The Ethiopian Public Health Institute

Report on the 2014 Round Antenatal Care based Sentinel HIV Surveillance in Ethiopia

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LIST OF STUDY TEAM MEMBERS

1. Minilik Demissie
2. Asfaw Adane
3. Wudinesh Belete
4. Atsebha Gebreegziabxier
5. Dr. Desta Kassa
6. Tesfaye Tilahun
7. Nigussie Gezahegn
8. Abebe Habetsilassie
9. Simiret Tesfay
10. Dr.Fekadu Adugna
11. Eleni Seyoum,
12. Alankar Malviya
13. Hiwot H/Sellassie
14. Mulu Girma
15. Yohannes Belay
16. Gebremedihin Gebremichael
17. Kidest Zaelias
18. Feyisa Chala
19. Seble Girma
20. Eleni Kidane
21. Merone Seleshi
22. Zeleke Geto
23. Dr. Yibeltal Assefa
24. Dr. Amha Kebede

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LIST OF ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
BCC	Behavior Change & Communication
BSS	Behavior Surveillance Survey
CI	Confidence Interval
CSA	Central Statistics Agency
DHS	Demographic Health Survey
EPHI	Ethiopian Public Health Institute
EIA	Enzyme Immuno-Assay
GOE	Government of Ethiopia
HAPCO	HIV/AIDS Prevention & Control Office
HC	Health Centre
HF	Health Facilities
HIV	Human Immunodeficiency Virus
HS	Hospital
IEC	Information, Education, Communication
MARPs	Most at Risk Populations
MOH	Ministry of Health
NEQAS	National External Quality Assurance Schemes
NRL	National Referral Laboratory
PMTCT	Prevention of Mother-to-Child Transmission
RHB	Regional Health Bureau
RPR	Rapid Plasma Reagin
SNNPR	Southern Nations Nationalities and Peoples Region
STI	Sexually Transmitted Infections
TWG	Technical Working Group
UAT	Unlinked Anonymous Testing
UNAIDS	Joint United Nations Program on HIV/AIDS
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

FOREWORD

Ethiopia is the second most populous country in Africa that has continued to be affected by the HIV/AIDS epidemic. According to the results of 2014 round ANC-based HIV surveillance, the epidemic continued to decline at a slower rate. However, the HIV epidemic remains to be a significant public health challenge.

The Government of Ethiopia (GOE) and its partners are working together to prevent further spread of HIV/AIDS and to control the pandemic. The GOE has been focusing on efforts to create an enabling environment by establishing the National HIV/AIDS Prevention and Control policy and has developed several technical guidelines. Some of the guiding documents include the Monitoring and Evaluation of the Multi-sectoral Response, ARV, PMTCT, VCT and the Road Map for accelerated access to HIV/AIDS prevention and care etc. Currently the emphasis is focused on effective leadership, coordination, planning, mobilization of resources and monitoring activities for which different institutional changes have been made.

The Federal Ministry of Health (FMOH) has designated the Ethiopian Public Health Institute (EPHI) to coordinate and conduct HIV and related survey and surveillance activities to generate reliable and timely reports for evidence-based decision making, planning and monitoring and evaluation of HIV/AIDS prevention, care and treatment programs.

EPHI sincerely hopes and expects that the 2014 Round of Antenatal Care based Sentinel HIV Surveillance report will be a valuable source of information for the FMoH and FHAPCO from program point of view as well as all partners who contribute in the fight against HIV/AIDS in Ethiopia. This report provides HIV prevalence data from ANC attendees at sentinel site, region and national level. There is no inclusion of projection estimates generated from any modeling.

Finally, EPHI would like to take this opportunity to thank all those who participated in the preparation, data collection and implementation of 2014 round ANC surveillance activities. In particular, I thank EPHI surveillance team that worked relentlessly on the implementation and final generation of this report and the national HIV surveillance and surveys (TWG) members for providing valuable guidance during the implementation of the 2014 round ANC surveillance. Finally yet importantly, I thank all Regional Health Bureaus (RHBs), the Regional Testing Laboratories and the ANC sentinel surveillance site staff members, without whom the 2014 round ANC based Sentinel HIV surveillance, would not have been possible.

Amha Kebede (PhD)

Director General

Ethiopian Public Health Institute

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EXECUTIVE SUMMARY

This HIV Surveillance Report presents results from the Antenatal Care (ANC) based Sentinel HIV Surveillance data from the 2014 round. The results showed the HIV prevalence of ANC clients at the level of sentinel sites, regional, and national levels. It also includes HIV prevalence in urban and rural site settings. However, this report does not include any modeling or national projections.

The 2014 ANC-based HIV Sentinel Surveillance round was unlinked anonymous, where HIV testing was performed on left-over blood collected for routine syphilis testing, or other services like hemoglobin determination. Data and specimens were collected at national level from 122 sentinel sites of which 79 were rural and 43 were urban. Blood samples were tested using Vironostika HIV Ag/Ab ELISA for screening and Murex HIV Ag/Ab ELISA as a confirmatory test for all the HIV-reactive specimens. Testing was done at 20 HIV testing laboratories across all regions. All HIV positives, indeterminate and 10% of the HIV negative samples were re-tested in the National HIV Referral Laboratory at EPHI for quality control. In this round, a total of 55,451 samples were collected, of which 52,942 samples were eligible for the national data analysis. The HIV test result agreement between EPHI and all regional labs for both the positives and negatives were 96.8%.

The national unadjusted HIV prevalence among pregnant women attending ANC clinics in 2014(excluding Army, Federal Police, Dimma refugee Camp clinics and Pynido refugee sites) was 2.2% (urban 3.9% and rural 1.4 %). The adjusted National HIV prevalence (adjusted for the relative urban and rural population size of each region) using all the sites together are 2.0%. The HIV prevalence is heterogeneous among different regions and settings. The Highest adjusted regional HIV prevalence was observed in Addis Ababa city Administration (5.5%), while the lowest figure was observed in Oromia and Benishangulgumuz both (1.2%). In urban sites, Gambella region showed the highest unadjusted HIV prevalence (7.5%) while BenishangulGumuz showed the lowest (2.0%). Rural HIV prevalence was highest in Somali (3.8%) while 12 sites from Oromia, Tigray, Harari, Diredawa and SNNPR regions showed the lowest (0.0) prevalence.

Since the number of sites in each region is not comparable region-to-region comparison of HIV prevalence might be less stable and inappropriate. For national or regional planning, estimates including total people living with HIV need for PMTCT and ART services, etc. need to be generated by projection using the updated figures from this report.

In 2014, the HIV prevalence among 15-24 years age group was 1.7% while it was 2.6% in 25-34 age group. This might indicate a decline in new infections. The overall trend of HIV prevalence in all age groups (15- 49) has remarkably declined in the past 12 years (5.3% in 2003 to 1.7% in 2014).

The national syphilis prevalence (excluding Army, Federal Police, Dimma refugee Camp clinics and Pynido refugee sites) was 1.2%. The syphilis prevalence is 1.3% in Rural and 0.7% in urban sites. It was highest (1.7%) among the ANC clients aged 35-49 years (urban 1.3% & rural 1.9%). In addition, Syphilis positive clients were two times higher to be HIV positive than syphilis negatives (4.3% among syphilis positives compared to 2.2% in Syphilis negative clients).

The observed decline in HIV prevalence may have resulted from multiple factors including HIV/AIDS control and mitigation efforts such as Behavioral Change Communication (BCC) and Information Education and communication (IEC), community sensitization, widespread implementation and increased uptake of antiretroviral therapy (ART), voluntary counseling and testing (VCT), condom use and other interventions.

Based on the observed declining trend of HIV prevalence overtime and heterogeneity of the epidemic in the regions and sites, the multi-sectoral response for HIV should be maintained and further strengthened at all levels. Special attention should be given to regions and settings with relatively higher HIV prevalence levels. It is also important to undertake HIV incidence studies to understand the rate of new HIV infections since prevalence figures are less informative in the era of ART scale up.

Moreover, in the era of rapid expansion and coverage of PMTCT program in the country, the unlinked anonymous way of HIV surveillance is less acceptable in the era of service availability, the utilization of PMTCT based HIV surveillance in place of the ANC based HIV surveillance need to be considered in the future.

1 Background and Introduction

Ethiopia's population was estimated to be 87.8 million in July-2014, and is expected to grow by over 2.7% annually based on the projection from 2007 census. The population is young, with 44.6% being under the age of 15 years. Approximately 81% of the population was rural (CSA 2014). Ethiopia has a federal system with nine regions and two Administrative Councils (Addis Ababa and Dire Dawa).

Ethiopia is one of the sub-Saharan African countries affected by the HIV-1 pandemic. The first serum positive for HIV-1 antibodies was found in 1984 based on the retrospective analysis of samples collected for other purposes (Tsega et al., 1988). The first two hospitalized AIDS cases were diagnosed in 1986 (Lester et al., 1988). The 2011 Ethiopian Demographic and Health Survey (EDHS) report showed that the overall adult (aged 15-49) HIV prevalence to be 1.5% (CI = 1.2-1.7%) while it was 1.4% (CI = 1.1-1.8%) in the 2005 EDHS (CSA, 2012). Moreover, according to the 2015 HIV Related Estimates and Projections for Ethiopia, the HIV prevalence was estimated to be 1.1% and an estimated 729,517people live with HIV/AIDS in Ethiopia (EPHI, 2015).

The Federal HIV/AIDS Prevention and Control Office (FHAPCO) was established in 2002 and mandated to coordinate the overall national HIV/AIDS prevention and control program with a broad-based multi-sectoral approach. FHAPCO developed and implemented different national strategic framework as part of the national response to HIV/AIDS. Several priority interventions were implemented and several targets were successfully achieved since the establishment. The strategic plan II for 2010-2014 was also focused on the provision of preventive, care, support and treatment services and as a result, 90% new infection reduction and 50% reduction in AIDS related mortality were registered (FHAPCO, 2014).

EPHI is mandated to conduct operational research on public health priority diseases, surveys and surveillance activities related to infectious and non-infectious diseases, nutrition and traditional medicine. The Institute is also mandated to lead the National Public Health Emergency Response. Because of these, HIV and other National surveillance and survey activities are hosted and led by EPHI. Hence, EPHI is trying to address the HIV and other National surveillance issues giving strong attention in its five year strategic plan (EPHI, 2010).EPHI also serves as Ethiopia's National Centre of Excellence to perform referral medical laboratory services and is providing highly specialized diagnostic services that cannot be conducted elsewhere in the country. It implements National External Quality Assurance Schemes (NEQAS) for HIV testing.

ANC based HIV sentinel surveillance involves collection of blood samples from consecutive women attending antenatal clinic facility at ANC survey site for the first time. Justification for such an approach is to prevent selection bias. As part of routine ANC care, blood samples are collected for hemoglobin estimation and/ or syphilis testing and an aliquot is utilized for HIV testing after removing the identifiers. In this approach, there are almost no instances of refusals and the data obtained are unlikely to suffer from refusal bias. The methodology of unlinked anonymous testing (UAT) practiced for ANC surveillance does not require informed consent for HIV testing.

Ethiopia has utilized ANC-based HIV sentinel surveillance since 1989. ANC-based sentinel HIV surveillance sites have increased from one urban site in 1989 to 122 sites in 2014 (Figure1) with increasing rural representation and data quality. This has been serving as a major planning data source for HIV/AIDS control and prevention. The 2014 Round ANC Sentinel HIV Surveillance report also included trends from several years. This report and similar previous round reports will be available online at the Ethiopian AIDS Resource Center website (www.etharc.org) as well as at EPHI website (:www.EPHI.gov.et).

