



**The Republic of Malawi
Ministry of Health**

**HIV and Syphilis Sero –Survey
and
National HIV Prevalence and AIDS Estimates
Report for 2010**



National Aids Commission

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Foreword

Malawi has consistently been monitoring HIV and Syphilis prevalence through antenatal clinic (ANC) attendees in 19 sentinel sites since 1994. The 19 sites are distributed in all the three regions of Malawi but in selected districts. In 2007, number of sites were increased to 54, covering all the districts in the country. This was in line with the decentralization process that created demand for data to assist in developing district specific plans.

The HIV and Syphilis Sero-Surveys, and National HIV Prevalence Estimates are done to provide data which can be used for making evidence-based decisions for public health actions and the general monitoring of the national response.

Overall HIV prevalence in Malawi continues to decline. However, there are still regional and locality differences. Between 2007 and 2010 HIV seem to have declined rapidly in the rural and semi urban areas but has stagnated in the three major cities; according to data obtained in the pregnant women. Despite the noted declines HIV prevalence is still high comparing to neighboring countries. This calls for need to scale up interventions particularly in the most affected areas in order to control the HIV and AIDS epidemic in the country.

Between 2007 and 2010, syphilis prevalence in pregnant women attending antenatal care has remained at 1% in Malawi though with some locality differences. There is need to further reduce syphilis prevalence by strengthening programme interventions so that we can reach elimination levels.

I am pleased to disseminate the results of the 2010 HIV and Syphilis Sero-Survey and National HIV Prevalence Estimates. This will further assist in strengthening the implementation process of HIV and AIDS as well as other sexually transmitted infection programmes.

SECRETARY FOR HEALTH

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Executive Summary

HIV surveillance is conducted in selected antenatal clinics in Malawi on a regular basis. Initially the surveillance was conducted once every year but from 2001 the surveillance is conducted once every two years. The main objective of the survey is to provide data for monitoring HIV and Syphilis trends in Malawi. The surveillance targets pregnant women that come for their first ante-natal care visit. These are tested for Syphilis and residual blood from syphilis testing is dried on a filter paper and sent to Community Health Sciences Unit reference laboratory for HIV testing. In 2010 sample collection started on 13th September and ended in mid-December.

Data entry and cleaning were done using Microsoft Access for windows. Analysis of the data was done using STATA to calculate HIV prevalence rates and other important demographic factors. Spectrum was used to project and estimate the national HIV prevalence in the general population and to estimate ART needs.

The overall median HIV prevalence was 10.8% which is lower than the 2007 prevalence (12.6 %). The prevalence ranged from 1.3 % in Kamboni health centre in Kasungu to 25.2 % in Thyolo District hospital. In 2007 the prevalence ranged between 2% in Nthalire health centre in Chitipa and 25 % in Thyolo district hospital. Thyolo district has maintained the highest prevalence for the last two sentinel surveillance surveys.

The Southern region has maintained the highest prevalence rate at 15.0% followed by the Central and northern region showed a similar HIV prevalence of about 9.0

However the overall prevalence has declined in all the regions. Prevalence according to health zones has indicated that the South West Zone has the highest prevalence (15.6%) with the lowest being the Central East Zone (6.7%). The urban sites have a higher prevalence (13.4%) than the rural sites (8.7%).

Number of marriages, locality of residence, and region of residence were some of factors that were associated with HIV prevalence.

Syphilis prevalence was 1.2% which is the same as the 2007 prevalence (1.1%). The prevalence ranged from 0% to 7.6 % in 2010 while in 2007 it ranged from 0% to 12.7%.

Using Spectrum and taking into account DHS data, gender differences, and ART and PMTCT program coverage we estimated that in 2010 national HIV prevalence was 10.5% (C.I 9.0-11.0) among those aged between 15 and 49 years.

The number of people living with HIV was estimated at 923058 in 2010 of whom 180,972 are aged less than 15 years. A projection of these figures showed that in 2011 the number of people living with HIV was 917,407 of which 176,033 were aged less 15 years. It was also estimated that 287, 918 HIV positive adults and 106,490 were in need of ART in 2010 while for 2011 ART needs were estimated at 389,968 and 100,464 for adults and children respectively.

Conclusions

These data have shown that prevalence of HIV in Malawi is still high and close to one million people are living with the disease. The data also continue show regional and rural and urban disparities. Interventions that enhance marriage stability and promote couple faithfulness are encouraged.

1.0 Background

The HIV epidemic in Malawi started in the early 1980s and the first AIDS case was reported and confirmed in 1985. Several studies were conducted in different sub populations to determine HIV and AIDS prevalence and identify risk factors. However, the studies focused on urban sub-populations. Since 1994 routine data on pregnant women attending antenatal clinics (ANC) has been consistently collected in 19 sites across the country until 2007 when sites were increased to 54 in order to ensure district representation.

Surveillance in antenatal clinics has been the primary source of data for monitoring trends of HIV and Syphilis and to provide estimates for tracking the epidemic in Malawi. In the HIV and Syphilis prevalence report in 2007 HIV prevalence was estimated at 12.0% in adults aged between 15 and 49 years. In addition, HIV data is obtained from Demographic and Health Surveys (DHS). MDHS 2004 report estimated HIV prevalence in 15 - 49 year old adults to be 12.7% which declined to 10.6% in 2010.

The HIV and AIDS epidemic in the country is classified as generalized because the HIV prevalence among pregnant women attending ANC is consistently more than 1%. HIV transmission is predominantly through unprotected heterosexual intercourse. While there are limitations of surveying pregnant women for estimating HIV prevalence, it is acknowledged that data from ANC sero-surveys continue to be a valuable and convenient source of information on the current epidemiological situation in the general population.

This report contains the findings of 2010 HIV Sentinel Surveillance Survey that can be used by policy makers, academics, Non Governmental Organizations, multilateral partners and the general public.

2.0 Objectives

The main objective was to provide data for monitoring HIV and Syphilis trends in Malawi. The specific objectives were to: -

- Determine the HIV and syphilis prevalence among pregnant women attending antenatal clinics.
- Determine the trends of HIV and syphilis among pregnant women in antenatal clinics.
- Estimate the national HIV and AIDS prevalence, incidence, mortality and impact.
- Project the national HIV and AIDS prevalence, incidence, mortality and impact.

3.0 Methods

3.1 ANC Sentinel Surveillance

3.1.1 Study Design

This was a cross sectional survey targeting women attending antenatal clinics in selected antenatal clinics in Malawi. Testing for syphilis is part of routine antenatal clinic care in Malawi, therefore pregnant women were tested for HIV after syphilis screening.

3.1.2 Target population

All pregnant women attending antenatal care services for the first time during the survey were sampled for the study.

3.1.3 Selection of sentinel sites

Government and Christian Health Association of Malawi (CHAM) health facilities were targeted for the survey. In the initial 19 sites, urban sites were purposefully selected whereas semi-urban and rural sites were selected using simple random sampling. In 2007, the sites were increased to 54. The additional sites were selected through the consultative process with the district health officials using a set of criteria as described in 2007 Sentinel surveillance report.

3.1.4 Sampling

3.1.4.1 Sample Size

The required sample sizes per site were: - 300 women in rural areas, 500 women in semi-urban areas and 800 women in urban areas¹. The targeted number of women from the 54 sites was 22,500.

3.1.4.2 Sampling scheme

Consecutive sampling method was used to recruit all eligible women in all the sites for a period of up to 8 weeks.

3.1.4.3 Data collection

Sample and data collection was done from 13th September to December 2010. All sites stopped sampling at the end of the defined sampling period regardless of whether they had reached the planned sample size or not. Data collection questionnaire (**Appendix 2**) was administered to all women who were sampled in this survey.

3.1.4.4 Inclusion and exclusion criteria

All women attending the antenatal clinic for the first time during the survey were enrolled into the survey. Women attending ANC for the subsequent visit during the survey were excluded.

¹ WHO recommendation stipulates that the desired minimum sample size per site should be 300

RESULTS

1 Demographic distribution of the sample

1.1 Number of women enrolled by site and by locality of the site

Location of sites and distribution of enrolled women by location

There were a total of 23, 788 pregnant women who were enrolled in this survey from 28 urban sites and 26 rural sites. Table 1 shows the distribution of the sampled women by region and locality. Since sample size was greater in urban areas as per design of the survey, only 34.8% of the women were from rural areas while 65.2% came from urban areas. The majority of the women came from southern region 47.0% while 21.2% were from the northern region and 32.0% from the central region. Number of women enrolled at each site against number targeted at that site and location of the site is provided in Appendix 1.

Table 1: Number of women sampled by region and locality

	Total	Percent
Region		
North	5,042	21.20
Centre	7,600	31.95
South	11,146	46.86
Locality		
Rural	8,283	34.82
Urban	15,505	65.18

1.1.2 Age of women

There were a total of 67 (0.3%) women in the sample who were under the age of 15. About 55% of the women were under the age of 25 and 80% were aged below 30. The median age was 24 years, with no differences by region. By zone, central east zone had a slightly older population with a median age of 25, while central west was 24 and the rest (south east, south west and north) were 23. The ages ranged from 11 to 50 years. Table 2 shows the distribution of women by age and region.

Table 2a: Distribution of the sample by age and region

Age group	Total (%)	North (%)	Central (%)	South (%)
Less than 15	67 (0.3)	18 (0.4)	8 (0.1)	41 (0.4)
15-19	5,013 (21.1)	1121 (22.2)	1,343 (17.7)	2,549 (22.9)
20-24	7,954 (33.4)	1726 (34.2)	2,588 (34.1)	3,640 (32.7)
25-29	5,681 (23.9)	1238 (24.6)	1,850 (24.3)	2,593 (23.3)
30-34	3,162 (13.3)	621 (12.3)	1,116 (14.7)	1,425 (12.8)
35-39	1,521 (6.4)	257 (5.1)	584 (7.7)	680 (6.1)
40-44	282 (1.2)	41 (0.8)	82 (1.1)	159 (1.4)
45-50	55 (0.2)	10 (0.2)	18 (0.2)	27 (0.2)
Missing age	53 (0.2)	10 (0.2)	11 (0.1)	32 (0.3)
Total	23,788 (100)	5,042 (100.0)	7,600 (100.0)	11,146 (100.0)

Table 2b presents age distribution of the sample by adolescents, youth and reproductive age groups by region. As stated above the central region had fewer younger pregnant women compared to the other regions.

