

Bibliography on HIV/AIDS in Ethiopia and Ethiopians in the Diaspora: The 2016 Update

Mesfin S. Mulatu¹, Helmut Kloos², Paul J. Converse³, Mirgissa Kaba⁴, Damen Haile Mariam⁴, Wubegzier Mekonnen⁴,

Introduction

This fourteenth annual update of the HIV/AIDS literature on Ethiopia includes references to studies covering all major public health aspects of this infection in Ethiopia and in Ethiopians in the diaspora. All references are again listed under eight main headings, as follows: 1) basic biomedical research, 2) epidemiological, behavioral socioeconomic and cultural research, 3) impacts research, 4) treatment, care and clinical research, 5) prevention research, 6) health services and policy research, 7) health informatics and evaluation research and 8) research on Ethiopians in the diaspora. The text preceding each list of references briefly summarizes patterns, trends, and major findings of studies, and attempts to highlight some of the new approaches, concepts and tools used and reported in 2016. As in previous updates, we used a simple categorization approach where a citation appears only in one section. In reality, complex studies cover multiple topics and areas. Thus, we continue to encourage readers interested in any one area of research to review also other sections in this update. Overall, we hope that this annual update will, like previous issues, serve as a resource for researchers interested in HIV/AIDS epidemiology, prevention, control, care and support in Ethiopia and among Ethiopians in the diaspora.

We used the same methods as in previous updates to identify and classify references. Literature searches using keywords “Ethiopia AND HIV AND 2016” and “Ethiopia AND AIDS AND 2016” were made in PubMed, CINAHL, EconLit, EMBASE, Global Health, POPLINE, PsycINFO, Social Services Abstracts, Sociological Abstracts, and other major databases that archive relevant published articles, dissertation, and reports from multiple sources. We made additional online searches on major national and

regional HIV/AIDS resource centers and international organizations, mostly <http://www.etharc.org> and <http://unaids.org>.

There are 436 references in this update – 32 references fewer than the previous update. More than half (243 or 55.7%) of the references are published articles; 147 (33.7%) are conference abstracts, 45 (10.3%) are thesis, and 1 (0.2%) is a report. All of thesis were from Addis Ababa University. It was not possible to access theses from Jimma, Gondar, Hawassa, Mekele, or other universities as in some of the previous updates.

Trends in International AIDS Conference Presentations:

We continued to monitor trends in conference presentations at the biannual International AIDS Conference (IAC) by searching for abstracts containing “Ethiopia” in the International AIDS Society’s abstract archive (<http://www.abstract-archive.org/>). The years and conference locations were: 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), 20th (Melbourne, 2014), 21st (Durban, 2016). As Figure 1, Panel A shows, conference presentations at the IAC increased linearly from 1985 to 2006 – with the highest number of presentations at 137 in Toronto in 2006. Since then, there has been a declining trend in IAC presentations presumably because of visa issues, travel expenses, or availability of other conference opportunities in Ethiopia and elsewhere.

¹Independent Researcher, 3 Fitzgerald Court, Decatur, Georgia, 30030, USA; E-mail:-mulatu@gmail.com.

²Department of Epidemiology and Biostatistics, University of California, Medical Center, San Francisco, San Francisco, E-mail- helmutkloss@gmail.com, CA 94143, USA;

³Center for Tuberculosis Research, Johns Hopkins University, School of Medicine, Baltimore, MD 21231, E-mail-pconver1@jhmi.edu, USA;

⁴School of Public Health, College of Health Sciences, Addis Ababa University, E-mail- D.H. damen_gmail.com, W.M wubegzierm@gmail.com, M.K mirgissk@yahoo.com, P.O. Box 32812, Addis Ababa, Ethiopia.

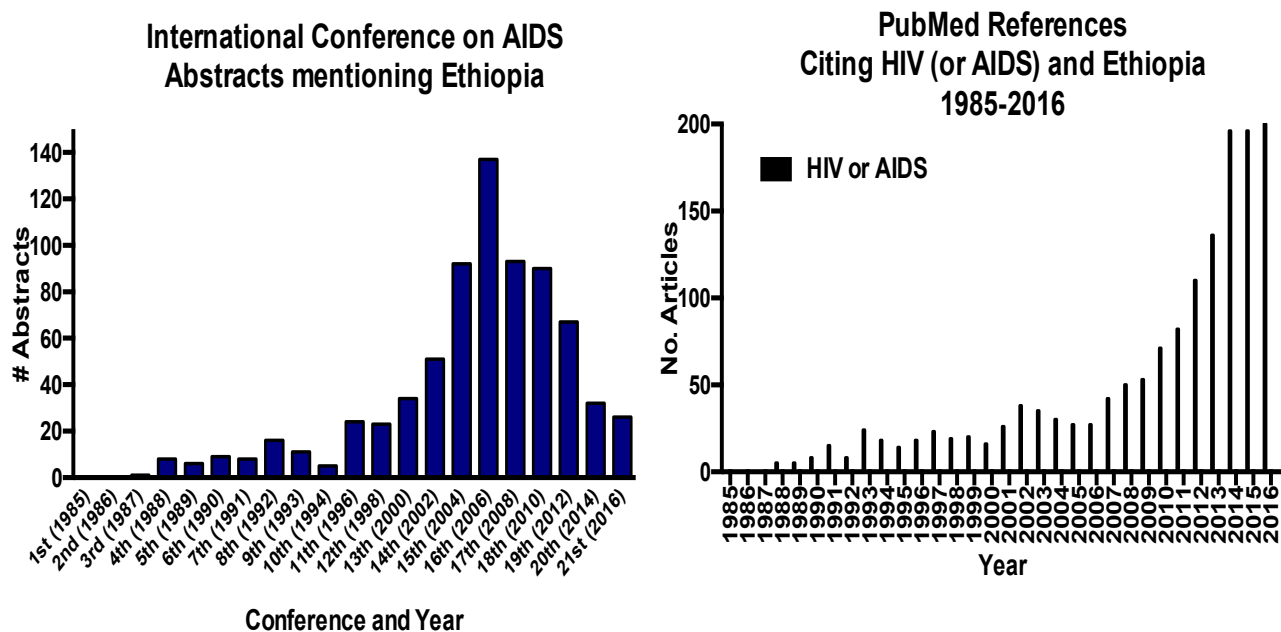


Figure 1: Presentations at the International Conference on AIDS (A) and Publications cited in PubMed (B) concerning Ethiopia and HIV or AIDS, 1985-2016.

Trends in Published Studies Archived in PubMed:

As the largest database of abstracts of scientific publications, PubMed provides an opportunity to monitor the trends in publication of HIV/AIDS related studies. We searched for published studies archived in PubMed database using the following terms: Ethiopia AND HIV [dp] or Ethiopia AND AIDS [dp]. Covering the years 1985 through 2016. Figure 1, Panel B, presents the number of unique articles archived in PubMed for each year. There appears an increasing trend in published articles starting from 2006 and it has continued through 2016. While this trend may be tied to increasing number of online journals being archived in PubMed, it is also likely because of increased productivity of researchers. Similarly, Figure 2 presents trends in publications of articles on other

common infections, including tuberculosis (TB) and malaria. Unlike previous updates, which included publication trends on schistosomiasis (until 2012), this update includes publication trends in helminth infections because of the growing relevance of parasitic infections in health outcomes of people living with HIV/AIDS in Ethiopia (see Section 2). For Figure 2, the Pub Med search terms were: Ethiopia AND HIV [dp]; Ethiopia AND AIDS [dp]; Ethiopia AND malaria [dp]; Ethiopia AND tuberculosis [dp]; Ethiopia AND helminth [dp]. These searches were further stratified by year of publication (2007-2016). The results show increasing trends in publications citing HIV, AIDS, tuberculosis, and malaria, but a stabilizing or declining trend for publications on helminths and Ethiopia.

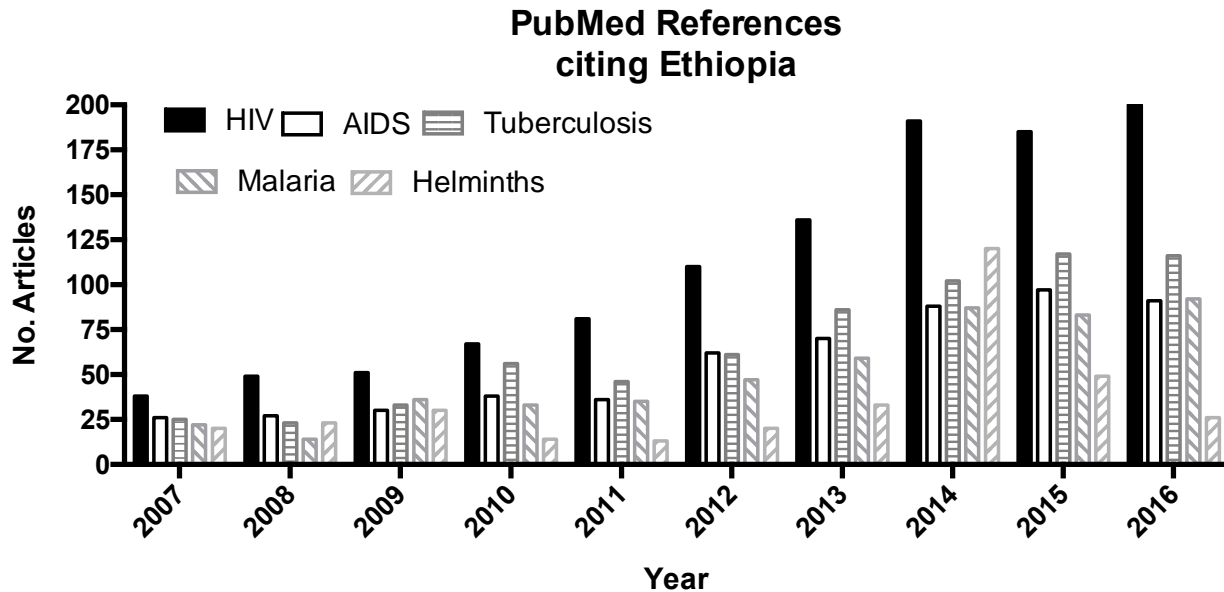


Figure 2: Publications Cited in PubMed Concerning Ethiopia and HIV, AIDS, Tuberculosis, Malaria, and Helminths, 2007-2016

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 2016, there are 32 references classified as Biomedical Research, up from only 11 in 2015. There are 19 references on different aspects of tuberculosis including 5 published papers, 5 theses, and 9 conference presentations. There are 3 papers, 2 theses, and 1 conference presentation focused on HIV. The remaining 7 references, including 4 papers, concerned various opportunistic infections and diseases that may be exacerbated in the context of HIV infection and immunodeficiency.

Derbie et al. (11) evaluated the relatively new, PCR-based Xpert-MTB/RIF assay for the detection of *M. tuberculosis* and drug-resistant TB in nearly 2,000 presumptive TB patients in Bahir Dar and Debre Tabor. The authors concluded that the test resulted in more accurate diagnoses of TB and multi drug-resistant (MDR) TB and would avoid inappropriate treatment of patients who actually do not have TB. The system is rapid and particularly suitable in places where bacterial culture facilities are not available. These findings were also presented at the Ethiopian Public Health Association (EPHA) Conference (10). TB diagnostics was also the topic of a presentation by Deriba et al. (12) at the EPHA meeting comparing cultural methods – the relatively new mycobacterial growth indicator tube (MGIT) system that gives time-to-positivity results with the classical Lowenstein-Jensen culture method that yields colonies of *Mtb* – at the national reference laboratory in Addis Ababa. In a presentation at the Ethiopian Medical Association (EMA) Fantahun

et al. (15) compared cultural and molecular methods for the diagnosis of tuberculous lymphadenopathy at St. Paul's Hospital in Addis Ababa. A thesis by A. Gadissa (16) evaluated still another TB diagnostic technique, LED fluorescent microscopy, compared with Xpert at Ambo Hospital. At the EMA, Cherinet et al. (8) also evaluated LED fluorescent microscopy and the issue of stain fading. At the EPHA, Gebretsadik et al. (17) assessed the phenotypic and genotypic characteristics of *Mtb* isolates and their drug susceptibility in Debre Berhan. A thesis by S. Getachew (18) assessed *Mtb* isolates from lymphadenopathy patients by spoligotyping. A thesis by A. Meaza (23) along with a conference presentation by Meaza et al. (24) assessed another molecular assay, MTBDRplus, for TB diagnosis. A thesis (27) and EPHA presentation (28) by B. Sherefedin evaluated the use of the Xpert test in clinics in Addis Ababa. Tilahun et al. (29) presented their finding concerning *Mtb* molecular epidemiology and drug susceptibility in Ambo at the EPHA meeting. Also at the EPHA meeting, Zewdie et al. (32) presented their findings on the molecular epidemiology of *Mtb* isolates from lymphadenitis patients in Addis Ababa. A thesis by D. Addise (1) addressed the issue of decontamination of sputum samples with sodium hydroxide and its impact on the detection of mycobacteria and contaminating microbes. A paper by Awoniyi et al. (6) assessed production of multiple cytokines in response to novel *Mtb* antigens and their utility for TB diagnosis. Overall, it was encouraging to note the range of assays and settings in Ethiopia being evaluated for TB diagnosis in this year's papers, theses, and conference abstracts. The availability of and appropriate use of these assays should increase the diagnostic accuracy, specificity, and sensitivity for the control of TB.

In other TB-related research, a paper by Habtewold et al. (19) explored the pharmacological issues of the anti-

TB drug, rifampicin (RIF), administered together with the anti-HIV drug, efavirenz (EFV). They found no significant influence of RIF-based anti-TB co-therapy on the EFV pharmacokinetic exposure measures but cautioned that the regimen and high EFV metabolite levels could increase the risk of neurotoxicity in female patients with the CYP2B6*6 genotype. By exploring host gene expression in HIV+ patients with active and latent TB, Kassa et al. (21) identified increased expression of the chemokine CCL22 and immunoglobulin receptor, FCGR1A, in particular, and to a lesser extent, three other genes, as having potential to discriminate with active from latent TB. In another paper, Kassa et al. (20) also reported that the production of certain cytokine/chemokine markers in response to Mtb antigens in whole blood assays might also help discriminate active and latent TB in HIV-infected patients and also monitor patient responses to anti-HIV and TB treatment.

Using a variety of genetic tests to characterize the HIV-1 subtype C that predominates in Ethiopia, Amogne et al. (4) found that the HIV-1 C strains from Ethiopia, obtained in 2008, are more similar than those from other regions and that the distinctions are more detectable at near full-length than sub-genomic assessments. Drug resistance mutations were at low levels. Aralaguppe et al. (5) demonstrated the feasibility of a simple sequencing approach that can potentially be used in the molecular surveillance of HIV-1 for effective identification of subtypes and transmission clusters for operational public health intervention. Kobeb and Degu (22) showed that CD4 levels increase over the first 18 months in children in response to antiretroviral treatment and that the benefit is greater if HAART is initiated at higher CD4 levels. At the EPHA Conference, Mulu (26) reported that a 10-year study showed that HIV-1C strains retain homogeneity in spite of increasing trends of drug resistance. A thesis by E. Woldu (30) showed the importance of time and temperature on absolute CD4 counts. Using a rat model, the thesis by A. Wondimnew (31) explored the effects of a leaf extract on HAART-induced dyslipidemia and non-alcoholic fatty liver disease.

By reviewing the literature on antifungal drug resistance patterns in sub-Saharan Africa, Africa and Abrantes (2) concluded that there is a need for a revision of antifungal therapy guidelines with better controls in antimicrobial drug distribution and implementation of antimicrobial surveillance programs to reduce the high Candida drug resistance levels emerging the region. Moges et al. (25) found 31% resistance to six antifungal agents against oropharyngeal candidiasis (OPC) in HIV-infected patients in Addis Ababa, highlighting the need for study on the epidemiology of OPC and resistance to antifungal drugs. Alebachew et al. (3) found that bacterial sepsis was a major cause of admission for HIV infected patients in Gondar, predominantly *Staphylococcus aureus* and coagulase negative

staphylococci species. Most of the isolates were multidrug resistant.

Diro et al. (13) showed that the sensitivity and specificity of buffy coat and peripheral blood mononuclear cell smear microscopy could be relatively high and much safer than tissue (e.g., spleen) biopsy in HIV co-infected visceral leishmaniasis patients. At the EPHA, Demeke et al. (9) reported on the immunogenicity of Leishmania-derived antigens in treated visceral leishmaniasis patients from southwest Ethiopia.

At the EMA Conference, Eshetu et al. (14) evaluated the burden and genotype distribution of high-risk human papilloma virus types and cytology abnormalities found in selected obstetric and gynecologic clinics in Addis Ababa. Birhanu et al. (7) reported to the EPHA the association of disease severity, hemozoin-containing leukocytes and hematological parameters in children with malaria in northwest Ethiopia. They excluded HIV-infected patients from the study.

Addise D. Effect of 1.5% sodium hydroxide final concentration for the detection of mycobacterium species and identification of bacterial and fungal contamination at Ethiopian Public Health Institute, Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.