Objectives of ANC-based HIV Surveillance

The main objectives of this ANC based HIV surveillance is to:

1. To estimate the HIV prevalence among pregnant women attending ANC clinics
2. To provide data on trends of HIV prevalence over time
3. To provide data for advocacy
4. To provide data for appropriate planning and timely prevention and control activities

2 Methodology

2.1 Site Selection

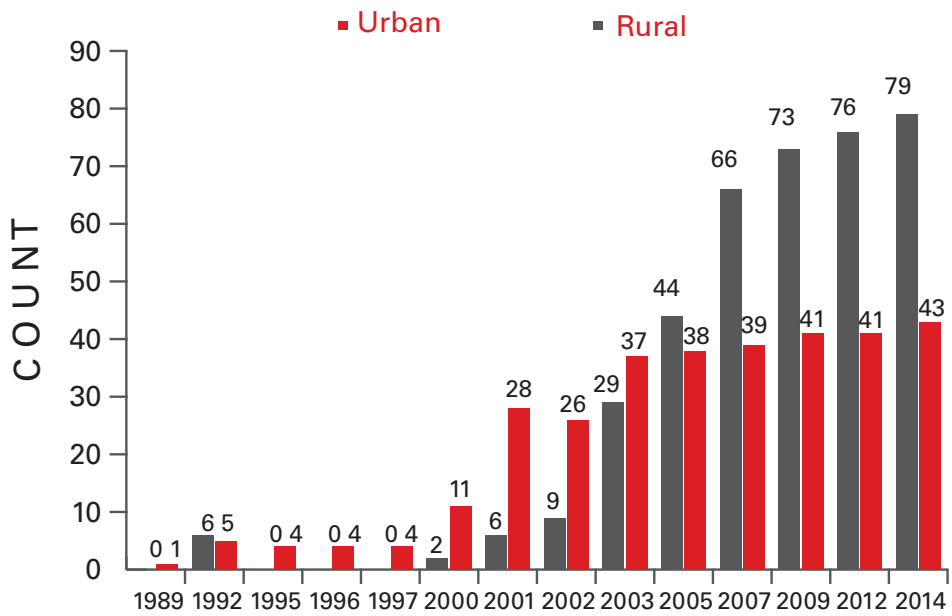
For the 2014 round ANC-based sentinel surveillance, a total of 122 sites (117 existing sites and 5 additional new sites) were included. Of these sites, 43 of them were urban and 79 rural sites (Figure 1). In the urban sites, Federal Police and Federal Armed Forces hospitals were included, whereas Pinyudo Refugee Camp clinic was included in rural sites. Sites were selected based on the following criteria according to the National ANC guidelines:

1. Sustainability of antenatal care service.
2. Accessible functional laboratory (adequacy of personnel, equipment and supplies) for the main site.
3. Adequate client volume (first time attendees) for the required sample size – the minimum numbers being:
    a. Rural sites – 60 ANC clients per month
    b. Urban sites – 84 ANC clients per month

1. The health facility should be drawing blood for routine services, such as syphilis testing and/or hemoglobin determination.
2. Sustainable supply of RPR for syphilis screening.
3. For rural sites, special considerations were made, i.e.:
    a. Use of the Central Statistical Agency (CSA) definition to select sentinel sites.
    b. Select areas not on the main roads or highways (at least 25 km away from highways).
    c. Those which are non-commercial centers and/or100 Kilometers away from regional or zonal towns (this may not apply for regions such as Dire Dawa, Harari and Gambella).

The 2014round of ANC-based HIV Sentinel Surveillance followed the National HIV sentinel surveillance guideline that was revised in February 2014. All Regional Health Bureaus (RHB) and site staffs were trained prior to the survey.

Figure 1.1: Expansion of ANC Sentinel Surveillance in Urban and Rural sites (1989-2014)



2.2. Sample Size

All sentinel sites were required to collect a minimum of 370 and 450 specimens from urban and rural sites, respectively. The maximum data collection period was 12 weeks for urban sites and 20 weeks for rural sites. Sentinel sites that were unlikely to achieve the target sample size have collaborated with a maximum of three nearby health facilities (called satellite sites). The satellite sites were health centers, clinics, or health posts, located nearby the main site serving similar population. Data and samples from the satellite sites were combined with those from the main sites for analysis.

2.3. Data Collection

All pregnant women attending ANC as part of routine antenatal care were tested for syphilis and/or hemoglobin. After syphilis testing, leftover blood was centrifuged and the separated plasma or serum was aliquoted to 1.8 ml Nunk tube, which then labeled with a surveillance code number. All eligible ANC clients were sampled consecutively during the surveillance period.

Specimens were transported to 20 regional testing laboratories maintaining standard cold chain procedures for HIV testing. HIV testing was done in anonymous and unlinked fashion in testing laboratories. Vironostika HIV Uni-Form II Ag/Ab EIA (bioMerieux, France) was used for screening and all HIV-reactive specimens were re-tested using Murex HIV Ag/Ab Combination EIA (Abbott, Germany or USA). Test results were recorded on standardized data collection forms.

2.4. Study Population

The population chosen for HIV surveillance included pregnant women seeking ANC service at the selected public or nongovernmental organization ANC clinics designated as sentinel sites.

2.5. Inclusion Criteria

Pregnant women attending the ANC sentinel site who were:

1. Aged 15 to 49 years, and
2. Not previously tested for syphilis during the current pregnancy.

ANC clients were sampled irrespective of whether this is their first or subsequent visit, as long as this is their first syphilis test.

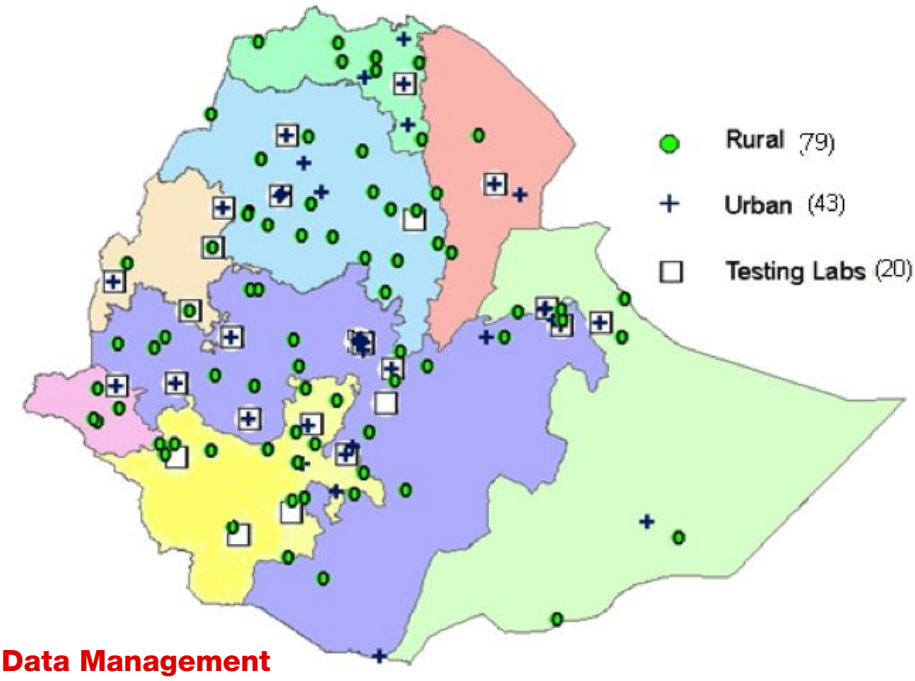
2.6. Exclusion Criteria

Women referred from other health facilities for any reason were not included. This is because they may have already been included for surveillance at another sentinel site and/or may have been referred because of HIV-related complications. Hence they could have a differential HIV positivity rates than those not referred, and may bias prevalence estimate if included. Women below the age of 15 years and above the age of 49 years were also excluded.

2.7. Ethical Considerations

Confidentiality was maintained throughout the process. The names or other personal identifiers of the ANC clients were not recorded or linked to the HIV test results. ANC clients were either offered HIV testing through existing PMTCT services or were encouraged to receive VCT for HIV where services were available nearby. Data in the record form also included routine demographics and syphilis test results. Moreover, the surveillance protocol was ethically approved by the Scientific and Ethical Review Committee of EPHI.

Figure 1.2: Map of Sentinelle Surveillance Sites & Testing Laboratories in 2014



2.8. Data Management

All copies of the completed data forms were transported to EPHI–National Referral Laboratory (NRL) for double data entry and cleaning using Epi-Info version 3.5.1. Data analysis was done using SPSS-version 20.0.

2.9. Data Quality

Ten percent of systematically selected samples (every tenths specimen once the first sample code is selected by lottery method) among HIV negative samples, all HIV-positive and all indeterminate specimens were transported to the National HIV Reference Laboratory at EPHI and re-tested using Vironostika and Murex EIA for quality control purposes.

3 Findings

3.1. Completeness of Information

In the 2014 round surveillance, 55,451 samples were collected from 122 (79 rural and 43 urban) sentinel sites. Finally, 2,509 specimens were excluded from the analysis for various reasons as shown below:-

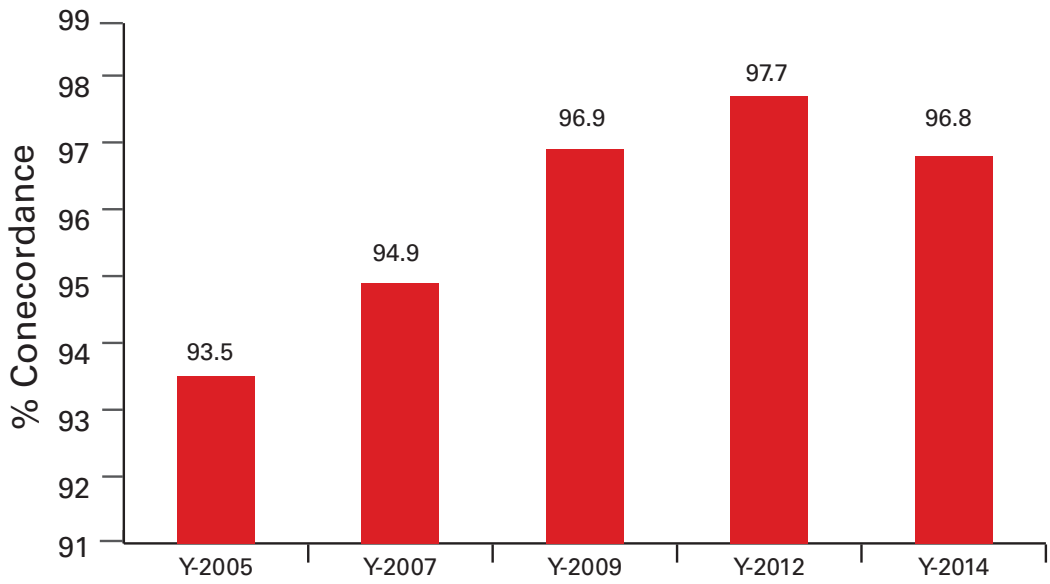
i. Specimen representing special population groups from Addis Ababa (Federal Police Hospital (n=446) and Armed Force General Hospital (n=380) which serve uniformed service population: 280 specimens from Pynido HC: 468 Pynido refugee clinic and 297 specimens from Dimma refuge clinics.

ii. Six hundred eleven (611) samples from rural sentinel sites that had mixed urban population (rural –urban contamination) in Haik, Mertolemariam and Dangla Health Centers in Amhara region.

iii. Twenty-seven samples also excluded from analysis due to indeterminate result. Finally, 52,942 specimens were eligible for the national data analysis.

3.2 .Concordance of Test result between regions and EPHI

Figure 3.1: below shows the improvement in the regional testing labs performance in HIV through time compared with the National Reference Laboratory.



3.3. Unadjusted HIV Prevalence

3.3.1 HIV Prevalence by Settings (urban, Rural)

The overall unadjusted urban HIV prevalence for pregnant women aged 15-49 in Ethiopia is 3.9% (Figure 3.2 and Table 3.1). The highest unadjusted Urban HIV prevalence was from Gambela region (7.5%) followed by Harar (6.6%) and Amhara (6.1%). Lowest urban HIV prevaalnce were from Benishangul (2.0%), and Oromiya (2.1%).

The overall unadjusted rural HIV prevalence for Ethiopia is 1.4% (Figure 3.3).Somali region has the highest rural HIV prevalence (3.8%) followed by Gambella (3.2%). The rural prevalence for Harari and Dire Dawa region is 0%, however this value comes from only one site. Afar and Benishangul also show relatively low HIV prevalence with 0.8% for each.

Rural sites show a median value of HIV prevalence to be 0.9%, while the urban sites show 3.3%. The median unadjusted HIV prevalence for all urban and rural sites is 1.4%; while the overall national (urban + rural) unadjusted HIV prevalence was 2.2%.

Figure 3.2: Unadjusted HIV Prevalence (%) among ANC Attendees at Urban ANC Clinics, by Region, Ethiopia, 2014

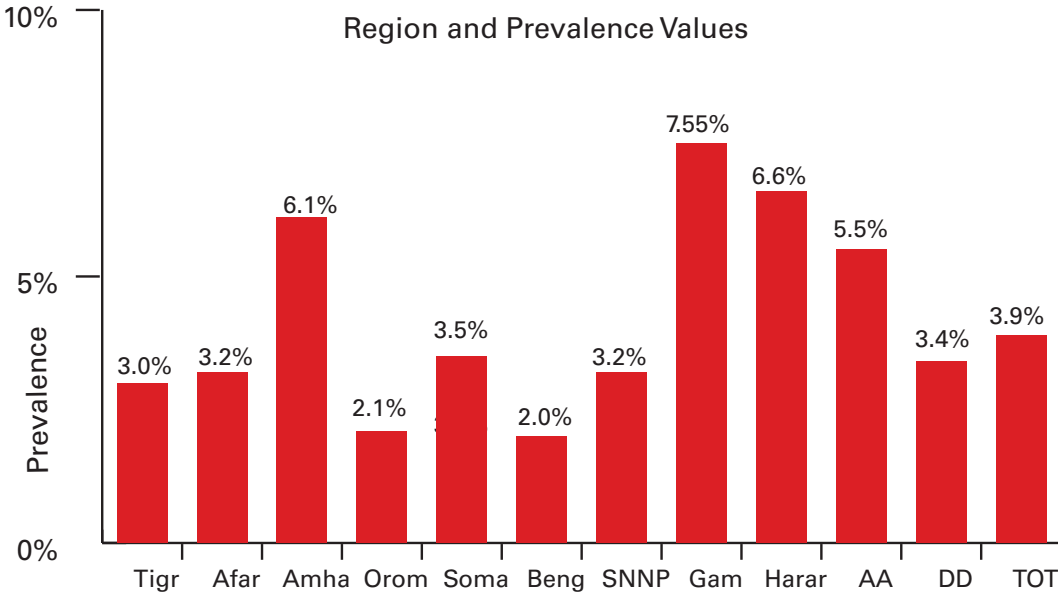


Figure 3.3: Unadjusted HIV Prevalence among ANC Attendees at Rural ANC Clinics, by Region and national level (TOT), Ethiopia, 2014