Table 2b: Distribution of the sample by special age groups and region

Age group	Total	North (%)	Central (%)	South (%)
15-19	5013	1121 (22.3)	1343 (17.7)	2549 (22.9)
15-24	12967	2847 (56.6)	3931 (51.8)	6189 (55.7)
15-49	23665	5014 (99.6)	7579 (99.9)	11072 (99.6)

NOTE: Percentages in the table are presented as a total per region, not on age group.

1.1.3 Marital status, number of marriages and gravidity

Table 3 shows marital status of the sampled women. A majority of women were married (91.7%). Among them; 72% had been married only once, 15% had been married twice, only 2% had been married for more than 2 times. The number of times married varied significantly by region, with southern region having the highest proportions of those who married more than once. The northern region had the lowest proportions of those who married for more than once; 11% had married twice compared to 18% in the southern region. The southern region had the highest proportion of pregnant women who had never been married (9.4) %, while the northern region had the lowest proportion (2.6%).

The table also shows the distribution by gravidity. The median gravidity in this population was 3 children and did not differ by region.

Table 3: Distribution of the women by marital status and gravidity

Category	North	Central	South	Total (%)
Marital status				
Never been married	133(2.6)	362 (4.8)	1042 (9.4)	1537 (6.5)
Married	4812 (95.4)	7161 (94.2)	9846 (88.3)	21,819 (91.7)
Divorced	49 (1.0)	55 (0.7)	254 (2.3)	358 (1.5)
Widowed	10 (0.2)	19 (0.3)	41 (0.4)	70 (0.3)
Number of Marriages				
0	133(2.6)	362 (4.8)	1042 (9.4)	1537 (6.5)
1	4122 (81.8)	5887 (77.5)	87116 (63.8)	17125 (72.0)
2	564 (11.2)	1063 (14.0)	2018 (18.1)	3645 (15.3)
3 and above	48 (1.0)	96 (1.3)	263 (2.4)	407 (1.7)
Missing	175 (3.5)	192 (2.5)	707 (6.3)	1074 (4.5)
Gravida				
1	1,251 (24.8)	1,748 (23.0)	2,774 (24.8)	5,773 (24.2)
2	1,199 (23.8)	1,604 (21.1)	2,400 (21.5)	5,203 (21.9)
3	1,045 (20.7)	1,425 (18.8)	2,173 (19.5)	4,643 (19.5)
4	764 (15.2)	1,126 (14.8)	1,578 (14.2)	3,468 (14.6)
5	426 (8.5)	807 (10.6)	1,066 (9.6)	2,299 (9.7)
6	204 (4.1)	448 (5.9)	601 (5.4)	1,253 (5.3)
7	114 (2.3)	412 (5.4)	494 (4.3)	1,020 (4.3)
Missing	39 (0.8)	30 (0.4)	60 (0.5)	129 (0.5)

1.1.4 Education Level

Most of the women in this sample had attended primary school (65.6%); 11.1% had never been to school while 18.9% had reached secondary school. Differences were noted by regions with southern region having poor education indicators when compared to northern region. In the northern region 3.1% had never been to school

compared to 13.0% in the central and southern region. Fifty three percent in the northern region had reached upper level primary school compared to about 33% in the south and central region. In the northern region, about 11.5% had reached senior secondary school classes compared to 6.7% in the southern region (Table 4).

Table 4: Distribution of the sample by level of education

Education level	North	Central	South	Total
None	157 (3.1)	1033 (13.4)	1445 (13.0)	2,635 (11.1)
Std 1-5	738 (14.6)	2602 (34.2)	3655 (32.8)	6,995 (29.4)
Std 6-8	2668 (52.9)	2425 (32.0)	3516 (31.5)	8,609 (36.2)
Form 1-2	771 (15.3)	742 (9.8)	980 (8.8)	2,493 (10.5)
Form 3-4	582 (11.5)	608 (8.0)	742 (6.7)	1,932 (8.1)
Post Secondary	10 (2.3)	20 (0.3)	33 (0.3)	63 (0.3)
Missing	116 (2.3)	170 (2.2)	775 (7.0)	1,061 (4.5)

1.1.5 Occupation

About 44% of the women were earning a living in subsistence farming and 42% reported that they were house wives, while proportion of partners who earned a living through farming was 47%, distribution of other occupations differed by gender as expected (table 5).

Table 5: Distribution of the sample by pregnant women and partner's occupation

Occupation	Pregnant women		Partners	
	Number	Percent	Number	Percent
Farmer	10,418	43.80	11,235	47.23
Business	1,790	7.52	4,319	18.16
Tradesman	37	0.16	1,688	7.10
Driver	0	0	661	2.78
Teacher	139	0.58	363	1.53
Army/Police	0	0	82	0.34
Housewife	9,982	41.96	NA	NA
Other	662	2.78	4,942	20.78
Missing	760	3.19	498	2.09
Total	23,788	100.00	23,788	100.00

NOTE: The occupations of the pregnant women and partners are independent.

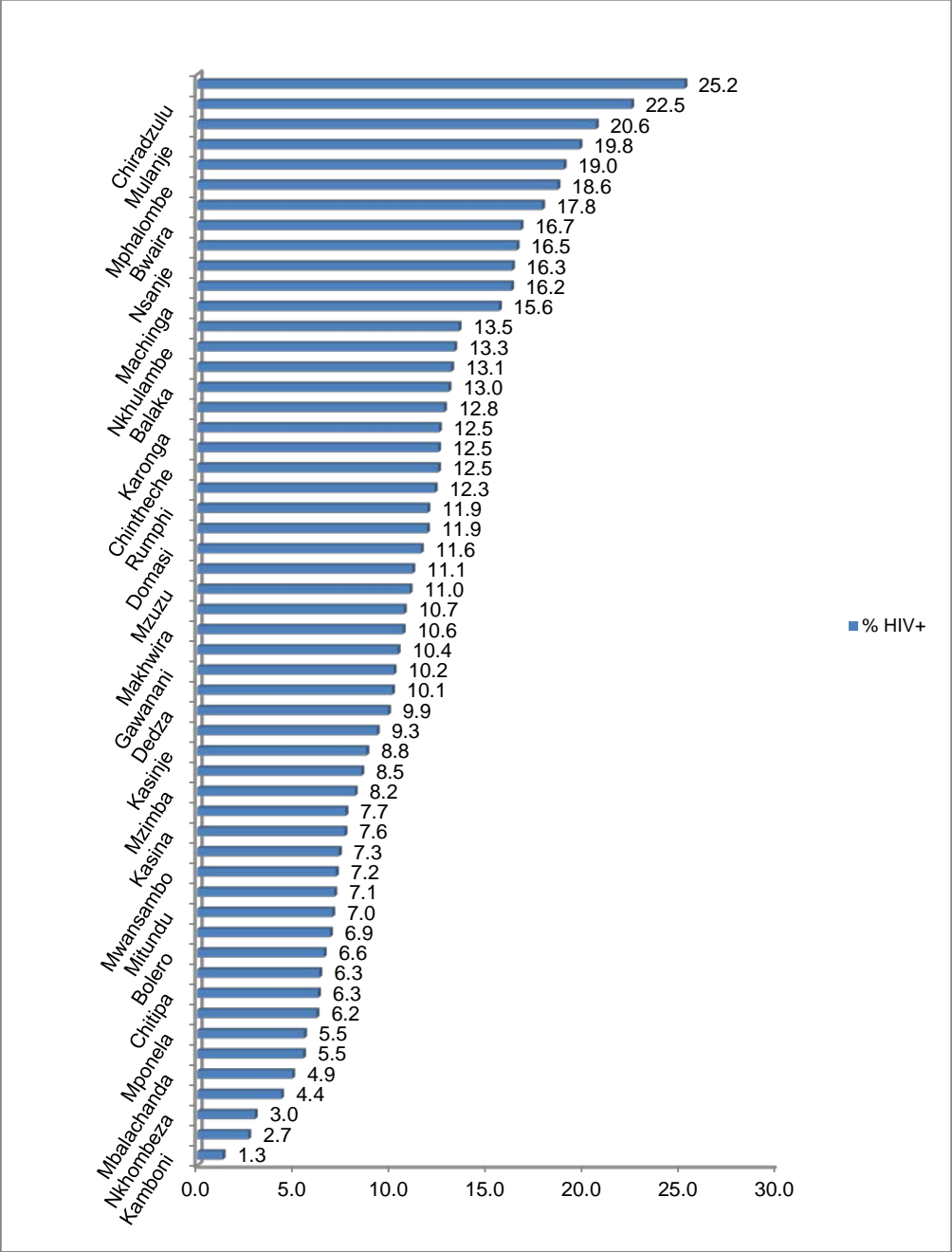
1.2 HIV Prevalence

Of the total 23,788 pregnant included in the survey 2,806 tested HIV positive and 81 (0.3%) had no HIV test result due to sample loss.

1.2.1 Prevalence by site

The median prevalence in pregnant women was **10.6%**. HIV prevalence in the selected sites ranged from 1.3% in Kamboni health centre in Kasungu to 25.2 % at Thyolo district hospital. Figure 1 shows the prevalence for all the selected sites.

Figure 1: HIV prevalence by site



1.2.2 HIV prevalence by demographic factors

HIV prevalence increased with increasing age up to age group 30 – 34. The lowest prevalence was in those aged below 15 years (1.5%) with those in the 30 – 34 age group having the highest prevalence (18.6%). Prevalence was 5.8% in those aged 15-19 and 9.7% in those aged 20-24 years (Table 6).

Table 6: HIV Prevalence by age group

Age group	Total	HIV+	% Positive	Confidence Interval
Less than 15	66	1	1.52	1.51 – 4.54
15-19	4,991	288	5.77	5.12 - 6.41
20-24	7,929	773	9.74	9.10 -10.4
25-29	5,663	845	14.9	14.00 - 15.85
30-34	3,151	589	18.6	17.33 - 20.05
35-39	1,518	259	17.1	15.18 - 18.96
40-44	281	43	15.3	11.07 – 19.54
45-50	55	4	7.3	0.19 - 14.4 4
Missing	53	4	7.6	0.20 – 14.98
Total	23,654	2,806	11.9	11.42 - 12.24

There were no differences noted in HIV infection between pregnant women who never went to school and those who did. Table 7 shows prevalence by education level and marital status.

