV Positives in Ethiopia. Private Sector Program-Ethiopia. Addis Ababa.
17. Asgedom KY (2012) Assessment of knowledge, attitude and practices of communities towards tuberculosis in Arsi Zone, southwestern Ethiopia [MSc Thesis]: Addis Ababa University.
18. Asgedom KY (2012) A community based study on KAP of HIV/AIDS in Jijiga Town, Somali Region, Ethiopia [MSc Thesis]: Addis Ababa University.
19. Assefa K (2012) Prevalence and associated factors of multiple sexual partners and condom use among traditional gold miners in Bero Wereda, Bench Zone [MPH thesis]: Gondar University.
20. Ayenew F, Tadesse T, Azale T (2012) Alcohol and khat use as risk factors for HIV infection among visitors to voluntary counselling and testing centres in Northwest Ethiopia. Trop Doct 42: 99-100.
21. Bati MG (2012) A study on maternal viral load, CD4 cell counts and time of mother to child transmission of HIV-1 at Adama and Assela hospitals [MSc Thesis]: Addis Ababa University.
22. Baye BA (2012) Assessment of premarital sexual practice and factors affecting it among freshman and senior students in Ambo University [MPH Thesis]: Addis Ababa University.
23. Bekalu MA, Eggermont S. Urban-rural comparative findings on HIV/AIDS-related behaviours and behavioural determinants among sub-Saharan Africans: a descriptive review and synthesis of the evidence so far; 2012; AIDS 2012, XIX International

AIDS Conference. Washington, D.C. Abstract TUPE446.
24. Belay B. Assessment of nutritional status and associated factors among adults living with HIV/AIDS in Addis Ababa; 2011. 22nd Annual Conference of the Ethiopian Public Health Association. October 31st – November 3rd, 2011. April 2012; Addis Ababa. Abstract no. 8.3.1.
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115. Wondimeneh Y, Muluye D, Belyhun Y (2012) Prevalence of pulmonary tuberculosis and immunological profile of HIV co-infected patients in Northwest Ethiopia. BMC Res Notes 5: 331.
116. Yami A, Deribew A, Mesfin N, Colebunders R, Van Geertruyden JP, Woldie M, *et al.* Predictors of mortality among tuberculosis and human immunodeficiency virus co-infected persons in South-West Ethiopia: A case control study ; 2012. 48th Annual Conference of the Ethiopian Medical Association. February 22-24, 2012; Addis Ababa. Abstract no. 10.
117. Yitayew B (2012) Oral Candida carriage among HIV infected and non-infected individuals in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia [MSc thesis]: Addis Ababa University.
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Section 3. Impacts Research

This section includes studies on the characteristics and course of HIV infection and opportunistic infections, treatment to AIDS and opportunistic infections, effects and outcomes associated with treatment, clinical non-clinical care and supportive services to people living with HIV/AIDS.

This is again the smallest section after Diaspora Research, but it must be noted that HIV/AIDS impacts on health and various socioeconomic parameters are also described in many studies included in the other sections. Whereas social and economic impacts of HIV/AIDS have received considerable attention by researchers, mental impacts have been largely neglected. Bezabih (4) found that 59% of the PLHIV they studied decided not to have any more children, 40% not to have sex and 37% not to get married, with significantly higher rates among females than males, and around 12% each terminated their education, training and employment because of their HIV status. Similarly disturbing is Bezabih's finding that one in 5 PLHIV studied felt suicidal. A study pointing out the persistence of widespread commercial sex work notes that the rights and safety of adult sex workers and minors are often compromised in the context of the broader legal framework (7). The authors' suggestion that structural interventions such as micro economic initiatives designed to rehabilitate commercial sex workers have largely failed needs to be scrutinized in further studies in the search for viable interventions. Green *et al.* (6) examine measures of self stigma and optimism about the future towards a better understanding

of the impacts of economic strengthening on households. The authors call for quantitative research that can define indicators for livelihood vulnerability and resilience for HIV-affected households. The issues addressed by the remaining studies, including challenges faced by sensory disabled women (1), coping strategies to meet livelihood needs (3, 5) and the incidence and correlates of low birth weight (8) have been reported in earlier publications.

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3. Bezabih T. HIV/AIDS and food consumption and asset disposal related coping strategies in rural Ethiopia: results from household survey in four regions; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract THPE335.
4. Bezabih T. Internal stigma among HIV-positive adults in Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract WEAD0504.
5. Eshete A, Zwedu S, Sherefedin B, Mekonen T, Tibesso G, Ruff A, *et al.* Impact of mentoring and coaching on laboratory quality management systems development: the case of Addis Ababa Health Research Laboratory, Ethiopia; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE718.
6. Green C, Weeks K, Teferi T, Lipsky A, Salerno R. Measuring livelihoods vulnerability among HIV affected households: moving past income and hunger to include measures of self-stigma and optimism about the future as benefits of economic strengthening (ES) and indicators of resilience: lessons learned from; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE417.
7. Overs C, Alemayehu B. The impact of law on the health and human rights of female sex workers in three sites in Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract WEPE556.
8. Zeleke BM, Zelalem M, Mohammed N (2012) Incidence and correlates of low birth weight at a referral hospital in Northwest Ethiopia. Pan Afr Med J 12: 4.

Section 4. Health Services and Health Policy Research

This section includes reports on research and programmatic activities that are aimed at expanding and improving the healthcare system, including such issues as expansion of services for people living with HIV/AIDS, health resource economics and management, healthcare staff training, and national as well as international policies, laws, and guidelines for the provision of services and the protection of people living with HIV/AIDS, women, children, and other vulnerable groups.

In the current update, 39 studies are included in this section, 23.5% lower than those included in the 2011 update. The majority of the studies are articles published in peer-reviewed journals (15) and abstracts presented at the AIDS 2012, XIX International AIDS Conference in Washington, DC (13). In addition, there were: abstracts presented at the 140th Conference of the American Public Health Association (5) and at the 48th Annual Conference of the Ethiopian Medical Association (1); one PhD dissertation, one MSc and one MPH thesis at AAU and another MPH thesis at Hawassa University. There was also a report by Pathfinder International.

Decentralization of HIV/AIDs related care to the level of health centers and health posts is the theme of a number of studies in this category (8, 21, 25, 32, 37). Assefa *et al.* (8) show the effectiveness and acceptability of delivery of antiretroviral treatment in health centers through task shifting to health officers and nurses, while Hassen (21) has assessed the effectiveness of prevention of mother to child transmission of HIV in health institutions in Addis Ababa. Similarly, Tollera *et al.* (37) describe how a hospital in South West Shoa Zone mentoring support to health centers in its catchment area as a sustainable approach to strengthening the continuity of HIV care and treatment services. Medhanyie *et al.* (25) show the contribution of health extension works in the expansion of access to HIV counselling and testing in Ethiopia.

Within the perspective of health systems strengthening, Asres *et al.* (7) have made structural assessment of primary health care facilities in five regions, while Kebede *et al*. (23) conducted conducted a pre-post study of 24 hospitals that are managed by Chief Executive Officers trained in a new Masters of Health Administration Program to assess the contributions of a systems-based approach implemented in the Ethiopian Hospital Management Initiative (EHMI).