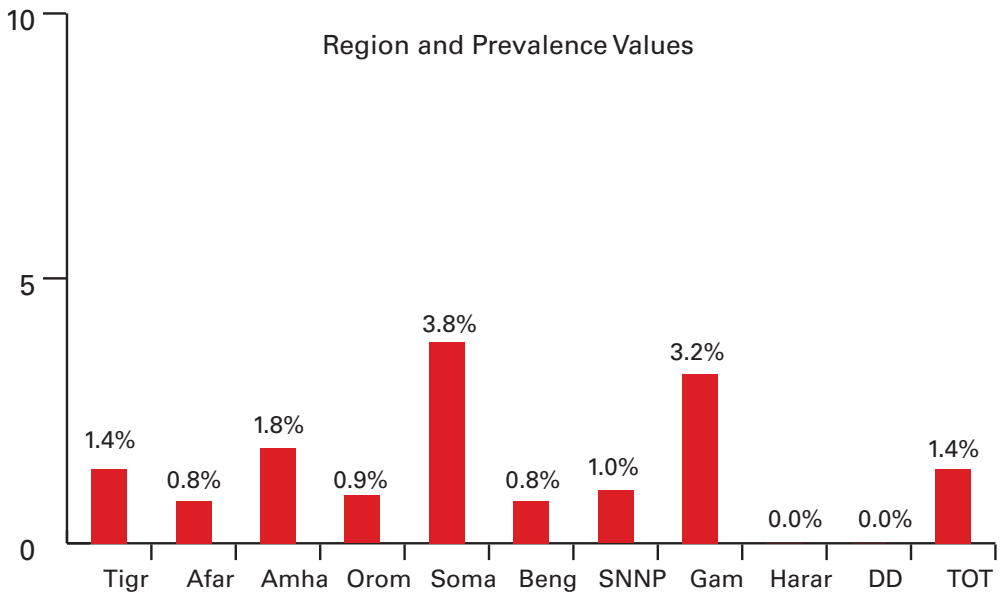


Table 3.1: HIV Prevalence and Confidence Intervals by Region and Setting, 2014

Setting	Region	No.HIV tested	HIV Prevalence (%)		Unadjusted HIV prevalence
			Point Estimate	95% CI	
Urban + Rural*	Tigray	5,024	2.0	1.6 - 2.4	1.9
	Afar	3,152	1.4	1.0 - 1.8	1.5
	Amhara	10,453	2.8	2.5 – 3.1	2.8
	Oromia	11,410	1.2	1.0 - 1.4	1.3
	Somali	3,012	3.8	3.1 - 4.4	3.8
	Benishangul Gumuz	2,317	1.2	0.7 - 1.6	1.3
	SNNPR	10,299	1.5	1.2 - 1.7	1.5
	Gambella	1,729	5.2	4.2 - 6.3	4.2
	Harari	859	3.6	2.4 - 4.9	3.0
	Addis Ababa	3,303	5.5	4.8 – 6.3	5.5
	Dire Dawa	1,384	2.1	1.4 - 2.9	2.2
	National	52,942	2.0	1.9 - 2.1	2.2
Urban	Tigray	1,620	3.0	2.1 -3.8	
	Afar	886	3.2	2.0 - 4.3	
	Amhara	2,345	6.1	5.2 – 7.1	
	Oromia	3,477	2.1	1.6 – 2.5	
	Somali	762	3.5	2.2 - 4.9	
	BenishangulGumuz	888	2.0	1.1 - 3.0	
	SNNPR	2,415	3.2	2.5 – 3.9	
	Gambella	389	7.5	4.8 – 10.1	
	Harari	394	6.6	4.1 – 9.1	
	Addis Ababa	3,303	5.5	4.8 - 6.3	
	Dire Dawa	884	3.4	2.2 - 4.6	
	National	17,369	3.9	3.6 - 4.1	
Rural	Tigray	3,404	1.4	1.0 – 1.8	
	Afar	2,266	0.8	0.4 – 1.2	
	Amhara	8,108	1.8	1.5 – 2.1	
	Oromia	7,933	0.9	0.7 – 1.1	
	Somali	2,250	3.8	3.0 – 4.6	
	BenishangulGumuz	1,429	0.8	0.4 – 1.3	
	SNNPR	7,884	1.0	0.7 – 1.2	
	Gambella	1,340	3.2	2.3 – 4.2	
	Harari	465	0.0		
	Dire Dawa	500	0.0		
	National	35,581	1.4	1.3 – 1.5	

* Urban + rural values are adjusted for relative regional urban and rural population size.

3.3.2 Unadjusted HIV Prevalence by Site and Setting

The HIV prevalence estimates varied widely across sites, especially in urban areas. Unlike the previous rounds, the highest observed HIV prevalence is from Gonder HC (13%) in Amhara region. The prevalence of Bahirdar hospital has reduced significantly to 6.8 % from that of 17% in 2012, while the prevalence of Bahirdar HC is 7.7%. In addition to Gonder HC and Bahirdar HC, urban sites located in Addis Ababa (Gulele HC, Higher 23 HC) and Gambella (Gambella Hospital) have HIV prevalence higher than 7%. Overall, regions with several urban sites show high variations in HIV prevalence: The HIV prevalence in Amhara urban sites ranges from 1.5% (Addis Zemen HC) to 13% (Gonder HC); in Oromia, it ranges from 0.5% (Alemaya HC) to 3.8% (Adama HC); and in Addis Ababa it ranges from 2.8% (Kolfe HC) to 8.0% (Higher 23 HC).

The HIV prevalence across rural sites is more homogeneous at low levels than urban sites. When compared with seven sites in 2012, twelve rural sites have shown 0% HIV prevalence in 2014 which includes:- Semema and workamba Health Centre (Tigray), Delfage HC (Afar) Hasange HC (Harari), Biyowale HC (Dire Dawa), LimuSeka HC, Ayira Hosp, Toke Hosp, Kokosa HC and Chewaka HC (Oromia); Karat and Teza HC (SNNPR). Furthermore, some sites have shown dramatic reduction and increment in HIV prevalence like Dalifage and Dadem HC. Dalifage HC has reduced from 4.5% in 2012 to 0% in 2014 and Dadim HC, which was 0% in 2012, became 2.2% in 2014

In contrast, however, there are rural sites which showed higher HIV prevalence: in Tigray (Churchur HC 6.8%); in Amhara (Kone HC 5.8%); in Oromiya (Mesela HC 4.6%); Gambella (Itang HC 6.6%). In addition, in Somali region, Kebribeyah (4.9%), Dolo Odo(4.7%) and Kelafo HC (4.6%) shows higher HIV prevalence just like the previous round. The increase in HIV prevalence in rural sites indicates the presence of potential hotspots in rural areas.

In the Key populations that were surveyed: the 3.2% HIV prevalence for the armed forces (AFTGH); 1.8% for the police (Federal Police Hospital,) was lower than the previous round while the prevalence in refugees in Gambella (Pynido Refugee Clinic 4.5%) and in Dimma refugee HC (14.8%) has almost similar trend with 2012 round.

Table 3.2: Urban 2014 ANC Surveillance Sites with Point HIV Prevalence and Confidence Intervals

Regional	Site Name	Sample Size	HIV Prevalence (%)	
			Point Estimate	95% CI
Tigray	Mekele HC	380	3.9	2.0 - 5.9
	AdigratHosp	500	1.6	0.5 - 2.7
	MaychewHosp	370	6.5	4.0 - 9.0
	AbiAdi HC	370	0.3	-0.3 - 0.8
Afar	Asaita HC	451	1.1	0.1 – 2.1
	DubtiHosp	435	5.3	3.2 – 7.4
Amhara	Bahir Dar HC	413	7.7	5.2 – 10.3
	Estie HC	379	1.8	0.5 – 3.2
	Gonder HC	370	13.0	9.5 – 16.4
	Bahir Dar Hosp	396	6.8	4.3 – 9.3
	Addis Zemen HC	406	1.5	0.3 – 2.7
	MetemaHosp	381	6.3	3.9 – 8.7
Oromia	Shashemene HC	377	2.7	1.0 – 4.3
	Mettu HC	500	1.2	0.2 – 2.2
	Adama HC	400	3.8	1.9 – 5.6
	Jimma HC	417	1.2	0.2 – 2.2
	Nekemtie HC	497	3.0	1.5 – 4.5
	Chiro Clinic	452	2.0	0.7 – 3.3
	Alemaya HC	379	0.5	-0.2 – 1.3
	Moyale HC	455	2.2	0.9 – 3.5
Somali	Jijiga Hosp	392	4.8	2.7– 7.0
	Gode Hosp	370	2.2	0.7 – 3.6
Benishangu IGumuz	Assosa Hosp	500	2.4	1.1 – 3.7
	Pawe Hosp	388	1.5	0.3 – 2.8
SNNPR	Dilla Hosp	400	4.8	2.7 – 6.8
	Hossana Hosp	400	3.3	1.5 – 5.0
	Sawla HC	395	1.0	0.0 – 2.0
	Aletawondo HC	442	1.6	0.4 – 2.7
	Sodo HC	398	6.0	3.7 – 8.4
	Hawassa HC	369	2.7	1.1 – 4.4
Gambella	GambellaHosp	389	7.5	4.8 – 10.1
Harari	HiwotFanaHosp	394	6.6	4.1 – 9.1
Addis Ababa	Kolfe HC	468	2.8	1.3 – 4.2
	Kotebe HC	497	4.0	2.3 – 5.8
	Teklehaymanot HC	382	6.0	3.6 – 8.4
	Kazanches HC	458	6.1	5.2 – 10.1
	Higher 23 HC	499	8.0	5.6 – 10.4
	Gulele HC	499	7.2	4.9 – 9.5
	Akaki HC	500	4.6	2.8 – 6.4
Dire Dawa	DiredawaHosp	388	5.2	3.0 – 7.4
	Dire Dawa HC	496	2.0	0.8 – 3.3
Armed Forces	AFTGH	380	3.2	1.4 – 4.9
Federal Police	Federal Police Hosp	446	1.8	0.6 – 3.0

Table 3.3: Rural 2014 ANC Surveillance Sites with HIV Prevalence and Confidence Interval

Region	Site	Sample Size	HIV Prevalence (%)	
			Point Estimate	95% CI
Tigray	EdagaArbi HC	563	0.9	0.1 – 1.7
	Atsibi HC	500	0.8	0.0 – 1.6
	Workamba HC	450	0.0	0.0
	Zana HC	470	0.9	0.0 – 1.7
	Semema HC	477	0.0	0.0
	Adigoshu HC	470	0.9	0.0 - 1.7
	Chercher HC	474	6.8	4.5 – 9.0
Afar	Chifra HC	459	0.2	-0.2 – 0.6
	Delfage HC	449	0.0	0.0
	Kelewan HC	461	0.7	-0.1 – 1.4
	Werer HC	448	2.9	1.3 – 4.5
	Aboala HC	449	0.2	-0.2 – 0.7
Amhara	Sekela HS	463	0.4	-0.2 – 1.0
	Bibugne HC	500	1.4	0.4 – 2.4
	Chara Clinic	500	0.6	-0.1 – 1.3
	Enewari HC	437	0.7	-0.1 – 1.5
	Bora HC	500	1.4	0.4 – 2.4
	Tenta HC	500	2.8	1.4 – 4.2
	Kone HC	500	5.8	3.8 – 7.8
	MertolemariamHC (S)	366	1.4	0.2 – 2.6
	Haik HC _(S)	261	2.7	0.7 – 4.6
	Dangla HC _(S)	222	1.4	-0.2 – 2.9
	Delgi HC	498	1.6	0.5 – 2.7
	Jaragedo HC	459	0.2	-0.2 – 0.6
	Mekoy HC	499	1.4	0.4 – 2.4
	Arerti HC	450	1.8	0.6 – 3.0
	Kelala HC	500	3.6	2.0 – 5.2
	Jama HC	500	1.4	0.4 – 2.4
	Amdework HC	469	1.9	0.7 – 3.2
	Guhala HC	484	1.7	0.5 – 2.8