Pregnant women who had never been married had the lowest prevalence (9.1%), and widowed women had the highest (41.4%). Among those who had ever been married, prevalence differed by number of times married. HIV prevalence increased with increasing number of times married; the prevalence of those who were married twice was more than two times that of those married once. The prevalence in the never married and in those who were married once was the same.

Table 7: HIV Prevalence by education, marital status and gravidity

Education level	Total	HIV+	% Positive	95% C.I
None	2,628	318	12.1	10.9 – 13.3
Std 1-5	6,976	806	11.5	10.8 - 12.3
Std 6-8	8,576	935	10.9	10.2 – 11.6
Form 1-2	2,480	334	13.4	12.1 – 14.8
Form 3-4	1,924	263	13.6	12.1 – 15.2
Post secondary	61	7	11.1	3.24 – 19.7
Missing	1,059	143	13.5	11.4 – 15.6
Marital status				
Never married	1,540	140	9.1	7.7 – 10.5
Married	21,744	2,570	11.8	11.4 – 12.25
Divorced	354	67	18.7	14.8 – 24.0
Widowed	69	29	41.4	30.1 – 54.0

Number of times married				
0	1,540	140	9.1	7.7 – 10.5
1	17,070	1,542	9.0	8.6 – 9.5
2	3,630	891	24.4	23.2 – 26.0
3 and above	400	108	26.5	23.0 – 31.9
Missing	1,074	125	11.6	9.6 – 13.3
Gravida				
1	5,753	375	6.5	5.9 – 7.2
2	5,187	569	10.9	10.1 – 11.8
3	4,620	668	14.4	13.4 – 15.5
4	3,457	553	16.0	14.8 – 17.2
5	2,292	338	14.7	13.3 – 16.2
6	1,251	181	14.5	12.5 – 16.4
7 and above	1,018	117	11.5	9.5 – 13.5
Missing	129	5	3.9	0.5 – 7.3

When data were analyzed by gravidity, it was observed that HIV prevalence increased with increasing gravidity up to gravida 4 after which it declined. This is expected as HIV prevalence is associated with duration at which the women have been exposed to the risk of HIV through sexual activity. Higher gravidity implies a longer exposure to sexual activity and hence the risk of HIV.

Table 8 shows HIV prevalence by occupation of both pregnant women and their partners. HIV prevalence was highest in women in business (19.1%) and lowest in tradesmen (2.8%). HIV prevalence in farmers was 8.8%. HIV prevalence in women who reported that they were teachers was slightly higher (15.2%) than in women who reported that their partners were teachers (11.6%).

Table 8: HIV Prevalence by occupation of the women and that of their partners

Pregnant women				Partners			
Occupation	Total	HIV+	% Positive	Occupation	Total	HIV+	% Positive
Farmer	10,397	918	8.8	Farmer	11,181	962	8.6
Business	1,785	340	19.1	Business	4,313	623	14.4
Tradesman	36	1	2.8	Tradesman	1,687	251	14.9
Teacher	138	21	15.2	Teacher	361	42	11.6
Housewife	9,933	1,307	13.2	Driver	660	135	20.5
Other	660	126	19.1	Fishermen	464	52	11.2
Missing	758	93	12.3	Army/Police	82	11	13.4
				Other	4,464	653	14.6
				Missing	495	77	15.6

1.3 HIV prevalence by locality

HIV prevalence was highest in the southern region whereas no differences were observed between north and central region.

Table 9: HIV Prevalence by region and locality

	Total	HIV+	% HIV+	95% C.I
Region				
North	4,984	459	9.2	8.4 – 10.0
Centre	7,596	682	9.0	8.3 – 9.6
South	11,127	1,665	15.0	14.3 – 15.6
Locality				
Rural	8,222	723	8.8	8.2 – 9.4
Semi-Urban	13,012	1684	12.9	12.4 – 13.5
urban	2,473	399	16.1	14.7 – 17.6

Prevalence was also higher in urban areas when compared to rural areas but these differences were more marked when data was stratified by age and locality (table 10). For rural areas prevalence was lowest in central region compared to the other two regions for both 15-24 (3.3%) and 15-49 year olds (5.4%). While for the urban areas similar prevalence was observed between the north and central regions. However, urban areas in the southern region had the highest HIV prevalence in the 15-49 age group (17.2%).

Table 10: Distribution of HIV Prevalence by age and locality and region

Women aged 15-24					Women aged 15-49			
	Total	HIV+	% HIV+		Total	HIV+	% HIV+	
Rural								
North	917	57	6.2	4.7 – 7.8	1,602	118	7.4	6.1 – 8.7
Centre	1,210	40	3.3	2.3 – 4.3	2,430	131	5.4	4.5 – 6.3
South	2,393	184	7.7	6.6 – 8.8	4,152	473	11.4	10.4 – 12.4
Total	4,520	281	6.2	5.5 – 6.9	8184	722	8.8	8.2 - 9.4
Urban								
North	1,897	147	7.8	6.6 – 9.0	3,355	340	10.1	9.1 – 11.2
Centre	2,718	215	7.9	6.9 – 8.9	5,145	551	10.7	9.9 – 11.6
South	3,785	418	11.0	10.0 – 12.0	6,901	1,188	17.2	16.3 – 18.1
Total	12,967	1061	9.3	8.7 – 9.9	15,401	2079	13.5	13.0 – 14.0

Much more marked differences however, were noted when data were stratified by zone and number of marriages. HIV prevalence was lowest in the central east zone (6.7%) and highest in the south west zone (15.6%) though this was not that different from the prevalence observed in the south east zone (14.6%). When number of marriages was taken into account, prevalence was as high as 40% in those who had been married three times or more in the south west zone. About a third of those who had married three times or more in the central west zone, and married two times or more in the south east and south west zones had HIV infection (table 11).

Table 11: HIV Prevalence by zone and number of marriages

	Total	HIV+	% Positive	
North				
0	133	8	6.0	1.5 – 7.9
1	4,080	320	7.8	7.1 – 8.7
2	554	115	20.8	7.7 – 2.5
3 and above	45	9	20.0	7.9 – 32.2
Missing	172	7	4.0	1.1 – 7.3
Total	4,984	459	9.2	8.4 – 10.0
Central east				
0	128	5	3.9	0.01 – 6.0
1	3,243	201	6.2	5.4 – 7.0
2	606	66	10.9	8.5 – 13.5
3 and above	68	4	5.9	0.2 – 11.6
Missing	116	2	1.7	0.3 – 5.4
Total	4,161	278	6.8	6.0 – 7.4
Central west				
0	237	19	8.0	4.3 – 11.1
1	2,870	267	9.3	8.2 – 10.4
2	513	120	23.4	19.8 – 27.1
3 and above	37	12	32.4	16.6 – 48.3
Missing	75	12	16.0	7.9 - 24.2
Total	3,657	430	11.4	10.5 – 12.6
South east				
0	134	12	9.0	5.6 – 15.6
1	3,696	404	10.9	9.9 – 11.9
2	970	256	26.4	23.7 – 29.3
3 and above	145	41	28.4	21.7 – 36.7
Missing	304	54	17.8	12.8 – 21.3
Total	5,249	767	14.4	13.7 – 15.6
South west				
0	905	96	10.6	8.9 – 13.1
1	3,181	350	11.0	9.9 - 12.1
2	987	334	33.8	30.8 - 36.7
3 and above	105	42	40.0	31.1 – 50.4
Missing	403	50	12.4	9.0 – 14.8
Total	5,581	872	15.6	14.7 - 16.6

HIV prevalence was also calculated by district. However only two clinics per district were included in this survey, as such the district based distribution should be interpreted with caution. These prevalence figures are just indicative of what might be happening in the districts and are not representative of the general population in those districts. Table 11b shows that HIV prevalence was lowest in Chitipa district and highest in Thyolo district.

Table 11b HIV Prevalence by district

District	Total	Positive	% positive
Chitipa	873	41	4.7
Ntchisi	817	45	5.5
Kasungu	881	53	6
Dowa	852	52	6.1
Nkhotakota	797	58	7.3
Mzimba	784	56	7.4
Salima	814	70	8.6
Dedza	920	84	9.1
Mwanza	751	73	9.7
Rumphu	849	84	9.9
Mchinji	838	85	10.1
Mangochi	801	87	10.9
Nkhatabay	824	92	11.2
Karonga	853	98	11.5
Balaka	812	94	11.6
Chikwawa	849	99	11.7
Ntcheu	807	95	11.8
Neno	297	37	12.5
Machinga	906	121	13.4
Lilongwe	1167	166	14.2
Zomba	980	152	15.51
Nsanje	806	131	16.3
Phalombe	918	151	16.5
Blantyre	1123	94	17.8
Mulanje	832	94	19.5
Chiradzulu	845	171	20.2
Thyolo	634	142	22.4

HIV Prevalence Trends

Figure 2 shows national HIV prevalence trends in pregnant women. The data shows that prevalence of HIV in pregnant women has declined from 12.6% in 2007 to 10.6% in 2010.