1. Africa CWJ, Abrantes PMS. Candida antifungal drug resistance in sub-Saharan African populations: a systematic review. *F1000Research* 2016, 5: 2832.
2. Alebachew G, Teka B, Endris M, Shiferaw Y, Tessema B. Etiologic agents of bacterial sepsis and their antibiotic susceptibility patterns among patients living with human immunodeficiency virus at Gondar University Teaching Hospital, northwest Ethiopia. *Biomed Res Int.* 2016; 5371875.
3. Amogne W, Bontell I, Grossmann S, Aderaye G, Lindquist L, et al. Phylogenetic analysis of Ethiopian HIV-1 subtype C near full-length genomes reveals high intrasubtype diversity and a strong geographical cluster. *AIDS Res Hum Retroviruses* 2016;32(5):471-474.
4. Aralaguppe SG, Siddik AB, Manickam A, Ambikan AT, Kumar MM, et al. Multiplexed next-generation sequencing and de novo assembly to obtain near full-length HIV-1 genome from plasma virus. *J Virol Methods* 2016;236:98-104.
5. Awoniyi DO, Teuchert A, Sutherland JS, Mayanja-Kizza H, Howe R, et al. Evaluation of cytokine responses against novel Mtb antigens as diagnostic markers for TB disease. *J Infect* 2016;73(3):219-230.
6. Birhanu M, Asres Y, Addisu W, Yemane T, Gedefaw L. Haematological parameters and hemozoin-containing leukocytes in children with malaria: association with disease severity at Pawe General Hospital, northwest Ethiopia. Paper

- presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 27.
7. Cherinet Z, Kebede A, Hassen F, Desta H. Auramine o stained mycobacterial smears fading rate and its implication for LED fluorescence microscopy external quality assessment. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-053.
 8. Demeke G, Hailu A, Ghalib HM. Immunogenicity of *Leishmania* derived antigens in peripheral blood mono-nuclear cells isolated from previously treated visceral leishmaniasis, southwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 23.
 9. Derbie A, Mekonin D, Mezgebu Y, Zenebe Y, Adam Y, et al. Xpert MTB/RIF assay for the diagnosis of *Mycobacterium tuberculosis* and its rifampicin resistance at the Felege Hiwot Referral Hospital in a high TB and HIV burden setting: a first implementation research. Poster 24 of the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 24.
 10. Derbie A, Worku S, Mekonnen D, Mezgebu Y, Teshager A, et al. Xpert MTB/RIF assay for the diagnosis of *Mycobacterium tuberculosis* and its rifampicin resistance at Felege Hiwot and Debre Tabor hospitals, northwest Ethiopia: a preliminary implementation research. *Ethiop J Health Dev* 2016;30(2):96-102.
 11. Deriba G, Dilebo J, Kebede A, Yaregal Z, Getahun M, et al. Comparison of *Mycobacterium* growth indicator tube Bactec 960 with Lowenstein Jensen for recovery of *Mycobacterium tuberculosis* complex at Ethiopian National TB Reference Laboratory, Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 30.
 12. Diro E, Yansouni CP, Takele Y, Mengesha B, Lynen L, et al. Diagnosis of visceral leishmaniasis using peripheral blood microscopy in Ethiopia: A prospective phase-III study of the diagnostic performance of different concentration techniques compared to tissue aspiration. *Am J Trop Med Hyg* 2017;96(1):190-196.
 13. Eshetu K, Desta K, Mohammed I, Solomon D, Haile T, et al. Burden and genotype distribution of high risk human papilloma virus and cytology abnormalities at selected obstetrics and gynecology clinics in Addis Ababa, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-018.
 14. Fantahun M, Yenew B, Gemechu T, Mamuye Y, Tadesse M, et al. Assessment of possible tuberculosis lymphadenopathy by Xpert MTB/RIF assay compared to non-molecular methods at St. Paul's Hospital Millennium 17 Medical College, Addis Ababa, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-017.
 15. Gadissa A. Performances of light emitting diode (LED) fluorescent microscopy and GeneXpert MTB/RIF assay for the diagnosis of pulmonary tuberculosis among HIV infected and non-infected patients in Ambo Hospital, west central Ethiopia. Thesis, Addis Ababa University; 2016.
 16. Gebretsadik D, Habte Mariam S, Kinde S. Phenotypic and genotypic determination of drug susceptibility and molecular characterization of *Mycobacterium tuberculosis* isolates at Debre Berhan Referral Hospital, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 19.
 17. Getachew S. Spoligo-typing mycobacteria isolated from tuberculosis lymphadenitis patients attending international clinical laboratories, Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
 18. Habtewold A, Aklillu E, Makonnen E, Amogne W, Yimer G, et al. Long-term effect of rifampicin-based anti-TB regimen coadministration on the pharmacokinetic parameters of efavirenz and 8-hydroxy-efavirenz in Ethiopian patients. *J Clin Pharmacol* 2016;56(12):1538-1549.
 19. Kassa D, de Jager W, Gebremichael G, Alemayehu Y, Ran L, et al. The effect of HIV coinfection, HAART and TB treatment on cytokine/chemokine responses to *Mycobacterium tuberculosis* (Mtb) antigens in active TB patients and latently Mtb-infected individuals. *Tuberculosis* 2016;96(131-140).
 20. Kassa D, Ran L, Jager WD, van den Broek T, Jacobi R, et al. Discriminative expression of whole blood genes in HIV patients with latent and active TB in Ethiopia. *Tuberculosis* 2016;100: 5-31.
 21. Kokeb M, Degu G. Immunological response of HIV-infected children to highly active antiretroviral therapy at Gondar University Hospital, northwestern Ethiopia. *Ethiop J Health Sci* 2016;26(1):25-30.
 22. Meaza A. Evaluation of the diagnostic performance of genotype MTBDRplus version 2 line probe assay for the detection of multi-drug resistance TB (MDRTB) in sputum samples referred to national TB reference laboratory, Ethiopian Public Health Institute. Thesis, Addis Ababa University; 2016.
 23. Meaza A, Desta K, Kebede A, Yarega Z, Dagne Z, et al. Evaluation of the diagnostic performance of MTBDRplus ver 2.0 line probe assay for the detection of MDR-TB in sputum samples referred to National TB Reference Laboratory, Ethiopian Public Health Institute. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 43.117.
 24. Moges B, Bitew A, Shewaamare A. Spectrum and the in vitro antifungal susceptibility pattern of yeast isolates in Ethiopian HIV patients with oropharyngeal candidiasis. *Int J Microbiol* 2016;2016: 3037817.
 25. Mulu A. HIV-1C clade homogeneity with increasing trends of drug resistances: a decade

- longitudinal study. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-25.
26. Sherefedin B. Performance of GeneXpert for the diagnosis of extra-pulmonary TB in selected health facilities in Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
 27. Sherefedin B, Desta K. Performance of Xpert MTB/RIF assay for rapid diagnosis. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 33.
 28. Tilahun M, Ameni G, Desta K, Zewde A, Yamuah L, et al. Molecular epidemiology and drug sensitivity patterns of *Mycobacterium tuberculosis* isolated from pulmonary tuberculosis patients in and around Ambo Town, central Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016.
 29. Woldu E. Time and temperature dependence of absolute CD4 count evaluated by BD FACS count in Armed Forces Referral Teaching Hospital in Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
 30. Wondimnew T. Effect of *Camellia sinensis* leaf extract on highly active anti-retroviral therapy induced dyslipidemia and non-alcoholic fatty liver disease on albino wistar rats. Thesis, Addis Ababa University; 2016.
 31. Zewdie O, Mihret A, Worku A, Tsageye B, Genechu T, et al. Tubercular typing of *Mycobacterium tuberculosis* complex species isolated from tuberculous lymphadenitis cases in Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016.
- of HIV among samples of individuals, including among those who donate blood, receive services at emergency health departments or participate in voluntary HIV testing and counseling programs. In a retrospective review of the records of 2,606 blood donors screened at Gambo Rural Hospital in Western Arsi, HIV prevalence was found to be 0.7% (100). In another similar retrospective study involving analysis of 5 years of medical records (2009 to 2013) of blood donors at the blood bank of Yirgalem Hospital in Hawassa, HIV infection was found among 1.6% of 6367 donors (36). Abate et al. (1) reviewed the records of 6,827 blood donors aged 17-65 years in Jigjiga and found HIV positivity to be 3.16%. Three other studies found higher prevalence rates in samples from emergency departments or voluntary testing and counseling programs. In retrospective study that examined the prevalence of HIV and other infectious diseases among specimen samples left from 797 individuals who attended Tikur Anbessa Hospital in Addis Ababa, HIV infection was 11.2% (79). Sinku et al. (115) examined HIV prevalence and the associated factors among 2,120 voluntary counseling and testing (VCT) clients at the University of Gondar Teaching Hospital. The authors found that 17.1% of the sample to be seropositive for HIV. Shiferaw et al. (110) conducted a review of records of all new patients who were screened at a voluntary HIV testing and counseling center in Kombolcha town from February 8, 2005 to December 31, 2014. The authors found an overall HIV infection rate of 10.8%. The authors noted that the rate of infection declined significantly from 13.3% in 2005 to 4.5% in 2014.

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.

This section contains 138 references: 72 (52.2%) published articles, 55 (39.8%) conference abstracts, and 11 (8.0%) masters theses. As in previous years, the broad categories of research interest within this section included: 1) prevalence and determinants of HIV infection; 2) prevalence and associated factors of opportunistic infections and other comorbidities; 3) HIV risk perceptions and risk behaviors; 4) HIV-related social norms and practices; 5) other existing research areas. An interesting focus area in this update is the epidemiology of cervical cancer.

HIV Prevalence and Determinants: While no major national surveys on HIV prevalence were reported in 2016, researchers continued to monitor the prevalence

The above and other studies (66, 67, 107) have documented increased vulnerability of some population groups because of their personal attributes, their position in society, or their geographical placement. For example, in a qualitative study that explored the social determinants of HIV infection, Kaba et al. (66, 67) found daily laborers, female sex workers, students who are living away from family, widows, separated and divorced women, those who work in restaurants and engaged in petty trade were found to be relatively more vulnerable population groups. While the variability of the prevalence estimates reflects the differences in the characteristics of the samples (general population vs. patient population; small vs. large town), they all suggest that HIV is still a major public health problem in Ethiopia despite positive national trends reported in previous updates. Continued monitoring of HIV prevalence, and when possible HIV incidence, would be important to monitor progress towards national HIV prevention goals and to inform public health programs.

Early diagnosis of HIV infection is critical to disrupt further transmission of HIV by providing an opportunity for reductions in risk behaviors and entry into treatment and subsequent viral suppression. Aniley et al. (20) studied factors associated with delayed diagnosis of HIV infection among a sample of 392 HIV-diagnosed persons, half of whom had a delayed

diagnosis and the other half who were controls without delayed diagnosis. The researchers found having no understanding about HIV and ART, being tested for presence of symptoms/illness, and acquiring HIV through sexual contact were independent and significant factors associated with late HIV diagnosis – pointing the need for programs to raise awareness about the benefits of HIV testing and the effectiveness of antiretroviral therapies.

Overall, these highlighted studies underscore the need for continued research on the patterns and trends of HIV prevalence in the country with a focus on the most vulnerable groups of the population in order to design better HIV prevention, treatment, and care programs.

HIV and Opportunistic Infections: As in previous updates, a plurality of studies has examined the prevalence, determinants, or outcomes of co-infections of HIV and tuberculosis, including studies on tuberculosis among PLWH (13, 14, 15, 88), HIV among TB suspected cases (50), TB and HIV co-infection among prisoners (53), tuberculosis among PLWH on ART (55), and social determinants and delayed presentation among tuberculosis and HIV co-infected patients (59, 60). It is important to note that HIV and tuberculosis co-infections remain to be high, as shown by 27.7% tuberculosis infection among a sample of adult HIV patients in Amhara region (88) and roughly similar proportions (20-30%) of tuberculosis patients who were diagnosed with an HIV co-infection (50, 53). This level of co-infection should be seen within the broader context of tuberculosis infection among various population groups, which several studies in this update covered (7, 8, 30, 55, 76, 97, 105, 106, 133, 137), including studies on the prevalence, determinants, and impacts of multi-drug resistant tuberculosis (9, 34, 44, 86).

Several studies focus on the epidemiology of hepatitis virus infections in different population groups (blood donors, patients visiting emergency departments, VCT, antenatal care, or ART clinics, prisoners, and the general population). The most commonly studied hepatitis virus infections were infections with hepatitis B (HBV; 33, 36, 61, 69, 80, 84, 95, 100, 138) and hepatitis C (HCV; 1, 25, 33, 79, 80, 100, 103, 138), although infections with other hepatitis viruses, including hepatitis A (HAV; 33), hepatitis D (HDV; 33) or hepatitis E (HEV; 4, 33) have also been reported. The systematic review and meta-analytic study by Belyhun and colleagues (33) provides a summary and a good start to understand the magnitude, geographic and population distribution of hepatitis virus infections in Ethiopia. In this study, the authors conducted a systematic review of 68 studies and a meta-analysis of 55 studies to summarize viral hepatitis epidemiology and the potential clinical burdens in Ethiopia. Overall pooled prevalence estimates were 7.4% for HBV and 2.4% for HCV. The authors acknowledged that although there are relatively few studies on hepatitis virus HAV, HDV, and HEV, all types of viral hepatitis virus infections are endemic in Ethiopia and suggested adapting routine screening and

treatment for hepatitis infections in healthcare systems and implementing prevention and control policies in the general population.

Researchers were also interested in prevalence of and risk factors for infections with other sexually transmitted disease, particularly syphilis, among HIV-negative and/or HIV-positive persons (1, 16; 32, 36, 39, 69). The 10-year trend data reported by Kassa et al. (69) showed a continuous decrease in syphilis in both HIV positive and negative pregnant women (from 2.5% to 1.1%) in Kombolcha, although prevalence rates of syphilis remained higher among HIV-positive women than those who were HIV-negative. There has also been continued interest in prevalence, risk factors, and impacts of intestinal parasites among people living with HIV/AIDS (49, 115, 120, 136) and other population groups (65). These studies find high levels of intestinal parasites among PLWHA and the general public, and lead to the recommendation that public health agencies expand routine screening, treatment, and prevention services for parasitic infections. Other infectious disease studied included malaria (5, 46), herpes (11), meningitis (74) and schistosomiasis (127). Further research on the interaction of these disease with HIV will be important to design treatment programs and improve the health outcomes of PLWHA.

HIV and Other Co-morbidities: In Ethiopia and other developing countries, the relationships between nutrition and HIV infection are complex. On one hand, poverty and food insecurity are closely tied to vulnerability to HIV infection and poor health outcomes. On the other, HIV disease and its treatment regimens contributes to nutritional disorders. Thus, researchers are interested in exploring the prevalence of malnutrition and nutritional deficiencies among the general population or among PLWHA (3, 12, 35, 49, 52, 58, 87, 94, 120). Mitiku et al. (87) and colleagues found undernutrition in 23.2% of a sample of HIV positive adults attending ART clinic in Dembia District. In another study, Mulu et al. (94) found indicators of malnutrition among 44-49% of HIV/AIDS patients attending Jimma University Specialized Hospital. Both studies found several factors to be associated with nutritional deficiencies, including CD4 count less than 200 cells/mL. These studies underscored the importance of addressing both nutritional deficiencies and HIV disease among PLWHA. One unique co-morbidity studied was the prevalence of common mental disorders among HIV-positive adolescents in Addis Ababa (64). Behavioral health issues, including substance abuse and mental health, are neglected areas and thus further researched would be highly valuable.

HIV Risk Perceptions and Risk Behaviors: As in previous updates, several studies have also reported on HIV/AIDS related knowledge, perceptions, and risk behaviors among young people, mostly in academic settings (10, 21, 42, 45, 70, 71, 82, 96, 101, 108) but also in other settings (37, 75, 117, 123). These studies continue to document low levels of risk perception and

high levels of sexual risk behaviors, including earlier sexual initiation, premarital sex, unprotected sex, sex with multiple partners, and sex with commercial sex workers. In addition, some these studies have also identified substance use behaviors that are associated with sexual risk behaviors, including *khat* chewing, consumption of alcohol, and use of illicit drugs. Most of these studies tend to be small, cross-sectional and limited to specific geographical locations, and should be treated as supplements to national level behavioral risk factors surveys that are crucial for monitoring trends in HIV-related knowledge, perception, and risk behaviors. Studies with other priority population groups, including commercial sex workers, out-of-school youth, men who have sex with other men, and persons who use drugs are still needed.

HIV-Related Social Norms and Practices: The role of prevailing social norms and practices that are detrimental to HIV infection were investigated in studies that examined the prevalence of and associated factors for gender-based or intimate partner violence and harassment against women, including pregnant women (2), married women (41, 92, 93), female federal police (72), women working in government institutions (41), and female university students (123). Manning-Geist et al. (81) conducted a retrospective analysis of the medical outcomes of 1,712 survivors of rape seen in two clinics in Adama and Hawassa. The researchers found that 13.3% of patients tested positive for a sexually transmitted infection (gonorrhea, hepatitis B, syphilis, or HIV), 9.0% were pregnant, 16.8% had genital injury, and 4.7% had evidence of other body trauma. Although most of these studies are conference presentations and their abstracts were unavailable for a review, they demonstrate continued interest in this topic and further help increase awareness and inform future research or interventions towards changing negative social norms. Three additional studies focused on another aspect of gender-based violence against girls and women – female genital mutilation or cutting (FGM; 19, 26, 68, 98). The research by Andualem (19) examined the prevalence and determinants of FGM among 730 women aged 15-49 years and their < 5 year old daughters. The study found out that 96% of the mothers and 49% of their daughters had experienced FGM. The likelihood of FGM among daughters was higher among parents with lower levels of education, those who resided in rural areas, and those who had a maternal history of FGM. In contrast, FGM was less likely among those who received health education, followed by health extension workers, and those who participated in anti-FGM interventions. These findings are encouraging because they hint that FGM may be declining and that health education and anti-FGM interventions can help reverse this negative social practice. Other social norms and practices studied include masculine norms that contribute to men's HIV-related risk behaviors (51), gender norms and family planning decisions among married men and women (56); marginality and social mobility among HIV-positive women (104); and infant oral mutilation and

risk for infections (63). Further research on these social determinants of HIV infection will help advance social and structural interventions against HIV/AIDS.

Cervical Cancer Epidemiology: A higher than previously reported number of studies have focused on cervical cancer (23, 29, 47, 91, 111, 112, 113). In a conference abstract, Assefa (23) reported that 35.9 new cases of cervical cancer are diagnosed and 22.6 die from it per 100,000 women annually in Ethiopia. In a review of the patterns of genital cancer investigated at St Paul Hospital Millennium Medical College (SPHMMC) Ethiopian Public Health Institute (EPHI) pathology laboratory, the authors found that 30.6% of the 13,043 pathological tumors diagnosed at the hospital were cervical cancers (47). Four other studies examined knowledge and perceptions about cervical cancer among female students (91), among HIV-positive women (111, 112, 113). Shiferaw et al. (111, 112) found that knowledge about cervical cancer was generally low and concluded that awareness programs should be strengthened at both community and health facility levels with emphasis highlighting the causes, risk factors, care seeking behaviors, and treatment options for cervical cancer. In one of those studies, barriers to cervical cancer screening among HIV positive women in Addis Ababa were explored (113). Given the availability of vaccines that would help prevent most cervical cancers, research on epidemiology and knowledge and perceptions of cervical cancer would be valuable for informing future public health policy and practice.

Other Existing HIV/AIDS Research Topics: There were also studies that reported on other topics covered previous updates. Three studies reported research on healthcare related practices that might contribute to HIV acquisition or transmission among healthcare staff or patients, including one study on the incidence and patterns of surgical glove perforations (31) and two other studies on prevalence and risk factors for needle stick injury among healthcare workers (109, 129). Other studies explored issues including knowledge, attitudes, and practice related to mother-to-child transmission of HIV among pregnant women (6), determinants of fertility desires among PLWHA (90), infant feeding practices among HIV-positive women (125, 135), broader reproductive and sexual health needs among young people with disability (73), prisoners (39), and South Sudanese immigrants in Ethiopia (124).