Another group of studies in this section have dealt with issues of quality and decentralization of laboratory services for HIV/AIDS services (2, 5, 10, 14, 17, 24, 30). In a panel discussion, Castle and Messele (10) discuss how the American Society for Clinical Pathology (ASCP) contributed to capacity building in the area of clinical laboratory in sub-Saharan Africa through staff training and enhancement of laboratory infrastructure. Alemayehu *et al.* (2) discuss the stepwise laboratory quality improvement process towards accreditation as a key strategy for rapid scale-up of total quality management and laboratory system strengthening where laboratories that implemented total quality management are shown to have achieved measurable and significant quality standards which is an essential domain of health systems strengthening. Similarly, Eshete *et al.* (14) by describing the experience of expanding and improving

the quality of laboratory services in 26 rural health centers in Gambella and Benishangul Gumuz regions of Ethiopia, demonstrate the possibility of fully decentralizing and integrating laboratory services to remote areas, while Manyazewal *et al.* (24) discuss the the role of secondary level laboratories in strengthening quality at primary level health facilities' laboratories. On the other hand, Nicole Angoti (5) argues interventions such as HIV testing that are developed in the western context would be unlikely to have their intended effects in sub-Saharan Africa unless the norms are institutionalized within the contexts of the less developed countries, while Fonjungo *et al.* (17) emphasize the need for strong country leadership and commitment in terms of equipment management and maintenance for assuring the sustained implementation of laboratory services in sub-Saharan Africa. Furthermore, Mindaye and Taye (29) show that the overall satisfaction level of clients with ART monitoring laboratory services to be low in Addis Ababa because of the lack of accessibility and availability of latrines, low ability of phlebotomists to answer questions raised by clients and non-comfortable chairs in blood drawing rooms.

Leveraging HIV programs to support diabetes services in Ethiopia is a study by Rabkin *et al.* (31) that suggests the health systems strengthening approach to deal with the emerging issues of non-communicable diseases in developing countries by indicating the potential to rapidly improve the quality of care and treatment of diabetes mellitus through adapting HIV-specific policies, systems and tools. On the other hand, Hailemariam (20) has looked at the contribution of the private health sector to all forms of TB case detection in Ethiopia through the analysis of a five-years retrospective data.

A few studies in this section have looked at the cost and financing of HIV/AIDS care and treatment (3, 27, 28, 33). Ali *et al.* (3) undertook cost analyses and projections for PEPFAR resources required to continue supporting the national ART program in Ethiopia under various scenarios from FY2011 through FY2015 and show that, even though faster rate of scale-up requires markedly increased resources for expanding capacity to accommodate a large number of patients at the initial phase, annual costs will drop sharply in subsequent years below the slower rate of scale-up for universal access. Similarly, in a study that looked at the determinants of HIV treatment costs in resource limited settings that included Ethiopia, Menzies *et al.* (27, 28) predict substantial reductions in pre-patent service delivery costs as ART sites mature and patient cohorts increase in size. On the other hand, Ryan *et al.* (32) discuss the limitations in allocation of HIV funding and resources targeting MSM especially in countries where these group tend to be criminalized.

The role of community participation and linkage as well as self-help groups in HIV/AIDS programs has been a topic of few of the studies (12, 22, 35, 38, 39). Using the results of a qualitative study, Curry *et al.* (12) show that community perspectives provide critical insights to defining, implementing and sustaining partnerships with respect to roles and responsibilities for strengthening primary health care in rural Ethiopia, while Tesema *et al.* (35) discuss how a pilot model that linked PMTCT services at clinics with health extenstion workers, community support grops and community resources improve service coverage and reduce drop out rates. Wagner (39), using the case of the World Vision's community based care and support programming indicates the importance of vertical linking to government structures as one of the key factors for sustainability of community based organizations. Furthermore, Kaysay *et al.* (22) describe how the use of a self help groups to enable families living with HIV to support each other in Ethiopia, while Wada (38) discusses the role of community participation in improving tuberculossis control programs.

Two studies (9, 31) have also looked at the role of health extension workers in health services including HIV/AIDS care. Carnell *et al.* (9) examined the role of volunteer community health promoters trained as role models to extend the reach of Health Extension Workers to significantly boost the achievements of the Health Extension Program in several key child health indicators, while Nigussie *et al.* (30) assessed the knowledge and practice of health extension workers on clean and safe delivery,Oromia, Ethiopia

Assessment of health hazards and safety concerns of health professionals associated with occupational set-up was done by Mengesha and Desalegn (26), while Mindaye (29) did a study to assess the status of HIV/AIDS workplace policy implementation through a case study of three organizations in Addis Ababa. On the other hand, issues of stigma and discrimination against PLHIV among health care providers were the topics looked at by Feyissa and his colleagues (15, 16), while Andualem *et al.* (4) examined the medical waste management practices in selected health facilities and revealed gaps in waste management as considerable numbers of health centers and hospitals, including weakness in the practice of sharps management.

In terms of drugs, a study by Daniel and colleagues (13) assessed the supply chains for pharmaceutical and medical commodities for malaria, TB and HIV, while Tadeg *et al.* (33) documented the situation of substandard and counterfeit antimicrobials in developing countries.
Bringing youth friendly services to scale in Ethiopia and the situation of sexual health services among adolescents and high school students in Addis Ababa are topics that have been looked at by Asnake *et al.* (6), Cherie (11) as well as (Gatta) and Thupayagale-Tshweneagae (18), while Gibbs *et al.* (19) suggest that overall women and girls as well as their strategic interests are poorly included in National Strategic Plans for HIV/AIDS in southern and eastern Africa.

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11. Cherie A (2012) Sexual behavior and barriers to seeking sexual health services among high school students in Addis Ababa: Implication for prevention of HIV/AIDS and other STIs [PhD Thesis]: Addis Ababa University.
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Section 5. Prevention Research

This section includes reports on research and programmatic activities that are aimed at provision of prevention services targeted against HIV/AIDS and related opportunistic infections. Included in this section are studies on information and behavioral change communication, provision of voluntary testing and counseling and mother-to-child transmission prevention services, community mobilization, and other efforts against HIV/AIDS.

Fifty-five references are listed in this section, 35 less than in the 2011 update. Major reductions occurred in 2 areas of prevention, namely counseling and testing and health education and health promotion. On the other hand, a number of issues neglected or inadequately covered in earlier updates were studied for the first time. Two studies examined the integration of HIV/AIDS services with other services or programs. Integration of HIV/AIDS care and support activities with community-based malaria programs in 15 *woredas* in Oromia Region increased health care seeking from 28% to 58%, resulted in earlier referrals by volunteers to health extension workers and thus the severity and complications of both diseases, and rendered the project cost-effective and efficient (4). A retrospective review of health center records for 18,645 pregnant women revealed that 43% of them received services through back-up services at the health post level, including PMTCT and maternal, newborn and child health services, resulting in expansion of these important services for pregnant women (8). Similarly, Enque Selasie (16) reported a high degree of willingness to use home –based counseling and testing, a

promising approach to increase VCT service utilization, knowledge about HIV/AIDS and reduce stigma and discrimination. Home-based counseling and testing thus promises to further accelerate the expansion of the prevention program, which achieved an increase in the number of people tested for HIV nation-wide from 40,000 in 2005 to nearly 10 million in 2011 (26). Adnew *et al.* (3) evaluated a promising cervical cancer prevention service consisting of visual inspection and acetic acid wash of the cervix and same-day cryotherapy for women with premalignant lesions. The single-visit service, provided in HIV and AIDS care and treatment units to women aged 30-45 years, was well accepted by HIV-positive women in five hospitals in Addis Ababa and four regions. This simple, cost-effective and time-efficient prevention strategy, which can be used by non-physicians and was successfully introduced also in Nigeria and Zambia, promises to increase the coverage of middle aged women in the population but needs to be tried in health centers to increase its accessibility in rural areas. Nigussie (36) assessed knowledge surrounding cervical preventive screening among females living with HIV.