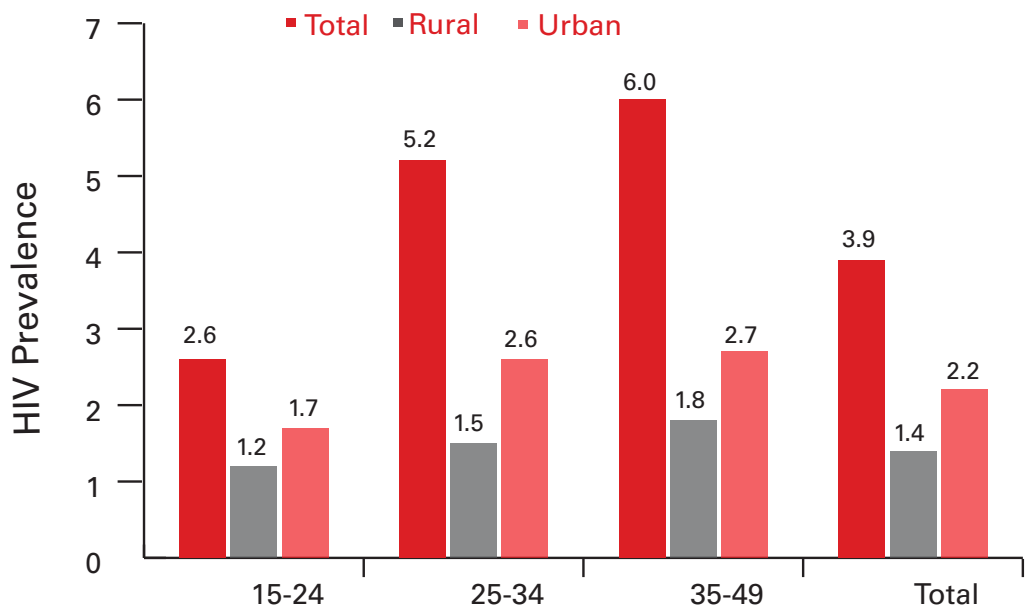
Region	Site	Sample Size	HIV Prevalence (%)	
			Point Estimate	95% CI
Oromia	Abomsa HC	458	0.0	0.0
	LimuSeka HC	480	0.0	0.0
	GamboHosp	510	0.8	0.0 – 1.5
	AyraHosp	500	0.0	0.0
	Gosa Clinic	459	0.7	-0.1 – 1.4
	Daddim HS	450	2.2	0.9 – 3.6
	Toke HS	468	0.6	-0.1 – 1.4
	Derra HC	450	2.0	0.7 – 3.3
	Dello HC	463	1.3	0.3 – 2.3
	Begi HC	466	0.2	-0.2 – 0.6
	Chewaka HC	445	0.0	0.0
	Amaya Clinic	465	0.4	-0.2 – 1.0
	Mesela HC	477	4.6	2.7 – 6.5
	Kokosa HC	452	0.0	0.0
	AmuruJarite HC	472	1.1	0.1 – 2.0
	AlemTeferi HC	469	0.9	0.0 – 1.7
	GidaAyana HC	449	0.9	0.0 – 1.8
Somali	Awbere HC	439	1.8	0.6 – 3.1
	Kebribeyah HC	451	4.9	2.9 – 6.9
	DoloOdo HC	449	4.7	2.7 – 6.6
	Kelafo HC	456	4.2	2.3 – 6.0
	Erer HC	455	3.1	1.5 – 4.7
BenishangulGumuz	Debate HC	458	0.9	0.0 – 1.7
	Kamashi HC	500	1.0	0.1 – 1.9
	Menge HC	471	0.6	-0.1 – 1.4
SNNPR	Belle HC	481	0.4	-0.2 – 1.0
	TerchaHsp	471	1.3	0.3 – 2.3
	Karat HC	499	0.0	0.0
	Gimbichu HC	500	0.2	-0.2 – 0.6
	Mirab Abaya HC	500	1.0	0.1 – 1.9
	118-Daye HC	500	3.6	2.0 – 5.2
	120-Buee HC	493	0.4	-0.2 – 1.0
	122-Hana HC	500	0.6	-0.1 – 1.3
	AttatHosp	500	1.4	0.4 – 2.4
	Chiri HC	493	0.2	-0.2 – 0.6
	Sheko HC	499	0.4	-0.2 – 1.0
	Agam HC	500	0.2	-0.2 – 0.6
	Teza HC	500	0.0	0.0
	ChenchaHosp	495	1.4	0.4 – 2.5
	Gazer HC	500	1.8	0.6 – 3.0
	BechiHc	453	2.6	1.2 – 4.1
Gambella	Itang HC	427	6.6	4.2 – 8.9
	Korgang HC	450	0.7	-0.1 – 1.4
	Metti HC	463	2.6	1.1 – 4.0

Region	Site	Sample Size	HIV Prevalence (%)	
			Point Estimate	95% CI
Harari	Hasange HC	465	0.0	0.0
Dire Dawa	Biyowale HC	500	0.0	0.0
Gambella	Dima Refugee Clinic	297	14.8	10.8 – 18.9
	Pynido Refugee Clinic	468	4.5	2.6 – 6.4

3.3.3 HIV Prevalence by Age and Setting

The overall unadjusted HIV prevalence among pregnant women attending ANC clinics is 2.2% (urban 3.9%, rural 1.4 %) in 2014. Women in the age groups of 25-34 years and 35-49 years have the highest overall HIV prevalence of 2.6% and 2.7%, respectively. The highest urban and rural prevalence is among 35-49 years old (6.0% and 2.7% respectively). It seems that the peak of HIV prevalence is moving towards older ages groups (compared to previous rounds) in line with mature epidemic patterns. For details, see Figure 3.4.

Figure 3.4: Unadjusted HIV Prevalence by Age Group and Site Setting, 2014

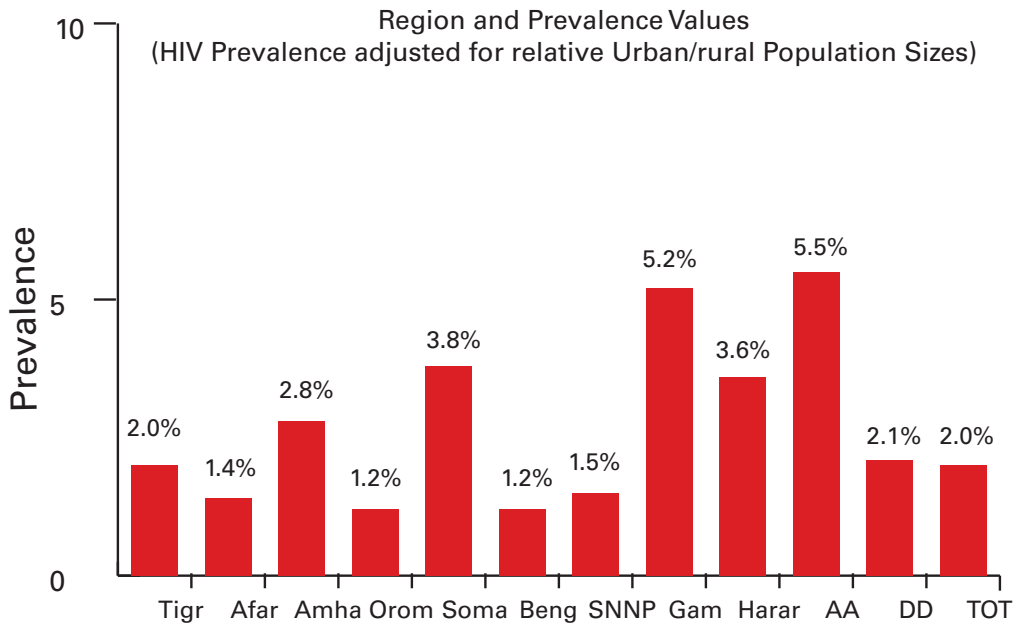


3.4. Adjusted HIV Prevalence

The national HIV prevalence adjusted for the relative urban/ rural population size was 2.0%. The highest regional HIV prevalence during the 2014 ANC round was observed in Addis Ababa (5.5%) followed by Gambella (5.2%) and Somali (3.8%).

The lowest adjusted HIV prevalence figures were from Oromia (1.2%) and Benishangul Gumuz (1.2%) followed by Afar (1.4%) and SNNPR (1.5%). The relatively low prevalence observed in most of the regions is consistent with the findings from previous 2012 ANC surveillance rounds. (Figure 3.4)

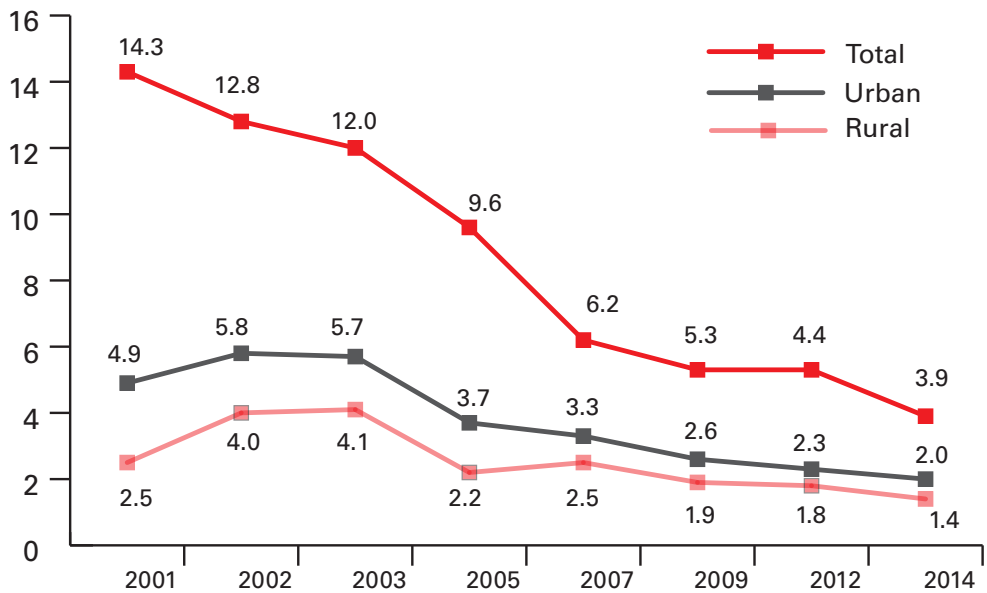
Figure 3.5: Adjusted HIV Prevalence among ANC Attendees by Region, Ethiopia, 2014



3.5. Trends in HIV Prevalence

Figure 3.6 illustrates the national HIV prevalence trend by urban and rural location. Overtime, the national prevalence shows a declining trend. The adjusted HIV prevalence among pregnant women aged 15-49 has declined consistently at national level from a peak of 5.8% in 2002 to to 1.7% in 2014. Similarly, HIV prevalence among pregnant women aged 15-49 declined consistently in both urban and rural areas since 2003; urban HIV prevlance declined from apeak of 14.3% in 2001 to 3.9% in 2014. Rural prevalence peaked in 2003 at 4.1% and remained low at 1.8% in 2012 and even reducing to 1.4% in 2014.

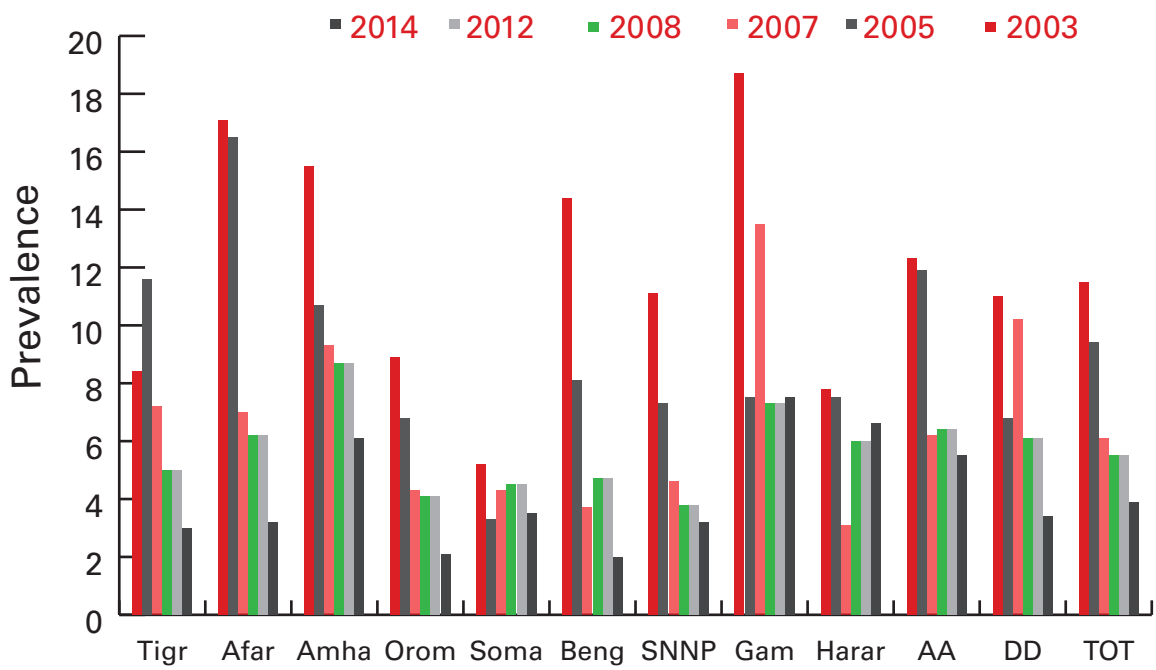
Figure 3.6: Trends of HIV Prevalence (%) among ANC Clients in All Urban and Rural Sites in Ethiopia, 2001-2014



3.5.1 Trends of HIV Prevalence in Urban Sites

Figure 3.7 shows the trend in HIV prevalence in urban sites of regions. HIV prevalence has declined in most of urban sites of regions however; some sites in Addis Ababa and Gambella have increased. The site level variability of HIV prevalence among the regions has continued to decline (Annex 7). In 2003, HIV prevalence ranged from 5.2% to 17.1%; this decreased to a range of 2.7% to 8.8% in 2012 and to 2.1% to 7.5% in 2014.