1. Abate M, Wolde T. Seroprevalence of human immunodeficiency virus, hepatitis b virus, hepatitis c virus, and syphilis among blood donors at Jijjiga blood bank, eastern Ethiopia. *Ethiop J Health Sci* 2016;26(2):153-160.
2. Abebe B, Admassu B, Tilahun T. Determinants of intimate partner violence during pregnancy among married women in Abay Chomen District, western Ethiopia: a community-based cross-sectional study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health

- Association; Addis Ababa; 2016, Abstract no. 58.
- Abebe SM, Getachew A, Fasika S, Bayisa M, Girma Demisse A, et al. Diabetes mellitus among HIV-infected individuals in follow-up care at University of Gondar Hospital, northwest Ethiopia. *BMJ Open* 2016;6(8):e011175.
3. Abera WK. Outbreak investigation of suspected hepatitis e among South Sudan refugees, Gambella Regional State, Ethiopia, July 2014. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 43.174.
 4. Abossie A, Bekele A, Abera A, Yohanes T. Prevalence of asymptomatic plasmodium falciparum and plasmodium vivax malaria carriage among school children of malaria endemic area of Mirab Abaye District, southern Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 35.
 5. Abteu S, Awoke W, Asrat A. Knowledge of pregnant women on mother-to-child transmission of HIV, its prevention, and associated factors in Assosa town, northwest Ethiopia. *HIV/AIDS - Research and Palliative Care* 2016;8:101-107.
 6. Adane K, Spigt M, Asmelash T, Abebe M, Dimant G-J. Half of pulmonary tuberculosis patients were left undiagnosed in prisons of the Tigray Region of Ethiopia: implications for tuberculosis control. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 32.
 7. Adane K, Spigt M, Ferede S, Asmelash T, Abebe M, et al. Half of pulmonary tuberculosis cases were left undiagnosed in prisons of the Tigray Region of Ethiopia: implications for tuberculosis control. *PLoS One* 2016;11 (2):e0149453.
 8. Adane MA, Beyene BB, Kidanemariam TG. The magnitude of multidrug resistance tuberculosis and related comorbidity in Amhara Region, Ethiopia, 2010-2014. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 38.
 9. Admasu M, Kifle M, Tefera Y, Nega A, Meseret S, et al. HIV/AIDS risk perception and behavior of college students of the Metekel Zone, Benishangul Gumuz Regional State, Ethiopia. *Vulnerable Children and Youth Studies* 2016;11(2):180-192.
 10. Alemayehu A, Mihret A, Hailemichael F. Sero-prevalence and risk factors of herpes simplex virus-2 among pregnant women attending antenatal care at health facilities in Wolaita Zone, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 63.
 11. Alemu R. Comparative cross sectional study on prevalence and associated factors of anemia in HAART - naïve and HAART - experienced adults HIV patients at Zewditu Memorial Hospital, Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
 12. Alemu YM, Andargie G, Gebeye E. High incidence of tuberculosis in the absence of isoniazid and cotrimoxazole preventive therapy in children living with HIV in northern Ethiopia: a retrospective follow-up study. *PLoS One* 2016;11 (4):e0152941.
 13. Alemu YM, Awoke W, Wilder-Smith A. Correction. Determinants for tuberculosis in HIV-infected adults in northwest Ethiopia: a multicentre case-control study. *BMJ Open* 2016;6(4):e009058corr009051.
 14. Alemu YM, Awoke W, Wilder-Smith A. Determinants for tuberculosis in HIV-infected adults in northwest Ethiopia: A multicentre case-control study. *BMJ Open* 2016;6(4):e009058.
 15. Ali S, Sewunet T, Sahlemariam Z, Kibru G. *Neisseria gonorrhoeae* among suspects of sexually transmitted infection in Gambella Hospital, Ethiopia: risk factors and drug resistance. *BMC Res Notes* 2016;9(1):439.
 16. Al-Salem W, Herricks JR, Hotez PJ. A review of visceral leishmaniasis during the conflict in South Sudan and the consequences for East African countries. *Parasit Vectors* 2016;9:460.
 17. Amsalu A, Worku M, Tadesse E, Shimelis T. The exposure rate to hepatitis b and c viruses among medical waste handlers in three government hospitals, southern Ethiopia. Paper presented at the 27th Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. 69.
 18. Andualem M. Determinants of female genital mutilation in East Gojjam Zone, western Amhara, Ethiopia. *Ethiop Med J* 2106;54(3):109-116.
 19. Aniley AB, Ayele TA, Zeleke EG, Kassa AA. Factors associated with late human immunodeficiency virus (HIV) diagnosis among peoples living with it, northwest Ethiopia: hospital based unmatched case-control study. *BMC Public Health* 2016;16(1076):1-8.
 20. Argaw MD, Desale AY, Yalew AW. Prevalence and associated factors of risky sexual behaviors among in-school youth (15-24 years): The case of Lalibela Town, North Wollo Zone, Amhara Regional State, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 81.
 21. Asebe G, Gudina E. Knowledge, attitudes and practices of communities about bovine tuberculosis and associated risk factors in Gambella Region, Dsatelare Woreda, southwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. (Board) 4.
 22. Assefa NA. Cervical cancer: Ethiopia's outlook. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 96.
 23. Assen A, Molla F, Wondimu A, Abrha S, Melkam W, et al. Late presentation for diagnosis of HIV infection among HIV positive patients in South Tigray Zone, Ethiopia. *BMC Public Health* 2016;16:558.
 24. Atsbaha AH, Asmelash Dejen T, Belodu R, Getachew K, Saravanan M, et al. Sero-prevalence

- and associated risk factors for hepatitis c virus infection among voluntary counseling testing and antiretroviral treatment clinic attendants in Adwa Hospital, northern Ethiopia. *BMC Res Notes* 2016;9:121.
25. Ayele W, Lulseged S. Female genital mutilation as an issue of gender disparity in the 21st century: leveraging opportunities to reverse common trends. *Ethiop Med J* 2016;54(3):107-108.
 26. Baral S, Lyons C, Sullivan E, Kurani S, Sherwood J, et al. The uptake of population size estimation studies for key populations in guiding HIV responses across Sub-Saharan Africa: a systematic review. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEAD0306LB.
 27. Bayessa T. Assessment of magnitude of risky sexual behavior, associated factors and parenting practices among unmarried youth students. Thesis, Addis Ababa University; 2016.
 28. Bekela E, Addissie A, Gizaw M, Hirpa S. Knowledge and attitude of cervical cancer and screening among primary health care workers in West Wollega Zone, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-012.
 29. Bekele A, Ashenafi S, Aderay G, Assefa G, Assefa A, et al. Latent tuberculosis among adult Ethiopian patients at chest clinic, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Ethiop Med J* 2006;54(4):181-188.
 30. Bekele A, Mekonnen N, Tesfaye L, Taye M. Incidence and patterns of surgical glove perforations experience from Addis Ababa, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-029.
 31. Belete M. Burden of sexually transmitted diseases and risky sexual behavior among students of Addis Ababa University, Ethiopia. Thesis, Addis Ababa University; 2016.
 32. Belyhun Y, Maier M, Mulu A, Diro E, Liebert UG. Hepatitis viruses in Ethiopia: a systematic review and meta-analysis. *BMC Infect Dis* 2016;16(1):761.
 33. Berhanu A. Level of knowledge and practice of tuberculosis patients towards multidrug resistant tuberculosis prevention and associated factors at public private mix directly observed treatment facilities in Addis Ababa. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 15.
 34. Beyene W, Berhan Y, Kabeta A, Lato K. Factors associated with nutritional status of human immunodeficiency virus infected children in Hawassa University Referral Hospital, Hawassa, southern Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 110.
 35. Birhaneselassie M. Prevalence of transfusion-transmissible infections in donors to an Ethiopian blood bank between 2009 and 2013 and donation factors that would improve the safety of the blood supply in underdeveloped countries. *Lab Med* 2016;47(2):134-139.
 36. Bondyopadhyay N, Haileyesus MG, Sellers T, Kashiha J, Mbodj M, et al. Africa key population experts group: sex workers, men who have sex with men, transgender persons and people who use drugs take a lead in providing strategic direction to the HIV response in Africa. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEE533.
 37. Burnett D, Aronson J, Asgary R. Oral health status, knowledge, attitudes and behaviours among marginalized children in Addis Ababa, Ethiopia. *J Child Health Care* 2016;20(2):252-261.
 38. Busi S, Oltaye Z. Assessment of magnitude of sexually transmitted infections, sexual and reproductive health status among prisoners aged between 18-49 years in tabor prison, Hawassa, Ethiopia. *Momona Ethiopian Journal of Science* 2016;8(1):89-97.
 39. Demisse A. Women's experience of workplace sexual harassment in government institutions: the case of two institutions in Welmera Woreda, Oromia Regional State. Thesis, Addis Ababa University; 2016.
 40. Demissie DB, Abduro K, Teklu H. Intimate partner violence against married women and associated factors in Gedo Town, Oromia, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 78.
 41. Derbie A, Assefa M, Mekonnen D, Biadlegne F. Risky sexual behavior and associated factors among students of Debre Tabor University, northwest Ethiopia: a cross-sectional study. *Ethiop J Health Dev* 2016;30(1):11-18.
 42. Desalegn Z, Wassie L, Beyene HB, Mihret A, Ebstie YA. Hepatitis b and human immunodeficiency virus co-infection among pregnant women in resource-limited high endemic setting, Addis Ababa, Ethiopia: Implications for prevention and control measures. *Eur J Med Res* 2016;21:16.
 43. Dessalegn M, Daniel E, Behailu S, Wagnaw M, Nyagero J. Predictors of multidrug resistant tuberculosis among adult patients at Saint Peter Hospital Addis Ababa, Ethiopia. *Pan Afr Med J* 2016;25(Suppl 2):5.
 44. Dheresa M, Dessie Y, Oljira L, Busa N. HIV seroprevalence and sexual behaviors of Haramaya University students: implications for intervention. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 4.
 45. Dida N, Darega B, Abebe A. Treatment seeking behavior and associated factors among malaria suspected patients in Bale Zone, southeast Ethiopia: institution-based cross-sectional study.

- Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 10.
46. Djirata EA. The pattern and trends of female genital track cancer at St Paul Hospital Millennium Medical College, Ethiopian Public Health Institute Pathology Laboratory 2014-2016, Addis Sababa, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-039.
 47. Duken EE, Regea D, Siyum O. Determinants and risk of HIV infection among HIV-exposed infants in western Ethiopia. *J Int AIDS Soc* 2016;19:25.
 48. Dullo B. Prevalence of intestinal parasites and its relationship to cd4 t cell count and anemia among adults attending ART clinic in Dilla University Hospital, Gedeo Zone, SNNPR, Ethiopia. Thesis, Addis Ababa University; 2016.
 49. Fanosie A, Gelaw B, Tessema B, Tesfay W, Admasu A, et al. Mycobacterium tuberculosis complex and HIV co-infection among extrapulmonary tuberculosis suspected cases at the University of Gondar Hospital, northwestern Ethiopia. *PLoS One* 2016;11(3):e0150646.
 50. Fleming PJ, Diclemente RJ, Barrington C. Masculinity and HIV: dimensions of masculine norms that contribute to men's HIV-related sexual behaviors. *AIDS Behav* 2016;20(4):788-798.
 51. Gari T, Loha E, Deressa W, Solomon T, Hailu A, et al. Anemia and malaria among children 6-59 months old in south central Ethiopia: a community-based study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 152.
 52. Gebrecherkos T, Gelaw B, Tessema B. Smear positive pulmonary tuberculosis and HIV co-infection in prison settings of north Gondar zone, northwest Ethiopia. *BMC Public Health* 2016;16(1091):1-10.
 53. Gebremedhn G, Gebremariam TT, Wasihun AG, Dejene TA, Saravanan M. Prevalence and risk factors of methicillin-resistant *Staphylococcus aureus* colonization among HIV patients in Mekelle, northern Ethiopia. *Springer Plus* 2016;5(1):877.
 54. Gebretsadik D, Haileselassie H. The prevalence of pulmonary tuberculosis and intestinal parasitosis among ART attendant HIV patients at Kombolcha Health Center, South Wollo Zone, northeast Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 45.
 55. Geleta D, Kaufman M, Berhanu Z. Gender norms and family planning decision making among married men and women, rural Ethiopia: a qualitative study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 56.
 56. Gemechu A, Nega J. Community-based prevalence of smear positive pulmonary tuberculosis in Nirak Kebele, Abergelie Woreda, northern Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 38.
 57. Gemechu B. Assessment of nutrition status of adolescents infected with HIV. Thesis, Addis Ababa University; 2016.
 58. Gesesew H, Tsehaine B, Massa D, Tesfay A, Kahsay H, et al. The prevalence and associated factors for delayed presentation for HIV care among tuberculosis/HIV co-infected patients in southwest Ethiopia: a retrospective observational cohort. *Infect Dis Poverty* 2016;5(1):96.
 59. Gesesew H, Tsehaine B, Massa D, Tesfay A, Kahsay H, et al. The role of social determinants on tuberculosis/HIV co-infection mortality in southwest Ethiopia: a retrospective cohort study. *BMC Res Notes* 2016;9:89.
 60. Geta M, Moges F, Abat E. Sero-prevalence of hepatitis b virus infection and its associated factors among mothers living in Gondar Town, northwest Ethiopia, 2016. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-009.
 61. Getachew D, Lemma D. Prevalence of oral health related illness and associated factors among working adults in Addis Ababa, Ethiopia: longitudinal survey with cross-sectional baseline assessment Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 158.
 62. Girgis S, Gollings J, Longhurst R, Cheng L. Infant oral mutilation - a child protection issue? *BritDental J* 2016;220(7):357-360.
 63. Gobana M. Assessment of common mental disorders among HIV positive adolescents in Addis Ababa, Ethiopia: Does HIV status disclosure matter? Thesis, Addis Ababa University; 2016.
 64. Gudeta AN. Seroprevalence of toxoplasma gondii and hepatitis B virus infection among pregnant women attending antenatal clinic in selected health institutes of Jigjiga east Ethiopia. Paper presented at the International Meeting on Emerging Diseases and Surveillance; Vienna, Austria; 2016, Abstract no. 19.149.
 65. Kaba M, Taye G, Gizaw M, Mitiku I, Adugna Z, et al. Determinants of vulnerability to HIV in urban settings in Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 39.
 66. Kaba M, Taye G, Gizaw M, Mitiku I, Adugna Z, et al. A qualitative study of vulnerability to HIV infection: Places and persons in urban settings of Ethiopia. *Ethiop J Health Dev* 2016;30(3):105-111.
 67. Kangmennaang J, Osei L, Mkandawire P, Luginaah I. Circumcision status and time to sexual debut among youth in sub-saharan africa: Evidence from six demographic and health surveys. *AIDS Behav* 2016;20(11):2514-2528.
 68. Kassa D, Tilahun T, Ayalkebet A, Abreha Y, *Ethiop. J. Health Dev.* 2017;31(4)

- Mesfin G, et al. Prevalence of sexually transmitted infections (HIV, HSV-2, syphilis and HBV) in pregnant women in Ethiopia: Trends over the past 10 years (2005-2014). Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEC240.
69. Kassa GM, Degu G, Yitayew M, Misganaw W, Muche M, et al. Risky sexual behaviors and associated factors among Jiga High School and preparatory school students, Amhara Region, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 59.
 70. Kassa GM, Degu G, Yitayew M, Misganaw W, Muche M, et al. Risky sexual behaviors and associated factors among Jiga high school and preparatory school students, Amhara Region, Ethiopia. *Int Sch Res Notices* 2016;2016:4315729.
 71. Kassa S, Worku A. Prevalence of gender based violence and associated factors among females of federal police in Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 77.
 72. Kassa TA, Luck T, Bekele A, Riedel-Heller SG. Sexual and reproductive health of young people with disability in Ethiopia: a study on knowledge, attitude and practice: a cross-sectional study. *Global Health* 2016;12(1):5.
 73. Kebede HG, Seyoum H, Abebe Y, Fisseha S, Assefa D, et al. The invisible killer: a pilot project on cryptococcal meningitis screening, diagnosis and management in high volume hospitals in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. THPEE486.
 74. Kenyon CR, Tsoumanis A, Schwartz IS. A population's higher-risk sexual behaviour is associated with its average sexual behaviour-an ecological analysis of subpopulations in Ethiopia, Kenya, South Africa, Uganda and the United States. *Epidemics* 2016;15:56-65.
 75. Krsulovic FAM, Lima M. Tuberculosis epidemiology at the country scale: self-limiting process and the HIV effects. *PLoS One* 2016;11(4):e0153710.
 76. Kyu HH, Pinho C, Wagner JA, Brown JC, Bertozzi-Villa A, et al. Global and national burden of diseases and injuries among children and adolescents between 1990 and 2013: findings from the global burden of disease 2013 study. *JAMA Pediatr* 2016;170(3):267-287.
 77. Lifson AR, Workneh S, Hailemichael A, Demisse W, Slater L, et al. Implementation of a peer HIV community support worker program in rural Ethiopia to promote retention in care. *J Int Assoc Provid AIDS Care* 2017;16(1):75-80.
 78. Mamuye AT, Azaj A, Westergard R. Seroprevalence of HIV, HBV, and HCV among patients presenting to emergency department of a teaching hospital, Addis Ababa, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-045.
 79. Mamuye Y, Nigatu B, Bekele D, Getahun M. Maternal and congenital cytomegalovirus infection and zero rubella IGM prevalence in newborns in St. Paul's Hospital Millennium Medical College. *BMC Res Notes* 2016;9(1):476.
 80. Manning-Geist B, Murphy B, Comeau D, Conrad A, Chao S, et al. Predictors of medical outcome in 1,712 Ethiopian survivors of rape. *Annals of Global Health* 2016;82(3):324.
 81. Mavhandu-Mudzusi AH, Asgedom TT. The prevalence of risky sexual behaviours amongst undergraduate students in Jigjiga University, Ethiopia. *Health SA Gesondheid* 2016;21:179-186.
 82. Mengistie Z. High prevalence of *Schistosoma mansoni* and other intestinal parasites among elementary school children in southwest Ethiopia: a cross-sectional study. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 41.011.
 83. Metaferia Y, Dessie W, Ali I, Amsalu A. Seroprevalence and associated risk factors of hepatitis b virus among pregnant women in southern Ethiopia: a hospital-based cross-sectional study. *Epidemiol Health* 2016;38:e2016027.
 84. Mikus M, Drobin K, Gry M, Bachmann J, Lindberg J, et al. Elevated levels of circulating cdh5 and fabp1 in association with human drug-induced liver injury. *Liver Int* 2017;37(1):132-140.
 85. Misgana GM, Workneh T, Hordofa N, Saoudi M, Abebe G, et al. Multi-drug resistant *Mycobacterium tuberculosis* and associated risk factors in the Oromo Region of Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 42.
 86. Mitiku A, Ayele TA, Assefa M, Tariku A. Undernutrition and associated factors among adults living with human immune deficiency virus in Dembia District, northwest Ethiopia: an institution based cross-sectional study. *Arch Public Health* 2016;74:33.
 87. Mitku AA, Dessie ZG, Muluneh EK, Workie DL. Prevalence and associated factors of TB/HIV co-infection among HIV infected patients in Amhara Region, Ethiopia. *Afr Health Sci* 2016;16(2):588-595.
 88. Mohammed AE, Yewhalawork T, Seboka G. Well-designed graduation of vulnerable children critical to sustaining outcomes: an effectiveness analysis of child graduation procedures and outcomes in Ethiopia's Yekokeb Berhan program. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPEE593.
 89. Mohammed F, Assefa N. Determinants of desire for children among HIV-positive women in the Afar Region, Ethiopia: case control study. *PLoS One* 2016;11(3):e0150566.
 90. Mruts KB, G/Mariam TB. Knowledge and perception towards cervical cancer among female Debre Berhan University students. Paper presented at the 27th Annual Conference of the Ethiopian