Figure 2: National HIV trends in pregnant women

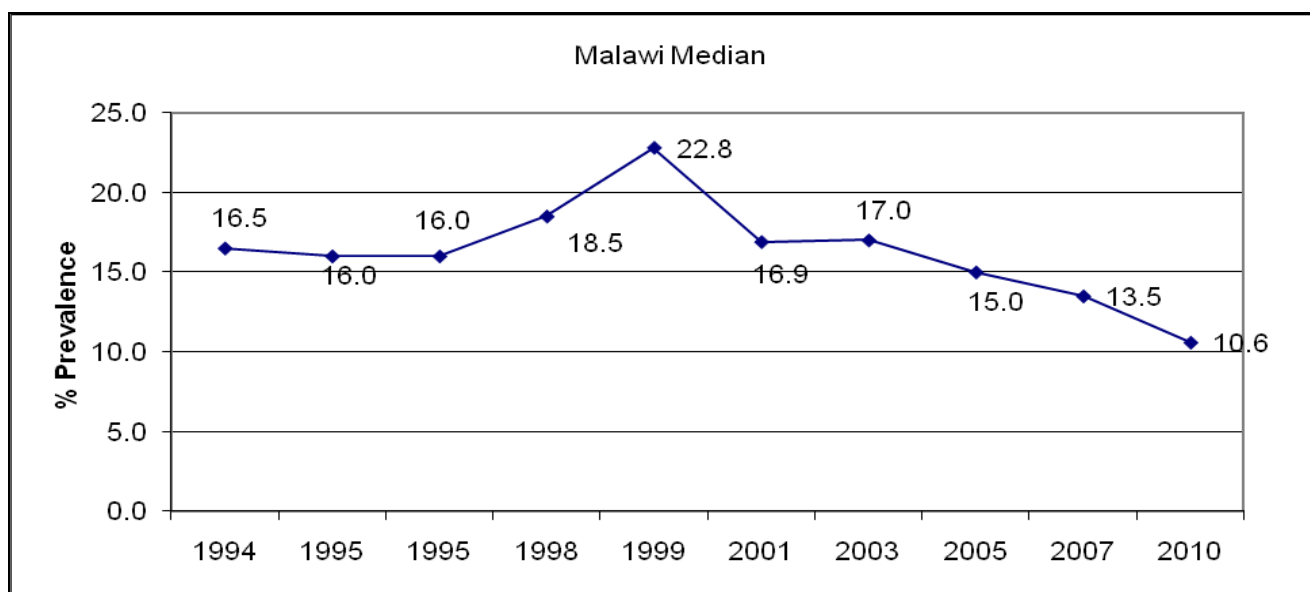
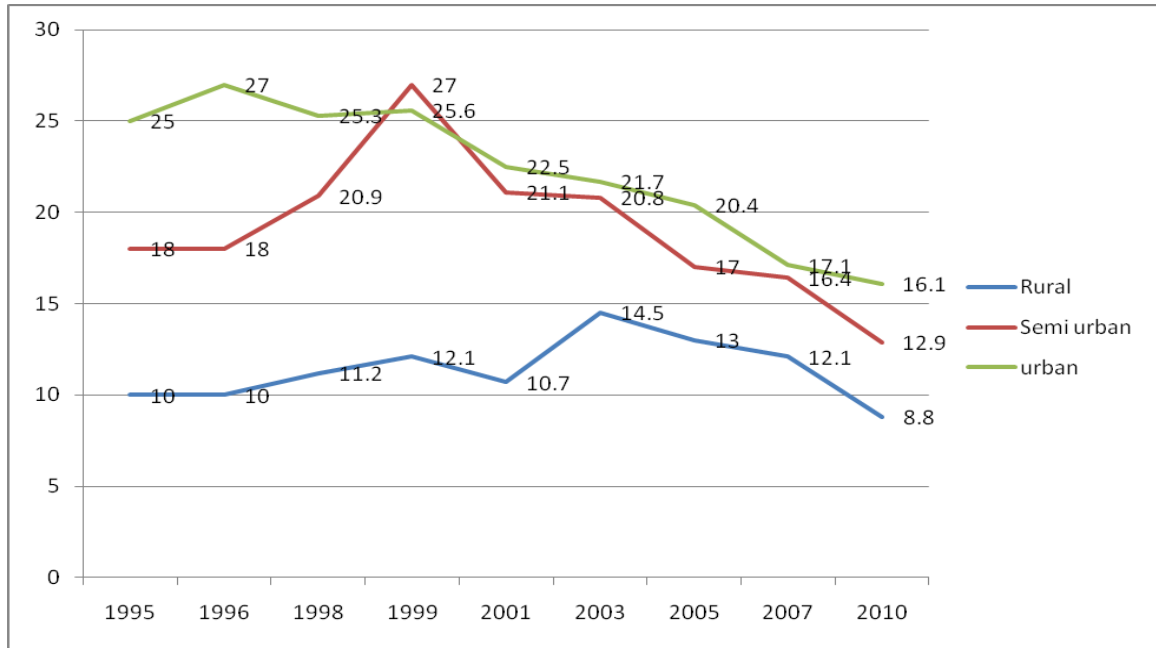


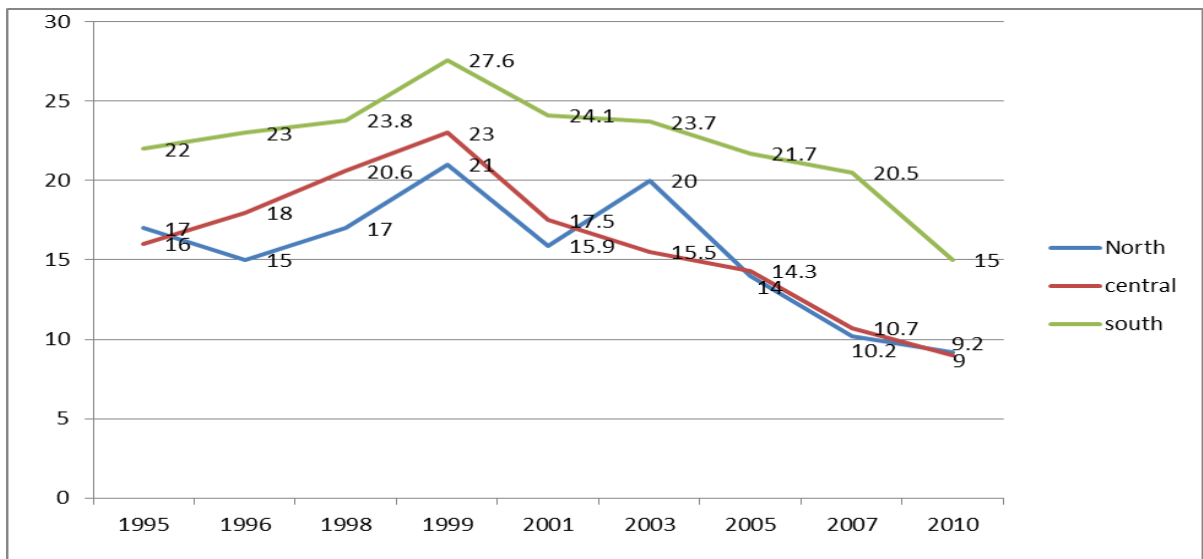
Figure 2b shows HIV trends by locality. The data show huge HIV prevalence differences between rural and urban areas. Between 2007 and 2010 prevalence has rapidly declined in rural and semi urban areas while it has remained almost the same in the country's three major cities.

Figure 2b HIV trends by locality



Declining HIV prevalence trends have also been observed in each region in this country. In the central and northern region HIV prevalence has declined from about 10% in 2007 to 9% in 2010 but much more declines were observed in the southern region where prevalence declined from 20.5% in 2007 to about 15% in 2010. Despite observing only a modest change of HIV prevalence in central region between 2007 and 2007, the trend suggest that HIV prevalence in the central region is declining rapidly.

Figure 3: HIV prevalence trends in pregnant women by region



In the 15-19 year olds HIV prevalence declined from 9.5% in 2007 to 5.75 in 2010 and similar trend was observed in the 15-24 year olds in which prevalence declined from 12.3% in 2007 to 8.2% in 2010 (Figure 3).

Figure 3: HIV prevalence trend in young pregnant women **

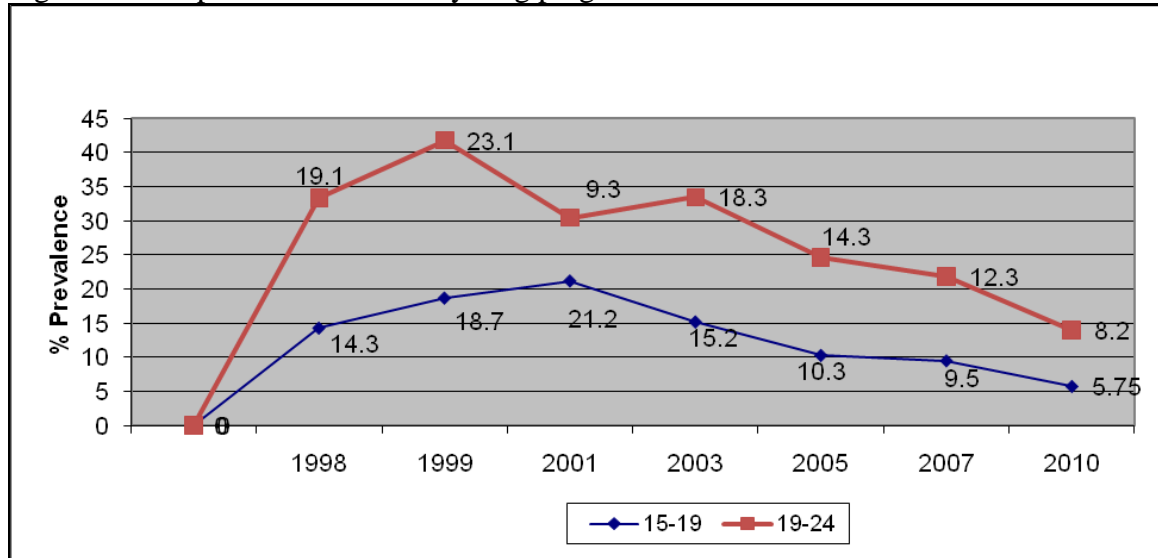


Table 6: HIV Prevalence by site

Site name	Total	HIV+	% HIV+		Total	HIV+	% HIV+
Chitipa	495	31	6.26	Kasinje	297	26	8.75
Nthalire	378	10	2.65	Balaka	500	65	13.0
Karonga	496	62	12.50	Mbera	312	29	9.29
Kapolo	357	36	10.08	Mangochi	501	64	12.77
Rumphu	529	63	11.91	Chilipa	300	23	7.67
Bolero	320	21	6.56	Gawanani	374	38	10.16
Mzimba	540	44	8.15	Machinga	532	83	15.60
Mbalachanda	244	12	4.92	Mphalombe	542	101	18.63
Mzuzu	801	88	10.99	Nkhulambe	376	50	13.30
Nkhatabay	511	53	10.37	Matawale	617	110	17.83
Chintheche	313	39	12.46	Domasi	363	42	11.57
Nkhotakota	505	37	7.33	Mulanje	526	104	19.77
Mwansambo	292	21	7.19	Chonde	306	58	18.95
Salima	513	61	11.89	Nsanje	504	82	16.27
Nkhombeza	301	9	2.99	Makhwira	320	34	10.63
Thonje	310	22	7.10	Kalamba	302	49	16.23
Mponela	542	30	5.54	Chikwawa	529	65	12.29
Kasungu	577	49	8.49	Thyolo	540	136	25.19
Kamboni	304	4	1.32	Mianga	276	19	6.88
Ntchisi	518	32	6.18	Ntambanyama	94	6	6.38
Malomo	299	13	4.35	Limbe	805	166	20.62
Mchinji	510	67	13.14	Mpemba	318	34	10.69
Kapiri	328	18	5.49	Neno	297	37	12.46
Bwaira	867	145	16.72	Mwanza	530	59	11.13
Mitundu	300	21	7.0	Kunenekude	221	14	6.33
Dedza	618	61	9.87	Milepa	315	52	16.51
Kasina	302	23	7.62	Chiradzulu	530	119	22.45
Ntcheu	510	69	13.53				
				Total	23,707	2,806	11.84

Overall Syphilis prevalence in 2010 was 1.1% and ranged from 0% to 7.6%. Syphilis prevalence was highest in Mulanje unlike in 2007 when highest prevalence was observed at Thyolo district hospital.