Several studies contribute to a better understanding of persisting challenges in reducing PMTCT of HIV. One of the few detailed studies of PMTCT in Ethiopia found that whereas 88.5% of 400 mothers in one hospital and 5 health centers in Gondar Town knew about MTCT, only 58.4% knew that transmission is preventable by ARVs and a mere 18% considered abstinence from breast feeding to be preventive. The positive association between mothers' knowledge of attending antenatal services in hospitals and living in urban areas but negatively with their age and the positive association between knowledge of prevention and accessibility of health facilities and having a good understanding of HIV transmission indicates the need for accessible and well functioning health facilities with PMTCT services, especially in rural areas (31). High adherence of most lactating HIV-infected women to exclusive breast feeding in Addis Ababa, is in line with recommendations and guidelines by WHO, UNICEF and most African governments for settings where replacement feeding is not feasible and safe, feasible, acceptable, and sustainable, to lower the risk of intestinal infection and infant mortality commonly reported with mixed breast/alternative feeding practices (34). Muluye *et al.* (35) found 10.5% of infected mothers to practice the non-recommended mixed breast feeding method. Woldegiyorgis *et al.* (52), using the Three Bodies Model, identified inadequate counseling services, poor economic conditions and lack of support and follow-up as major challenges HIV-positive mothers face in choosing between breastfeeding and replacement feeding. A thesis (21) assessing sero-conversion of HIV-exposed, breast-feeding infants addressed important parameters of HIV transmission dynamics among post-natal mothers. Mukurem and Haidar (34) reported 78% adherence to exclusive breast feeding among HIV-positive mothers in selected health facilities in Addis Ababa, a practice now recommended by the Ministry of Health and WHO for the first six months of life in combination with ART, especially in households where replacement feeding is not feasible or safe. Another two studies dealt with infant feeding, one of them on knowledge and attitudes toward breast feeding (22) and one on the impact of infant feeding practices on MTCT (2). More research is needed on attitudes towards and practices of breast feeding, mixed feeding, the use of bottle milk and weaning in different socioeconomic and environmental settings and in the context of HIV/AIDS.

Four studies provide new information on how to increase HIV testing by couples and the benefits of joint testing. A review of 22 studies and a follow-up WHO guidelines meeting in Harare, Zimbabwe, assessed access to HIV testing and counseling for couples (CHTC) , which is still relatively uncommon (9). Important results included the finding that CHTC had no negative impact on the relationship between partners and that the provision of ART to HIV-infected partners of serodiscordant couples significantly decreased transmission to uninfected partners regardless of CD4 counts. The meeting repeated earlier calls for the expansion of couples HIV testing and counseling in different settings, including antenatal and family planning services, that partners of couples should access testing with counselor-supported mutual disclosure and that ART should be offered to HIV-infected partners (9). Dabi (13) provided new insights into the willingness of males to volunteer for HIV testing by studying the perception of ANC clients regarding males' attitudes toward testing and Oli Gebru (38) addressed the related issue of involvement of males in promoting HIV testing of pregnant women. Brewster-Lee (12) adapted a couples-based, skills building curriculum in areas of domestic and family affairs to PLHIV issues and evaluated it among predominantly HIV-infected people in four regions in Ethiopia. The beneficial effects of the program included significant improvements in the couples' relationships, particularly in communication and joint decision making about child care, finances and sexual negotiation, ART adherence, decreases in the prevalence of STIs and a sharp increase in the number of antenatal visits by males with pregnant partners (12). Several studies used primary and secondary prevention methods to evaluate the impact of interventions among most-at risk populations (MARPS). Wasie *et al.* (49) carried out the first study of the relationship between the use of oral emergency contraceptives on condom use in Ethiopia and found that students' belief in the effectiveness of oral contraceptives kept them from using condoms. Increasing availability of oral contraceptives and the widespread aversion to condom use by students point out the need for educating youth about reproductive health and family planning and HIV prevention. A study of HIV/AIDS education in a refugee camp in northern Kenya may have implications for Ethiopian schools with multicultural and multi-religious student bodies and teaching staff. Ochieng (37)

found that whereas Ethiopian and Somali Moslem girls remained quite and reserved in HIV/AIDS education activities for cultural reasons, the Christian Turkana and Sudanese boys and girls interacted more freely, thus learning faster. Similarly, Christian and Moslem teachers presented different and conflicting messages on similar topics**.** HAPCO (26) issued a HIV Prevention Package for MARPs and other vulnerable groups with the objective to guide implementing partners in designing and implementing HIV prevention programs using best practices. At the 19th International AIDS Conference in Washington DC, Prince Bahati *et al.* (39) presided over the Symposia Session Guidance on Community Engagement of MSM [men having sex with men] in Rights Constrained Settings, which may have applications in Ethiopia and other countries.

The remaining references are to studies addressing issues that had been presented in earlier updates. They include the use of community conversations in HIV prevention and control (46), income generation from gardening for PLHIV (45); HIV disclosure (42, 25, 33); attitudes of antenatal care clients toward HIV counseling and testing (18); VCT uptake among students (40), occupational exposure to and prevention of HIV at the workplace (28); developing HIV testing messages for urban and rural communities (10), PMTCT, implementation and utilization patterns (32, 44, 50), the development of HIV prevention programs at the workplace (14, 28) and adherence to isoniazid preventive therapy for HIV-positive patients (7). Particularly encouraging is the implementation of a well designed and proactive HIV prevention program by the Ministry of Water Resources (MWR) that includes an effective training, capacity building and mentoring program that benefits affiliated institutions as well (28). Examination of this successful program may reveal possibilities for similar interventions by other large-scale employers. Gashaw (19) described the status of HIV/AIDS education in preparatory schools in a district in Addis Ababa and Libassie (29) examined parental involvement and the sexual behavior of their adolescent children. Two studies assessed condom use by adult PLHIV (53,54). A reference to a study of rape management in the Democratic Republic of the Congo is included in this update because the integrated approached used, including police training, expedited examination, the set-up of two-way referral systems between health facilities and police stations, community sensitization and the engagement of support groups in stigma reduction (30) may have programmatic value also in other sub-Saharan countries, including Ethiopia.

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3. Adnew S, Salvador-Davila G, Blumenthal P, Shiferaw N, Ansel J, Sisay G, *et al.* Introducing cervical cancer prevention using visual inspection with acetic acid (VIA) and cryotherapy among HIV-positive women: new hope for Ethiopian women; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE674.
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5. Argaw R, Seyoum B, Egata G (2012) Influencing preventive behavior with regard to HIV/AIDS among the police force of Harar Region, Eastern Ethiopia. Ethiop J Health Dev 26: 3-8.
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10. Bekalu MA, Eggermont S. Framing HIV testing messages for urban and rural audiences: evidence from field experiment in northwest Ethiopia; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract THAD0301.
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12. Brewster-Lee D, Suba M. Effect of a values-based prevention curriculum on HIV-positive couples from four regions in Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract WEAD0305.