- Public Health Association; Addis Ababa; 2016, Abstract no. 112.
91. Muche AA, Adekunle AO. A qualitative study of experience of gender-based violence among married women in Debre Tabor Town, northwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 57.
 92. Muche AA, Arowoyolu AO. Magnitude and correlates of gender-based violence among married women in northwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 50.
 93. Mulu H, Hamza L, Alemseged F. Prevalence of malnutrition and associated factors among hospitalized patients with acquired immunodeficiency syndrome in Jimma University Specialized Hospital, Ethiopia. *Ethiop J Health Sci* 2016;26(3):217-226.
 94. Mulu W, Zenebe Y, Abera B, Yimer M, Hailu T. Prevalence of human immunodeficiency virus and hepatitis b virus infections in young women seeking abortion care in Ethiopia: a cross-sectional study. *BMC Public Health* 2016;16:996.
 95. Mussa A, Mellie H, Ketema A. Risky sexual behavior and factors associated with it among public and private secondary school students in Addis Ababa: a cross-sectional comparative study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 84.
 96. Negerie K, Gizachew M, Gelaw B, Tesfa H, Getaneh A, et al. Prevalence of rifampicin mono resistant *Mycobacterium tuberculosis* among suspected cases at Gondar University Hospital, northwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 29.
 97. Odo DB, Walabu M, Markos D, Kaso M. Intention toward the continuation of female genital mutilation in Bale Zone, Ethiopia Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 72.
 98. Orlien SM, Belay NB, Ismael NY, Ahmed TA, Gundersen SG, et al. Unexplained chronic liver disease in eastern Ethiopia: a cross-sectional study. *Hepatology* 2016;64 (1 Supplement 1):904A.
 99. Ramos JM, Tissiano G, Fano H, Yohannes T, Gosa A, et al. Prevalence of positive HIV, HBY, HCV and treponemal tests in blood donors in a rural hospital in southern Ethiopia. *J Clin Virol* 2016;77:60-62.
 100. Regassa T, Chala D, Adeba E. Premarital sex in the last twelve months and its predictors among students of Wollega University, Ethiopia. *Ethiop J Health Sci* 2016;26(4):351-358.
 101. Rimal RN, Edberg MC. Improving HIV knowledge and reducing tolerance for interpersonal violence: how community characteristics shape media effects among Ethiopian women Paper presented at the American Public Health Association's 2016 Annual Meeting and Expo; Denver, CO, USA; 2016, Abstract no. Board 9.
 102. Riou J, Ait Ahmed M, Blake A, Vozlinsky S, Brichler S, et al. Hepatitis c virus seroprevalence in adults in Africa: a systematic review and meta-analysis. *J Viral Hepat* 2016;23(4):244-255.
 103. Rosis CD. Le pouvoir aux marges: Les femmes qui vivent avec le VIH, entre marginalité et mobilité sociale [power on the margins : women living with HIV, between marginality and social mobility]. *Recherches Feministes* 2016;29(2):87-104.
 104. Saudi M. Pulmonary tuberculosis and selected hematological profile among patients at selected hospitals in Oromia Regional State, Ethiopia. Thesis, Addis Ababa University; 2016.
 105. Semunigus T, Tessema B, Eshetie S, Moges F. Smear positive pulmonary tuberculosis and associated factors among homeless individuals in Dessie and Debre Birhan towns, northeast Ethiopia. *Ann Clin Microbiol Antimicrob* 2016;15(1):50.
 106. Serbessa MK, Mariam DH, Kassa A, Alwan F, Kloos H. HIV/AIDS among pastoralists and refugees in North-East Africa: a neglected problem. *Afr J AIDS Res* 2016;15(1):45-54.
 107. Sharew NT, Habtewold TD, Haile YG. Premarital sexual experience, its consequences and influencing factors among in-school youth in Shoa Robit Town, North Shoa Zone, Amhara Region, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 83.
 108. Shiferaw M, Kuma A. Assessment of the prevalence of needle sticks injury and associated factors among health care workers in South Gondar Administrative Zone, Amhara National Regional State. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 88.
 109. Shiferaw MB, Gebregergs GB, Sinishaw MA, Yesuf YA. Decreases in human immunodeficiency virus infection rates in Kombolcha, Ethiopia: a 10-year data review. *HIV/AIDS - Research and Palliative Care* 2016;8:119-124.
 110. Shiferaw N, Brooks MI, Salvador-Davila G, Lonsako S, Kassahun K, et al. Knowledge and awareness of cervical cancer among HIV-infected women in Ethiopia. *Obstet Gynecol Int* 2016;2016:1274734.
 111. Shiferaw N, Kassahun K, Asnake M. Knowledge and awareness of cervical cancer among HIV infected women in Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 1.
 112. Shiferaw S. Assessment of knowledge about cervical cancer and barriers to cervical cancer screening among HIV positive women in Addis Ababa, Ethiopia. Thesis, Addis Ababa University; *Ethiop. J. Health Dev.* 2017;31(4)

- 2016.
113. Shimelis T, Tassachew Y, Lambiyo T. Cryptosporidium and other intestinal parasitic infections among HIV patients in southern Ethiopia: significance of improved HIV-related care. *Parasit Vectors* 2016;9(1):270.
 114. Sinku Y, Gezahegn T, Gashaw Y, Workineh M, Deressa T. Seroprevalence of human immunodeficiency virus among voluntary counseling and testing clients at the University of Gondar Teaching Hospital, northwest Ethiopia. *HIV/AIDS - Research and Palliative Care* 2016;8:135-140.
 115. Slogrove A, Judd A, Leroy V. The epidemiology of perinatally HIV-infected adolescents: a cipher cohort collaboration global analysis. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEAC0301.
 116. Soboka M, Tesfaye M, Feyissa GT, Hanlon C. Khat use in people living with HIV: a facility-based cross-sectional survey from southwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 144.
 117. Tadele G. Despair and optimism: reflections on my experience of researching and publishing sexuality in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPED301.
 118. Tarekegne D, Jemal M, Atanaw T, Ebabu A, Endris M, et al. Prevalence of human immunodeficiency virus infection in a cohort of tuberculosis patients at Metema hospital, northwest Ethiopia: a 3 years retrospective study. *BMC Res Notes* 2016;9(192).
 119. Taye M. Prevalence of autoimmune hemolytic anemia in HIV infected adult individuals: a cross sectional study at Tikur nbessa Specialized Teaching Hospital from June 5 to September 10, 2015, Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
 120. Tegegne D, Abdurahaman M, Mosissa T, Yohannes M. Anti-toxoplasma antibodies prevalence and associated risk factors among HIV patients. *Asian Pac J Trop Med* 2016;9(5):460-464.
 121. Tekle K. Dating related abuse of girl students in Addis Ababa university. Thesis, Addis Ababa University; 2016.
 122. Vidovic B, Markos B, Abu El Ela A, Abouzeid G, Butale B, et al. Selling sex through the lens of those left behind: young people's experiences and needs. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. THPED363.
 123. Wachira M, Migombano M. Meeting the sexual and reproductive health, including HIV needs, of South Sudanese refugees in Gambella, Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. THPEE592.
 124. Wakwoya EB, Zewudie TA, Gebresilasie KZ. Infant feeding practice and associated factors among HIV positive mothers in Debre Markos Referral Hospital, East Gojam Zone, northwest Ethiopia. *Pan Afr Med J* 2016;24(300).
 125. Weldegebreal F, Mitiku H, Teklemariam Z. Magnitude of adverse drug reaction and associated factors among HIV-infected adults on antiretroviral therapy in Hiwot Fana Specialized University Hospital, eastern Ethiopia. *Pan Afr Med J* 2016;24:255.
 126. Weldegebreal HH. Prevalence and re-infection of *Schistosoma mansoni* among school children in Mekele Town, north Ethiopia. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 42.089.
 127. Weldemhret L, Asmelash T, Belodu R, Gebreegziabiher D. Sero-prevalence of HBV and associated risk factors among HIV positive individuals attending ART clinic at Mekelle Hospital, Tigray, northern Ethiopia. *AIDS Res Ther* 2016;13:6.
 128. Woldesonbet ZD. Epidemiology of needle stick-sharp injuries (NSSI) and potential high risk exposures among health professionals in Ethiopia: neglected public health concern. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 42.090.
 129. Woldesonbet ZD. Hepatitis b and human immunodeficiency virus co-infection among pregnant women in resource limited high endemic setting, Addis Ababa, Ethiopia: implications for current and emerging prevention and control measures. *International Journal of Infectious Diseases* 2016;45:204.
 130. Woldesonbet ZD. Hepatitis B and human immunodeficiency virus co-infection among pregnant women in resource limited high endemic setting, Addis Ababa, Ethiopia: implications for current and emerging prevention and control measures. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 41.281.
 131. Woldesonbet ZD. Survey of hepatitis b surface antigen (HBSAG) prevalence and its risk factors among pregnant women at Bishoftu Hospital, Oromia Regional State, Ethiopia. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 43.241.
 132. Workneh MH, Bjune GA, Yimer SA. Diabetes mellitus is associated with increased mortality during tuberculosis treatment: a prospective cohort study among tuberculosis patients in south-eastern Amhara Region, Ethiopia. *Infect Dis Poverty* 2016;5:22.
 133. Wudineh F, Dامتew B. Mother-to-child transmission of HIV infection and its determinants among exposed infants on care and follow-up in Dire Dawa City, eastern Ethiopia. *AIDS Res Treat* 2016;2016:3262746.

134. Yimer NB, Kumsa H, Mulugeta M, Sisay Y. Prelacteal feeding practices and associated factors among mothers of children aged less than 24 months in Woldia, Kobo and Lalibela, northeastern Ethiopia: a community based cross-sectional study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016.
135. Yizengaw HA. Seroprevalence of immunoglobulin G and of immunoglobulin M anti-toxoplasma gondii antibodies in human immunodeficiency virus infection/acquired immunodeficiency syndrome patients at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *Value in Health* 2016;19 (3):A214.
136. Zenebe Y, Adem Y, Mekonnen D, Derbie A, Bereded F, et al. Profile of tuberculosis and its response to anti-TB drugs among tuberculosis patients treated under the TB control programme at Felege-Hiwot Referral Hospital, Ethiopia. *BMC Public Health* 2016;16(688).
137. Zewoldie AZ. Prevalence of transfusion-transmissible infections among blood donors and strategy on direct laboratory testing cost of blood screening at the Ethiopian National Blood Bank Center, Addis Ababa, Ethiopia. *Transfusion* 2016;56:192A.

Section 3: Impact Research

This section covers studies of the demographic, social, psychological, and economic impacts of HIV/AIDS on individuals, families, communities, institutions and the nation.

This section includes 24 references to impact studies, 7 more than in the 2015 Update. Eleven of the studies dealt with mortality and survival from AIDS and TB (1-4, 6-8,14,16,19), mental health and quality of life (15,20,21,24), socioeconomic impacts (12,17,23), HIV and TB impacts on disease burden and other diseases (9,11,13,18,22), and the impact of HIV stigma on ART clients (10) and suicide (5).

Most studies of health impacts emphasized the need to diagnose health conditions and initiate appropriate counseling and treatment activities early to reduce morbidity and mortality levels (5,9,14,16,19,22) and reported on mortality and survival of patients with ART/TB coinfections (1,2,4,11,14,16) and on mental health impacts of HIV and AIDS (5,15,20,21,24).

A national burden of disease and injuries study using Global Burden of Disease data from 2013 (4) and various statistical estimation methods and age standardized data showed reduction of HIV/AIDS by 63% and of tuberculosis by 66% between 2005 and 2013. Contrary to these results, a longitudinal community-based study, using the verbal autopsy method reported that mortality from tuberculosis consistently increased during the six-year study period (2). Gebremariam et al. (11), in a 6-year retrospective study, found that TB patients who did not know their HIV status were significantly more likely to default and transfer out of treatment. These findings

reemphasize the need for integrated HIV/TB testing at treatment initiation.

Five studies addressed mental health challenges faced by HIV/AIDS patients, an increasingly important issue in the ART era. Tesfaye et al. (21) found a strong link between food insecurity, mental health and quality of life. Vo et al. (24) reported significant higher overall function and life satisfaction scores than men. Whereas Surur (15) found no significant association between illness conditions and quality of life in a HIV/AIDS patient population in generally good health, Tesfaw et al. (20) reported a strong link between HIV stage III and depression and anxiety. Both studies identified different independent factors that were significantly associated with quality of life. Bitew et al. (5) reported that one-third of people living with HIV contemplated and 20% attempted suicide and called for early screening, treatment and referral of suicidal patients.

Three studies addressed socioeconomic impacts of HIV on the livelihoods of individuals and interventions at the community level. Tsiko (23) addressed the issue of access to land by HIV-infected women. He found that both urban and rural women had more access to own land than to acquire family land, indicating stigma and social ostracism against HIV-positive women. The impacts of HIV infection on socioeconomic conditions infected people reported by Hailu (12) were also reported by earlier studies. A sociological study of five Ethiopian NGOs engaged in strengthening of livelihoods in communities affected by HIV/AIDS reported suboptimal results of their programs due to deficient design, implementation, monitoring and evaluation of the interventions, which resulted in inadequate interactions between the NGOs and the communities (17).

One study reported on the impact of HIV stigma on treatment outcome. Fido et al. (10) found significant associations between duration of ART use and all three types of stigma (experienced, internalized, and perceived stigma), again emphasizing the need for early HIV counseling of new ART patients.

One of the first studies in Ethiopia of the association between undernutrition with increased risk of death at the initiation of ART indicates the need to integrate nutrition counseling at all stages of ART implementation to improve treatment outcome (19). Several maternal and pediatric studies addressed various issues related to HIV. Assefa et al. (3) found formula-fed infants to have four times lower risk of HIV infection than breast-fed infants and called for stepped up efforts to provide ARV for HIV-positive mothers to reduce the risk of mother-to-child transmission. However, there is a need to conduct additional studies in rural areas, where safe bottle feeding may be compromised by unsafe water, as reported in earlier studies. Bohn et al. (6) reported the highest mortality rates from all causes, including HIV/AIDS, early during hospitalization in a hospital in Addis Ababa. Deribew et al. (8), using various data sources, found that mortality from all causes in

Ethiopia in under 5-year olds declined from 20.05 per 100,000 to 16.67/100,000 between 1990 and 2013.

We are advising readers to visit other sections, which contains additional references to studies reporting on HIV linked mortality, morbidity, and other socio-economic impacts on patients, their families, communities, and the nation.

1. Abebe Y. Survival and its determinant of multi-drug resistant TB patients with HIV/AIDS co-infection at St. Peter TB Specialized Hospital, Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
2. Ashenafi W, Eshetu F, Assefa N, Oljira L, Baraki N, et al. Double burden of disease as cause of adult mortality: evidence from verbal autopsy analysis in Kersa health and demographic surveillance. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 104.
3. Assefa M, Worku A. Survival and morbidity of breastfeeding versus formula feeding infants and young children of HIV-infected women who were on prevention of mother to child transmission follow-up in selected health facilities in Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 96.
4. Beyene Y, Geresu B, Mulu A. Mortality among tuberculosis patients under dots programme: a historical cohort study. *BMC Public Health* 2016;16:883.
5. Bitew H, Andargie G, Tadesse A, Belete A, Fekadu W, et al. Suicidal ideation, attempt, and determining factors among HIV/AIDS patients, Ethiopia. *Depress Res Treat* 2016;2016:8913160.
6. Bohn JA, Kassaye BM, Record D, Chou BC, Kraft IL, et al. Demographic and mortality analysis of hospitalized children at a referral hospital in Addis Ababa, Ethiopia. *BMC Pediatr* 2016;16(1):168.
7. Bohn JA, Record DA, Kassaye BM, Mesfin HA, Chou BC, et al. Demographic and mortality analysis of hospitalized children at a referral hospital in Addis Ababa, Ethiopia. *Annals of Global Health* 2016;82(3):378.
8. Deribew A, Tessema GA, Deribe K, Melaku YA, Lakew Y, et al. Trends, causes, and risk factors of mortality among children under 5 in Ethiopia, 1990-2013: findings from the global burden of disease study 2013. *Popul Health Metr* 2016;14:42.
9. Feleke BE. Maternal HIV status affects the infant hemoglobin level: a comparative cross-sectional study. *Medicine (Baltimore)* 2016;95(31):e4372.
10. Fido NN, Aman M, Brihnu Z. HIV stigma and associated factors among antiretroviral treatment clients in Jimma Town, southwest Ethiopia. *HIV/AIDS - Research and Palliative Care* 2016;8:183-193.
11. Gebremariam G, Asmamaw G, Hussen M, Hailemariam MZ, Asegu D, et al. Impact of HIV status on treatment outcome of tuberculosis patients registered at Arsi Negele Health Center, southern Ethiopia: a six year retrospective study. *PLoS One* 2016;11(4):e0153239.
12. Hailu B. The current socio-economic condition of people living with HIV/AIDS: the case of Guder town. Thesis, Addis Ababa University; 2016.
13. Misganaw A, Nagavi M. National burden of diseases and injuries: findings from global burden of diseases 2013 study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 111.
14. Reepalu A, Balcha TT, Skogmar S, Guner N, Sturegard E, et al. Factors associated with early mortality in HIV-positive men and women investigated for tuberculosis at Ethiopian health centers. *PLoS One* 2016;11(6):e0156602.
15. Surur AS. Health-related quality of life of HIV/AIDS patients on highly active anti-retroviral therapy at a university referral hospital in Ethiopia. *Value in Health* 2016;19(3):A95.
16. Tachbele E, Ameni G. Survival and predictors of mortality among human immunodeficiency virus patients on anti-retroviral treatment at Jinka hospital, South Omo, Ethiopia: a six years retrospective cohort study. *Epidemiol Health* 2016;38:e2016049.
17. Tadele G, Ayalew A, Loevinsohn M. (re)building livelihoods of communities confronting HIV and AIDS in Ethiopia. *Eastern Africa Social Science Research Review* 2016;32(1):63-91.
18. Tegene E, Belachew T. Prevalence and patterns of cardiac diseases among HIV infected people following antiretroviral clinic at Jimma University specialized hospital, southwest Ethiopia. *Global Heart* 2016;1:e26.
19. Tesfamariam K, Baraki N, Kedir H. Pre-ART nutritional status and its association with mortality in adult patients enrolled on ART at Fiche Hospital in North Shoa, Oromia Region, Ethiopia: a retrospective cohort study. *BMC Res Notes* 2016;9(1):512.
20. Tesfaw G, Ayano G, Awoke T, Assefa D, Birhanu Z, et al. Prevalence and correlates of depression and anxiety among patients with HIV on-follow up at Alert Hospital, Addis Ababa, Ethiopia. *BMC Psychiatry* 2016;16(1):368.
21. Tesfaye M, Kaestel P, Olsen MF, Girma T, Yilma D, et al. Food insecurity, mental health and quality of life among people living with HIV commencing antiretroviral treatment in Ethiopia: a cross-sectional study. *Health Qual Life Outcomes* 2016;14:37.
22. Tsegaw M, Andargie G, Alem G, Tareke M. Screening HIV-associated neurocognitive disorders (hand) among HIV- positive patients attending antiretroviral therapy in South Wollo, Ethiopia. *J Psychiatr Res* 2017;85:37-41.
23. Tsiko RG. Geographically weighted regression of determinants affecting women's access to land in Africa. *Geosciences* (2076-3263) 2016;6(1):1-26.
24. Vo QT, Hoffman S, Nash D, El-Sadr WM, Tymejczyk OA, et al. Gender differences and psychosocial factors associated with quality of life among ART initiators in Oromia, Ethiopia. *AIDS*

Behav 2016;20(8):1682-1691.