Figure 3.7: Trend of HIV prevalence among Urban ANC clients in regional setting 2003- 2014



3.5.3 Trends of HIV Prevalence by Age Group

HIV prevalence in all age groups (15-49) showed a consistent decline from 2001 to 2014 with the exception of 35-49 age-groups which increased in 2012 and decreased in 2014 (fig 3.8). HIV prevalence was highest among 15-24 year old until 2005, since then prevalence in this age group has markedly declined compared to the other age groups and was the lowest in 2014. A similar trend was observed in both urban and rural prevalence by age group. The age group 35-49 in urban sites shows an increasing trend from 2009 to 2014 which might be due ART scale up (Table 3.4). Overall, the HIV prevalence ratio comparing 15-24 age groups to the 25-34 age groups clearly shows a reduction in HIV infection in the younger age group (Fig.3.6 and table 3.5).

Figure 3.8: Trends of HIV Prevalence by age group

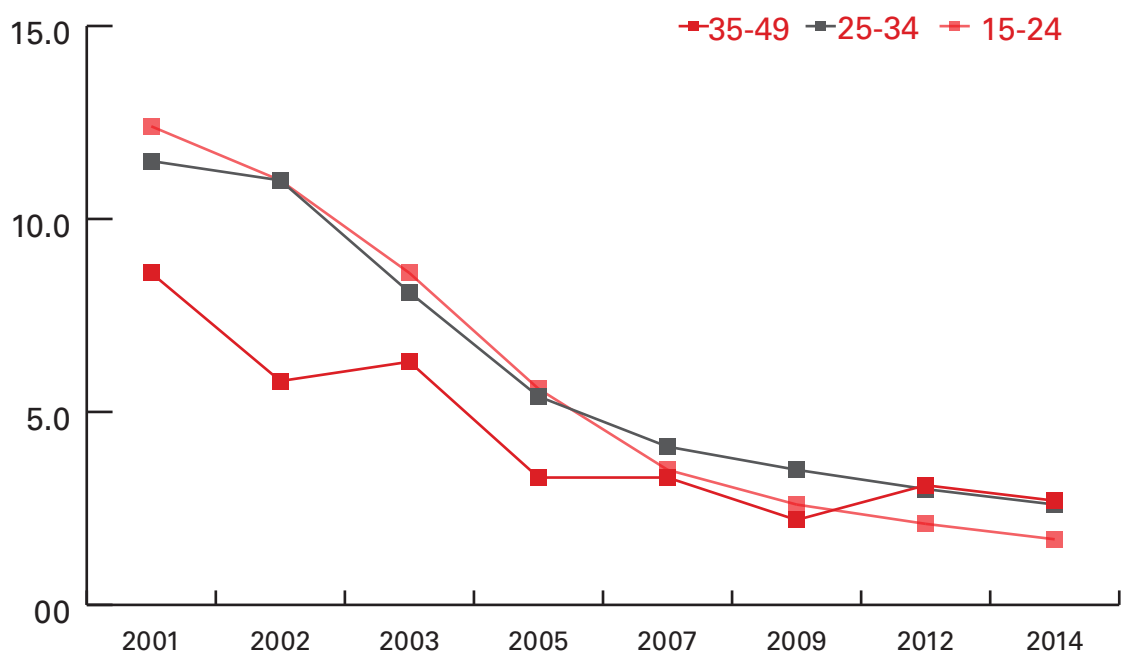


Table 3.4: ANC-based HIV Prevalence by Age Group and Year of Survey

Setting	Age group (Years)	HIV Prevalence (%) and Year of Survey							
		2001	2002	2003	2005	2007	2009	2012	2014
Urban + Rural	15 – 24	12.4	11.0	8.6	5.6	3.5	2.6	2.1	1.7
	25-34	11.5	11.0	8.1	5.4	4.1	3.5	3.0	2.6
	35-49	8.6	5.8	6.3	3.3	3.3	2.2	3.1	2.7
	Total	11.7	10.6	8.2	5.3	3.8	3.0	2.1	2.2
	Ratio of Prevalence 15-24 to 25- 34 years	1.08	1.00	1.07	1.05	0.84	0.62	0.69	0.65
Urban	15 – 24	14.2	12.7	11.9	9.1	5.4	4.2	3.3	2.6
	25-34	15.0	13.6	12.5	10.6	7.3	6.8	5.7	5.2
	35-49	11.0	8.5	10.3	7.1	6.3	4.5	4.9	6.0
	Total	14.3	12.8	12.0	9.6	6.2	5.3	4.5	3.9
	Ratio of Prevalence 15-24 to 25- 34 years	0.95	0.93	0.95	0.86	0.74	0.62	0.58	0.50
Rural	15 - 24	3.3	4.7	4.3	2.4	2.2	1.7	1.4	1.2
	25-34	1.8	3.8	3.9	2.2	2.7	2.1	1.8	1.5
	35-49	2.8	2.0	3.6	1.6	2.3	1.7	2.5	1.8
	Total	2.5	4.0	4.1	2.2	2.5	1.9	1.7	1.4
	Ratio of Prevalence 15-24 to 25- 34 years	1.89	1.22	1.10	1.10	0.82	0.82	0.76	0.81

4 Syphilis Prevalence Findings

4.1. Prevalence of Syphilis by Age and Site

Of the 55,451 sample collected for syphilis testing, 53,431specimens had properly documented syphilis test result. Of these a total of 1,527 samples from the Federal Police, Federal Army Hospitals and Pynido and Dimma refugee Camp clinics were excluded from national and regional analysis. Among 51904 (97.1%) samples used for national and regional analysis, 559 (1.1%) were reactive for Rapid Plasma Reagin (RPR) (1.3% Rural & 0.7% Urban). When adjusted for urban and rural population sizes of each region, the overall prevalence of syphilis becomes 1.2%. The adjusted syphilis prevalence is highest in Gambela region (5.0%) followed somali by (4.2%) and Diredawa (3.4%). The lowest is in Harari (0.0%) followed by Tigray 0.2% (Figure 4.1%).

The unadjusted Syphilis prevalence in urban sites is 0.7% of which the highest (9%) is noted in Gambela followed by Dire Dawa and SNNPR (each 1.0%) as indicated in Figure 4.2.Unlike the previous round a higher rural prevalence noted in Diredawa (biyowale HC 7.3%) followed by Somali (5.3%) and Oromiya region (1.7%),(see Figure 4.3).

We observed a relative increment in syphilis prevalence from 1.0 % in 2012 to 1.2% in 2014. Although there is more syphilis prevalent in rural areas compared to urban sites, a total of 53 facilities (45%) of the sites including 17 urban and 36 rural sites have reported 0% RPR reactivity for syphilis.

Some of the rural health centers such as Kokossa HC, Awebere HC, Kelafo HC and Hana HC showed high syphilis prevalence (>5%) than others and need further attention. Among Urban sites, Felegehiwot and Gambela hospital had higher prevalence (See Annex 3, 4 & 5). Pynido Refugee Clinic in Gambella is particularly high. This may indicate persistent high risk sexual behavior.

Although both HIV and syphilis are sexually transmitted diseases, higher syphilis prevalence was observed in rural areas compared to urban areas. The syphilis prevalence was 0.7% in urban and 1.3% in rural sites in 2014 round. Similarly, the syphilis prevalence in 2012 round were 0.7% in urban and 1% in rural sites. This observation is contrary to the higher HIV prevalence observed in urban areas than rural areas. These findings call for further studies to fully explain the observation.

Figure 4.1: Adjusted Syphilis Prevalence among All ANC Attendees by Region, Ethiopia, 2014

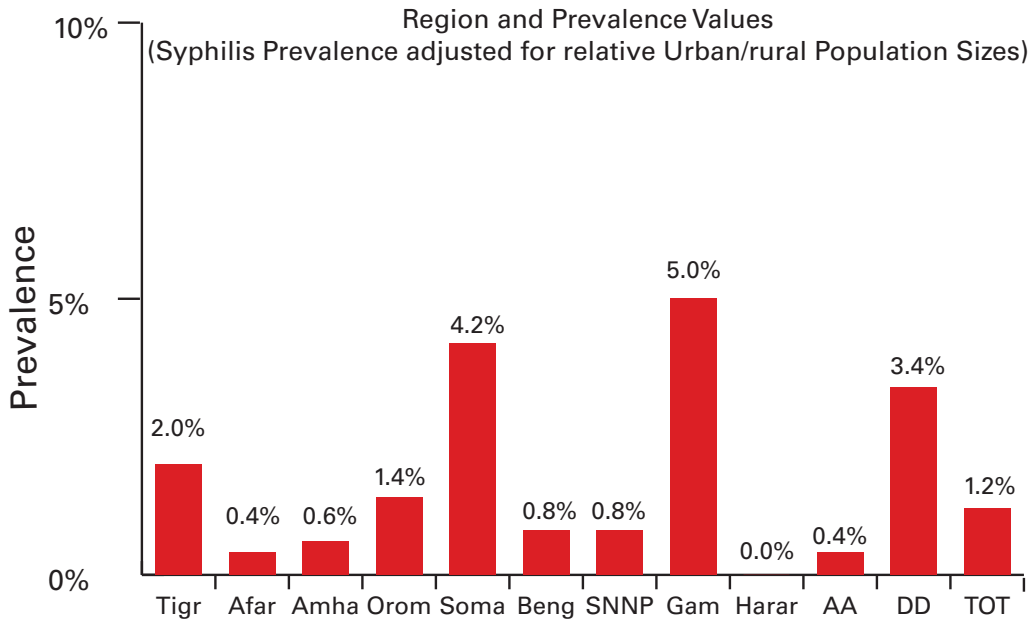


Figure 4.2: Unadjusted Syphilis Prevalence among ANC Attendees at Urban ANC Sites, by Region, Ethiopia, 2014

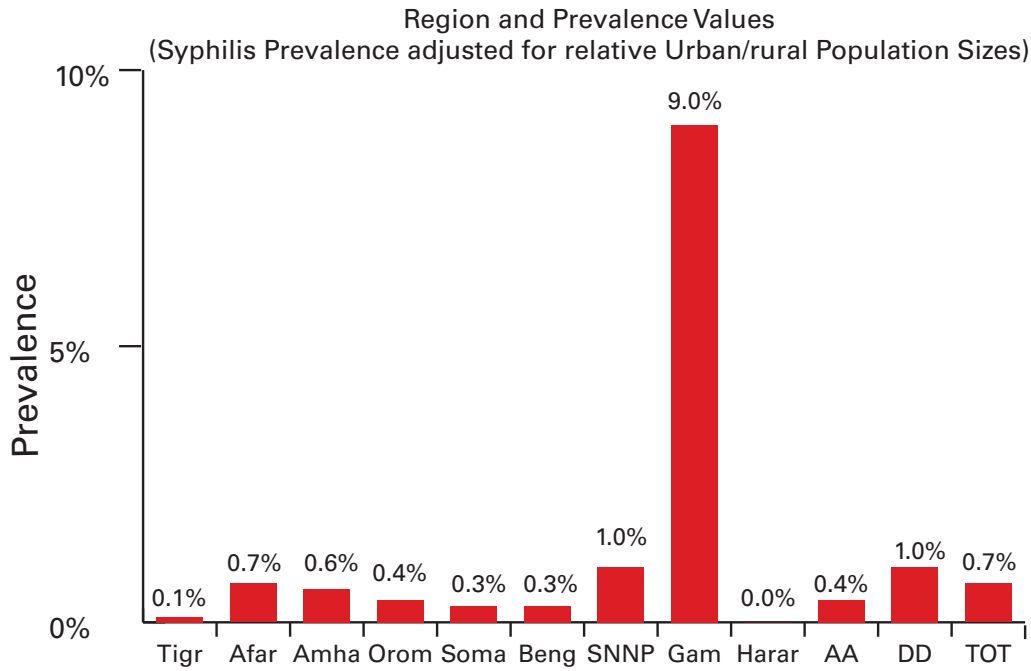
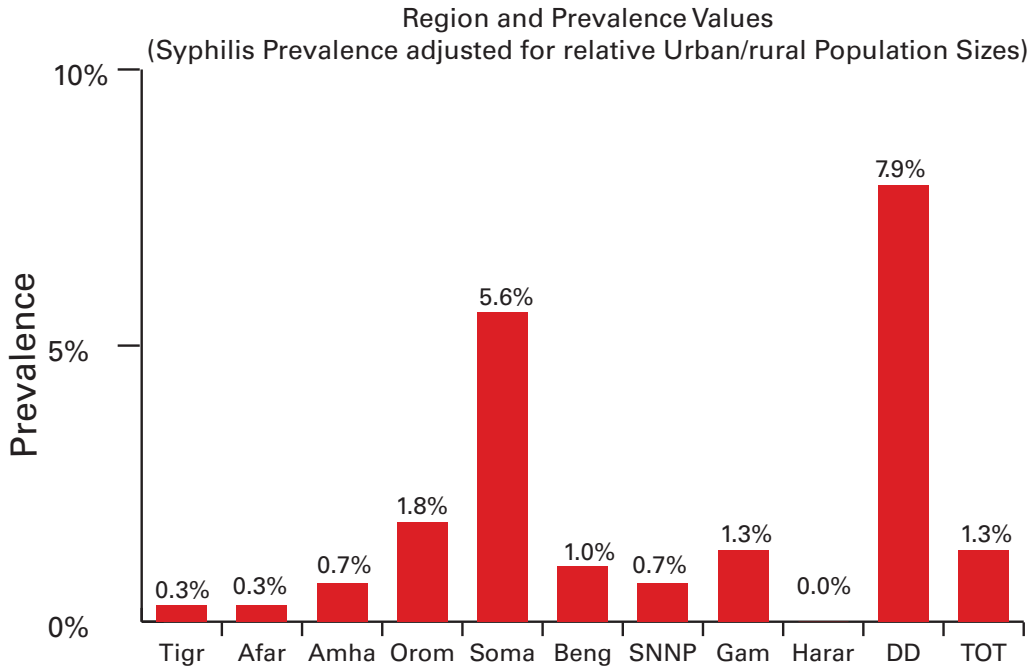
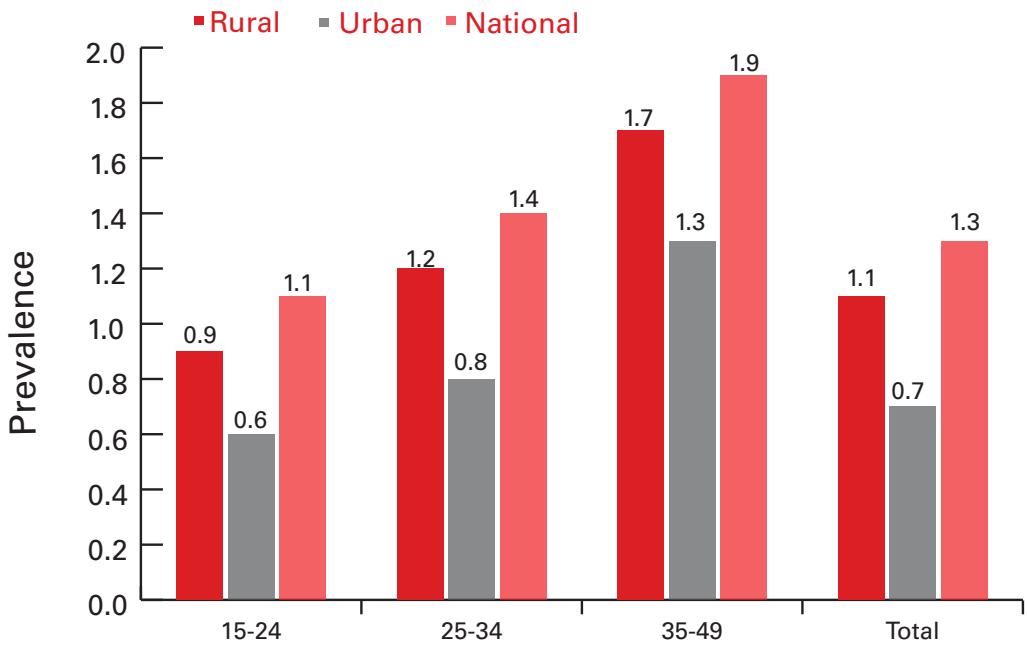