13. Dabi K (2012) Assessment of factors affecting willingness for HIV testing of male partners as perceived by pregnant women attending antenatal clinics in Addis Ababa health centers, Addis Ababa [MPH thesis]: Gondar University.
14. Djekoundade A, Zewdu M, Kebde G, Barbo C, Allen L. HIV/AIDS prevention in the flower plantation industry in Ethiopia; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE465.
15. Dunning D, Teitsworth E. Improving adolescent girls' sexual and reproductive health through global policy advocacy 2012. 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. Abstract no. 260297.
16. Enque Selasie F. Willingness to home-based HIV counseling and testing service among residents in Chagni town Administration and Guangua Woreda, West Amhara Region, Ethiopia; 2011. 22nd Annual Conference of the Ethiopian Public Health Association. October 31st – November 3rd, 2011. April 2012; Addis Ababa. Abstract no. 12.11.13.
17. Fabri M, Tesfaw TE. Psychosocial counselors: A community response to gender-based violence in Ethiopia 2012. 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. Abstract no. 259643.
18. Fikre T (2012) Assessment of Antenatal Care Clients Willingness for HIV Counselling and testing in Assela governmental Health Institutions, Ethiopia [MSc thesis]: Addis Ababa University.
19. Gashaw TT (2012) The status of HIV/AIDS education in preparatory schools of Gulele Sub-City, Addis Ababa [MA Thesis]: Addis Ababa University.
20. Gerdts C, Prata N, Holsten M, Gessessew A. Potential of integrating services: contraception and comprehensive abortion care in Tigray, Ethiopia 2012, 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. Abstract no. 259394.
21. Girma S (2012) Assessment of sero-conversion of HIV- exposed infants who continued breast feeding and its determinants in four hospitals in Addis Ababa [MPH thesis]: Gondar University.
22. Gizachew A (2012) Assessment of knowledge and attitude among women with unknown HIV status towards breastfeeding in the era of HIV/AIDS in Amhara region, West Gojam zone, Ethiopia [MSc thesis]: Addis Ababa University.
23. Guta T (2012) The knowledge and counseling practice of family planning service provider on intrauterine contraceptive device [MPH thesis]: Gondar University.
24. Haile B (2012) Essays in health and labor economics. Dissertation Abstracts International Section A: Humanities and Social Sciences 73: 2221.
25. Hailu A, Ali A (2012) Provider- initiated HIV testing and counseling, acceptance and disclosure of HIV status and factors related to them among outpatients in Debre Berhan Referral Hospital. Ethiop J Health Dev 26: 176-185.
26. HAPCO. (2011) HIV prevention package: MARPS and vulnerable groups. Addis Ababa: HAPCO.
27. Harlan SV, Sullivan T, Hailegiorgis SE, Wagnew S. Using existing social networks to improve knowledge exchange among family planning and reproductive health professionals in Ethiopia 2012. 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. Abstract no. 264529.
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29. Libassie W (2012) Parental involvement and sexual behavior among general secondary and preparatory school adolescents in Debre Markos Town [MA Thesis]: Addis Ababa University.
30. Loha M, Rezene M. Improving rape management services: leveraging HIV prevention programs in fragile contexts: the case of eastern Democratic Republic of Congo; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract PUB074.
31. Malaju MT, Alene GD (2012) Determinant factors of pregnant mothers' knowledge on mother to child transmission of HIV and its prevention in Gondar town, North West Ethiopia. BMC Pregnancy Childbirth 12: 73.
32. Merdassa BA (2012) Assessment of factors affecting utilization of PMTCT service and linkage to ART service among pregnant women in Addis Ababa [MPH Thesis]: Addis Ababa University.
33. Miheret A (2012) Magnitude, outcome and factors affecting HIV positive status disclosure to regular sexual partner among women attending ART clinics at health center of Addis Ababa [MPH thesis]: Gondar University.
34. Mukurem M, Haidar J (2012) Assessment of the prevalence and factors influencing adherence to exclusive breast feeding among HIV positive mothers in selected health institution of Addis Ababa, Ethiopia. Ethiopian Journal of Health Development 26: 169-175.
35. Muluye D, Woldeyohannes D, Gizachew M, Tiruneh M (2012) Infant feeding practice and associated factors of HIV positive mothers attending prevention of mother to child transmission and antiretroviral therapy clinics in Gondar Town health institutions, Northwest Ethiopia. BMC Public Health 12: 240.
36. Nigussie B (2012) Assessment of cervical preventive knowledge screening practice among women living with HIV/AIDS in Addis Ababa [MPH thesis]: Gondar University.
37. Ochieng RM. Gender and HIV/AIDS education in the multi-cultural context of schools at Kakuma Refugee Camp in Kenya; 2012 July 22-27, 2012;

AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract THAD0304.
38. Oli Gebru S, Mehrete Demkash S. Involvement of male for improving acceptance of HIV testing among pregnant women in selected areas of Ethiopia: systematic review; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract PUB033.
39. Prince Bahati, Cheikh Traore, Rhon Reynolds, Stefan Baral, Kent Klindera. Symposia Session: Respect, Protect, Fulfill: guidance on community engagement for men who have sex with men and HIV-related research in rights constrained settings scientific skills development; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOWS02.
40. Rewabe T, Destaw B, Admassu M, Abera B (2012) Assessment of factors associated with voluntary counseling and testing uptake among students in Bahir Dar University: a case control study. Ethiop J Health Dev 26: 16-21.
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43. Shukri T (2012) Factors associated with HIV counseling and testing service utilization among commercial sex workers who went through structured peer education program in eleven southeastern roadside towns [MPH thesis]: Gondar University.
44. Sufian R (2012) Assessment of utilization of PMTCT services among pregnant women attending antenatal care in Harar Town, Harari Regional State [MPH thesis]: Gondar University.
45. Tefera A, Salerno R. Micro-gardening as an effective technique to address the nutrition and income needs of urban poor affected by HIV/AIDS; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract LBPE56.
46. Terku YA (2012) HIV/AIDS community conversation program and its role in preventing and controlling the spread of HIV/AIDS in some selected kebeles of Adama Town [MA Thesis]: Addis Ababa University.
47. Teshome S, Walson J, Alemu S. Stakeholder perceptions of the role of the Ethiopian Orthodox Church in improving HIV/AIDS prevention, care and treatment 2012. 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. Abstract no. 264429.
48. Tsegaye AM (2012) Status of HIV counseling and testing service for intervention of PMTCT at selected PMTCT health institutions in Guraghe Zone, southern Ethiopia [MA Thesis]: Addis Ababa University.
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53. Yalew E, Zegeye DT, Meseret S (2012) Patterns of condom use and associated factors among adult HIV positive clients in North Western Ethiopia: a comparative cross sectional study. BMC Public Health 12: 308.
54. Yimer K (2012) Condom acceptance among HIV-positive patients in reproductive age group in Addis Ababa [MPH thesis]: Gondar University.
55. Zewde TT. Factors affecting acceptance of HIV testing among antenatal care attendees in Ethiopia: With emphasis on the role of male partners 2012. 140th Conference of the American Public Health Association. Nov. 2-6, 2012; San Francisco, CA. Abstract no. 264379.

Section 6. Treatment, Care, Clinical Research

This section includes studies on the characteristics and clinical course of HIV infection and opportunistic infections, treatment to AIDS and opportunistic infections, effects and outcomes associated with treatment, clinical and non-clinical care and supportive services provided to people living with HIV/AIDS.

With 138 references, this section is, for the first time, the largest one in this update.

The great majority of studies dealt with ART outcomes, particularly survival/mortality and specific health outcomes of HIV patients on ART (3, 6, 7, 19, 28, 30, 35, 41, 42, 45-47, 54, 61, 62, 65, 69, 75, 80, 85, 97, 114, 129) and outcomes of tuberculosis treatment and combined ART/tuberculosis treatment (34, 38, 41, 63, 74, 79, 41, 63,74, 79, 84, 86, 96, 110, 119 136). Araya *et al.* (25) determined that population-level AIDS-related deaths can be reliably diagnosed by physician verbal autopsy reviewers. Shore (111) identified predictors of pre-ART mortality and 2 studies Eniyew (58) and Feleke (60) examined ART-associated metabolic abnormalities, the latter reporting increasing prevalence of lipodystrophy with length of ART. A retrospective study revealed that the main reason for modifying the first HAART regimen of HIV/AIDS patients was toxicity, followed by comorbidity, pregnancy and treatment

failure (128). Berhane *et al.* (39) associated relatively high rates of metabolic syndrome and lipodistrophy with ART of more than 12 months duration. Adem *et al.* (10) examined the problem of ART failure detection. A retrospective cohort analysis of the outcome of ART services in 25 health centers staffed by health officers and nurses and 30 hospitals staffed by physicians found similar retention and mortality rates in both types of facilities. A retrospective study of HIV-positive adults on ART for 3-96 months found that patients who started ART with low body mass index, severe immunosuppression and clinical stage III/IV illness had poorer nutritional, functional and immunological responses, supporting the WHO recommendation to start patients early on ART, before these three indices deteriorate (115). Similarly, Koye *et al.* (82) associated high mortality among HIV-infected children with delayed or regressing developmental parameters and severe immunodeficiency at baseline. Janols *et al.* (72) used a clinical scoring system based on patient interviews and clinical examination to predict early treatment response among patients with pulmonary TB and to identify patients with high mortality risk.