Table 7: Syphilis Prevalence by site

Site name	Total	Positive	%		Total	Positive	%
Chitipa	494	1	0.20	Kasinje	296	4	1.35
Nthalire	373	0	0	Balaka	499	6	1.20
Karonga	503	7	1.39	Mbera	312	3	0.96
Kapolo	350	0	0	Mangochi	492	6	1.22
Rumphi	529	8	1.51	Chilipa	300	7	2.33
Bolero	365	0	0	Gawanani	369	1	0.27
Mzimba	534	1	0.19	Machinga	528	6	1.14
Mbalachanda	242	0	0	Mphalombe	495	14	2.83
Mzuzu	792	0	0	Nkhulambe	384	7	1.82
Nkhatabay	509	4	0.79	Matawale	613	7	1.14
Chintheche	312	3	0.96	Domasi	358	1	0.28
Nkhotakota	501	5	1.00	Mulanje	525	40	7.62
Mwansambo	289	1	0.35	Chonde	300	5	1.67
Salima	508	1	0.20	Nsanje	501	1	0.20
Nkhombeza	302	1	0.33	Makhwira	320	8	2.50
Thonje	307	2	0.65	Kalemba	303	8	2.64
Mponela	539	0	0	Chikwawa	525	6	1.14
Kasungu	569	5	0.88	Thyolo	537	16	2.98
Kamboni	304	1	0.33	Mianga	276	16	5.80
Ntchisi	510	3	0.59	Ntambanyama	94	5	5.32
Malomo	299	2	0.67	Limbe	803	9	1.12
Mchinji	511	0	0	Mpemba	317	2	0.63
Kapiri	327	4	1.22	Neno	294	7	2.38
Bwaira	867	13	1.50	Mwanza	526	8	1.52
Mitundu	300	2	0.67	Kunenekude	221	1	0.45
Dedza	602	3	0.50	Milepa	306	4	1.31
Kasina	302	3	0.99	Chiradzulu	519	6	1.16
Ntcheu	507	4	0.79				
				Total	23,560	278	1.18

3.2 Estimation and projection

3.2.1 Estimation of national HIV prevalence

National HIV prevalence and its demographic impacts were estimated and projected from HIV prevalence from sentinel surveillance data in pregnant women attending antenatal clinics (ANC), using recommended methods¹ by UNAIDS and partners. HIV surveillance and program (ART coverage) data were entered into SPECTRUM to generate a national adult prevalence curve over time as described in Appendix 3. Data was entered by location i.e. urban and rural. The combined national prevalence curve was weighted according to the population sizes in the different locations. HIV prevalence from national population based surveys (Demographic and Health Surveys) for 2004 and 2010 that included HIV testing was used to calibrate the ANC based prevalence. ⁶

3.2.2 Projection of national HIV prevalence and impacts

The national HIV prevalence curve generated together with population estimates and parameters, epidemiological assumptions and ART program and PMTCT coverage data (Appendix 4) were used to calculate the numbers of adults and children living with HIV/AIDS, number of pregnant women infected with HIV, AIDS related deaths, new HIV infections and treatment needs.

3.2.3 The major new assumptions are:

- Median survival of people living with HIV is 11 years instead of previously 9 years for all countries except those where subtype E constitutes the majority of infections.
- In countries with a generalized HIV epidemic that have not conducted a national population-based survey, prevalence data from pregnant women attending ANC should be adjusted downward by a factor of approximately 0.8, for both rural and urban ANC.
- The median time to need of treatment for People living with HIV was 8 years, with an average 3 years before they die in the absence of ART in countries where subtype E does not constitute the majority of infections, and on average 2.5 years in countries where subtype E does constitute the majority of infections
- The impact of ART on infectivity was also taken into consideration. The infectivity of those on ART was set at 0.11 of the infectivity of persons not on ART (Baggaley and colleagues)
- Year-by-year estimates of percentage survival in the 1st year of ART. By default this was set to 86% surviving the first year and was kept at this value throughout the projection.

4.2.1 National HIV prevalence estimates

In 2010 the National HIV prevalence in the 15 to 49 age group was estimated at 10.5% (10.0% - 11.0%). In total there were 923,058 people living with HIV and AIDS in 2010. Of these 180,972 were children less than 15 years. It was also estimated that 48,569 people died of AIDS related diseases in 2010, a slight reduction from over 50, 000 estimated in 2007. Table 19 shows ART needs and HIV prevalence and incidence measures in the year 2010. It was estimated that in 2010, there were 394,408 HIV positive people who were in need of ART and this increased to 490,432 in 2011.

Table 19: National HIV Estimates for 2010 and 2011

	2010			2011		
	Lower 2.5%	Median 50%	Upper 98%	Lower 2.5%	Median 50%	Upper 98%
HIV Adults + Children	864,470	923,058	982,121	858,395	917,407	976,371
HIV Adults 15+	700,375	742,086	791,431	700,302	741,373	787,994
HIV 15+ female	411,256	437,375	468,442	411,701	437,102	466,461
HIV population- Children	158,050	180,972	206,051	152,892	176,033	201,671
Prevalence Adult	9.96	10.45	11	9.53	10.03	10.54
Prevalence- Males aged 15 to 24	1.78	2.26	3.18	1.64	2.08	2.88
Prevalence- Females aged 15 to 24	4.34	5.42	6.91	3.86	4.84	6.14
HIV Prevalence- Children	2.28	2.63	3.01	2.14	2.47	2.86
New HIV infections- Adult	26,553	32,587	39,177	25,126	30,618	36,853
New HIV Infections- Children	16,350	19,642	23,469	9,099	12,284	15,922
Annual AIDS deaths	42,944	48,569	54,539	36,121	41,597	47,508
Annual AIDS deaths- Adult	32,478	36,900	42,714	27,463	31,581	37,221
Annual AIDS deaths- Children	9,798	11,669	13,889	8,238	10,016	12,228
Need for ART- Adult (15+)	272,856	287,918	305,878	370,606	389,968	412,495
Need for ART- Children	93,258	106,490	121,616	87,196	100,464	115,940
Mothers needing PMTCT	57,015	65,528	75,989	54,456	62,907	73,024
AIDS orphans	566,926	612,908	664,460	551,596	597,502	647,961
HIV population (15-49)	674,832	706,815	743,616	669,077	701,644	737,346
Number of new HIV infections	44,698	52,229	59,353	35,566	42,902	49,581
Incidence Adults 15-49	0.43	0.52	0.61	0.38	0.46	0.55
Annual AIDS deaths- Children (1-4)	3,054	3,751	4,669	2,622	3,288	4,160

HIV Estimates by Zone

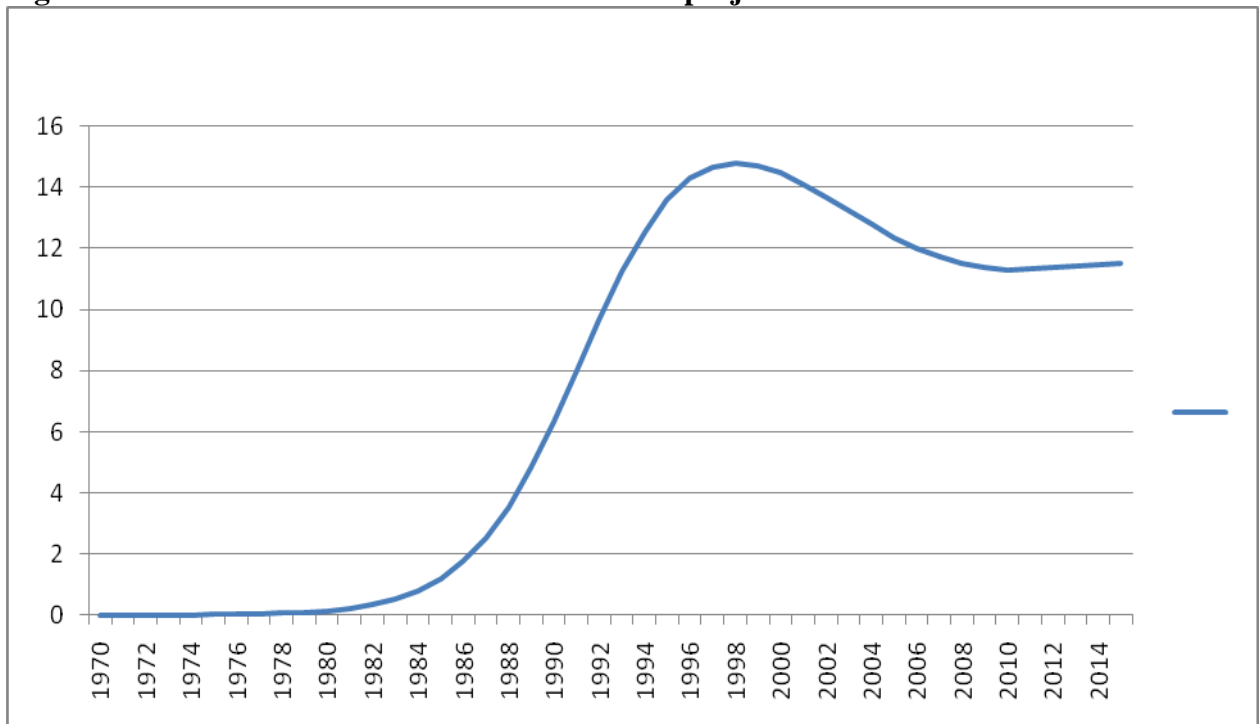
Analysis by zone showed that most new infections in 2011 occurred in central west and both of the southern zones. HIV incidence rate was highest in the southern region and ranged from 0.24% in central east to 0.77% in the South west. HIV population was also estimated to be higher in these three zones compared to the south east and the northern zones. Table 20 shows HIV estimates by zone.