Figure 4.3: Unadjusted Syphilis Prevalence among ANC Attendees at Rural ANC Clinics, by Region, Ethiopia, 2014



Like the previous round (2012), the highest syphilis positivity observed in 35-49 age groups 1.7 %(1.3% in urban and 1.9% in rural). In both urban and rural settings, the positivity increased as age group increase (see Figure 4.4 & Annex 6 for further details).

Figure 4.4: Unadjusted Syphilis Prevalence by Age Group and Site Setting, 2014



4.2 Prevalence of Syphilis by HIV Status and Sites

HIV prevalence was consistently higher among Syphilis positive clients both in urban and rural settings compared to Syphilis negative clients. The overall national prevalence of HIV among Syphilis positive (4.3%) is twice that of Syphilis negative clients (2.2%). The difference is more marked in urban areas where high HIV positivity rate observed. (fig.4.5)

HIV prevalence was found to be higher among clients with syphilis than those without syphilis. This was true both in urban (more than 2.5 times) and rural (2 times) areas.

On the other hand syphilis prevalence among HIV positive individuals were 2.1% and among HIV negative individuals 1.1 % nationally. (fig.4.6)

Figure 4.5: HIV Prevalence by Syphilis Status and Site Setting, Ethiopia, 2014

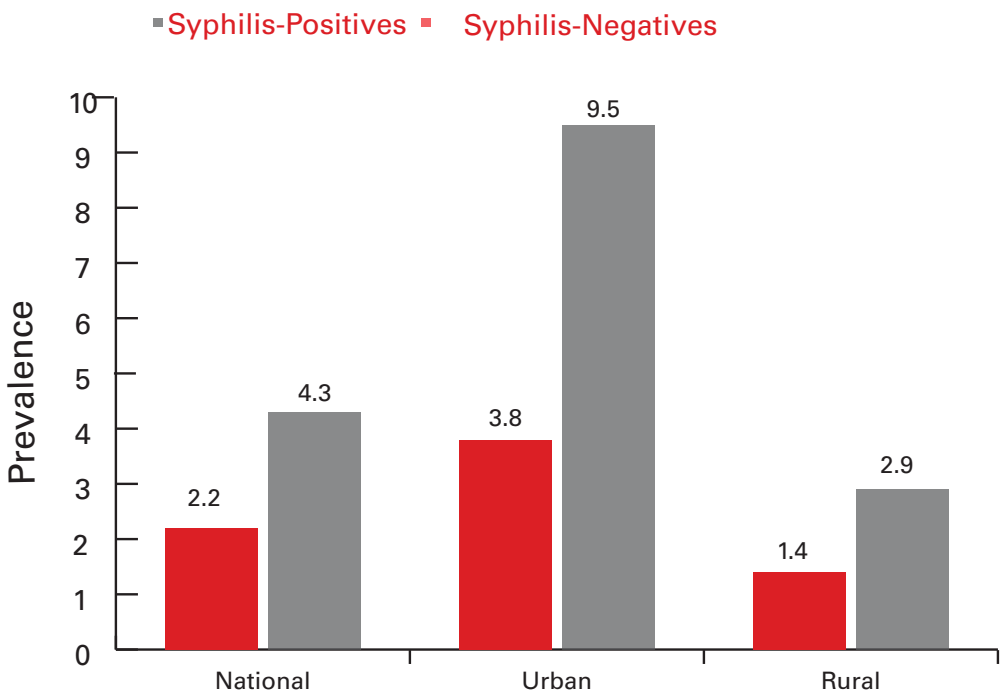
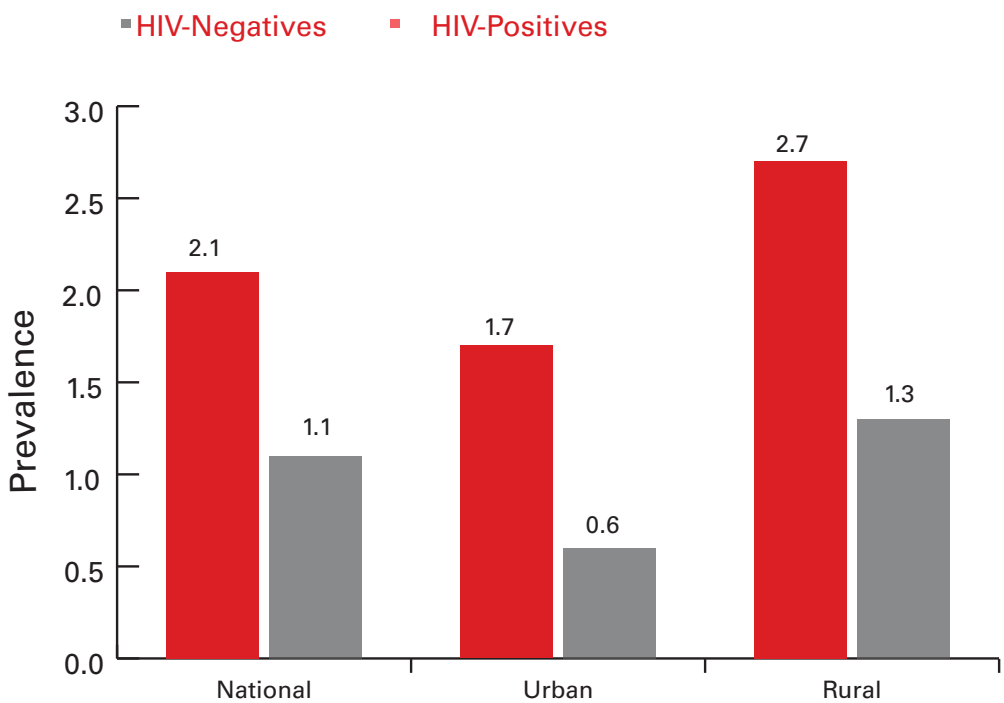


Figure 4.6: Syphilis Prevalence by HIV Status and Site Setting, Ethiopia, 2014



5 Discussion

ANC surveillance is used to monitor the trend of HIV prevalence levels because it is less expensive logistically, easier to conduct, and can be repeated periodically. On the other hand, the use of ANC-based HIV surveillance data has inherent limitations such as exclusion of non-pregnant women, women who are pregnant but not attending ANC clinics, and those attending private health facilities. Additionally, except for proxy information (15-24 years), it is not possible to obtain HIV incidence estimates directly from ANC data. Still, ANC based HIV sentinel surveillance is the primary source of information for HIV among reproductive age group in many countries with generalized epidemic.

Ethiopian ANC-based HIV sentinel surveillance program, which was started in 1989, has improved over the years. The very well structured ANC based surveillance system; the expansion of sentinel sites especially in rural sites, which represent the vast majority of the country; strong supervisions at all level and the laboratory quality control system, makes the program one of the exemplary programs in Africa.

The national adjusted HIV prevalence declined from 2.3% in 2012 to 2.0% in 2014. The highest regional adjusted HIV prevalence during the 2014 round was observed in Addis Ababa (5.5%) followed by Gambella (5.2%). However, the prevalence estimates are based on individual sites, and in regions such as Harari, Somali and Gambella, the number of sites were relatively small thereby limiting the representatives of the ANC data for these regions, which could contribute to the difference in HIV prevalence among the regions. Thus, observed variation in regional HIV prevalence should be interpreted with caution. Moreover, some sites even though classified as rural, they are becoming increasingly urbanized, which may contribute to the increase in the HIV prvalence . The lowest adjusted HIV prevalence figures were from Oromia (1.2%) and Benishangulgumuz (1.2%) followed by Afar (1.4%) and SNNPR (1.5%). The relatively low prevalence observed in most of the regions is consistent with the findings from previous 2012 ANC surveillance rounds.

The HIV prevalence is heterogeneous across regions and sites. However, it is more heterogeneous in urban than rural sites. Urban HIV prevalence varies from 0.3 % in Abi Adi HC, (Tigray) to 13% in Gonder HC while most of the rural HIV prevalence is between 0.2% - 2%. Nevertheless, sites in Tigray (Churechur 6.8%) in Amhara (Kone 5.8%) In Oromiya (Mesela 4.6%) In Gambella (Itange 6.6%) and in most of Somali (2.9 – 4.9%) rural sites showed an increase in HIV prevalence. In this round, the HIV prevalence in rural Somali sites has exceeded urban sites, which might need a revision of sites for the next round. Unlike the previous round, twelve rural sites showed zero HIV prevalence and except Dalifage in Afar; which jump from 4.5% in 2012 to 0% in 2014; most of these sites have a record of accomplishment of low HIV prevalence in previous ANC surveillance rounds. This might indicate the need to increase the sample size for rural sites in the coming round of ANC based HIV surveillance In some sites especially urban sites, fluctuation of HIV prevalence between rounds were observed. This possibly could be associated to variation in population (pregnant women) movement which could be initiated due to variation in HF preference (hospital vs. HC)

HIV prevalence is still high in some key populations like refugees but in uniformed service facilities, a dramatic reduction was observed. Dimma refuge clinic is with the highest HIV prevalence (14.9%). Dimma refugee HC was originally a refuge clinic but currently serving for the surrounding population, mainly gold miners, composed of mobile daily laborers, after the closing of the refugee camp. This might contribute therefore the higher level of HIV prevalence.

Prevalence in younger age group (age 15-24 years old) is a proxy indicator of incidence. The marked decline in the national HIV prevalence in the younger age group (15-24 years) over the years indicates the decrease in new HIV infections.

Several factors may be contributing to the observed decline in prevalence. These include HIV/AIDS control and prevention efforts that led to behavior change and reduction in transmission, strengthening of the health sector response has enabled the rapid and massive scale-up of comprehensive HIV/AIDS programs, including prevention, care and treatment services.

Unlike the HIV part the national syphilis prevalence has increased compared to 2012 round; Due to the increase in rural sites while the urban prevalence is consistent. The higher syphilis prevalence in rural setting despite lower HIV prevalence seems contradictory. The possible explanation of this observation is that, syphilis is a treatable and curable disease and urban residents might have a better health seeking behavior and get treated earlier which could alter the status of syphilis.