High mortality in HIV/TB co-infected patients starting ART continues to be a common problem among TB patients in Ethiopia. Shaweno and Worku (110) found a survival probability of less than 15% for HIV-positive TB patients and of 85% for HIV-negative TB patients at the end of the 8-month DOTS period. Ali and Klotz (20) found a mortality rate of 8% and a wide range of clinical manifestations among 143 patients with immune reconstitution inflammatory syndrome in tuberculosis (TB-IRIS) and Ghezehegn (66) examined the impact of that syndrome on ART outcome. Mesfin *et al.* (88) reported a mortality rate of 9.2% among 119 ART-associated TB cases of 4.6% among 238 controls after 6 months of follow-up treatment, which they associated with TB-IRIS. In a large cohort study, regular CD4 monitoring of patients before ART, earlier ART initiation and regular clinical staging decrease mortality risk and TB incidence (74). An important study of TB prevention found that while the provision of isoniazid preventive therapy was high in six health facilities in Addis Ababa, only 32.0% of TB-free HIV-positive patients attending these facilities had been provided this preventive therapy and 29.8% of them knew about its availability (127). Studies in regional and rural health facilities may provide further information on the need to upgrade TB diagnostic facilities and to increase the availability of isoniazid preventive therapy. Solomon (112) reported that the incidence of TB was twice as high among HAART-naïve AIDS patients than those receiving HAART in an ART clinic.

Twenty studies focused on the continuing challenge of retention of patients in chronic care, adherence to treatment and patient drop-out (5, 17, 29, 32, 40, 50, 51, 71, 76, 77, 83, 89, 102, 104, 120, 121, 123, 124, 130, , 138). The major reasons for non-adherence to pediatric ART by care givers in Addis Ababa were forgetfulness and being away from home (40). Tekele (120) explored the role of social networks in adherence to ART, an approach shown to be promising in generating much needed support to PLHIV under treatment, and Teklu (121) reported the results of the use of ART-experienced patients serving as adherence supporters. By shifting selected counseling tasks from health care providers to adherence supported, patients in the intervention group were significantly more satisfied, knowledgeable and likely to adhere to ART than patients in the control group and Tilahun (123) studied the effect of perceived social support, depression and stigma on ART adherence. Low adherence to ART in three hospitals in Addis Ababa was associated primarily with stigma, discrimination and poor patients-provider relationship (138). A doctoral study in anthropology found that medication practices, health-seeking behavior and stigmatization of PLWHA in Addis Ababa are deeply rooted in culturally specific behaviors and that conventional measures of adherence need to be modified for use in resource poor, culturally diverse communities (102). Tilahun *et al.* (124) found that stigma was negatively associated with adherence to HAART and with self-confidence to take the medication correctly. Another study developed tools for measuring retention of AIDS patients in care in the ART program in Ethiopia. These tools yielded results similar to those using the Kaplan Meyer method but were easier to use (29). Herman (71) described the compatibility of traditional faith healing and ART, an issue that is examined in greater detail by Kloos *et al.* in this issue.

Several investigators studied the shifting, streamlining and integration of various services into HIV diagnosis, care, support and treatment services, moved ref. 72 to Health Services: including improving the operational link between VCT and treatment facilities (12) and the integration of food security (126) and cervical cancer prevention programs(11, 99), towards the provision of more comprehensive, accessible and cost-effective interventions. Meeting the nutritional needs of PLHIV remains a problem in Ethiopia; Coates *et al.* (49) described constraints in the supply and demand in the delivery of a national food distribution program for PLHIV. Alemu (14) reported on beneficial effects of food supplementation on treatment efficacy of ART and quality of life of patients and on a longitudinal study evaluating the effect of nutrition on the survival of children on antiretroviral treatment after the advent of ART (15). Inadequate coverage and quality of care and support services for PLHIV at the household and community levels in Arba Minch Town were attributed mainly to inadequate financial support and referral services in spite of strong political will, social support and access to care givers (137). In view of the increasing demand for care and support for PLHIV in Ethiopia, this first study of the provision of care and support services in Ethiopia needs to be followed up with further research on the generation and integration of family, community and external resources in different communities. The first 10-year evaluation of a long-term community and home-

based care and support program for PLHIV operated by iddir indicates that this organization can help to improve the quality of life and socioeconomic condition of affected people (106, 100). Iddirs have become instrumental in reducing stigma and discrimination and supporting orphans, other vulnerable children and PHIV in Ethiopia (113) but further progress is needed to benefit members of women's iddirs economically (122).

The impact of ART on risky sexual behavior of HIV patients is receiving increasing attention in Ethiopia and elsewhere because of the need to evaluate their HIV transmission potential as part of assessing the effectiveness of chronic care and to better understand family planning intentions of PLHIV under treatment, discussed in the Epidemiological, Social, and Behavioral Research section. Dessie (52) found that although all 13 male study members had fewer sexual partners after initiating ART, nonuse or inconsistent use of condoms were common. Further studies are needed for patients from different socioeconomic and cultural groups.

Psychological and social parameters are increasingly thought to impact on the wellbeing of PLHIV, as noted in the Impacts Research section above. There is also evidence that they can influence the outcome of antiretroviral treatment. A review of 23 studies in Sub-Saharan Africa found that good ART adherence was 55% lower among PLHIV with depression symptoms than those without symptoms (93). Alemu *et al.* (16) reported that depression and perceived inadequate social support were negatively associated with both weight gain and CD4 cell progression. The authors called for the consideration of these two psychosocial factors in the design and implementation of HAART programs. The study by Dewo *et al.* (53) indicates that community-based treatment support services involving continuous engagement of family and patients in treatment and care can improve treatment adherence. They achieved significant declines in loss to follow-up and increases in ART adherence. Tadesse *et al.* (115) found 39.3% of 318 children on HAART participating in a hospital-based study in Addis Ababa to have behavioral and emotional problems, particularly children of poor families and orphans. The authors called for additional research with the objective to better understand and appropriately respond to these problems.

The remaining studies examined TB drug resistance, both primary (4, 135) and multidrug resistance (8); adverse drug reactions associated with ART (2); the impact of the introduction of rifampicin/isoniazid fixed-dose combination TB treatment for chronic care on treatment outcome (133); TB care practices in public and private DOTS clinics from a patient perspective (131), the effect of asymptomatic helminth co-infection on immunological response among newly diagnosed TB patients (1); the effect of anti-TB chemotherapy on hypercalcemia (21); the introduction of the Loop Electrosurgical Excision Procedure in Ethiopia to treat cervical cancer (101); prevailing knowledge surrounding cervical preventive screening among females living with HIV (33); the association between water, hygiene and sanitation practices and risk of opportunistic infections among PLHIV (132, 102); evaluated the VA model for determining pulmonary TB as cause of death (116); development of standards of care for vulnerable children in 9 countries, including Ethiopia (48) and reasons for delays in TB treatment (109); and Konings *et al.* (81) estimated the number of HIV patients on ART in Ethiopia to increase by about 30% as a result of the adoption of the new WHO guidelines recommending to start ART between a CD4+ count of >200 and <350 cells/mm (3).