Table 20: Regional Estimates by Zone in 2011 for the 15-49 year olds

	Northern	Central East	Central West	South East	South West
HIV population					
Total	77,996	56,680	175,371	187,662	194,174
Male	31,501	22,892	70,828	75,793	78,423
Female	46,495	33,788	104,542	111,870	115,752
Prevalence	6.54	5.16	9.39	12.92	14.7
New HIV infections					
Total	3,474	2,525	7,811	8,359	8,649
Male	1,523	1,107	3,424	3,664	3,791
Female	1,951	1,418	4,388	4,695	4,858
Incidence	0.31	0.24	0.46	0.66	0.77
Annual AIDS deaths					
Total	3,501	2,544	7,872	8,424	8,716
Male	1,511	1,098	3,397	3,635	3,762
Female	1,990	1,446	4,475	4,788	4,954
Total number receiving ART	26,970	19,599	60,639	64,890	67,141
Total need for ART	39,944	29,028	89,813	96,108	99,443
Total	1,192,942	1,098,960	1,867,250	1,451,957	1,320,184
Male	604,851	557,200	946,741	736,177	669,366
Female	588,091	541,761	920,509	715,779	650,819
HIV population					
Total	20,293	14,747	45,627	48,825	50,519
Male	10,265	7,460	23,080	24,698	25,555
Female	10,028	7,287	22,546	24,127	24,964
New HIV infections					
Total	1,452	1,056	3,266	3,495	3,616
Male	736	535	1,656	1,772	1,833
Female	716	520	1,610	1,723	1,783
Annual AIDS deaths					
Total	1,180	858	2,653	2,839	2,938
Male	597	434	1,342	1,436	1,486
Female	583	424	1,311	1,403	1,452

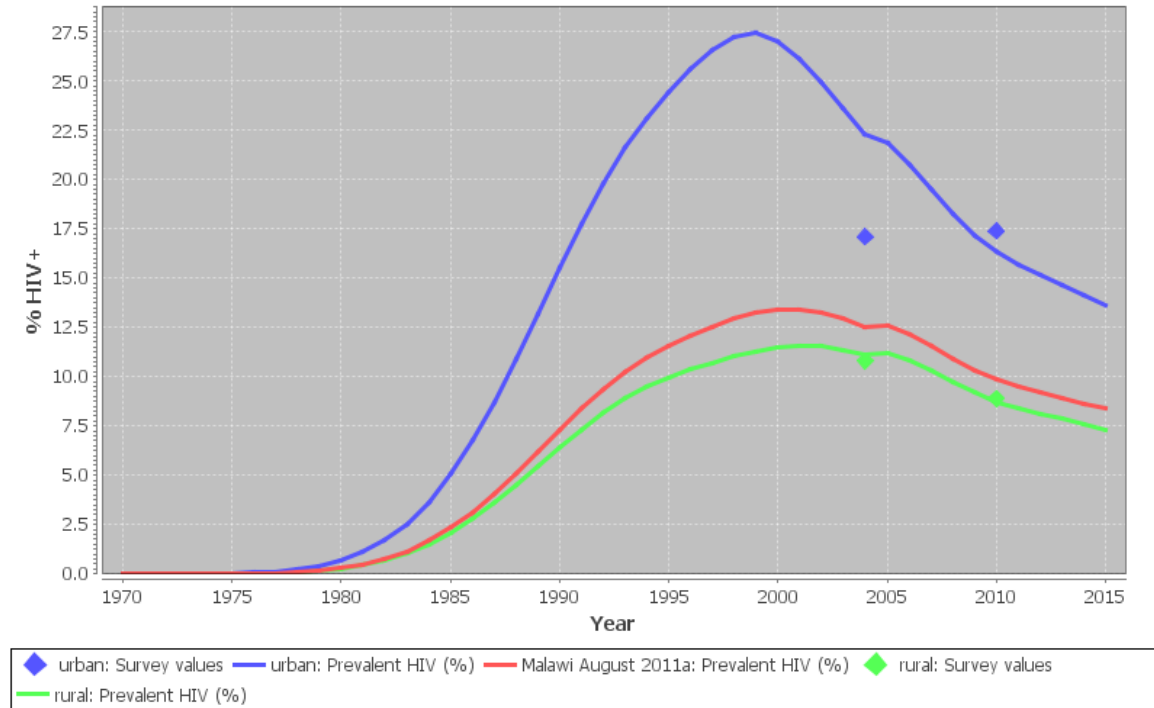
Figure 4 shows HIV prevalence trends as estimated and projected in the spectrum software. The graph shows that the National prevalence estimates declined from about 12% in 2007 to about 10.5% in 2010 and it is projected that these results will remain stable in the next 5 years.

Figure 4: National HIV Prevalence estimates and projection



HIV estimates were higher in the urban areas when compared to rural areas as has always been the case in previous years. Results from EPP software showed that in 2010 HIV prevalence in urban areas was 17.4 compared to 8.9 in rural areas. The HIV prevalence differences between these two localities were projected to continue in the coming years. Figure 5 shows estimates of HIV prevalence trends by locality from 1980 to 2015.

Figure 5: Estimates HIV Prevalence Trends by national, urban and rural, 1980 – 2015



HIV incidence was estimated at 0.54% in 2010 and was projected to continue declining in the next five years. This would also translate to declining number of new infections projected at about 52,000 in 2010 and to decline to 22,000 by 2015. Annual AIDS related deaths were also projected to continue declining to about 15,749 in 2015 and thereafter to start increasing slightly as ART cohort matures.

The survey also estimated that in 2010 there were 612,908 children in Malawi who were orphaned due to HIV related deaths and projected that this figure will be declining to 452,576 in 2015. Selected detailed figures on these indicators are shown in Table 20. But all other estimates are provided in appendices 5-7.

Table 20: Summary Table of important indicators

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HIV Population											
HIV Adults + Children	936,926	933,966	933,674	931,060	926,623	923,058	917,407	911,975	909,907	910,399	911,246
HIV population (15-49)	752,271	743,257	734,223	724,903	714,791	706,815	701,644	700,261	702,335	705,518	707,986
HIV Adults 15+	778,392	769,669	761,801	754,257	746,604	742,086	741,373	745,616	754,615	765,921	777,676
HIV 15+ female	457,464	452,623	448,308	444,041	439,802	437,375	437,102	439,720	445,051	451,673	458,527
HIV population- Children	158,534	164,297	171,873	176,803	180,018	180,972	176,033	166,359	155,292	144,478	133,570
Prevalence											
Prevalence Adult	13	12.47	11.94	11.43	10.92	10.45	10.03	9.67	9.36	9.07	8.79
Prevalence- Males aged 15 to 24	3.7	3.39	3.06	2.77	2.5	2.26	2.08	1.95	1.85	1.79	1.76
Prevalence- Females aged 15 to 24	9.35	8.54	7.67	6.87	6.11	5.42	4.84	4.37	3.99	3.68	3.43
HIV Prevalence- Children	2.68	2.7	2.74	2.74	2.7	2.63	2.47	2.25	2.03	1.82	1.62
New infections											
Number of new HIV infections	88,054	79,001	69,351	63,883	58,943	52,229	42,902	33,796	27,913	24,817	22,658
New HIV infections- Adult	60,299	52,115	43,997	41,070	36,540	32,587	30,618	27,959	24,675	21,774	19,815
New HIV Infections- Children	27,755	26,887	25,355	22,812	22,404	19,642	12,284	5,837	3,238	3,043	2,843
Incidence Adults 15-49	1.11	0.92	0.78	0.69	0.59	0.52	0.46	0.4	0.34	0.29	0.27
AIDS Deaths											
Annual AIDS deaths	77,276	74,741	62,473	59,341	56,134	48,569	41,597	32,622	23,688	18,220	15,749
Annual AIDS deaths- Adult	61,992	59,325	50,708	47,757	43,651	36,900	31,581	24,567	17,143	12,584	10,740
Annual AIDS deaths- Children	15,284	15,416	11,765	11,584	12,483	11,669	10,016	8,055	6,545	5,636	5,009
Annual AIDS deaths- Children (1-4)	5,734	5,765	3,774	3,935	4,150	3,751	3,288	2,187	1,279	692	456
AIDS orphans	576,458	603,409	615,878	623,466	623,157	612,908	597,502	573,141	537,351	495,323	452,576
ART Need											
Need for ART- Adult (15+)	209,138	216,777	227,342	245,890	265,915	287,918	389,968	414,592	443,301	476,601	511,545
Need for ART- Children	64,778	67,487	81,043	81,882	84,384	106,490	100,464	91,713	85,435	81,743	78,807

Table 20: Summary Table of important indicators

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mothers needing PMTCT	73,784	73,314	72,231	70,496	68,120	65,528	62,907	60,344	57,865	55,456	53,088
ART impact											
Deaths averted by ART	1,213	6,017	16,114	20,219	25,146	32,322	37,646	44,184	50,775	54,208	54,710
Infections averted by PMTCT	355	628	1,570	3,540	2,759	4,257	10,101	14,580	15,375	14,223	13,623

5.0 Discussion

The HIV prevalence for the ANC sentinel surveillance is used to develop national estimates, and to obtain trends in 15-24 year olds as estimates for HIV incidence in pregnant women. The results from the 54 sites of the 2010 sentinel survey indicated that HIV prevalence rates ranged from 1.3% at Kamboni Health centre in the rural areas of Kasungu district in central region to 25.2% at Thyolo district hospital in the southern region, with a median prevalence of 10.6%.

In general the median HIV prevalence has declined from 12.6% in 2007 to 10.6% in 2010. There is also an observed decline in HIV prevalence at the regional and locality levels. Prevalence in the Southern region declined from 20.5% to 15.0%, from 10.7% to 9.0 in the Central region, and from 10.2% to 9.2% in the North. It was further observed that the South West zone had the highest prevalence of 15.6% while the Central East zone was the lowest at 6.8%. In the rural areas the prevalence declined from 12.1% to 8.8% while in the urban areas it declined from 17.1% to 13.5%. It is interesting to note that prevalence data obtained in from MDHS survey and that obtained from ANC surveillance was comparable. Normally, higher prevalence figures are expected from ANC survey than from DHS but in 2010 median prevalence obtained from ANC surveillance and that reported in DHS was similar (10.6%) and urban prevalence obtained in MDHS was even higher than that observed in ANC surveillance. The lower HIV prevalence figures observed in pregnant women could be due to selection bias where women who are HIV positive are less likely to get pregnant. This could be a result of reproductive health messages given to women through the PMTCT program.