It is also important to understand that there were discrepancies (an increase or decrease) in HIV prevalence in some ANC sites including (Felegehiwot Referral Hospital (FHRH), Gondar HC, Jimma HC, Itang HC, Dalifage HC, Messela HC Higher 23 HC, Gambella Hosp and Karamara hospital) in the 2014 surveillance result as compared to the previous round 2012. Thus, a short field trip aimed to assess the possible scenarios that may cause discrepancy in HIV prevalence between 2012 and 2014 has been conducted.

The main finding observed during the assessment was the previous positivity status of the study participants. Among the positives reported from these assessed sites, more than 70% of them were known positives, which may indicate the HIV epidemic maturation and the decrease in incidence.

The possible Reason for HIV prevalence increment in the assessed HC could be due to the increased number of HIV positive pregnant women flow from ART Center to ANC services.The decrease in HIV prevalence in Health Centers could be due the decrease in number of pregnant women from ART center and the increase in the number of ANC attendees from the surrounding rural kebeles to the health center (when compared to the previous round).

Thus, our observation in the field visit supports the results of the 2014 round HIV surveillance of the observed health facilities. Therefore, these findings strongly suggests the need to pay more attention for sites that give ART services during ANC based HIV surveillance period

6 Conclusions And Recommendations

6.1 Conclusions

The following conclusions can be drawn from the ANC-Based HIV Sentinel Surveillance data of 2014 round:

- Both the urban and rural HIV prevalence in pregnant women have declined significantly as compared to previous rounds. However, the HIV epidemic in Ethiopia remains generalized.
- The epidemic appears to remain heterogeneous across regions.
- Since 2001, HIV prevalence among 15-24 year olds (marker for incidence) has continued to decline in rural and urban areas.
- The HIV prevalence is getting higher and higher among the older age group, which is the characteristic of matured epidemic.
- Some regions like, Addis Ababa and Gambella still demonstrate high HIV prevalence despite the observed decline across survey rounds.
- Unlike other regions and previous rounds, the positivity status of Somali region in the rural area is higher than the urban one.
- National syphilis prevalence has shown a slight increment when compared to the previous round. Still syphilis is more prevalent in rural sites compared to urban sites. The increment observed in the rural sites while the urban is consistent.

6.2 Recommendations

From the 2014 round ANC-based national HIV sentinel surveillance findings, the following recommendations are drawn:

1. Given the overall national unadjusted prevalence of 2.2% (2.0%, adjusted for relative population size of regions), prevention efforts should focus in specific regional settings based on the contextual epidemic patterns to address observed regional heterogeneity. However, efforts should continue to maintain and strengthen the multi sectoral HIV prevention and control strategies.

2. Further studies in regions (Addis Ababa, Gambela and Somali) with relatively higher HIV prevalence is needed to assess determinants for the observed high prevalence.

3. Additional study in hot spots; such as Dimma in Gambella and in some of the rural sites which exhibited higher prevalence; should be conducted to determine the composition and behavior of the surroundings population for better prevention and control strategy.

4. The currently observed difference in HIV prevalence in hospitals and health Centers and the dramatic change of prevalence in some sites needs further investigation. Its implication for inclusion in the ANC surveillance should also be clarified.

5. It is crucial to undertake an HIV incidence study on subsequent round ANC samples to assess the leading edge of the epidemic.

6. Some of the rural sites in Somali region need further assessment to clarify whether they are being urbanized or if there is another event which explains the change in prevalence

7. Given the observed syphilis prevalence, there is a need to strengthen STI services throughout the country especially in rural areas.

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ANNEXES

Annex 1: Unadjusted HIV Prevalence by Age Group and Site Setting, 2014

Setting	Age Group	#HIV- Positive	# HIV-Negative	Total	HIV-Prevalence
Total	15-24	414	23,942	24,356	1.7
	25-34	610	22,456	23,066	2.6
	35-49	108	3,851	3,959	2.7
	Total	1,132	50,249	51,381	2.2
Urban	15-24	219	8,171	8,390	2.6
	25-34	373	6,833	7,206	5.2
	35-49	51	805	856	6.0
	Total	643	15,809	16,452	3.9
Rural	15-24	195	15,771	15,966	1.2
	25-34	237	15,623	15,860	1.5
	35-49	57	3,046	3,103	1.8
	Total	489	34,440	34,929	1.4

Annex 2: Syphilis Prevalence and CI by Region and Site Setting, 2014

Setting	Region	No. tested	Syphilis prevalence	95% CI
	Tigray	4,996	0.2	0.1 – 0.4
	Afar	3,080	0.4	0.2 – 0.6
	Amhara	10,299	0.6	0.5 – 0.8
	Oromia	11,074	1.5	1.3 – 1.8
	Somali	2,952	4.6	3.8 – 5.3
	Benishangul Gumuz	2,318	0.9	0.5 – 1.2
	SNNPR	9,993	0.8	0.6 – 0.9
	Gambella	1,707	3.7	2.8 – 4.6
	Harari	859	0.0	0.0
	Addis Ababa	3,257	0.4	0.2 – 0.6
	Dire Dawa	1,369	3.4	2.4 – 4.3
	National	51,904	1.2	0.1 – 1.3
Urban	Tigray	1,618	0.1	0.0 - 0.3
	Afar	875	0.7	0.1 - 1.2
	Amhara	2,321	0.6	0.3 - 0.9
	Oromia	3,413	0.4	0.2 - 0.6
	Somali	730	0.3	-0.1 - 0.7
	BenishangulGumuz	889	0.3	0.0 - 0.7
	SNNPR	2,393	1.0	0.6 - 1.4
	Gambella	390	9.0	6.1 - 11.8
	Harari	394	0.0	0.0
	Addis Ababa	3,257	0.4	0.2 - 0.6
	Dire Dawa	877	0.9	0.4 - 1.7
	National	17,157	0.7	0.6 – 0.8

Setting	Region	No. tested	Syphilis prevalence	95% CI
Rural	Tigray	3,378	0.3	0.1 - 0.4
	Afar	2,205	0.3	0.1 - 0.6
	Amhara	7,978	0.7	0.5 - 0.8
	Oromia	7,661	1.8	1.5 - 2.1
	Somali	2,222	5.6	4.7 - 6.6
	BenishangulGumuz	1,429	1.0	0.5 - 1.5
	SNNPR	7,600	0.7	0.5 - 0.9
	Gambella	1,317	1.3	0.7 - 1.9
	Harari	465	0.0	0.0
	Dire Dawa	492	7.9	5.5 - 10.3
	National	34,747	1.3	1.2 - 1.4

**Urban + rural values are adjusted for relative urban and rural population size.*

Annex 3: 2014 ANC Surveillance Urban Sites Syphilis Prevalence

Region	Site	Sample Size	RPR Prevalence (%)	95% CI
Tigray	01-Mekele HC	380	0.0	0.0
	02-Adigrat Hosp	500	0.0	0.0
	03-Maychew Hosp	370	0.5	-0.2 - 1.3
	04-Abi Adi HC	368	0.0	0.0
Afar	07-Asaita HC	440	1.4	0.3 - 2.4
	08-Dubti Hosp	435	0.0	0.0
Amhara	10-Bahir Dar HC	414	0.5	-0.2 - 1.2
	11-Estie HC	379	0.0	0.0
	12-Gonder HC	370	0.0	0.0
	13-Bahir Dar Hosp	395	2.5	1.0 - 4.1
	65-Addis Zemen HC	397	0.3	-0.2 - 0.7
	73-Metema Hosp	366	0.0	0.0
Oromia	21-Shashemene HC	377	0.0	0.0
	22-Mettu HC	500	0.0	0.0
	23-Adama HC	400	0.0	0.0
	24-Jimma HC	416	0.0	0.0
	25-Nekemtie HC	458	0.9	0.0 - 1.7
	28-Chiro Clinic	428	0.5	-0.2 - 1.1
	35-Alemaya HC	379	0.8	-0.1 - 1.7
	77-Moyale HC	455	0.7	-0.1 - 1.4
Somali	36-Jijiga Hosp	371	0.3	-0.3 - 0.8
	37-Gode Hosp	359	0.3	-0.3 - 0.8
BenishangulGumuz	39-Assosa Hosp	499	0.0	0.0
	41-Pawe Hosp	390	0.8	-0.1 - 1.6
SNNPR	119-Aletawondo HC	449	3.6	0.0
	121-Sawla HC	400	0.8	0.0
	42-Dilla Hosp	389	0.8	-0.1 - 1.6
	43-Hossana Hosp	389	0.3	-0.2 - 0.8
	44-Sodo HC	397	0.0	0.0
	45-Awassa HC	369	0.0	0.0

Region	Site	Sample Size	RPR Prevalence (%)	95% CI
Gambella	52-Gambella Hosp	390	9.0	6.1 - 11.8
Harari	54-Hiwot FanaHosp	394	0.0	0.0
Addis Ababa	109-Kolfe HC	466	0.6	-0.1 - 1.4
	110-Kotebe HC	486	0.6	-0.1 - 1.3
	57-Teklehaymanot HC	362	0.3	-0.3 - 0.8
	58-Kazanches HC	455	0.4	-0.2 - 1.0
	59-Higher 23 HC	500	0.0	0.0
	60-Gulele HC	493	0.0	0.0
	61-Akaki HC	495	0.6	-0.1 - 1.3
Dire Dawa	55-Diredawa Hosp	386	0.8	-0.1 - 1.7
	56-Dire Dawa HC	491	1.2	0.3 - 2.2
Armed Forces	62-AFTGH	380	0.0	0.0
Federal Police	63-Federal Police Hosp	446	0.0	0.0

Annex 4: Rural 2014 ANC Surveillance Sites Syphilis Prevalence (%)

Region	Site	Sample Size	Prevalence	95% CI
Tigray	05-Edaga Arbi HC	563	0.0	0.0
	06-Atsibi HC	500	0.2	-0.2 - 0.6
	68-Workamba HC	440	0.0	0.0
	69-Zana HC	470	0.4	-0.2 - 1.0
	70-Semema HC	477	0.0	0.0
	71-Adigoshu HC	470	0.0	0.0
	90-Chercher HC	458	0.2	-0.2 - 0.6
Afar	09-Chifra HC	410	1.0	0.0 - 1.9
	115-Delfage HC	436	0.0	0.0
	116-Kelewan HC	461	0.7	-0.1 - 1.4
	117-Werer HC	448	0.0	0.0
	72-Aboala HC	450	0.0	0.0

Region	Site	Sample Size	Prevalence	95% CI
Amhara	14-Sekela HS	463	1.3	0.3 - 2.3
	15-Bibugne HC	500	0.0	0.0
	16-Chara Clinic	500	0.0	0.0
	17-Enewari HC	428	0.7	-0.1 - 1.5
	18-Bora HC	500	0.6	-0.1 - 1.3
	19-Tenta HC	470	0.4	-0.2 - 1.0
	20-Kone HC	461	0.0	0.0
	64-Mertrolemariam HC	363	0.0	0.0
	66-HaikHC _Surroundings	248	0.0	0.0
	67-DanglaHC _Surroundings	221	0.0	0.0
	74-Delgi HC	497	0.0	0.0
	89-Jaragedo HC	459	0.0	0.0
	91-Mekoy HC	500	3.4	1.8 – 5.0
	92-Arerti HC	446	0.7	-0.1 - 1.4
	93-Kelala HC	470	0.4	-0.2 - 1.0
	94-Jama HC	500	3.0	1.5 - 4.5
	95-Amdework HC	469	0.4	-0.2 - 1.0
	96-Guhala HC	483	0.0	0.0
Oromia	100-Abomsa HC	458	0.0	0.0
	101-Limu Seka HC	480	0.0	0.0
	26-Gambo Hosp	510	1.0	0.1 - 1.8
	27-Ayra Hosp	457	0.0	0.0
	29-Gosa Clinic	459	0.0	0.0
	30-Daddim HS	450	0.0	0.0
	31-Toke HS	453	0.9	0.0 - 1.7
	32-Derra HC	450	4.0	2.2 - 5.8
	33-Dello HC	463	1.5	0.4 - 2.6
	34-Begi HC	286	0.3	-0.3 - 1.0
	75-Chewaka HC	433	0.9	0.0 - 1.8
	76-Amaya Clinic	454	0.0	0.0
	85-Mesela HC	477	0.0	0.0
	86-Kokosa HC	452	7.5	5.1 - 10.0
	97-Amuru Jarite HC	472	0.4	-0.2 - 1.0
	98-Alem Teferi HC	469	0.0	0.0
	99-Gida Ayana HC	438	0.7	-0.1 - 1.5
Somali	102-Awbere HC	421	5.2	3.1 - 7.4
	103-Kebribeyah HC	450	1.1	0.1 - 2.1
	114-Dolo Odo HC	449	2.9	1.3 - 4.4
	38-Kelafo HC	453	13.5	10.3 - 16.6
	78-Erer HC	449	0.0	0.0
BenishangulGumuz	40-Debate HC	458	0.0	0.0
	79-Kamashi HC	499	2.4	1.1 - 3.7
	80-Menge HC	472	0.4	-0.2 - 1.0