Section 4: Prevention Research

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

This section summarizes 51 papers that focus on HIV prevention that were published, presented at conferences or produced for partial fulfillment of Masters of Public Health training during 2016. Updates in this section are classified as theses (12), papers presented at national as well as international conferences (19) and published articles in peer reviewed journals (20). All the papers were outcomes of cross sectional studies except one (34), a randomized control trial. This control trial looked into the persistent educational activities and its implication on HIV testing.

The papers in this section were categorized into sexual behavior including contraceptives, reproductive and condom (12), social and behavioral change communication and knowledge, attitudes and practices as relates to HIV and AIDS (10), male/partner involvement in HIV intervention including in PMTCT (5), cervical cancer and HIV focusing on single visit services (4) adherence to treatment (3), VCT (2) and others (single references on TB-HIV, breast feeding, PICT, and lost to follow-up).

The sexual behavior including contraceptives (1, 3, 6, 20, 22, 28, 33, 40, 41, 43, 48 and 50) highlighted various areas related to condom, family planning and other contraceptive service use among those who live with the virus. The second set of references was on social behavioral change communication including knowledge, attitude and practices related to HIV and AIDS (3,11,13,15,16,17,18, 30, 37 and 49). Papers in this category mainly addressed behavior change strategies/approaches, interventions and impacts, predictors of behavior change. In this section, one paper took behavior change communication and KAP to providers where communications and language use in a medical setting was addressed (16).

Male/partner involvement (4, 27, 35, 46 and 51) is another category in this section that focuses on role of male/partner in PMTCT and VCT service use and partner notification. One of the papers in this category assessed progress, impact and next steps in rolling out medical male circumcision for HIV prevention in 14 priority countries of Eastern and Southern Africa. This is believed to shade light on prevailing practices on medical male circumcision and next steps.

In this update a new area of research output on single visit service for cervical cancer and HIV testing (7, 25,

32 and 44) was recorded. Lessons drawn from prevention of cervical cancer, screening experiences and documentation of years of the single visit approach to cervical cancer were the major focus. Three papers on levels of adherence and predictors were recorded in this section (9, 10, 47).

Unlike previous years', research interest in voluntary counseling and testing, TB-HIV co-infection, breast feeding and PICT was limited during this year. There were only 2 papers (14,45) that focused on factors affecting VCT uptake, two papers on TB-HIV co-infection (8,21) one focusing on the practice of TB contact screening and childhood isoniazid preventive therapy while another one documented the evolution of Mycobacterium TB and implication for vaccine development. One paper each was found on predictors of exclusive breastfeeding (5) and predictors of provider -initiated HIV counseling and testing refusal among out-patients (19).

1. Abebe A. Assessment of consistent and correct condom use among commercial sex workers (CSWs) in Addis Ababa, Ethiopia: a case control study comparing CSWs on intervention and out of intervention. Thesis, Addis Ababa University; 2016.
2. Abiye A. A study of the social and behavioral change communication strategies of Ethiopia to prevent HIV/AIDS. Thesis, Addis Ababa University; 2016.
3. Alemu T. Modern contraceptive use by female ART attendants in Arada sub-city, Addis Ababa, Ethiopia: A cross sectional study. Thesis, Addis Ababa University; 2016.
4. Amano A, Musa A. Male involvement in PMTCT and associated factors among men whom their wives had ANC visit 12 months prior to the study in Gondar Town, north west Ethiopia, December, 2014. *Pan Afr Med J* 2016;24:239.
5. Arage G, Gedamu H. Exclusive breast feeding practice and its associated factors among mothers of infants less than six month of age in Debre Tabor Town, northwest Ethiopia: a cross sectional study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 15.
6. Asimamaw B. The role of peers in influencing adolescents' sexual behavior in the case of Beshale secondary and preparatory school. Thesis, Addis Ababa University; 2016.
7. Asnake M, Kassahun K, Shiferaw N, Belayihun B. "Addis tesfa" (new hope) project's lesson on the prevention of cervical cancer in Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 103.
8. Assefa B. The practice of TB contact screening and childhood isoniazid preventive therapy (IPT) in Addis Ababa. Thesis, Addis Ababa University; 2016.
9. Ayele HT, Mourik MSV, Bonten M. Predictors of adherence to isoniazid preventive therapy in HIV

- patients in Ethiopia: a prospective cohort study. Paper presented at the 17th International Congress on Infectious Diseases; Hyderabad, India; 2016, Abstract no. 43.089.
10. Ayele HT, van Mourik MS, Bonten MJ. Predictors of adherence to isoniazid preventive therapy in people living with HIV in Ethiopia. *Int J Tuberc Lung Dis* 2016;20(10):1342-1347.
 11. Bekalu MA, Eggermont S, Viswanath KV. HIV/AIDS communication inequalities and associated cognitive and affective outcomes: a call for a socioecological approach to AIDS communication in Sub-Saharan Africa. *Health Commun* 2017;32(6):685-694.
 12. Bezabih T, Menbere M-S. Participation in economic strengthening (ES) intervention and health related quality of life (HRQOL) among food insecure people living with HIV (PLHIV) in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPED350.
 13. Biock G, Miligo B, Saha A, Sellers T. Peer to peer learning on preventing anti-homosexuality bills: the DR Congo and Burkina Faso case study. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPED412.
 14. Bizuayehu HM. Voluntary HIV counseling and testing services utilization among pregnant women in northwest Ethiopia in 2014. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 9.
 15. Degefa N. Assessment of knowledge, attitude, and preventive practices towards sexually transmitted infections among Arsi Negelle Kiture preparatory school students, West Arsi Zone, Oromia, Ethiopia, 2016. Thesis, Addis Ababa University; 2016.
 16. Desalegn A. "A stitch in time saves nine": TB, communication and language in medical settings in Harari Region. Thesis, Addis Ababa University; 2016.
 17. Ebrahim NB, Davis S, Tomaka J. Attitude as a mediator between acculturation and behavioral intention. *Public Health Nurs* 2016;33(6):558-564.
 18. Evangeli M, Pady K, Wroe AL. Which psychological factors are related to HIV testing? a quantitative systematic review of global studies. *AIDS Behav* 2016;20(4):880-918.
 19. Facha W, Kassahun W, Workicho A. Predictors of provider-initiated HIV testing and counseling refusal by outpatient department clients in Wolaita Zone, southern Ethiopia: a case control study. *BMC Public Health* 2016;16:783.
 20. Fetene N. Assessment of the effect of youth centers on reduction of risky sexual behaviors among youth in Addis Ababa, 2016. Thesis, Addis Ababa University; 2016.
 21. Gagneux S. Evolution of Mycobacterium tuberculosis and implications for vaccine development. *Ethiop Med J* 2016;54(2):95-100.
 22. Gelaw B. Assessment of magnitude and factors affecting intention of women living with HIV to use long-acting and permanent family planning methods in Addis Ababa City government public health hospitals, Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 13.
 23. Geletu ZA, Kowalski M, Tesfaye A, Umer S. Reaching key populations in urban settings through home-based HIV testing and counseling by urban health extension professionals in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. THPEE516.
 24. Genetu H, Yenit MK, Tariku A. Breastfeeding counseling and support are associated with continuous exclusive breastfeeding from one week to six months of age among HIV exposed infants in North Gondar Zone, Ethiopia: a cross-sectional study. *Int Breastfeed J* 2016;12:21.
 25. Getachew E. Knowledge, attitudes and practices on cervical cancer and screening among reproductive health service clients, Addis Ababa, Ethiopia, 2015. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 12.
 26. Girma A. Assessment of PMTCT and ART services in Hawassa Health Centre, Ethiopia. Paper presented at the American Public Health Association's 2016 Annual Meeting and Expo; Denver, CO, USA; 2016, Abstract no. Board 4.
 27. Harling G, Barnighausen T. The role of partners' educational attainment in the association between HIV and education amongst women in seven sub-saharan african countries. *J Int AIDS Soc* 2016;19(1):20038.
 28. Hawulte B, Degefa B. Family planning use among women seeking abortion care in Harar health facilities, Harar Town, eastern Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016.
 29. Imana G, Hamza L, Woldemichael K. Isoniazid preventive therapy utilization rate and associated factors in adult HIV/AIDS patients in Jimma University Specialized Hospital ART clinic: a cross-sectional study. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P013.
 30. Jani N, Vu L, Kay L, Habtamu K, Kalibala S. Reducing HIV-related risk and mental health problems through a client-centered psychosocial intervention for vulnerable adolescents in Addis Ababa, Ethiopia. *J Int AIDS Soc* 2016;19(5 Suppl 4):20832.
 31. Kassahun K, Asnake M, Shiferaw N. The role of community support groups in strengthening cervical cancer prevention services in Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 6.

32. Kassahun K, Shiferaw N, Tilahun Y, Lew C, Osakwe C, et al. From pilot to national scale up: the legacy of pathfinder international-Ethiopia's single visit approach for cervical cancer prevention among HIV-positive women. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPEE533.
33. Ketema A. Assessment of effects of exposure to sexually explicit materials on early sexual initiation and other risky sexual behavior. Thesis, Addis Ababa University; 2016.
34. Kim HB, Haile B, Lee T. Promotion and persistence of HIV testing and HIV/AIDS knowledge: Evidence from a randomized controlled trial in Ethiopia. *Health Econ* 2017;26(11):1394-1411.
35. Kripke K, Njehumeli E, Samuelson J, Schnure M, Dalal S, et al. Assessing progress, impact, and next steps in rolling out voluntary medical male circumcision for HIV prevention in 14 priority countries in eastern and southern Africa through 2014. *PLoS One* 2016;11(7):e0158767.
36. Mark D, Ngombe A, Burford G, Renaud N, Djoumessi V, et al. Project reach: a facility-based peer support model across 20 facilities in five Sub-Saharan African countries. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEB126.
37. Mekonnen S. Analysis of HIV/AIDS prevention messages communicated to university students: message framing in focus. Thesis, Addis Ababa University; 2016.
38. Mitiku I, Arefayne M, Mesfin Y, Gizaw M. Factors associated with loss to follow-up among women in option B+ PMTCT programme in northeast Ethiopia: a retrospective cohort study. *J Int AIDS Soc* 2016;19(1):20662.
39. Negash TG, Ehlers VJ. An assessment of the outcomes of prevention of mother-to-child transmission of HIV services in Addis Ababa, Ethiopia. *Curationis* 2016;39(1):1583.
40. Negash W, Dessalegn M, Yitayew B, Demsie M, Wagnew M, et al. Reproductive health service utilization and associated factors: the case of North Shewa Zone youth, Amhara Region, Ethiopia. *Pan Afr Med J* 2016;25(Suppl 2):3.
41. Nigussie TS. Factors affecting contraceptive use among women of reproductive age group in Surma Woreda, southwestern Ethiopia: cross-sectional community based study. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P022.
42. Samuel M. Determinants of condom use among Addis Ababa university students: The case of students in the main campus. Thesis, Addis Ababa University; 2016.
43. Shiferaw N, Salvador-Davila G, Kassahun K, Brooks MI, Weldegebreal T. The single-visit approach as a cervical cancer prevention strategy among women with HIV in Ethiopia: successes and lessons learned. *Global Health: Science and Practice* 2016;4(1):87-98.
44. Teklehaimanot HD, Teklehaimanot A, Yohannes M, Biratu D. Factors influencing the uptake of voluntary HIV counseling and testing in rural Ethiopia: a cross sectional study. *BMC Public Health* 2016;16(239):1-13.
45. Tsadik M. Partner notification for sexually transmitted infections is an overlooked strategy in Ethiopia Paper presented at the National STD Prevention Conference; Atlanta, GA, USA; 2016, Abstract no. WP6.
46. Tsegaye D, Deribe L, Wodajo S. Levels of adherence and factors associated with adherence to option B+ prevention of mother-to-child transmission among pregnant and lactating mothers in selected government health facilities of South Wollo Zone, Amhara Region, northeast Ethiopia, 2016. *Epidemiol Health* 2016;38:e2016043.
47. Van Renterghem H, Benedikt C, Deperthes B, Dallabetta G, Broxton C, et al. Estimating condom needs and gaps for fast-tracking people-centred condom programming in Sub-Saharan Africa. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. LBPE025.
48. Yilma S. Assessment of knowledge, attitude, and intention to use long acting and permanent contraceptive methods among women in HIV chronic care. Thesis, Addis Ababa University; 2016.
49. Zemenu S, Tizta T, Mulusew G. Contraceptive discontinuation and patterns of method switching among women of reproductive age in Jimma Town, southwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 76.
50. Zenebe A, Gebeyehu A, Derseh L, Ahmed KY. Male partner's involvement in HIV counselling and testing and associated factors among partners of pregnant women in Gondar Town, northwest Ethiopia. *J Pregnancy* 2016;2016:3073908.

Section 5: Treatment, Care and Clinical Research

This section includes studies in the characteristics and clinical course of HIV infection and opportunistic infections, treatment of 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.

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

This section contains 103 references in this category, 35 fewer than in the 2015 update. Sixty-one are published documents, all except 1 of them journal articles, 33 are conference abstracts and the remaining 9 are masters theses. The most common research topics

in this Update are treatment outcome (30 references), adherence to treatment, attrition and loss to follow-up (21 references), and clinical and antiretroviral drug evaluation studies (3, 23, 26,29, 30, 45, 65, 70, 73, 76, 80, 94, 98).

Most studies of treatment outcome dealt with treatment of HIV/TB and HIV/hepatitis B coinfections (5, 15, 31, 36, 74, 98, 100), TB treatment (3, 12, 13, 28, 53, 62, 82, 83, 102, 103), ART failure (14, 27, 35, 66, 88), ART treatment (24, 42, 54, 55), chronic care of HIV-infected persons (1, 41, 44, 90, 96,97), including one study on client satisfaction (97) and one on accessibility of HIV/AIDS treatment (96), which are two understudied issues, and causes and outcomes of the timing of initiating drug therapy (16, 36, 63, 92). Three studies reported on the difficulties of treating visceral leishmaniasis (49, 76, 798) and one study on the impact of visceral leishmaniasis treatment on poor treatment outcome in HIV patients (4).

This Update presents additional studies of the role of different aspect of nutrition status and food supplementation in the treatment process, including the impact of therapeutic food on ART outcome and patient retention (20, 39), the impact of HAART on nutritional and immunological status in HIV-infected children (23), on vitamin D levels (99) and anthropometric parameters (78). Other studies investigated the role of ART on hematological abnormalities (29), anemia (61), metabolic syndrome (38), atherosclerosis (34), hepatitis B genome variability (1), renal and liver function (94,98), pre-term births (60) and quality of life (68).

Several studies measured the progression of ART in patients. Three studies modeled CD4 counts in HIV-positive individuals on ART (33, 72, 75). Wondafrash et al. (93) evaluated the dried blood spot test in testing the viral treatment status of HIV-exposed children. Kalibala et al. (41) evaluated several algorithms for HIV care and treatment. A global study of research on scaling up access to HIV viral load testing for patients receiving ART emphasized the crucial need for early ART initiation through universal access and equity of viral load testing for HIV treatment monitoring to meet the UN Program on HIV/AIDS 90-90-90 goals by 2020 (69). Mamuye et al. (48) recommended the use of fingerstick whole blood samples of HIV patients for on-site diagnosis of cryptococcal meningitis.

The nine maternal and pediatric studies in this section are in line with an increase of these studies since the 2013 Update. Two studies each examined adherence of children to ART (8,21) and chronic care of HIV-exposed and sick children (36,44). Additional studies reported on testing children on ART to monitor their treatment status ((93), the effect of ART on the clinical interventions (40), ART adherence of pregnant and lactating mothers in a PMTCT program (89), the association between protease inhibitor based ART during pregnancy and pre-term birth (6) and a study of

outcome of tympanoplasty, which showed higher treatment failure among HIV-infected children (40).

One study reported no significant differences in treatment outcomes between new HIV patients in primary health care facilities and hospitals (51). These results contradict the widely held belief that hospitals provide better treatment for HIV-infected persons but additional studies are required to validate these findings.

Most studies of the continuum and interruption of ART and TB drug treatment focused on adherence/discontinuation and its associated factors (8,17,21,25,32,47,50,52,56,64,85,87,89,90) and the relationship between adherence and treatment outcome (16,18,20, 28, 69,74). One study examined adherence to isoniazid preventive therapy by AIDS patients (15).

A number of studies addressed perceptions about ART and TB treatment delays and methods to increase and monitor adherence. Tymejczyk et al. (90) found that few adults initiating ART believed that if can prevent sexual transmission of HIV and many thought that holy water (*tsebel*) could cure AIDS. Erku et al. found stigma to cause interruption of ART adherence (25). Tiruneh et al. (85) attributed daily irregularities in adherence to dose schedules to patients' perception and beliefs. Tola et al. (87) found that psychological and educational interventions guided by the Health Belief Model significantly reduced non-adherence to TB treatment, indicating the usefulness of behavioral theories in routine treatment strategy. Wondiye et al. (95), using the grounded theory approach, examined a wide range of barriers to ART, including individual, medical, environmental and economic factors. These various results have potential application for behavioral interventions addressing non-adherence to ART, which continues to be high in Ethiopia and many other countries. Salla Munro et al., in a review of health behavior theories to promote long-term medication adherence for TB and HIV/AIDS, BMC Public Health, 2007, examined 11 theories and called for urgent research and analysis to identify the models which may be most effective in improving adherence to treatment regimens for chronic infectious diseases.

Several studies evaluated recently developed methods to monitor and facilitate ART adherence. Platt et al. (71) found multiplex cathepsin zymography to be a reliable and low-cost electrophoresis-based assay for monitoring ART adherence in resource limited settings. Mekuria et al. (56-58) used mixed methods to identify the most reliable adherence measure. Two studies reported on the acceptability of using text messages to send medication reminders to patients on ART (43) and on the effectiveness of ART adherence supporters in re-enlisting patients lost to care (79). Biru et al. (24) advocated large-scale studies using a combination of adherence measuring methods to more precisely define the extent and predictors of ART non-adherence.

The remaining studies in this section addressed cost-effective and economic aspects of treatment (6,19) and self-medication practices among university students (9).