The HIV prevalence was observed to increase with the number of times a woman was married. Women who were married for two or more times had observed prevalence of above 20% as compared to single women and those in their first marriages who had prevalence of around 9%. This could be due to an increase in the exposure to different sex partners. Pregnant women in southern region were more likely to report to have had more than one marriage than the other 2 regions. Messages and interventions that promote stronger marriage relationship and stable families are therefore encouraged.

Monitoring HIV Prevalence in the 15-19 and 15-24 year old groups is important because infection in younger women (associated with more recent infections) is a proxy for incidence trends, since these women are more likely to have only recently become sexually active. For this reason, HIV prevalence in the 15-24 year old age group is both a national and Millennium Development Goal indicator. There is also an observed decline in HIV prevalence for these age groups. Prevalence declined from 9.5% in 2007 to 5.8% in 2010 for those aged 15-19 and from 12.3% to 8.2% in the 15-24 age group.

Syphilis prevalence in pregnant women attending antenatal care clinics has remained at around 1%. In 2010 the prevalence was 1.2%, with a range of 0% in seven sites to 7.6% at Mulanje Mission Hospital. Seventy-six percent of the sites (19/25) in the Southern Region had prevalence of above 1% as compared to 11% (2/18) in the Central region and 18% (2/11) in the Northern Region. Syphilis prevalence was lowest in the north 0.5% seconded by central region 0.7% and was highest in the south 1.8%.

HIV estimation and projection

After Combining MDHS and the ANC sentinel surveillance data in the EPP and Spectrum modeling computer package, it was estimated that the National adult HIV prevalence in the reproductive age group (15-49 years) was 10.5% in 2010 with 923,058 people estimated to be living with HIV. This finding is contrary to the expected increase in HIV prevalence. With the expansion of ART program it was thought that AIDS related deaths would reduce resulting in an increase in HIV prevalence. However, contrary trends are being observed with both prevalence and incidence trends declining. Rapid declines in HIV incidence are projected particularly due to expansion of ART program that reduces infectiousness of those who are on ART.

Estimated annual AIDS-related deaths have reduced from slightly 52,405 in 2007 to 48,569 in 2010. It is estimated that the annual AIDS-related deaths will further reduce to 22,307 by 2015. These projections are based on current ART coverage and future targets. The scale-up of ART program has contributed to the reduction of annual AIDS deaths.

It was also estimated that in 2010 494 408 people who were living with HIV were in need of ART implying ART coverage of 64% as the 252000 people were alive and on ART by December 2010.

Conclusions

These data have shown that prevalence of HIV in Malawi is still high and close to one million people are living with the disease. The data also continue show regional and rural and urban disparities. Interventions that enhance marriage stability and promote couple faithfulness are encouraged.

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7.0 Appendices

Appendix 1: Location of sentinel sites

Region	Name of district	Location					
		Urban			Rural		
			Target	enrolled		Target	Enrolled
Northern Region	Mzimba	Mzuzu health centre	800	801			
		Mzimba District Hospital	500	540	Mbalachanda	300	244
	Chitipa	Chitipa District Hospital	500	495	Nthalire Health Centre	300	378
	Karonga	Karonga District Hospital	500	496	Kaporo health centre	300	357
	Rumphi	Rumphi District hospital	500	529	Bolero health centre	300	320
	Nkhatabay	Nkhatabay District hospital	500	511	Chintheche health centre	300	313
Central Region	Lilongwe	Bottom hospital	500	867	Mitundu Health Centre	300	300
	Kasungu	Kasungu district Hospital	500	577	Kamboni health centre	300	304
	Dowa	Mponela Health Centre	500	542	Thonje health centre	300	310
	Nkhotakota	Nkhotakota hospital	500	505	Mwansambo health centre	300	292
	Mchinji	Mchinji district hospital	500	510	Kapiri Health Centre	300	328
	Ncheu	Ntcheu district hospital	500	510	Kasinje Health Centre	300	297
	Dedza	Dedza district hospital	500	618	Kasina health centre	300	302
	Ntchisi	Ntchisi District Hospital	500	518	Malomo Health Centre	300	299
	Salima	Salima District Hospital	500	513	Khombeza Health Centre	300	301
	South						
	Blantyre	Limbe health centre	800	805	Mpemba Health Centre	300	318
	Zomba	Matawale Health Centre	800	617	Domasi Health Centre	300	363
	Mwanza	Mwanza district hospital	500	530	Kunenekude Health Centre	300	221
	Balaka	Balaka District Hospital	500	500	Mbela Health Centre	300	312
	Mangochi	Mangochi district hospital	500	501	Chilipa Health Centre	300	300
	Chiradzulu	Chiradzulu District Hospital	500	530	Milepa health centre	300	315
	Machinga	Machinga District Hospital	500	532	Gawanani health centre	300	374
	Thyolo	Thyolo District Hospital	500	540	Mianga health centre	300	276
	Mulanje	Mulanje Mission hospital	500	526	Chonde Health centre	300	306
	Nsanje	Nsanje District hospital	500	504	Kalembe Health Centre	300	302
	Neno	Neno District Hospital	500	297			
	Phalombe	Phalombe Health Centre	500	542	Nkhulambe	300	376
	Chikwawa		500	529	Makhuwira	300	320

Appendix 2: ANC Surveillance data collection form

2010 ANC SENTINEL SURVEILLANCE FORM

		(Circle only one option per box)	Form ID (barcode label)	
1.	Clinic name			
2.	Date (DD / MM / YY)		Time (24-hour clock)	:
3.	Counsellor ID			

Age and Pregnancy

4.	Age in years		Gravida	
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Education and Occupation

5.	Ever been to school		Y	N	
6.	If yes: Highest education level reached		Prim	Sec	Uni v
7.	Form / Standard completed (for primary / secondary school)				
8.	Were you attending school when you became pregnant with this baby?		Y	N	
9.	Any formal professional / skill training		Y	N	
10.	Main occupation of client				
11.	Main occupation of father of pregnancy				

Marital Status

12.	Have you ever been married?		Y	N	
13.	If yes: Current status	Married	Divorced / Septd	Widowed	
			Mar	Div	Wid
14.	How many times have you been married? (including the current marriage)				

Previous HIV Test Status (from before this visit)

15.	Most recent documented result	Never tested / no evidence	Negative older than 3 months	Neg. recent (in last 3 months)	Positive (ever)	Nev	Neg old	Neg rec	Pos
16.	Is the client currently taking any ARVs?	Specify if other:				No	AZT	A R	Oth

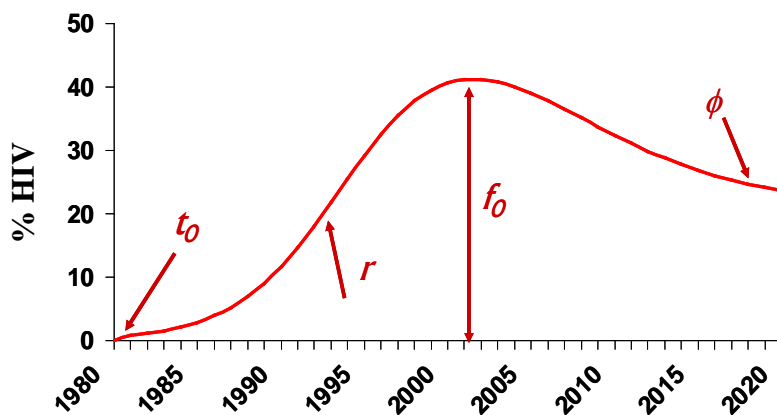
17.	HIV test done today							Y	N	
18.	Lot number	Test 1		Test 2		Test 3		Final result given to client		
19.	Outcome	+	-	+	-	+	-	+	-	
20.	Syphilis Test Result	ND = not done						+	-	ND

Appendix 3: UNAIDS/WHO estimation and projections methods

UNAIDS and WHO, with the guidance and recommendations from an external group of scientists and researchers (the UNAIDS Reference Group on Estimates, Modeling and Projections) have developed a set of methods and assumptions to model epidemic trends, to determine annual estimates of HIV prevalence in countries, and to make demographic projections of the epidemic.¹ For countries with generalized epidemics in which HIV is firmly established in the general population, the **Estimation and Projection Package (EPP)** has been designed as a tool to construct national and sub-national (e.g., urban and rural, or provincial) epidemic curves, an essential step in the estimation of levels and trends in the epidemic and its impact.^{3,4}

For each defined sub-epidemic, the EPP fits a simple epidemic model to a full set of HIV surveillance data points collected from sentinel surveillance sites over time. This produces an estimate of the time trend of adult HIV prevalence for each sub-epidemic, which are then combined (using population estimates assigned to the different sub-populations) to produce national prevalence estimates and trends. The EPP model incorporates population change over time and fits curves to epidemics by varying four parameters (shown in Figure 1):³ the rate of growth of the epidemic (r); the start year of the epidemic (t_0); the fraction of the population considered to be at risk of infection at the start of the epidemic (f_0); and a behavioral response parameter which determines the final epidemic prevalence (ϕ). It further provides the user with the ability to apply prevalence adjustments to surveillance data, or to calibrate the curve using, for example, more representative data from national population based surveys.

Parameters in the EPP model that are varied to produce the best fitting epidemic curve³



Once epidemic curves are produced in EPP, they are then incorporated into the **SPECTRUM Projection Package**, developed by the Futures Group, to generate estimates of national prevalence, incidence, mortality and treatment needs by sex and age groups.⁵ The Spectrum module for HIV/AIDS projections uses the HIV prevalence curve produced in EPP together with assumptions about the epidemiology of HIV, including the ratio of female to male prevalence, distribution of infection by age, the survival distribution (assumed to be a Weibull function), and the effect of HIV on fertility, to calculate HIV prevalence, incidence and mortality by age and sex. It also calculates the number of child infections occurring through infections from the mother, child deaths, and the number of orphans as a results of AIDS.⁵ Detailed data on treatment coverage for adults and children are needed in order to estimate the impact of antiretroviral therapy (ART) on the future course of the epidemic.