Region	Site	Sample Size	Prevalence	95% CI
SNNPR	104-Belle HC	439	0.7	-0.1 - 1.5
	105-Tercha Hsp	471	0.6	-0.1 - 1.4
	106-Karat HC	491	0.8	0.0 - 1.6
	107-Gimbichu HC	415	0.7	-0.1 - 1.5
	108-Mirab Abaya HC	500	0.0	0.0
	118-Daye HC	493	0.0	0.0
	120-Buee HC	441	0.0	0.0
	122-Hana HC	500	6.6	4.4 - 8.8
	46-Attat Hosp	478	0.0	0.0
	47-Chiri HC	487	0.0	0.0
	48-Sheko HC	500	0.8	0.0 - 1.6
	49-Agam HC	500	0.6	-0.1 - 1.3
	50-Teza HC	500	0.0	0.0
	51-Chencha Hosp	493	0.0	0.0
	81-Gazer HC	500	0.0	0.0
	82-Bechi Hc	392	0.0	0.0
Gambella	111-Itang HC	414	1.9	0.6 - 3.3
	112-Korgang HC	439	0.2	-0.2 - 0.7
	113-Metti HC	464	1.7	0.5 - 2.9
Harari	83-Hasange HC	492	0.0	0.0
Dire Dawa	84-Biyowale HC	232	0.0	0.0
Gambella	87-Dima Refugee Clinic	469	2.2	0.3 - 4.0
	88-Pynido Refugee Clinic	458	6.0	3.8 - 8.1

Annex 5: Syphilis Prevalence by Age Group and Site Setting, 2014

Setting	Age Group	No. Syphilis Positive	No. Syphilis Negative	Total No. Tested	Syphilis Prevalence	Adjusted for urban/rural population size
National	15-24	223	23,660	23,883	0.9	1.0
	25-34	265	22,388	22,653	1.2	1.2
	35-49	68	3,820	3,888	1.7	1.8
	All Ages	556	49,868	50,424	1.1	1.2
Urban	15-24	49	8,235	8,284	0.6	
	25-34	55	7,070	7,125	0.8	
	35-49	11	840	851	1.3	
	Total	115	16,145	16,260	0.7	
Rural	15-24	174	15,425	15,599	1.1	
	25-34	210	15,318	15,528	1.4	
	35-49	57	2,980	3,037	1.9	
	Total	441	33,723	34,164	1.3	

Annex 6: HIV Prevalence by Syphilis Status and Site Setting, Ethiopia, 2014

HIV Status				
Setting	Syphilis	Total	HIV-positive	HIV-negative
National	Total	51,889	1,141	50,748
	Non-Reactive	51,331	1,117	50,214
	Reactive	558	24	534
	Syphilis prevalence	1.1	2.1	1.1
Urban	Total	17,150	664	16,486
	Non-Reactive	17034	653	16381
	Reactive	116	11	105
	Syphilis prevalence	0.7	1.7	0.6
Rural	Total	34,739	477	34,262
	Non-Reactive	34297	464	33833
	Reactive	442	13	429
	Syphilis prevalence	1.3	2.7	1.3

Annex 7: Trends of HIV Prevalence (%) at urban ANC Sites, 1989 – 2014

Region	Site Name	1989	92-93	1997	1998	1999	2001	2002	2003	2005	2007	2009	2012	2014
	AbiAdi HC							7.7	9.6	10	2.0	2.0	0.6	0.3
	Adigrat HC						16.2		7.4	8.8	7.2	5.2	2.2	1.6
	Maychew Hosp.						16.8		7.4	14.4	9.6	7.0	3.9	6.5
Tigray	Mekele HC						17.2	16.8	9.3	13.4	9.3	5.7	6	3.6
	Aysaita HC						12.4		11.3	12.5	4.6	3.7	2.4	1.1
Afar	Dubti Hosp.								24	20.9	8.7	8.7	5.6	5.3
	Addis Zemen HC							12.6	10.5	4.7	3.7	3.1	3.4	1.5
	Bahir Dar HC		13			20.8	23.4	20	20.2	13.5	12.2	6.8	6.1	7.7
	Bahir Dar Hosp.						19.9	21	16.9	14	7.7	13.1	17.3	6.8
	Estie HC					7.3	10.7	8.9	11.7		2.6		2.4	1.8
	Gonder HC						15.1	18.3	13.9	10.3	12.6	10.0	6	13.0
Amhara	Metema Hosp.									15.9	11.7	7.6	7.4	6.3
	Alemaya HC							2.5	2.2	1.3	3.0	1.3	0.8	0.5
	Chiro HC								4.4	5.4	4.3	2.7	1.2	2.0
	Jimma HC						8.6	16.9	10.2	8.3	6.6	8.5	6.8	1.2
	MettuHosp		10.7			4	10.5	11.6	10.8	7.8	3.0	3.6	3.3	1.2
	Adama HC						18.7	16	10.8	9	6.5	6.6	1.8	3.8
	Nekemet HC						9.1	11.3	13	10.4	4.0	4.0	4	3.0
	Shashemene HC					14.3	13.1		8.7	7	2.8	1.4	4.3	2.7
Oromia	Moyale HC									5.1	6.7	1.0	3	2.2
	Gode Hosp.							5.6	2.5	1	3.8	5.0	4.2	2.4
Somali	Jijiga Hosp.			12.7			19	15.7	7.3	5.5	4.9	3.9	7.2	4.8
	Assosa Hosp.							13.1	15.4	7.6	2.6	4.7	2.2	2.4
Beni. G.	Pawe Hosp.						8.5		13.2	8.5	5.0	4.7	3.3	1.5
	Awassa HC				14.4	11.5	10	11.1	8.8	9.2	5.0	3.9	2.8	2.7
	Dilla Hosp.				14.5	11.7	9.8	11.5	12.1	9.3	3.2	4.6	2.7	4.8
	Hossana Hosp.				3.6	4.8	5.9	6	12.4	3.1	2.4	1.1	3	3.3
	Soddo HC				9.2	10.7	11.6	12.2	11.2	7.5	7.0	6.4	8.8	6.0
	Sawla HC													1.0
SNNPR	Aletawondo HC													1.6
	Gambella Hosp.													7.5
Gambella				12.7		19	14.6	15.4	18.7	7.5	13.5	7.3	4.1	
Harari	HiywotFana Hosp.						9.4	12.8	7.8	7.5	3.1	6.0	8.8	6.6

Region	Site Name	1989	92-93	1997	1998	1999	2001	2002	2003	2005	2007	2009	2012	2014
Addis Ababa	Akaki HC								10.9	9.1	7.8	7.4	4.6	4.6
	Gulele HC			20		18.2	15.8	12.3	12.4	13	6.1	8.7	7.3	7.2
	Higher 23 HC			14.1		10.7	12.3	10.2	11.8	10.1	5.2	5.4	2.6	8.0
	Kazanchis HC			16.7		18	17.7	15.1	11.6	16.7	5.7	4.4	3.6	6.1
	Teklehymanot HC			18.5		14	16.6	15.1	15.1	11.7	6.2	6.9	8.8	6.0
	Kolfe HC											2.2	1.6	2.8
	Kotebe HC											3.8	5.2	4.0
Dire Dawa	Diredawa HC						8.5	11.6	7.7	3	6.0	7.2	1.8	2.0
	Diredawa Hosp.		12.3			13.6	15.2	12.1	14.4	11	14.2	4.9	8.1	5.2
Federal Police Hospital									30.2	24.8	10.7	3.7	7.6	1.8
Armed Forces Gen. Hosp.									15.3	12	10.5	6.0	8.7	3.2

Annex 8: Trends of HIV Prevalence (%) at Rural ANC Sites, 1999 – 2014

Region	Site Name	99	2001	2002	2003	2005	2007	2009	2012	2014
Tigray	Atsbi HC				6	4.2	1.4	1.2	2.8	0.8
	EdagaArbi HC				2.8	1	1.5	0.4	0.2	0.9
	Workamba HC				2.1	0.7	1.2	0.8	0.5	0.0
	Zana HC					0.6	0.9	0.9	0.5	0.9
	Semema HC					1.5	0.2	0.0	0	0.0
	Adigoshu						3.5	1.9	1.9	0.9
	Chercher						4.9	4.3	5.7	6.8
Afar	Chifra HC				1.7		7.1	5.3	1.1	0.2
	Abala						7.4	2.0	4.5	0.2
	DalifageHC							5.2	4.5	0.0
	Kelewan								1.5	0.7
	Werer								0.5	2.9
Amhara	Bibugne HC				2.7	1.9		2.5	0.7	1.4
	Bora HC				5.6	2.9	1.9	0.7	0.4	1.4
	Chara Clinic				6	1.5	2.5	0.5	1.2	0.6
	Dangla HC (s)			9.6	4.5	2	4.0	0.7	1.3	1.4
	Enewari HC				11.9	4.3	3.8	0.6	1.6	0.7
	Haik HC (s)			6.1	6.9	2.5	3.2	2.9	4.6	2.7
	Kone HC				11.7	3.5	9.7	2.0	4	5.8
	Mertolemareyam HC (s)			4.9	2.8	4.8	1.4	1.6	1.7	1.4
	Sekela Clinic				6.6	1.4	0.8	0.2	1.6	0.4
	Tenta HC				11.5	8.1	6.6	3.8	4.1	2.8
	Delgi HC					2.7	6.5	2.4	2.4	1.6
	Jaragedo HC					1.7	1.0	0.6	1.2	0.2
	Mekoy						2.3	3.2	1.7	1.4
	Arerti						4.1	4.6	2	1.8
	Kelela						4.6	3.4	4.9	3.6
	Jama						3.0	2.4	2.3	1.4
	Amdework						3.1	1.9	1.9	1.9
	Guhala						5.3	2.5	1.2	1.7

Region	Site Name	99	2001	2002	2003	2005	2007	2009	2012	2014
Oromia	AyraHosp	2	2.6	2	0.5	1.5	0.4	1.3	0.4	0.0
	Begi HC				2.2	0.8	0.9	1.0	0.5	0.2
	Dadim Clinic		1.7	0.9	1	1.2	1.0	1.3	0*	2.2
	Gosa Clinic (Bore)		1.7	0.5	2.5	1.1	0.4	1.1	2	0.7
	Dello HC				8.5	3.2	7.5	0.7	0.9	1.3
	Derra HC				1.9	3.8	4.9	2.0	1.7	2.0
	GamboHosp	0.7	1.1		0.7	1.1	1.2	0.4	2.2	0.8
	GinirHosp		3.1							
	Toke Clinic		4.6		2.2	2.9	2.6	0.7	0	0.6
	Chewaka HC					1.2	0.3	0.3	0	0.0
	Mesela HC					0.6	0.0	1.2	0.5	4.6
	Amaya					3	1.3	1.0	0.8	0.4
	Kokosa HC					0.5	1.0	0.5	0	0.0
	AmuruJarte						1.6	2.4	1	1.1
	AlemTeferi						0.6	1.0	0.2	0.9
	GidaAyana						4.5	2.0	3.1	0.9
	Abomsa						1.5	1.2	0.7	0.0
	LimuSeka						1.9	3.4	0	0.0
Somali	KelafoHosp			1.8				4.0	5.7	4.6
	Awbere HC							2.0	2.5	1.8
	Keberbeyah						1.7	1.5	4.4	4.9
	Erer HC						6.3	5.9	3.2	3.1
	DoloOdo HC							3.0	5.1	4.7
Beni. G.	Debate HC				5	5	2.9	4.3	1.5	0.9
	Kamashi HC					4.2	0.6		1.2	1.0
	Menge HC					0.9	0.3	1.0	1	0.6

Region	Site Name	99	2001	2002	2003	2005	2007	2009	2012	2014
SNNPR	Agam HC				3.4	1	0.5	0.2	1	0.2
	AttatHosp	4	1.5	2.3	1.8	3.5	5.3	1.2	2.2	1.4
	Chencha Hosp				3.2	1.5	1.9	1.7	1.4	1.4
	Chiri HC				2.5	1.8	1.1	0.9	1	0.2
	Sheko HC				4.1	2.5	2.1	2.3	2	0.4
	Teza HC				2.3	1.5	1.6	1.4	0.8	0.0
	Gazer HC					1.7	3.1	0.8	1.8	1.8
	Bechi HC					1.2	0.7	1.2	1.6	2.6
	Belle						0.7	0.7	1.6	0.4
	Tercha						2.5		0.4	1.3
	Karat						0.0	0.4	0.8	0.0
	Gimbichu						1.4		0.2	0.2
	MirabAbaya/ Birbir						1.8	0.5	1.1	1.0
SNNPR	120-Buee HC									0.4
	121-Sawla HC									1.0
	122-Hana HC									0.6
Harari	Hasangay HC					0	0.3	0.0	0	0.0
Gambella	Pynido HC					2.8		8.9	5.2	
	Itang HC							1.3	0.8	6.6
	Korkang HC							3.6	0.9	0.7
	Metti HC							4.6	5	2.6
Dire Dawa	Biyowale HC					1	0.6	1.5	0.6	0.0
Dima Refugee Camp						12.9	17.1		12.9*	14.8
Pynido Refugee Clinic								6.7	6.4	4.5

The Ethiopian Public Health Institute

P.O.Box, 1242,
Fax: 251-112-754744
Tel: 251-112754647