1. Aantjes CJ, Quinlan TKC, Bunders JFG. Chronic care in Africa: how the experience with expanding antiretroviral treatment programmes for HIV can serve patients with other chronic conditions. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPEE527.
2. Adere AB. Quality of sexually transmitted infections (STIs) case management was found poor in health care facilities of Adama Town, eastern Ethiopia 2015; the missed opportunity to control HIV epidemic. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-002.
3. Admassu Z. Factor influencing sputum smear conversion at the end of two months of tuberculosis treatment among new smear positive pulmonary tuberculosis patients in an Addis Ababa public health center. Paper presented at the American Public Health Association's 2016 Annual Meeting and Expo; Denver, CO, USA; 2016, Abstract no. Board 2.
4. Alemayehu M, Wubshet M, Mesfin N. Magnitude of visceral leishmaniasis and poor treatment outcome among HIV patients: meta-analysis and systematic review. *HIV AIDS* 2016;8:75-81.
5. Ali SA, Mavundla TR, Fantu R, Awoke T. Outcomes of TB treatment in HIV co-infected TB patients in Ethiopia: a cross-sectional analytic study. *BMC Infect Dis* 2016;16(1):640.
6. Amogne W. Investigating cost-effective strategies towards chronic hepatitis B treatment in Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-57.
7. Anlay DZ, Alemayehu ZA, Dachew BA. Rate of initial highly active anti-retroviral therapy regimen change and its predictors among adult HIV patients at University of Gondar Referral Hospital, northwest Ethiopia: a retrospective follow up study. *AIDS Res Ther* 2016;13:10.
8. Arage G, Assefa G, Kassa H. Adherence to antiretroviral therapy and its associated factors among children at South Wollo Zone Hospital, northeast Ethiopia: a cross-sectional study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 15.
9. Argaw MD, Bekele S, Yalew A. Magnitude and factors associated with self-medication practices among university students: the case of Arsi University, College of Health Science, Asella, Ethiopia. Paper presented at the American Public Health Association's 2016 Annual Meeting and Expo; Denver, CO, USA; 2016, Abstract no. Board 4.
10. Aschalew J. Comparative study on changes in hematological parameters during the first six months of ART initiation among HIV infected pregnant and non-pregnant women at Zewditu Memorial Hospital, Addis Ababa, Ethiopia. Thesis, Addis Ababa University; 2016.
11. Asefa W, Tsegaye D, Dalebout S, Ahmed E. Improving adherence to antiretroviral therapy in Namibia. *Health Aff (Millwood)* 2016;35(12):2348.
12. Asres A, Deressa W, Jerene D. Treatment outcomes of six and eight months tuberculosis treatment regimens in districts of southwestern Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 41.
13. Asres A, Jerene D, Deressa W. Tuberculosis treatment outcomes of six and eight month treatment regimens in districts of southwestern Ethiopia: a comparative cross-sectional study. *BMC Infect Dis* 2016;16(1):653.
14. Ayalew MB, Kumilachew D, Belay A, Getu S, Teju D, et al. First-line antiretroviral treatment failure and associated factors in HIV patients at the university of Gondar Teaching Hospital, Gondar, northwest Ethiopia. *HIV/AIDS - Research and Palliative Care* 2016;8:141-146.
15. Ayele HT, Mourik MSV, Bonten M. Predictors of adherence to isoniazid preventive therapy in HIV patients in Ethiopia: a prospective cohort study. *Int J Infect Dis* 2016;45:386-386.
16. Belachew S, Addissie A, Ayele W. Case control study of factors contributing to late diagnosis of cervical cancer in public hospitals of Addis Ababa, Ethiopia, 2015.I. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 107.
17. Belyhun Y, Maier M, Liebert UG. HIV therapy with unknown HBV status is responsible for higher rate of HBV genome variability in Ethiopia. *Antivir Ther* 2017;22(2):97-111.
18. Bezabhe WM, Chalmers L, Bereznicki LR, Gee P, Peterson GM. Antiretroviral adherence and treatment outcomes among adult Ethiopian patients. *AIDS Care* 2016;28(8):1018-1022.
19. Bezabih T. The effect of engagement in economic strengthening interventions on ART adherence in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. THPEE524.
20. Bhagavathula AS, Tegegn HG, Dawson A, Elnour AA, Shehab A. Retention and treatment outcomes of an undernutrition program for HIV patients involving ready-to-use therapeutic food at Gondar University Hospital, Ethiopia: a cross-sectional study. *J Clin Diagn Res* 2016;10(8):Lc01-06.
21. Biru M, Jerene D, Lundqvist P, Molla M, Abebe W, et al. Caregiver-reported antiretroviral therapy non-adherence during the first week and after a month of treatment initiation among children diagnosed with HIV in Ethiopia. *AIDS Care* 2017;29(4):436-440.
22. Crum-cianflone N, Sullivan E. Meningococcal vaccinations. *Infect Dis Therapy* 2016;5(2):89-112.

23. Ebissa G, Deyessa N, Biadgilign S. Impact of highly active antiretroviral therapy on nutritional and immunologic status in HIV-infected children in the low-income country of Ethiopia. *Nutrition* 2016;32(6):667-673.
24. Elbirt D, Inberg Y, Mahlab-Guri K, Asher I, Bezalel-Rosenberg S, et al. Why do HIV/AIDS patients fail? Incidence, causes, demographic, immunologic and clinical characteristics of HIV patients who fail to achieve complete virologic suppression. *J Int AIDS Soc* 2016;19:106.
25. Erku DA, Mekuria AB, Gebresillassie BM. Perceived HIV stigma as a barrier to sustained ART adherence in north west Ethiopia: a cohort study. *Value in Health* 2016;19(3):A219.
26. Fiseha T, Gebreweld A. Urinary markers of tubular injury in HIV-infected patients. *Biochem Res Int* 2016;2016:1501785.
27. Gashaw K, Haile D, Takele A, Demelash H, Nigatu D. Predictors of treatment failure among adult antiretroviral treatment (ART) clients in Bale Zone Hospital, southeastern Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 118.
28. Gebreegziabher SB, Bjune GA, Yimer SA. Total delay is associated with unfavorable treatment outcome among pulmonary tuberculosis patients in West Gojjam Zone, northwest Ethiopia: a prospective cohort study. *PLoS One* 2016;11(7):e0159579.
29. Gebre E Gziabher Y, Melku M, Addis Z, Tadele A. Hematological abnormality and associated factors among children in antiretroviral therapy naive and on highly active antiretroviral therapy at Felege Hiwot Referral Hospital, Bahir Dar, northwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 23.
30. Gebresillassie BM, Gebeyehu MB, Abegaz TM, Erku DA, Mekuria AB, et al. Evaluation of cotrimoxazole use as a preventive therapy among patients living with HIV/AIDS in Gondar University Referral Hospital, northwestern Ethiopia: a retrospective cross-sectional study. *HIV/AIDS - Research and Palliative Care* 2016;8:125-133.
31. Gesesew H, Tsehayneh B, Massa D, Gebremedhin A, Kahsay H, et al. Predictors of mortality in a cohort of tuberculosis/HIV co-infected patients in southwest Ethiopia. *Infect Dis Poverty* 2016;5(1):109.
32. Gesesew HA, Mwanri L, Ward P, Woldemicahele K, Feyissa GT. Factors associated with discontinuation of anti-retroviral therapy among adults living with HIV/AIDS in Ethiopia: a systematic review protocol. *JBIC Database System Rev Implement Rep* 2016;14(2):26-37.
33. Gezie LD. Predictors of CD4 count over time among HIV patients initiated ART in Felege Hiwot Referral Hospital, northwest Ethiopia: multilevel analysis. *BMC Res Notes* 2016;9:377.
34. Gleason RL, Jr., Caulk AW, Seifu D, Rosebush JC, Shapiro AM, et al. Efavirenz and ritonavir-boosted lopinavir use exhibited elevated markers of atherosclerosis across age groups in people living with HIV in Ethiopia. *J Biomech* 2016;49(13):2584-2592.
35. Haile D, Takele A, Gashaw K, Demelash H, Nigatu D. Predictors of treatment failure among adult antiretroviral treatment (ART) clients in Bale Zone hospitals, south eastern Ethiopia. *PLoS One* 2016;11(10):e0164299.
36. Haile K, Zewdu G, Klinkenberg E, Woldeyohannes D. Time to initiation of antiretroviral therapy in HIV-positive tuberculosis patients in Addis Ababa, Ethiopia Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P019.
37. Herlihy JM, D'Acremont V, Hay Burgess DC, Hamer DH. Diagnosis and treatment of the febrile child. In: Black RE, Laxminarayan R, Temmerman M, Walker N, eds. *Reproductive, Maternal, Newborn, and Child Health: disease control priorities. Third edition (volume 2)*. Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2016.
38. Hirigo AT, Tesfaye DY. Influences of gender in metabolic syndrome and its components among people living with HIV virus using antiretroviral treatment in Hawassa, southern Ethiopia. *BMC Res Notes* 2016;9:145.
39. Hussen S, Belachew T, Hussien N. Nutritional status and its effect on treatment outcome among HIV infected clients receiving HAART in Ethiopia: a cohort study. *AIDS Res Ther* 2016;13:32.
40. Isaacson G, Melaku A. Results of pediatric tympanoplasty on short-term surgical missions. *Laryngoscope* 2016;126(6):1464-1469.
41. Kalibala S, Jani N, Kassa G. Algorithms for HIV care and treatment in Ethiopia. Washington, D.C., United States Agency for International Development [USAID], Project Search: HIVCore, 2016 Oct.; 2016.
42. Kebede A. Treatment outcomes of HIV-infected patients on second line ART in selected health facilities of Addis Ababa: a cross sectional study. 2016. Thesis, Addis Ababa University; 2016.
43. Kebede MM, Alamirrew A. Willingness to receive text message medication reminders among patients on antiretroviral treatment in northwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 3.
44. Kebede ZT, Taye BW. Outcomes and linkage to chronic care of HIV exposed infants among health centers and hospitals in Amhara Region, Ethiopia: implications to prevention of mother-to-child transmission of HIV program: a cross sectional study. *Pan Afr Med J* 2016;24:61.
45. Kip AE, Rosing H, Hillebrand MJ, Blesson S, Mengesha B, et al. Validation and clinical

- evaluation of a novel method to measure miltefosine in leishmaniasis patients using dried blood spot sample collection. *Antimicrob Agents Chemother* 2016;60(4):2081-2089.
46. Kulkarni S, Hoffman S, Gadisa T, Melaku Z, Fantahun M, et al. Identifying perceived barriers along the HIV care continuum. *J Int Assoc Provid AIDS Care* 2016;15(4):291-300.
 47. Letta S, Demissie A, Oljira L, Dessie Y. Erratum to: Factors associated with adherence to antiretroviral therapy (ART) among adult people living with HIV and attending their clinical care, eastern Ethiopia. *BMC Int Health Hum Rights* 2016;16:8.
 48. Mamuye AT, Bornstein E, Temesgen O, Blumberg HM, Kempker RR. Point-of-care testing for cryptococcal disease among hospitalized human immunodeficiency virus-infected adults in Ethiopia. *Am J Trop Med Hyg* 2016;95(4):786-792.
 49. Mebrahtu G, Alen eKA, Dachew BA. Visceral leishmaniasis treatment outcome and its determinant factors among patients in northwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 35.
 50. Megersa A, Garoma S, Eticha T, Workneh T. Predictors of lost to follow-up from antiretroviral treatment for adult patients in Oromia Region: a case control study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 40.
 51. Megerso A, Garoma S. Comparison of survival in adult antiretroviral treatment naive patients treated in primary health care centers versus those treated in hospitals: retrospective cohort study; Oromia Region, Ethiopia. *BMC Health Serv Res* 2016;16(1):581.
 52. Megerso A, Garoma S, Eticha T, Workneh T, Daba S, et al. Predictors of loss to follow-up in antiretroviral treatment for adult patients in the Oromia Region, Ethiopia. *HIV AIDS (Auckl)* 2016;8:83-92.
 53. Mekonnen D, Derbie A, Mekonnen H, Zenebe Y. Profile and treatment outcomes of patients with tuberculosis in northeastern Ethiopia: a cross sectional study. *Afr Health Sci* 2016;16(3):663-670.
 54. Mekuria LA, Nieuwkerk PT, Yalew AW, Sprangers MAG, Prins JM. High level of virological suppression among HIV-infected adults receiving combination antiretroviral therapy in Addis Ababa, Ethiopia. *Antivir Ther* 2016;21(5):385-396.
 55. Mekuria LA, Nieuwkerk PT, Yalew AW, Sprangers MAG, Prins JM. High level of virological suppression among HIV-infected adults receiving combination antiretroviral therapy in Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 33.
 56. Mekuria LA, Prins JM, Yalew AW, Sprangers MA, Nieuwkerk PT. Sub-optimal adherence to combination anti-retroviral therapy and its associated factors according to self-report, clinician-recorded and pharmacy-refill assessment methods among HIV-infected adults in Addis Ababa. *AIDS Care* 2017;29(4):428-435.
 57. Mekuria LA, Prins JM, Yalew AW, Sprangers MAG, Nieuwkerk PT. Which adherence measure - self-report, clinician recorded or pharmacy refill - is best able to predict detectable viral load in a public ART programme without routine plasma viral load monitoring? *Trop Med Internat Health* 2016;21(7):856-869.
 58. Mekuria LA, Prins JM, Yalew AW, Sprangers MAG, Nieuwkerk PT. Which adherence measure self-report, clinician-recorded or pharmacy refill is best able to predict detectable viral load in a public ART program where routine plasma viral load monitoring is unavailable? Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 138.
 59. Mekuria Y, Yilma D, Mekonnen Z, Kassa T, Gedefaw L. Renal function impairment and associated factors among HAART naive and experienced adult HIV positive individuals in southwest Ethiopia: a comparative cross sectional study. *PLoS One* 2016;11(8):e0161180.
 60. Mesfin YM, Kibret KT, Taye A. Is protease inhibitors based antiretroviral therapy during pregnancy associated with an increased risk of preterm birth? Systematic review and a meta-analysis. *Reprod Health* 2016;13:30.
 61. Mihiretie H, Taye B, Tsegaye A. Magnitude of anemia and associated factors among pediatric HIV/AIDS patients attending Zewditu Memorial Hospital (ZMH) ART clinic, Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 157.
 62. Mohammed A. Burden of smear- negative pulmonary tuberculosis before and after antibiotic use: the case of four public health centers of Addis Ababa, Ethiopia. Thesis: Addis Ababa University; 2016.
 63. Nash D, Tymejczyk O, Gadisa T, Kulkarni SG, Hoffman S, et al. Factors associated with initiation of antiretroviral therapy in the advanced stages of HIV infection in six Ethiopian HIV clinics, 2012 to 2013. *J Int AIDS Soc* 2016;19(1):20637.
 64. Negash E, Wakgari N, Wasie B, Edris M, Bekele G. Adherence to antiretroviral therapy and its associated factors among HIV-positive patients in Nekemte public health institutions, west Ethiopia. *HIV and AIDS Review* 2016;15(3):116-121.
 65. Neogi U, Haggblom A, Singh K, Rogers LC, Rao SD, et al. Factors influencing the efficacy of rilpivirine in HIV-1 subtype c in low- and middle-income countries. *J Antimicrob Chemother* 2016;71(2):367-371.
 66. Niemeyer K, King A, Mengistu S, Hennig N. Predictors of antiretroviral therapy failure in an urban HIV/AIDS clinic in Addis Ababa, Ethiopia. *The Lancet Global Health* 2016;4(6).
 67. Nylen H, Habtewold A, Makonnen E, Yimer G, *Ethiop. J. Health Dev.* 2017;31(4)

- Bertilsson L, et al. Prevalence and risk factors for efavirenz-based antiretroviral treatment-associated severe vitamin D deficiency: a prospective cohort study. *Medicine (Baltimore)* 2016;95(34):e4631.
68. Parcesepe A, Tymejczyk O, Remien R, Gadisa T, Gorrell-Kulkarni S, et al. Decision-making power, psychological distress and quality of life among women initiating ART in Oromia, Ethiopia. Paper presented at the American Public Health Association's 2016 Annual Meeting and Expo; Denver, CO, USA; 2016, Abstract no. 3275.
 69. Peter T, Ellenberger D, Kim AA, Boeras D, Messele T, et al. Early antiretroviral therapy initiation: access and equity of viral load testing for HIV treatment monitoring. *Lancet Infect Dis* 2017;17(1):e26-e29.
 70. Pienaar E, Kredt T. HIV/AIDS clinical trial activity on the African continent: an analysis of HIV/AIDS trials registered on the Pan African clinical trials registry (PACTR). Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEC222.
 71. Platt MO, Evans D, Keegan PM, McNamara L, Parker IK, et al. Low-cost method to monitor patient adherence to HIV antiretroviral therapy using multiplex cathepsin zymography. *Mol Biotechnol* 2016;58(1):56-64.
 72. Seyoum A, Ndlovu P, Zewotir T. Quasi-poisson versus negative binomial regression models in identifying factors affecting initial CD4 cell count change due to antiretroviral therapy administered to HIV-positive adults in north-west Ethiopia (Amhara Region). *AIDS Res Ther* 2016;13:36.
 73. Shiferaw MB, Tulu KT, Zegeye AM, Wubante AA. Liver enzymes abnormalities among highly active antiretroviral therapy experienced and HAART naive HIV-1 infected patients at Debre Tabor Hospital, North West Ethiopia: a comparative cross-sectional study. *AIDS Res Treat* 2016;2016:1985452.
 74. Solomon Ahmed A, Mavundla TR, Ribka F, Tadesse A. Outcomes of TB treatment in HIV co-infected TB patients in Ethiopia: a cross-sectional analytic study. *BMC Infect Dis* 2016;16(1):640.
 75. Tadesse K. Longitudinal modelling of cd4+t cell counts of HIV- positive patients on ART. Thesis, Addis Ababa University; 2016.
 76. Tamiru A, Tigabu B, Yifru S, Diro E, Hailu A. Safety and efficacy of liposomal amphotericin b for treatment of complicated visceral leishmaniasis in patients without HIV, north-west Ethiopia. *BMC Infect Dis* 2016;16(1):548.
 77. Teklay G, Teklu T, Legesse B, Tedla K, Klinkenberg E. Barriers in the implementation of isoniazid preventive therapy for people living with HIV in northern Ethiopia: a mixed quantitative and qualitative study. *BMC Public Health* 2016;16(1):840.
 78. Tekleab AM, Tadesse BT, Giref AZ, Shimelis D, Gebre M. Anthropometric improvement among HIV infected pre-school children following initiation of first line anti-retroviral therapy: implications for follow up. *PLoS One* 2016;11(12):e0167565.
 79. Teklu AM, Yirdaw KD. ART experienced patients for tackling attrition from HIV care: a multi-site cohort study. *Ethiop Med J* 2016;54(4):197-205.
 80. Terefe A. Evaluation of safety and efficacy of zidovudine and tenofovir as part of highly active anti-retroviral therapy at Zewditu Memorial Hospital: A retrospective cohort study. Thesis, Addis Ababa University; 2016.
 81. Tesfaye M, Kaestel P, Olsen MF, Girma T, Yilma D, et al. The effect of nutritional supplementation on quality of life in people living with HIV: a randomised controlled trial. *Trop Med Int Health* 2016;21(6):735-742.
 82. Teshome H. Assessment of the management of second-line anti-TB medications' adverse drug reactions among MDR-TB patients attending at St. Peter TB Specialized Hospital. . Thesis, Addis Ababa University; 2016.
 83. Tilahun G, Gebre-Selassie S. Treatment outcomes of childhood tuberculosis in Addis Ababa: a five-year retrospective analysis. *BMC Public Health* 2016;16:612.
 84. Tilahun K, Taye A, Moges Y. Is proteinase inhibitor-based antiretroviral therapy during pregnancy associated with an increased risk of preterm birth? Systematic review and a meta-analysis. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association Addis Ababa; 2016, Abstract no. Poster 34.
 85. Tiruneh YM, Galarraga O, Genberg B, Wilson IB. Retention in care among HIV-infected adults in Ethiopia, 2005- 2011: a mixed-methods study. *PLoS One* 2016;11(6):e0156619.
 86. Tiruneh YM, Wilson IB. What time is it? Adherence to antiretroviral therapy in Ethiopia. *AIDS Behav* 2016;20(11):2662-2673.
 87. Tola HH, Shojaeizadeh D, Tol A, Garmaroudi G, Yekaninejad MS, et al. Psychological and educational intervention to improve tuberculosis treatment adherence in Ethiopia based on health belief model: a cluster randomized control trial. *PLoS One* 2016;11(5):e0155147.
 88. Tsegaye AT, Wubshet M, Awoke T, Addis Alene K. Predictors of treatment failure on second-line antiretroviral therapy among adults in northwest Ethiopia: a multicentre retrospective follow-up study. *BMJ Open* 2016;6(12):e012537.
 89. Tsegaye D. Level of adherence and associated factors to option B PMTCT program among pregnant and lactating mothers in selected government health facilities of South Wollo Zone, Amhara Region, northeast Ethiopia, 2016. Thesis, Addis Ababa University; 2016.
 90. Tymejczyk O, Hoffman S, Kulkarni SG, Gadisa T, Lahuerta M, et al. HIV care and treatment beliefs among patients initiating antiretroviral treatment (ART) in Oromia, Ethiopia. *AIDS Behav* 2016;20(5):998-1008.
 91. Welay GM, Alene KA, Dachew BA. Visceral leishmaniasis treatment outcome and its determinants in northwest Ethiopia. *Epidemiol*