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Section 7. Health Informatics, Monitoring, and Evaluation Research

This section includes research concerning monitoring and evaluation of HIV/AIDS programs and the development and use of quantitative and qualitative assessment, analytic and communication methods. It covers the systematic application of information, computer science, and technology for HIV/AIDS prevention, care, research and evaluation.

This section contains 51 references, similar to the last three updates. In this update, references in this section are to studies assessing the development and use of programs and evaluations (2, 4-6, 13, 17-19, 22-26, 28, 30-34, 41), development and use of operational and evaluation tools and approaches (1, 3, 10-12, 15, 21, 29, 35, 37, 40, 45), data mining and other knowledge management practices (8, 9, 12, 14, 16, 20, 22, 36, 46- 48, 50, 51) and cost estimates of HIV/AIDS activities and programs (38, 42, 43).

Several studies used new approaches to increase accessibility and utilization of various HIV/AIDS services. Adugna (2) evaluated a pilot study of a community-based health information system (CBHIS) focused on strengthening the country's urban health extension program (UHEP) employing local community members. This program increased the number of outpatients five-fold, VCT and BCG vaccination by more than 100% and the number of PMTCT attendants by 26.4%. These encouraging results need to be validated in other health facilities using a wider time frame to evaluate the program's sustainability. Similarly sharp increases in the scale-up of comprehensive HIV/AIDS services were reported by HAPCO (this reference is no. 61 in the Epidemiological Behavioral, Socioeconomic and Cultural Research section) for the total population and by Hartman *et al.* (26) for the USAID/PEPFAR program for health centers. The remarkable achievements of both programs have been attributed to an approach combining the decentralization of treatment, care and support services from hospitals to health centers and communities. Another UHEP-linked program developed a referral tool kit to strengthen and monitor referral of most-at-risk populations (MARPs). Preliminary assessment revealed greater retention of patients, patient satisfaction, task shifting from the health facilities to the community nurses and improved tracking of MARPs (3). An NGO working with local partners used the difference in differences approach to evaluate the impact of various activities implemented to build capacity among rural churches representing 14 denominations in Ethiopia and Malawi. The method quantitatively and reliably measured areas where the program had contributed to positive changes and the process was appropriate to the NGOs administrating the surveys, indicating its usefulness in program evaluation (6). Another project used a multi-pronged approach including outreach services, facility and community-based mothers' support groups and demand creation/community mobilization through health extension workers and volunteers from faith-based organizations towards providing universal access to PMTCT nation-wide. As a result, 57,100 pregnant women, representing more than one-third of all women tested by the project, were counseled and tested from October 2011 to March 2012, health centers reported a 40% increase in ARV uptake, 78% increase in partner testing and 98% and 96% ARV uptake among pregnant mothers and their infants, respectively. Nevertheless, the authors recommended further studies of the effectiveness and cost-effectiveness of these interventions (8).

Quality of health services, an increasing concern in Ethiopia and elsewhere and is addressed by several studies in different sections in this and earlier updates, was the focus of a study using the Plan-Do-Study-Act (PDSA) strategy to identify problems and initiate improvements in pre-ART patient retention in care in a timely manner. The retention rate increased from 34.7% pre-intervention to 69.0% post-intervention, reportedly due to better provision of adherence counseling and improved patient flow (29). Tolu (45) validated a HIV-related stigma scale measuring health care providers' attitudes towards patients in 18 health centers in Jima Zone. This preliminary evaluation found that HIV knowledge, perceived institutional support, training on stigma and discrimination, educational status, HIV case load, the presence of ART in the health center and perceived religiosity were associated with stigma and discrimination.

New and understudied approaches to assess cost of HIV/AIDS programs and other issues relevant for sustaining and upscaling services were addresses by three studies. Tagar *et al.* (42), estimated the cost of ART per patient in 161 health facilities in Ethiopia, Malawi, Rwanda and Zambia in relation to upscaling services to provide universal access. They found that costs were lowest in Malawi ($125) and Ethiopia ($189) and estimated that costs would require, on average, only 10-15% of the $16 billion currently spent in low-income and middle/low-income countries to reach universal access to ART, but concluded that funding allocation would have to be carefully evaluated in individual countries. Telake *et al.* (43) estimated the cost of orphan care in Ethiopia and Botswana. They found that costs were nearly 12 times higher in the latter than in the former, that costs also varied significantly within these countries and that costs per orphan declined with the up-scaling of programs and increased with their expansion. Sewal-Menon (38) found that only moderate investments in the most disadvantaged adolescent girls in Ethiopia, Egypt,

Kenya, South Africa, Uganda and Guatemala can improve their health and economic levels and benefit their communities, findings which have implications for socioeconomic programs and HIV risk management for this group. Further studies are needed to empirically measure both costs and effectiveness of programs. A broadly based assessment of PMTCT access and availability in rural communities using multiple methodologies corroborated the results of earlier studies showing that inadequate integration of antenatal care with the HIV/AIDS program, lack of awareness, stigma, traditional birth delivery and lack of male participation were the major factors in low utilization of PMTCT services (17).

Six studies in this section and other studies listed in the section Epidemiological, Behavioral, Socioeconomic and Cultural Research predicted HIV and TB risk, distribution and transmission (5, 14, 24, 25, 44). Greig *et al.* (24) found significantly higher mortality in a cohort of 7,561 AIDS patients on ART aged 50 years and older in 9 countries and called for additional research into the causes and the development of appropriate interventions. Tolla (44) mapped the spatial distribution of multi-drug resistant *M. tuberculosis* isolates identified by the spoligotype method, an approach which has considerable potential in identifying TB drug-resistant populations and facilitating the targeting of communities for appropriate chemotherapy. An analysis of the TB epidemics in 211 countries, including Ethiopia, identified HIV as the main driver of these epidemics, followed by level of socioeconomic development and immigration (14). The authors make recommendations on how each of the countries studied should prioritize its interventions.

Integration of mother and child care, family planning, TB and other opportunistic infections and socioeconomic development programs and HIV/AIDS programs, also highlighted in other sections in this update, is known to be a prerequisite to developing cost-effective and sustainable interventions. Click (12) reported that the integration of registers for TB and HIV surveillance in children resulted in more consistent recording of HIV status but noted that procedures need to be revised to document age-specific diagnostic results and facilitate referral to appropriate care facilities. One of the first assessments of the linkage between HIV and TB programs reported that whereas collaboration in HIV testing and cotrimoxazole prophylaxis therapy were satisfactory, there were deficiencies in recording patient registration, screening PLHIV for TB, initiation of TB treatment, referral linkage and TB diagnostic capacity (31). Nouga *et al.* (37), summarizing the achievements of a large NGO implementing family planning/HIV program in Ethiopia and other Africa countries, concluded that additional work is needed by this organization and by the sexual/reproductive health/ HIV community in the areas of engaging stakeholders ranging from the community to the national levels to share successes, promote client-friendly, stigma-free care and leverage health information systems for monitoring, coordination and evaluation.