- Health 2016;39:e2017001.
92. Wilhelmson S, Reepalu A, Balcha TT, Jarso G, Bjorkman P. Retention in care among HIV-positive patients initiating second-line antiretroviral therapy: a retrospective study from an Ethiopian public hospital clinic. *Glob Health Action* 2016;9:29943.
 93. Wondafrash B, Hiko D. Dried blood spot test for HIV exposed infants and children and their antiretroviral treatment status in selected hospitals in Ethiopia. *Ethiop J Health Sci* 2016;26(1):17-24.
 94. Wondifraw Baynes H, Tegene B, Gebremichael M, Birhane G, Kedir W, et al. Assessment of the effect of antiretroviral therapy on renal and liver functions among HIV-infected patients: a retrospective study. *HIV AIDS* 2017;9:1-7.
 95. Wondiye H, Fantahun N, Limaye RJ, Kote M, Girma E. Barriers and facilitators of ART adherence in Hawassa town, southern Ethiopia: a grounded theory approach. *Ethiop J Health Dev* 2016;30(2):66-77.
 96. Yakob B, Ncama BP. A socio-ecological perspective of access to and acceptability of HIV/AIDS treatment and care services: a qualitative case study research. *BMC Public Health* 2016;16:155.
 97. Yakob B, Purity Ncama B. Client satisfaction: Correlates and implications for improving HIV/AIDS treatment and care services in southern Ethiopia. *Int Health* 2016;8(4):292-298.
 98. Yemaneberhan N. Magnitude of hepatitis B virus (HBV) and hepatitis C virus (HCV) among HAART taking patients and its association with liver function and renal function tests and cd4+t cell level. Thesis, Addis Ababa University; 2016.
 99. Yilma D, Kæstel P, Olsen MF, Abdissa A, Tesfaye M, et al. Change in serum 25-hydroxyvitamin D with antiretroviral treatment initiation and nutritional intervention in HIV-positive adults. *Br J Nutr* 2016;116(10):1720-1727.
 100. Yilma M, Seid Y, Assefa N, Desalegn Z. The effect of HIV co-infection on tuberculosis treatment in North Shoa, Ethiopia: retrospective cohort study. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P005.
 101. Zenebe T, Genet C, Tefera E, Kelebecha A. Effectiveness of directly observed treatment, short course on treatment of tuberculosis patients in Afar Region, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 39.
 102. Zenebe T, Tefera E. Tuberculosis treatment outcome and associated factors among smear-positive pulmonary tuberculosis patients in Afar, eastern Ethiopia: a retrospective study. *Braz J Infect Dis* 2016;20(6):635-636.

Section 6: Health Services and Health Policy Research

This section includes reports on research and programmatic activities that 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.

This section is comprised of 43 journal articles, 24 conference presentations, one masters thesis, and one newswire article that deal with a range of issues related to health services and health policy across broad sub-categories of (1-69): from service quality, access, utilization, and client satisfaction; HIV/AIDS and family planning; infection prevention including needle prick and transfusion related transmissions; training and capacity building including diagnostic developments; to cost, financing and policy related issues.

Clinical as well as laboratory quality were issues dealt with majority of the articles (10, 19, 25, 27, 28, 30, 34, 35, 39, 43, 44, 49, 57, 58, 66). Regarding service quality Burusie (19) found the quality of case management for sexually transmitted infection in facilities in Adama town to be poor, while Getnet et al. (25) presented a systematic review and meta-analysis (in which a number of studies were from Ethiopia) related to delays in diagnosis of pulmonary tuberculosis in low and middle-income country settings. According to Tadesse et al. (58), concerns about covert HIV testing are associated with delayed presentation of adults with suspected malaria cases. The study by Gizaw et al. (27) showed that one third of the health workers in public facilities in Addis Ababa had relatively poor knowledge and nearly half of them had unsatisfactory practice on tuberculosis infection control. Through the evaluation of Ethiopia's health extension program, Haregreaves et al. (28) presented the key aspects of measuring implementation strength methodology to be used in evaluating public health strategies in low and middle-income settings; while Johnson et al. (30) looked at the accuracy of eligibility for early medical abortion by community health workers using a simple checklist tool in Ethiopia India, and South Sudan. Tadele and Lamaro (57), in a community based study, assessed antenatal care service utilization and associated factors in southern Ethiopia; while Yakob and Ncama (66) investigated factors associated with perceived access to HIV/AIDS Treatment and care services in Wolaita Zone, Ethiopia. Pertaining to laboratory service quality, Asrat (10) and Mosissa et al. (43) assessed the performance of tuberculosis smear microscopists on external quality assessment, and Mossie et al. (44) assessed the knowledge, attitudes and practice of tuberculosis infection control among medical laboratory professionals in selected health facilities in Addis Ababa. Kebede A, et al. (34) stressed the importance of accreditation in point-of-care testing for quality control outside the laboratory environment, while Kebede Y, et al. (35) highlighted the feasibility of public-private partnership in improving specimen referrals and

improving quality of laboratory services. Ndiokubwayo et al. (49) present the preliminary results of WHO-AFRO's Stepwise Laboratory (Quality) Improvement Process towards Accreditation (SLIPTA) process in which nine public laboratories from Ethiopia were included.

The themes of the next group of articles (8, 12, 24, 32, 41, 47, 52, 59, 67, 68) included training, capacity building including developments in diagnostic capacity. Alemu and Alemayehu (8) presented on partnering to fill biomedical engineer and technician human resource gaps in Ethiopia, while Bacha et al. (12) presented on initiatives to improve emergency and critical care services for pediatric HIV patients. Getachew and Haile (24) explored continuing professional development needs of general medical practitioners; while, using task analysis, Yigzaw et al. (68) generated evidence for strengthening midwifery education, practice, and regulation. Kalibala et al. (32) reported the experiences in implementation and publication of operations research interventions. The presentation by Mizwa et al. (41) dealt with longitudinal north-south partnership in pediatrics to improve HIV/AIDS care and treatment, while Mumford et al. (47) discussed the progress in international twinning partnership between European palliative care centers and a non-governmental hospice in Ethiopia. In terms of investments in diagnostic capacity, Tadesse (59) presented an assessment of diagnosis and treatment facilities for cervical cancer in public health institutions in Addis Ababa; while Price and Asgary (52) described the implementation and feasibility of an adapted two-stage visual inspection with acetic acid/cryotherapy-based cervical cancer screening program for HIV-infected women in the same city. Similarly, Yebyo et al. (67) explored the pattern of C-reactive protein point-of-care testing and antibiotic prescribing for acute respiratory tract infections in rural primary health centers of north Ethiopia.

Another group of articles (13-15, 26, 31, 37, 45, 60, 63) raised issues of patterns of service utilization including access and delivery arrangements. Bane et al. (13) retrospectively studied medical admissions and outcomes at Saint Paul's Hospital in Addis Ababa, Ethiopia; Belayihun et al. (15) presented trends in antenatal care attendance and their link to skill delivery services; Girmye and Berhan (26) presented on skilled antenatal care service utilization and its association with the characteristics of women's health development team in southwest Ethiopia; while Bayu et al. (14) looked at cervical cancer screening service uptake and associated factors among age eligible women in Mekelle Zone. Kaba et al. (31) qualitatively explored why women in urban settings fail to use available maternal health services; and King et al. (37) similarly looked at the utilization of maternal health services in Ethiopia. Motuma et al. (45) presented on the utilization of youth friendly services and associated factors among youth in east Ethiopia; while Tekleab et al. (60) looked at antenatal care and women's decision-

making power as determinants of institutional delivery in a rural area. According to Workalemahu et al. (63), drop-in centers drive higher yield and better linkage to treatment for female sex workers.

There were a group of articles (21, 22, 29, 46, 53, 69) that dealt with cost, financing, and investment needs, as well as a couple (36, 54, 56) related to policy and framework issues. De Cuevas et al. (21) estimated patient side direct costs for tuberculosis diagnosis, and Fieno et al. (22) made a political economy analysis of human resources for health in Africa; while Hontelez et al. (29) discussed the investment needs and cost-effectiveness within changing HIV treatment eligibility under health system constraints in sub-Saharan Africa. Remme et al. (53) discussed the issue of financing the HIV response in sub-Saharan Africa from domestic sources; while Moucheraud et al. (46) claimed that PEPFAR investments in governance and health systems were one-fifth of countries' budgeted funds during 2004-2014. Furthermore, Zegeye et al. (69) conducted a cost-analysis of the prevention of mother to child transmission of HIV/AIDS services in Ethiopia. Kesetebirhan et al. (36) indicated a lesson on pro-poor pathway towards universal health coverage; Seyoum et al. (54) discussed the role of community knowledge and those of health extension workers on integrated diseases among households; and Shiferaw et al. (56) dealt with the policy, regulation and strategies for control and elimination viral hepatitis.

Six articles (4, 7, 17, 33, 42, 65) in this category dealt with issues of infection prevention including prevention of needle prick and transfusion related transmissions. Abraham (4), Kaweti & Abegez (33), as well as Worku et al. (65) presented on the prevalence of and response to needle stick injuries, including exposure to blood and blood fluids among health workers in hospitals in Addis Ababa and Hawassa. Alemayehu et al. (7) explored sharps injury and exposure to blood and body fluids among health care workers in health care centers of eastern Ethiopia; while Bisetegna et al. (17) as well as Mohammed and Bekele (42) looked at transfusion-transmissible infections among blood donors in different parts of Ethiopia.

HIV/AIDS and family planning and related issues were raised by five articles (2, 5, 61, 62, 64). Abeje and Motbaynor (2) explored the demand for family planning among HIV- positive women on anti-retroviral treatment in South Gondar and North Wollo Zones of Amhara Region. Adamchak et al. (5) presented results from a pilot test that developed indicators to monitor family planning and HIV service integration. Thomas et al. (61) discussed improving referrals and integrating family planning and HIV services through organizational network strengthening; while Wendwossen and Nigatu (62) dealt with partnering to strengthen obstetrics and gynecology training as a way to prevent new HIV infections, and Worke et al. (64) studied the utilization of contraception among sexually active HIV- positive

women attending ART clinic in University of Gondar Hospital.

More than a couple of articles in this category (1, 3, 23, 51) have dealt with issues related to client satisfaction in the delivery of care. Abebe et al. (1) found overall low level of satisfaction among respondents with pharmaceutical services provided at Gondar University Hospital; Aberra et al. (3) present early experiences from a pilot program for treatment of chronic hepatitis B in Ethiopia; Getachew described patients' satisfaction and associated factors towards health services in the adult emergency department of Tikur Anbessa Hospital, while Obsa and Worji (51) describe factors associated to satisfaction with outpatient services at Assela Teaching Referral Hospital in Arsi Region.

Patterns of drug supply including adverse reactions were dealt with by three articles (11, 16, 20) in this category. Ayisa et al. (11) presented on knowledge, practice and associated factors towards adverse drug reaction reporting among nurses working in district hospitals in northwest Ethiopia; Berhanemeskel et al. (16) described HIV/AIDS related commodities supply chain management in public health facilities of Addis Ababa; and Dayo et al. (20) explored the pattern of student interventions on international pharmacy rotation.

Aklilu et al. (6) assessed knowledge and perception of health professionals towards toxoplasmosis in selected towns; an anonymous poster presentation (9) on bridging to a sustainable future in global health was made at the 7th Conference of Consortium of Universities for Global Health; and according to Burki (18), Ethiopia is considered as showing that it is single-minded in tackling diseases. Kitaw (38) outlined lessons for the future in the health sector in Ethiopia. Mall et al. (40) reported on a qualitative study to inform development of care for people with severe mental disorders in rural Ethiopia.

1. Abebe TB, Gebresellassie BM, Erku DA, Haile KT, Mekuria AB. Expectation and satisfaction of HIV/AIDS patients toward the pharmaceutical care provided at Gondar University Referral Hospital, northwestern Ethiopia: A cross-sectional study. *Patient Preference & Adherence* 2016;10:2073-2082.
2. Abeje G, Motbaynor A. Demand for family planning among HIV positive women on art: The case of south Gondar and north wollo zones amhara region. *BMC Res Notes* 2016;9:43.
3. Aberra H, Desalegn H, Berhe N, Medhin G, Gundersen S, et al. Early experiences from one of the first treatment programs for chronic hepatitis b in sub-Saharan Africa. *Journal of Hepatology* 2016;1:S361-S362.
4. Abraham I. Prevalence of needle stick injuries among nurses in Tikur Anbessa Specialized hospital and their immediate response. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-026.

5. Adamchak SE, Okello FO, Kabore I. Developing a system to monitor family planning and HIV service integration: Results from a pilot test of indicators. *J Fam Plann Reprod Health Care* 2016;42(1):24-29.
6. Aklilu M, Sisay T, Abebe A. Assessment of knowledge and perception of health professionals towards toxoplasmosis in selected towns of Ethiopia. *Banat's Journal of Biotechnology* 2016;7(14):113-119.
7. Alemayehu T, Worku A, Assefa N. Sharp injury and exposure to blood and body fluids among health care workers in health care centers of eastern Ethiopia. *Int J Occup Environ Med* 2016;7(3):172-180.
8. Alemu AG, Alemayehu E. Partnering to fill biomedical engineer and technician human resource gaps in Ethiopia: PEPFAR's first biomedical technology training program in sub-Saharan Africa. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPEE580.
9. Anonymous. Poster abstracts from the 7th annual CUGH conference: Bridging to a sustainable future in global health. *Annals of Global Health Conference: 7th Annual CUGH Conference: Bridging to a Sustainable Future in Global Health United States* 2016;82:3.
10. Asrat H. Performance evaluation of tb smear microscopists at external quality assessment rechecking laboratories in Ethiopia. Thesis, Addis Ababa University; 2016.
11. Ayisa A, Amdie FZ, Jemberie SM. Knowledge, practice and associated factors towards adverse drug reaction reporting among nurses working in district hospitals, northwest Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P003.
12. Bacha T, Tefera M, Temsegen M, Butteris S, Hagen S, et al. Partnering to improve emergency and critical care services for pediatric HIV patients in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEE570.
13. Bane A, Bayisa T, Adamu F, Abdissa SG. Medical admissions and outcomes at Saint Paul Hospital, Addis Ababa, Ethiopia: A retrospective study. *Ethiop J Health Dev* 2016;30(1):50-56.
14. Bayu H, Berhe Y, Mulat A, Alemu A. Cervical cancer screening service uptake and associated factors among age eligible women in Mekelle Zone, northern Ethiopia, 2015: A community based study using health belief model. *PLoS One* 2016;11(3):e0149908.
15. Belayihun B, Kassie G, Asnake M, Zerihun H, Ali I. Trends in antenatal care attendance and their link to skill delivery services: a study in integrated family health project areas, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 65.
16. Berhanemeskel E, Beedemariam G, Fenta TG. HIV/AIDS related commodities supply chain

- management in public health facilities of Addis Ababa, Ethiopia: A cross-sectional survey. *J Pharm Policy Pract* 2016;9:11.
17. Bisetegen FS, Bekele FB, Ageru TA, Wada FW. Transfusion-transmissible infections among voluntary blood donors at Wolaita Sodo University Teaching Referral Hospital, south Ethiopia. *Can J Infect Dis Med Microbiol* 2016;2016:8254343.
 18. Burki T. Ethiopia shows it is single-minded in tackling disease. *The Lancet Infectious Diseases* 2016;16(2):153-154.
 19. Burusie A. Quality of sexually transmitted infections (STIs) case management was found poor in health care facilities of Adama town, eastern Ethiopia 2015: The missed opportunities to control HIV spread. Paper presented at the National STD Prevention Conference; Atlanta, GA, USA; 2016, Abstract no. LB7.
 20. Dayo Y, Daftary M, Maneno M, Akiyode O, Hailemeskel B, et al. Student interventions on international pharmacy rotations. *Journal of the American Pharmacists Association* 2016;56(3):e42.
 21. de Cuevas RM, Lawson L, Al-Sonboli N, Al-Aghbari N, Arbide I, et al. Patients direct costs to undergo TB diagnosis. *Infect Dis Poverty* 2016;5:24.
 22. Fieno JV, Dambisya YM, George G, Benson K. A political economy analysis of human resources for health (HRH) in Africa. *Hum Resour Health* 2016;14(1):44.
 23. Getachew T. Patients' satisfaction and associated factors towards health services in adult Emergency Medicine Department, Tikur Anbessa Hospital, Addis Ababa, Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P010.
 24. Getachew Y, Haile K. Continuing professional development needs assessment of general medical practitioners in Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. P028.
 25. Getnet F, Berhane Y, Assefa N, Mengistie B, Worku A. Delay in diagnosis of pulmonary tuberculosis in low and middle income settings: Systematic review and Meta analysis Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, abstract no. P028.
 26. Girmeye M, Berhan Y. Skilled antenatal care service utilization and its association with the characteristics of women's health development team in Yeky District, southwest Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 64.
 27. Gizaw GD, Alemu ZM, Kibret KT. Assessment of knowledge and practice of health workers towards tuberculosis infection control and associated factors in public health facilities of Addis Ababa, Ethiopia: A cross-sectional study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 16.
 28. Hargreaves JR, Goodman C, Davey C, Willey BA, Avan BI, et al. Measuring implementation strength: Lessons from the evaluation of public health strategies in low- and middle-income settings. *Health Policy Plan* 2016;31(7):860-867.
 29. Hontelez JAC, Chang AY, Ogbuaji O, De Vlas SJ, Barnighausen T, et al. Changing HIV treatment eligibility under health system constraints in sub-Saharan Africa: investment needs, population health gains, and cost-effectiveness. *AIDS* 2016;30(15):2341-2350.
 30. Johnston HB, Ganatra B, Nguyen MH, Habib N, Afework MF, et al. Accuracy of assessment of eligibility for early medical abortion by community health workers in Ethiopia, India and South Africa. *PLoS One* 2016;11(1):e0146305.
 31. Kaba M, Taye G, Gizaw M, Mitiku I, Adugna Z, et al. Why women in urban settings fail to use available maternal health services: A qualitative study in selected towns/cities of Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 88.
 32. Kalibala S, Woelk GB, Gloyd S, Jani N, Kay L, et al. Experiences in implementation and publication of operations research interventions: Gaps and a way forward. *J Int AIDS Soc* 2016;19(5 Suppl 4):20842.
 33. Kaweti G, Abegaz T. Prevalence of percutaneous injuries and associated factors among health care workers in Hawassa Referral and Adare District Hospitals, Hawassa, Ethiopia, January 2014. *BMC Public Health* 2016;16:8.
 34. Kebede A, Kebede Y, Desale A, Mulugeta A, Yaregal Z, et al. Quality assurance for point-of-care testing: Ethiopia's experience. *Afr J Lab Med* 2016;5(2):1-5.
 35. Kebede Y, Fonjungo PN, Tibesso G, Shrivastava R, Nkengasong JN, et al. Improved specimen-referral system and increased access to quality laboratory services in Ethiopia: The role of the public-private partnership. *J Infect Dis* 2016;213(Suppl 2):S59-64.
 36. Kesetebirhan A, Taye B, Ghebreyesus Tedros A. Pro-poor pathway towards universal health coverage: Lessons from Ethiopia. *Journal of Global Health* 2016;6:1.
 37. King R, Jackson R, Dietsch E, Hailemariam A. Utilization of maternal health services in Ethiopia: A key informant research project. *Development in Practice* 2016;26(2):158-169.
 38. Kitaw Y. Lessons for the future in the health sector in Ethiopia: Sharing experiences with the new generation. *Ethiop Med J* 2016;54(3):153-171.
 39. Kruk ME, Riley PL, Palma AM, Adhikari S, Ahoua L, et al. How can the health system retain women in HIV treatment for a lifetime? A discrete choice experiment in Ethiopia and Mozambique. *PLoS One* 2016;11(8):e0160764.
 40. Mall S, Hailemariam M, Selamu M, Fekadu A,