Additional studies using new or inadequately evaluated methods and approaches reported on the strengthening of advocacy for adolescent girls in different countries, including Ethiopia (19), comparison of sero-positive rates obtained by a NGO with WHO prevalence estimates (28) and the Standard Day Method for fertility control (7). In addition, Stephenson *et al.* (40) evaluated two scales based on the Sexual and Reproductive Power Scale (SRPS) and the Gender Equitable Male (GEM) scale, showing that they can measure balance of power and equitable attitudes within relationships in relation to self reporting of modern contraceptives in resource-poor areas. An evaluation of emergency assistance programs in Ethiopia and Somalia noted a failure of humanitarian organizations to integrate HIV activities to adhere to IASC guidelines for HIV responses in disaster areas, thus failing to meet the needs of local populations affected by malnutrition and infectious diseases (18). Abera (1) established normal reference values of immunological and hematological levels for apparently healthy HIV-negative adults in Bahir Dar City, finding that absolute CD4 cell counts were lower than those Ethiopia adopted and that females had higher counts than males. Garedew (21), using molecular typing of mycobacteria from TB patients, identified several clusters and new strains of *M. tuberculosis* in both pulmonary and extrapulmonary TB patients. Four Masters theses examined opportunities and challenges in the application of patient data mining for effective TB diagnosis ((36), in predicting ART outcome (48) and in identifying patterns in VCT and TB occurrence (50, 51).

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3. Adugna Z. A referral toolkit to establish and monitor functional referral system between community health programs and health facilities in urban settings of Ethiopia: why should frontline primary health care adapt it?; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract TUPE750.
4. Alexander CS, Memiah P, Henley YB, Kaiza-Kangalawe A, Shumbusho AJ, *et al.* (2012) Palliative care and support for persons with HIV/AIDS in 7 African countries: Implementation experience and future priorities. Am J Hosp Palliat Care 29: 279-285.

5. Aweke G (2012) Predicting HIV infection risk factors using voluntary counseling and testing (VCT) data: A case of African AIDS Initiative International (AAII) [MSc thesis]: Addis Ababa University.
6. Batchelor S, Scott N, Deakin D. The use of difference in differences as a robust but cost-effective approach to NGO evaluation of complex social programs; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE378.
7. Bekele B, Fantahun M (2012) The Standard Days Method: an addition to the arsenal of family planning method choice in Ethiopia. J Fam Plann Reprod Health Care 38: 157-166.
8. Blyth K, McLaughlin P, Bogale A. Universal prevention of mother-to-child transmission (PMTCT) access in Ethiopia: promising strategies in low-prevalence contexts with limited health service use; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract LBPE55.
9. Bourey C, Stephenson R, Bartel D, Rubardt M (2012) Pile sorting innovations: exploring gender norms, power and equity in sub-Saharan Africa. Glob Public Health 7: 995-1008.
10. Bradley EH, Byam P, Alpern R, Thompson JW, Zerihun A, Abebe Y, *et al.* (2012) A systems approach to improving rural care in Ethiopia. PLoS One 7: e35042.
11. Briscoe C, Aboud F (2012) Behaviour change communication targeting four health behaviours in developing countries: A review of change techniques. Soc Sci Med 75: 612-621.
12. Click ES, Feleke B, Pevzner E, Fantu R, Gadisa T, Assefa D, *et al.* (2012) Evaluation of integrated registers for tuberculosis and HIV surveillance in children, Ethiopia, 2007-2009. Int J Tuberc Lung Dis 16: 625-627.
13. Cumming RG (2012) HIV and AIDS in Africa: good news and bad news. Med J Aust 196: 309.
14. Currie CSM, Hoad KA (2012) A worldwide investigation of tuberculosis epidemics. Health Care Manag Sci 15: 223-238.
15. Dagnew G (2012) Designing a knowledge based system for blood transfusion [MSc thesis]: Addis Ababa University.
16. De Walque D, Kline R (2012) The association between remarriage and HIV infection in 13 sub-Saharan African countries. Stud Fam Plann 43: 1-10.
17. Desta E, NNPWE Staffs. An assessment of PMTCT service availability and access in rural Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract TUPE460.
18. Doraiswamy S, Cornier N, Omondi M, Spiegel P. HIV in the Horn of Africa crisis: what can we learn? Review of humanitarian instruments; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract WEPE594.
19. Dunning DR. Strengthening global advocacy for adolescent girls: lessons learned from the Adolescent Girls' Advocacy and Leadership Initiative; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE597.
20. Fox AM (2012) The HIV-poverty thesis re-examined: Poverty, wealth or inequality as a social determinant of HIV infection in sub-Saharan Africa? Journal of Biosocial Science 44: 459-480.
21. Garedew L. Molecular typing of Mycobacteria isolated from tuberculosis patients at Debre Birhan Referral Hospital, North Shoa; 2011. 22nd Annual Conference of the Ethiopian Public Health Association. October 31st – November 3rd, 2011. April 2012; Addis Ababa. Abstract no.12.12.15.
22. Gebre Sillassie G (2012) Assessment of knowledge management practices and factors influencing knowledge sharing in the national HIV/AIDS Resource Center in Addis Ababa: A cross-sectional study [MPH thesis]: Gondar University.
23. Gebreyesus EG (2012) Time to attrition and its determinants among adult ART clients in hospitals of Eastern Zone of Tigray Region, north Ethiopia: A facility- based two year retrospective cohort study [MSc Thesis]: Mekele University.
24. Greig J, Casas EC, O'Brien DP, Mills EJ, Ford N (2012) Association between older age and adverse outcomes on antiretroviral therapy: a cohort analysis of programme data from nine countries. AIDS 26 Suppl 1: S31-37.
25. Greyling C, Long S, Kean S. Best practices for establishing mother support groups to reduce HIV vertical transmission: a review of programmes in Africa; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract TUPE431.
26. Hartman AF, Arega T, Kahsu T, Wubne H, Konings E, Crandall W. Successful national scale-up of comprehensive HIV/AIDS services in Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE704.
27. Heard N (2012) Geography, GIScience, and HIV/AIDS: Applications in International Settings. Symposium on Spatiotemporal Analysis for Health Research, April 27-28, 2012. Washington DC.: Howard University.
28. Hilton K, Nazarov D, Babakhani A, Sayana S, Ford T, Weinstein M. Effective global HIV testing: AIDS Healthcare Foundation's HIV testing prevalence reflects WHO estimates; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract TUPE289.
29. Idris Z, Weiss B, Jerene D, Shewamare A, Nega A, Adamu R, *et al.* Use of the Plan-Do-Study-Act (PDSA) strategy to improve performance of pre-ART retention in care rate at a tertiary hospital in Ethiopia; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE498.
30. Jima T, Loha M, Ramlal R. Factors contributing to sustained functionality of community care coalitions

for OVC care and support after cessation of direct project support: the case of Atsbi Womberta district, Tigray region, Ethiopia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract TUPE404.
31. Kassa A, Jerene D, Assefa Y, Teka A, Aseffa A, Deribew A (2012) Evaluation of collaborative TB/HIV activities in a general hospital in Addis Ababa, Ethiopia. BMC Res Notes 5: 67.
32. Leta TH, Sandoy IF, Fylkesnes K (2012) Factors affecting voluntary HIV counselling and testing among men in Ethiopia: a cross-sectional survey. BMC Public Health 12: 438.
33. Malaju MT, Alene GD (2012) Assessment of utilization of provider-initiated HIV testing and counseling as an intervention for prevention of mother to child transmission of HIV and associated factors among pregnant women in Gondar town, North West Ethiopia. BMC Public Health 12: 226.
34. Marum E, Taegtmeyer M, Parekh B, Mugo N, Lembariti S, Phiri M, *et al.* (2012) "What took you so long?" The impact of PEPFAR on the expansion of HIV testing and counseling services in Africa. J Acquir Immune Defic Syndr 60: S63-S69.
35. Melkamu Y, Hounkanrin G, Kebede D, Kiflom H. Integration of abortion services into HIV and AIDS programs: the experience of Family Guidance Association of Ethiopia (FGAE); 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE667.
36. Nesredin A (2012) Mining patient's data for effective tuberculosis diagnosis: The case of Menelik II Hospital [MSc thesis]: Addis Ababa University.
37. Nouga A, Kudrati M, Ayalew A, Benevides R, Makumi M. Perspectives from multicountry field programming: achievements, challenges and next steps in community-level family planning/HIV integration from Pathfinder International; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract MOPE676.
38. Sewall-Menon J, Bruce J, Austrian K, Brown R, Catino J, Colom A, *et al.* (2012) The cost of reaching the most disadvantaged girls. Programmatic evidence from Egypt, Ethiopia, Guatemala, Kenya, South Africa, and Uganda. New York, New York, Population Council, 2012. 72 pp.
39. Skevington SM, Sovetkina EC, Gillison FB (2013) A systematic review to quantitatively evaluate 'Stepping Stones': a participatory community-based HIV/AIDS prevention intervention. AIDS Behav. 17: 1025-1039.
40. Stephenson R, Bartel D, Rubardt M (2012) Constructs of power and equity and their association with contraceptive use among men and women in rural Ethiopia and Kenya. Glob Public Health 7: 618-634.
41. Stroeken K, Remes P, De Koker P, Michielsen K, Van Vossole A, Temmerman M (2012) HIV among out-of-school youth in Eastern and Southern Africa: A review. AIDS Care 24: 186-194.
42. Tagar E, Sundaram M, Condliffe K, Over M, Assefa Y, Nyemazi JP, *et al.* The cost of scaling-up antiretroviral treatment: a costing study in 161 representative facilities in Ethiopia, Malawi, Rwanda and Zambia; 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract THPE738.
43. Telake D, Formson C, Forsythe S. What does it cost to raise an orphan? A comparison of OVC costs in Ethiopia and Botswana; 2012 July 22-27, 2012; AIDS 2012, XIX International AIDS Conference. Washington, D.C. Abstract FRAE0101.
44. Tolla TB (2012) Spoligotyping and mapping spatial distribution of multidrug resistant *Mycobacterium tuberculosis* strains in Ethiopia [MSc Thesis]: Addis Ababa University.
45. Tolu G. Validation of healthcare providers' HIV related stigma scale, Jima zone, Southwest Ethiopia; 2011. 22nd Annual Conference of the Ethiopian Public Health Association. October 31st – November 3rd, 2011. April 2012; Addis Ababa. Abstract no. 12.11.14.
46. Uchudi J, Magadi M, Mostazir M (2012) A multilevel analysis of the determinants of high-risk sexual behaviors in sub-Saharan Africa. Journal of Biosocial Science 44: 289-311.
47. Wang H, Dwyer-Lindgren L, Lofgren KT, Rajaratnam JK, Marcus JR, Levin-Rector A, *et al.* (2012) Age-specific and sex-specific mortality in 187 countries, 1970-2010: A systematic analysis for the Global Burden of Disease Study 2010. Lancet 380: 2071-2094.
48. Wondwessen N (2012) Application of data mining in prediction of anti-retroviral therapy outcomes among HIV/AIDS patients of Adama Referral Hospital (Info [MPH thesis]: Gondar University.
49. Worku A (2012) Editorial: High quality health information system for improved health system. Ethiop J Health Dev 26: 150- 151.
50. Wubetu K (2012) Application of data mining techniques to identify patterns in voluntary counseling and testing: A case of Gondar University Hospital VCT center [MPH thesis]: Gondar University.
51. Yilma M (2012) Application of data mining to explore the pattern of tuberculosis: the case of Debre Berhan Hospital North Shoa Zone [MPH thesis]: Gondar University.

Section 8. Diaspora Research

This section includes studies on HIV/AIDS among Ethiopians in the Diaspora and of Ethiopian health professionals in the Diaspora contributing to HIV/AIDS interventions in Ethiopia.

There are only two studies listed in this year's update. There are certainly more studies being done but often the national origin of the patients is unknown or not easily determined. Instead patients are lumped together with other Africans (2), are considered African-American in

the United States, and are slowly being blended into Israeli society (1). In fact, Elinav *et al.* report that comparing non-immigrants to legal, primarily Ethiopian, immigrants, both feature similar adherence to follow-up, exposure and response to ART, despite profound cultural differences.

1. Elinav H, Pops KO, Shasha D, Korem M, Hauzi-Bashan M, Grossman Z, *et al.* (2012) HIV/AIDS profile and realities at a regional antiretroviral therapy clinic in Jerusalem: 12 years analysis. Scand J Infect Dis 44: 65-69.
2. Schmidt E, Olomo F, Corcoran N (2012) Sex education targeting African communities in the United Kingdom: Is it fit for purpose? Sex Education 12: 65-78.

Section 9. Earlier Bibliographies

1. Mekonnen W, Haile Mariam D, Kloos H, Converse PJ, Mulatu MS, Mitike G (2012) Bibliography on HIV/AIDS in Ethiopia and Ethiopians in the Diaspora: The 2011 Update. Ethiop J Health Develop 26: 119-149.

All annual HIV/AIDS bibliographic updates in this journal starting in 2003 and other relevant bibliographies are listed in the March issues of the EJHD between 2003 and 2010.

Section 10. Selected Websites Featuring HIV/AIDS in Ethiopia

1. Federal HIV/AIDS Prevention and Control Office of Ethiopia: http://hapco.gov.et/ (under construction)
2. Center for International Health of the University of Bergen, Norway (also access to the Ethiopian Journal of Health Development): http://ejhd.uib.no/
3. Ethiopian AIDS Resources Center: http://www.etharc.org
4. Family Health International: http://www.fhi360.org/countries/ethiopia
5. Christian Relief and Development Association: www.crdaethiopia.org
6. Johns Hopkins University Center for Clinical Global Health Education: http://main.ccghe.net/CCG/country/ethiopia
7. People to People Organization: http://www.peoplepeople.org/
8. Save the Children: http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.6234245/k.A159/HIVAids_Programs.htm?msource=weilpres0511#Ethiopia
9. United Nations Children's Fund (UNICEF): http://www.unicef.org/ethiopia/hiv_aids_464.html
10. United Nations Development Program (UNDP): http://www.undp.org/content/undp/en/home/ourwork/hiv-aids/Projects-initiatives/hiv-epidemic-ethiopia-case-study-transformational-change/
11. United Nations Educational, Scientific and Cultural Organization (UNESCO): http://hivaidsclearinghouse.unesco.org/search/format_liste.php?lang=en&ret=topics.php&Chp2=Ethiopia
12. United Nations Joint Program on AIDS (UNAIDS): http://www.unaids.org/en/CountryResponses/Countries/ethiopia.asp
13. United States Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/globalaids/Global-HIV-AIDS-at-CDC/countries/Ethiopia/
14. AIDS Portal: http://www.aidsportal.org/overlay_details.aspx?nex=20
15. University of California, San Francisco HIV In Site: http://hivinsite.ucsf.edu/global?page=cr09-et-00.
16. Network of Ethiopian Professionals in the Diaspora (NEPID): http://andegraf.com/sites1/site_nepid/001.htm.
17. The International Technical Training and Education Center on HIV (I-TECH) of the University of Washington: http://www.go2itech.org/itech?page=co-03-00.
18. The International Center for AIDS Care and Treatment Programs (ICAP) at Columbia University's Mailman School of Public Health: http://icap.columbia.edu/where-we-work/ethiopia.
19. World Health Organization: http://www.who.int/countries/eth/en/
20. United States Agency for International Aid: http://www.usaid.gov/ethiopia/global-health