- Lund C, et al. 'Restoring the person's life': A qualitative study to inform development of care for people with severe mental disorders in rural Ethiopia. *Epidemiol Psychiatr Sci* 2017;26(1):43-52.
41. Mizwa MB, Gordon DM, Workneh G, Tigabu Z, Lakew W, et al. Longitudinal north-south partnership in pediatrics to improve HIV/AIDS care and treatment: A model for sustainability in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPEE491.
 42. Mohammed Y, Bekele A. Seroprevalence of transfusion transmitted infection among blood donors at Jijiga blood bank, eastern Ethiopia: Retrospective 4 years study. *BMC Res Notes* 2016;9:129.
 43. Mosissa L, Kebede A, Mindaye T, Getahun M, Tulu S, et al. External quality assessment of AFB smear microscopy performances and its associated factors in selected private health facilities in Addis Ababa, Ethiopia. *Pan Afr Med J* 2016;24:125.
 44. Mossie T, Kassu D, Fatuma H, Kassaynew A, Nigussie T, et al. Assessment of knowledge, attitudes and practices of TB infection control among medical laboratory professionals in selected dots providing health facilities under Addis Ababa city administration health bureau, Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 2.
 45. Motuma A, Syre T, Egata G, Kenay A. Utilization of youth friendly services and associated factors among youth in Harar Town, east Ethiopia: A mixed method study. *BMC Health Serv Res* 2016;16(272):1-10.
 46. Moucheraud C, Sparkes S, Nakamura Y, Gage A, Atun R, et al. PEPFAR investments in governance and health systems were one-fifth of countries' budgeted funds, 2004-14. *Health Affairs* 2016;35(5):847-855.
 47. Mumford J, Mumford S, Norrstrom Mittag-Leffler B. Progress in international twinning partnership between European palliative care centers & hospice Ethiopia, a NGO in Addis Ababa. *Palliative Medicine* 2016;30(6):NP289.
 48. Navarro KB, Castellote EM, Tato LP, Campos CR, Gadea MS, et al. Characteristics of children with tuberculosis in meki (Ethiopia): The challenge of diagnosis with limited resources. [Spanish]. *Acta Pediatrica Espanola* 2016;74(1):22-27.
 49. Ndiokubwayo JB, Maruta T, Ndlovu N, Moyo S, Yahaya AA, et al. Implementation of the world health organization regional office for africa stepwise laboratory quality improvement process towards accreditation. *Afr J Lab Med* 2016;5(1):280.
 50. Newswire PR. Healthcare system development in Tanzania and Ethiopia. London: Newswire PR: 2016.
 51. Obsa MS, Worji TA. Patient satisfaction toward outpatient department services and factors associated with satisfaction at Assela Teaching Referral Hospital, southeast Ethiopia. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-020.
 52. Price JT, Asgary R. Implementation and feasibility of an adapted two-stage visual inspection with acetic acid/cryotherapy-based cervical cancer screening programme for HIV-infected women in Addis Ababa, Ethiopia. *Eur J Cancer Care* 2016;25(3):526-527.
 53. Remme M, Siapka M, Sterck O, Ncube M, Watts C, et al. Financing the HIV response in sub-Saharan Africa from domestic sources: Moving beyond a normative approach. *Soc Sci Med* 2016;169:66-76.
 54. Saha A, Grant C, Getahun M, Sellers T. Legal environment assessments: a tool to generate evidence for law, policy and strategy review and reform in Africa. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPED411.
 55. Seyoum A, Urgessa K, Gobena T. Community knowledge and the role of health extension workers on integrated diseases among households in east Hararghe zone, Ethiopia. *Risk Manag Healthc Policy* 2016;9:135-142.
 56. Shiferaw F, Letebo M, Bane A. Chronic viral hepatitis: Policy, regulation, and strategies for its control and elimination in Ethiopia. *BMC Public Health* 2016;16(1):769.
 57. Tadele N, Lamaro T. Antenatal care service utilization and associated factors in bench Maji zone, southwest Ethiopia: A community-based cross-sectional study. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 66.
 58. Tadesse F, Deressa W, Fogarty AW. Concerns about covert HIV testing are associated with delayed presentation in Ethiopian adults with suspected malaria: A cross-sectional study. *BMC Public Health* 2016;16:102.
 59. Tadesse Y. Cervical cancer: Assessment of diagnosis and treatment facilities in public health institutions in Addis Ababa, Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. 106.
 60. Tekelab T, Yadecha B, Melka AS. Antenatal care and women's decision making power as determinants of institutional delivery in a rural area of western Ethiopia. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 73.
 61. Thomas JC, Reynolds HW, Alterescu X, Bevc C, Tsegaye A. Improving referrals and integrating family planning and HIV services through organizational network strengthening. *Health Policy Plan* 2016;31(3):302-308.
 62. Wendwessen Hailemariam N, Nigatu B. Partnering to strengthen obstetrics and gynecology (OB/GYN) training as a way to prevent new HIV

- infections in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. WEPEE622.
63. Workalemhu E, Girma W, Mamo G. Drop-in centers drive higher yield and better linkage to treatment for FSWs in Ethiopia. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEE534.
 64. Worke MD, Bezabih LM, Woldetasdik MA. Utilization of contraception among sexually active HIV positive women attending ART clinic in University of Gondar Hospital: A hospital based cross-sectional study. *BMC Womens Health* 2016;16(1):67.
 65. Worku W, Kumie A, Moges F. Prevalence of needle stick injury and exposure of blood and body fluids of health care workers in Ethiopia, meta-analysis. Paper presented at the 27th Annual Conference of the Ethiopian Public Health Association; Addis Ababa; 2016, Abstract no. Poster 90.
 66. Yakob B, Ncama BP. Correlates of perceived access and implications for health system strengthening – lessons from HIV/AIDS treatment and care services in Ethiopia. *PLoS ONE* 11(8): e0161553.
 67. Yebyo H, Medhanyie AA, Spigt M, Hopstaken R. C-reactive protein point-of-care testing and antibiotic prescribing for acute respiratory tract infections in rural primary health centres of north Ethiopia: A cross-sectional study. *NPJ Primary Care Respiratory Medicine* 2016;26:15076.
 68. Yigzaw T, Carr C, Stekelenburg J, van Roosmalen J, Gibson H, et al. Using task analysis to generate evidence for strengthening midwifery education, practice, and regulation in Ethiopia. *Int J Womens Health* 2016;8:181-190.
 69. Zegeye EA, Mbonigaba J, Kayes S, John B. Cost-analysis of the prevention of mother to child transmission of HIV/AIDS service in Ethiopia: urban-rural health facilities setting. Paper presented at the 21st International AIDS Conference; Durban, South Africa; 2016, Abstract no. TUPEE615.

Section 7: Health Informatics, Monitoring and Evaluation

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

There are 17 articles and reports in this section. The first report by Adepoju revealed a drone delivery system to get the desperately needed blood and medical supplies to outlying hospitals and doctors in Rwanda that had been developed by the San Francisco based tech start-up Zipline which was found very successful and can be scaled-up to neighboring African countries.

On the other hand, Statistical modeling of ART outcomes by Awoke et al, Dali et al, Hissaini et al and Sibhatu MK have also show different levels of improvement in the treatment outcomes of HIV/AIDS patients. The study by Dali and colleagues, for instance, informed the direction of research capacity and best practices for HIV testing strategies for population-based interventions in sub-Saharan Africa in addition to the understanding of what factors can influence rates of testing that could prove critical to improving testing, treatment and prevention processes. Hissaini and colleagues have also developed and used a model for the transmission dynamics of anthroponotic visceral leishmaniasis (AVL) and human immunodeficiency virus (HIV) in a population to assess the impact of the spread of each disease on the overall transmission dynamics.

Moreover, Fetene employed data mining technique for measuring the prognosis of HIV/AIDS whereas Inzaule and colleagues indicated an affordable HIV drug-resistance testing for monitoring of antiretroviral therapy in Sub-Saharan Africa. Besides, seminal works by Gebriel et al, Letebo and Shiferaw, Menberu, Olana et al, Ondoa et al, Tesfaye et al and Woldeamanuel et al showed validated and adapted data collection tools and diagnosis procedures which were found effective in a low income setting. Gebriel and colleagues demonstrated the reliability and validity of an interviewer-administered adaption of the youth self-report for mental health screening of vulnerable young people in Ethiopia. Letebo and Shiferaw adapted HIV patient and program monitoring tools for chronic non-communicable diseases in Ethiopia, while Menberu assessed the performance of the WHO 2011 TB symptom screening algorithm for pulmonary TB diagnosis among HIV-infected patients. Tesfaye and colleagues adapted and validated the short version WHOQOL-HIV in Ethiopia while Woldeamanuel and his colleagues developed, validated and field tested an instrument for clinical assessment of HIV-associated neuropathy and neuropathic pain in resource-restricted and large population study settings. On the other hand, Olana and colleagues have shown an early infant HIV diagnosis procedure using DNA-PCR using an eight years data. A new matrix for scoring the functionality of national laboratory networks in Africa by introducing the Labnet Scorecard was developed by Ondoa and colleagues.

In addition, two articles focused the economic implication of the HIV/AIDS pandemic. Hernandez-Villafuerte and colleagues documented the bibliometric trends of health economic evaluation in Sub-Saharan Africa while, Zegeye and colleagues showed the economic costs of patients attending the prevention of mother -to- child transmission of HIV/AIDS (PMTCT) services in Ethiopia in both an urban and rural settings. A web-based TB patient follow-up information system has been designed by Shekur.

1. Adepoju P. Drones to the rescue? *African Business* 2016;433:32-33.

2. Awoke T, Worku A, Kebede Y, Kasim A, Birlie B, et al. modeling outcomes of first-line antiretroviral therapy and rate of CD4 counts change among a cohort of HIV/AIDS patients in Ethiopia: a retrospective cohort study. *PLoS One* 2016;11(12):e0168323.
3. Dai L, Sweat MD, Gebregziabher M. Modeling excess zeros and heterogeneity in count data from a complex survey design with application to the demographic health survey in Sub-Saharan Africa. *Stat Methods Med Res* 2016;962280215626608.
4. Fetene B. Application of data mining for effective prognosis of HIV/AIDS. The case of Finote Selam zonal hospital. Thesis, Addis Ababa University; 2016.
5. Geibel S, Habtamu K, Gebeyehu M, Nrupa J, Kay L, et al. Reliability and validity of an interviewer-administered adaptation of the youth self-report for mental health screening of vulnerable young people in Ethiopia. *PLoS One* 2016;11(2):e0147267.
6. Hernandez-Villafuerte K, Li R, Hofman KJ. Bibliometric trends of health economic evaluation in Sub-Saharan Africa. *Global Health* 2016;12(1):50.
7. Hussaini N, Lubuma JM, Barley K, Gumel AB. Mathematical analysis of a model for AVI-HIV co-endemicity. *Math Biosci* 2016;271:80-95.
8. Inzaule SC, Ondoa P, Peter T, Mugenyi PN, Stevens WS, et al. Affordable HIV drug-resistance testing for monitoring of antiretroviral therapy in Sub-Saharan Africa. *Lancet Infect Dis* 2016;16(11):e267-e275.
9. Letebo M, Shiferaw F. Adapting HIV patient and program monitoring tools for chronic non-communicable diseases in Ethiopia. *Global Health* 2016;12(1):26.
10. Menberu MA. Performance of the WHO 2011 TB symptom screening algorithm for pulmonary TB diagnosis among HIV-infected patients in Gondar University Referral Hospital, Ethiopia. *Int J Microbiol* 2016;2016:9058109.
11. Olana T, Bacha T, Worku W, Tadesse BT. Early infant diagnosis of HIV infection using DNA-PCR at a referral center: an 8 years retrospective analysis. *AIDS Res Ther* 2016;13(1):29.
12. Ondoa P, Datema T, Keita-Sow MS, Ndiokubwayo JB, Isadore J, et al. A new matrix for scoring the functionality of national laboratory networks in Africa: introducing the Labnet Scorecard. *Afr J Lab Med* 2016;5(3):498.
13. Shekur A. Design a web based TB patient follow-up information system. Thesis, Addis Ababa University; 2016.
14. Sibhatu MK, Berhane Y, Worku A. Compared with a referent HIV viral load, the accuracy of adherence measurement. Paper presented at the 52nd Annual Medical Conference of the Ethiopian Medical Association; Addis Ababa; 2016, Abstract no. AB-003.
15. Tesfaye M, Olsen MF, Medhin G, Friis H, Hanlon C, et al. Adaptation and validation of the short version WHOQOL-HIV in Ethiopia. *Int J Ment Health Syst* 2016;10:29.
16. Woldeamanuel YW, Kamerman PR, Veliotes DG, Phillips TJ, Asboe D, et al. Development, validation, and field-testing of an instrument for clinical assessment of HIV-associated neuropathy and neuropathic pain in resource-restricted and large population study settings. *PLoS One* 2016;11(10):e0164994.
17. Zegeye EA, Mbonigaba J, Kaye SB. Economic costs of patients attending the prevention of mother-to-child transmission of HIV/AIDS (PMTCT) services in Ethiopia: urban-rural settings. *Acta Universitatis Danubius: Oeconomica* 2016;12(4):191-207.

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.

We found only two published studies on HIV among Ethiopians in the diaspora. In the first study, Daw et al. analyzed the prevalence of HIV and HIV-HCV coinfection in serum samples collected among 14,205 immigrants from North and Sub-Saharan Africa. Overall, 309 (2.3%) individuals were found to be positive for HIV and 109 (0.8%) for HIV/HCV coinfection. Immigrants from Burkina Faso/Ivory Coast (7.8%), Nigeria/Ghana (6%), and Ethiopia (5.2%) had the top three highest levels of HIV infection. Among Ethiopian immigrants with HIV, 29.7% had HCV co-infection, which was lower than the average 35.3% for all immigrants combined. Van Kesteren and Wojciechowski (2) conducted a retrospective analysis of the medical records of 315 adopted Ethiopian children in Belgium. The results indicate high prevalence of stunting and intestinal parasites but none of the children tested positive for HIV, syphilis or hepatitis C.

1. Daw MA, El-Bouzedi A, Ahmed MO, Dau AA, Agnan MM, et al. Prevalence of human immune deficiency virus in immigrants crossing to Europe from north and Sub-Saharan Africa. *Travel Med Infect Dis* 2016;14(6):637-638.
2. Van Kesteren L, Wojciechowski M. International adoption from Ethiopia: an overview of the health status at arrival in Belgium. *Acta Clin Belg* 2017;72(5):300-305.

Section 9: Previous bibliographies

This section lists the previous year's update and potentially other bibliographies that were published during 2016. Another 13 bibliographies were published between 2003 and 2015 in this journal.

Converse, PJ, Haile Mariam D, Kloos H, Mekonnen W, Mulatu MS, Kaba M. Bibliography on HIV/AIDS in Ethiopia and Ethiopians in the Diaspora: The 2015 Update. *Ethiop J Health Dev* 2016; 30(3): 103-276.

Section 10: Selected Websites Featuring HIV/AIDS in Ethiopia

1. Federal HIV/AIDS Prevention and Control Office of Ethiopia: <http://www.hapco.gov.et>
2. Ethiopian Public Health Association: <http://www.etpha.org/>
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. People to People Organization: <http://www.peoplepeople.org>
7. Save the Children: http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.6234245/k.A159/HIVAIDS_Programs.htm?msource=weilpres0511#Ethiopia
8. United Nations Children's Fund (UNICEF): http://www.unicef.org/ethiopia/HIV_AIDS_464.html
9. United Nations Joint Program on AIDS (UNAIDS): <http://www.unaids.org/en/Regionscountries/Countries/Ethiopia>
10. United States Agency for International Development: <http://www.usaid.gov/ethiopia/global-health>
11. United States Centers for Disease Control and Prevention (CDC): <http://www.cdc.gov/globalaids/Global-HIV-AIDS-at-CDC/countries/Ethiopia/>
12. University of California, San Francisco HIV In Site: <http://hivinsite.ucsf.edu/global?page=cr09-et-00>
13. The International Technical Training and Education Center on HIV (I-TECH) of the University of Washington: <https://www.go2itech.org/?s=ethiopia>
14. The International Center for AIDS Care and Treatment Programs (ICAP) at Columbia
15. University's Mailman School of Public Health: <http://icap.columbia.edu/where-we-work/ethiopia>
16. World Health Organization: <http://www.who.int/countries/eth/en/>
17. Management Sciences for Health's Ethiopia Network for HIV/AIDS Treatment, Care and Support (ENHAT-CS) Project <http://www.msh.org/our-work/projects/ethiopia-network-for-HIV-AIDS-treatment-care-support>
18. The Twinning Center: <http://www.twinningagainstaids.org/ethiopia.html>.