Appendix 5: Assumptions used in SPECTRUM

- ❖ Estimates of the population by age and sex projected over time were generated by Spectrum using data from the UN Population Division.
- ❖ Life expectancy was assumed to be about 46 for women and 49 for men in 2007. This resulted in a slightly lower overall population for 2007 than estimated in Spectrum using the UNPOP division estimates.
- ❖ Fertility rate was assumed to be 5.9 in 2004 (confirmed by the 2004 MDHS)
- ❖ The adult prevalence curve based on ANC data over time but calibrated according to the 2004 MDHS was read in from EPP.
- ❖ Age and sex ratios: data from the 2004 MDHS were used and replaced default ratios in Spectrum
- ❖ Progression periods: Default progression periods from HIV infection to the need for treatment (assuming a median of 8 years) and from treatment need to death in the absence of treatment (assuming a median of 3 years) were used. Annual survival on ART were changed as follows: Adult first year survival was assumed to be 75% and survival in subsequent years to be 90%; first year survival for children under 1 year was assumed to be 80%; first year survival for children 1 year and older was estimated at 85% and survival in subsequent years at 90%
- ❖ Ratio of fertility for HIV infected women to fertility among uninfected women was assumed to be 1.2 for women aged 15-19 years and 0.8 for women 20 years and older.
- ❖ Breastfeeding: it was assumed that 90% of HIV positive mothers provide mixed feeding while 10% provide exclusive breastfeeding to their babies. The median duration of breastfeeding in the population was assumed to be between 7 and 17 months.
- ❖ Data on treatment coverage (adults and children on ART) and mothers receiving PMTCT services, from the start of the program and projected to 2012, are summarized in table b.1.

Appendix 4: ARV Treatment and PMTCT coverage up to 2011 and projected to 2015

	Adult treatment	Prevention of mother to child transmission					Children treatment	
Year	Adults receiving ART	Single dose Nevirapine	dual therapy	Prophylaxis for 14 weeks	triple ART starting before Pregnancy	triple ART started after Pregnancy	%receiving cotrimoxazole	Number receiving ART
2000								
2001								
2002		642				642		0
2003		1,284				1,284		0
2004	2,720	2,719				2,719		6,520
2005	23,658	5,076				5,076		7,824
2006	77,040	9,231				9,231		9,128
2007	90,210	23,158				23,158	60	10,439
2008	132,055	19,425	16,919			36,344	60	14,601
2009	181,482	15,693	13,479			29,172	60	17,364
2010	228,478	11,960	10,038	7,691		29,689	65	26,431
2011	306,512	13,896	7,584	11,821	17,308	50,609	65	34,079
2012	378,678			16,612	35,953	52,565	65	42,075
2013	438,601			21,548	36,830	58,378	65	48,733
2014	483,513			26,618	34,720	61,338	65	53,724
2015	514,695			31,813	32,043	63,856	65	57,188

Appendix 5: Orphan summary table

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Maternal Orphans												
AIDS	322,393	347,536	366,626	374,436	378,199	376,103	366,759	353,079	332,948	305,940	275,756	245,890
Non-AIDS	173,922	168,701	163,662	158,902	154,617	150,918	147,776	145,142	142,944	141,152	139,841	138,985
Total	496,316	516,237	530,288	533,337	532,816	527,022	514,535	498,221	475,892	447,093	415,597	384,875
Paternal Orphans												
AIDS	308,011	329,759	347,802	357,687	364,410	366,546	363,101	357,126	346,376	328,715	306,778	283,833
Non-AIDS	336,139	332,059	328,458	325,167	322,490	320,670	319,733	319,726	320,450	321,693	323,467	325,888
Total	644,150	661,818	676,260	682,854	686,900	687,217	682,834	676,852	666,826	650,407	630,245	609,721
Double Orphans												
AIDS	111,981	125,841	136,262	140,972	143,131	142,462	138,576	132,871	124,673	113,867	101,803	89,899
Non-AIDS	54,696	50,689	47,354	44,469	41,909	39,616	37,546	35,710	34,080	32,603	31,291	30,163
Total	166,677	176,530	183,617	185,441	185,040	182,079	176,122	168,581	158,753	146,470	133,094	120,062
Total Orphans	973,789	1,001,525	1,022,932	1,030,751	1,034,676	1,032,160	1,021,246	1,006,492	983,965	951,030	912,748	874,535
All AIDS orphans	542,750	576,458	603,409	615,878	623,466	623,157	612,908	597,502	573,141	537,351	495,322	452,576

Appendix 6: Adults 15+ Summary – Total

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HIV population												
Total	781,951	778,392	769,669	761,801	754,257	746,604	742,085	741,373	745,615	754,615	765,921	777,676
Male	322,563	320,927	317,046	313,492	310,215	306,803	304,711	304,272	305,895	309,563	314,248	319,149
Female	459,388	457,464	452,623	448,308	444,041	439,802	437,374	437,102	439,720	445,051	451,673	458,527
Prevalence	11.54	11.16	10.72	10.3	9.9	9.5	9.15	8.85	8.61	8.43	8.27	8.11
New HIV infections												
Total	66,983	60,299	52,114	43,997	41,070	36,539	32,587	30,618	27,959	24,675	21,774	19,815
Male	29,216	26,356	22,818	19,289	18,024	16,049	14,322	13,461	12,295	10,852	9,574	8,709
Female	37,767	33,944	29,297	24,707	23,046	20,491	18,266	17,157	15,664	13,823	12,200	11,106
Incidence	1.15	1.01	0.84	0.69	0.62	0.53	0.46	0.42	0.37	0.31	0.27	0.23
Annual AIDS deaths												
Total	60,369	61,992	59,325	50,708	47,757	43,651	36,900	31,581	24,567	17,143	12,584	10,740
Male	26,399	27,055	25,938	22,256	20,862	19,176	16,291	14,002	11,067	7,880	5,905	5,099
Female	33,970	34,937	33,387	28,452	26,895	24,475	20,609	17,579	13,500	9,263	6,679	5,641
Annual AIDS deaths among those on ART												
Total	30	467	2,201	4,111	2,815	4,411	5,405	5,935	7,595	7,672	7,098	6,558
Male	16	242	1,136	2,114	1,450	2,274	2,782	3,043	3,875	3,909	3,628	3,370
Female	14	225	1,065	1,998	1,366	2,137	2,623	2,892	3,720	3,763	3,470	3,188
Annual AIDS deaths among those not on ART												
Total	60,339	61,525	57,124	46,597	44,942	39,240	31,495	25,646	16,972	9,471	5,486	4,182
Male	26,383	26,813	24,802	20,143	19,412	16,903	13,509	10,959	7,191	3,971	2,278	1,729

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Female	33,956	34,713	32,322	26,454	25,529	22,338	17,986	14,687	9,780	5,501	3,208	2,453
Total need for ART												
Total	200,889	209,138	216,777	227,342	245,890	265,915	287,918	389,968	414,592	443,301	476,600	511,545
Male	86,348	89,661	92,724	96,973	104,567	112,840	121,799	162,862	172,878	184,561	198,219	212,602
Female	114,541	119,477	124,053	130,369	141,324	153,075	166,118	227,106	241,714	258,740	278,382	298,943
Total number receiving ART												
Total	1,360	13,189	50,349	83,625	111,133	156,769	204,980	267,495	342,595	408,639	461,057	499,104
Male	605	5,703	21,579	35,570	47,154	66,341	86,469	112,278	143,125	170,130	191,587	207,169
Female	755	7,486	28,770	48,055	63,978	90,428	118,511	155,217	199,470	238,509	269,470	291,935
Coverage (%)	0.7	6.2	22.7	35.3	43.4	56.6	60.5	66.5	79.9	88.8	93.3	195.1
Number newly needing treatment												
Total	63,138	64,001	64,199	63,640	62,273	60,242	57,753	51,360	48,138	44,957	41,773	38,628
Male	27,517	27,844	27,873	27,560	26,881	25,910	24,750	21,957	20,526	19,124	17,726	16,349
Female	35,621	36,157	36,326	36,080	35,393	34,332	33,003	29,403	27,612	25,833	24,047	22,279
Unmet need for treatment												
Total	199,529	195,949	166,428	143,717	134,758	109,146	82,938	122,473	71,997	34,662	15,543	12,441
Male	85,743	83,958	71,145	61,403	57,413	46,499	35,330	50,584	29,752	14,431	6,632	5,433
Female	113,786	111,992	95,283	82,314	77,345	62,647	47,608	71,889	42,244	20,231	8,912	7,008
Population												
Total	6,777,732	6,976,279	7,181,190	7,397,858	7,622,577	7,858,831	8,109,900	8,374,795	8,655,571	8,952,781	9,263,637	9,585,542
Male	3,340,550	3,443,306	3,549,002	3,659,966	3,774,937	3,895,399	4,022,857	4,156,963	4,298,530	4,447,868	4,603,807	4,765,233
Female	3,437,182	3,532,973	3,632,188	3,737,893	3,847,640	3,963,432	4,087,043	4,217,833	4,357,041	4,504,912	4,659,831	4,820,309
Number	2,720	23,658	77,040	90,210	132,055	181,482	228,478	306,512	378,678	438,601	483,513	514,695
Percent	3.5	14.8	30	41	52.1	65.1	69.9	75.6	87.4	94.5	97.2	97.6

Appendix 7: Child 0-14 Summary

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HIV population												
Total	151,364	158,534	164,297	171,873	176,803	180,018	180,972	176,033	166,359	155,292	144,478	133,570
Male	76,477	80,115	83,045	86,894	89,405	91,047	91,542	89,053	84,164	78,568	73,100	67,584
Female	74,887	78,419	81,253	84,979	87,398	88,971	89,430	86,981	82,195	76,724	71,378	65,986
New HIV infections												
Total	27,810	27,755	26,887	25,355	22,812	22,404	19,642	12,284	5,837	3,238	3,043	2,843
Male	14,098	14,070	13,630	12,854	11,564	11,357	9,957	6,226	2,959	1,641	1,542	1,441
Female	13,713	13,685	13,256	12,501	11,248	11,046	9,685	6,057	2,879	1,597	1,501	1,402
Annual AIDS deaths												
Total	14,846	15,284	15,416	11,765	11,584	12,483	11,669	10,016	8,055	6,545	5,636	5,009
Male	7,502	7,725	7,793	5,947	5,857	6,313	5,902	5,066	4,074	3,310	2,851	2,534
Female	7,344	7,559	7,623	5,817	5,727	6,170	5,768	4,950	3,981	3,234	2,785	2,475
Population												
Total	5,769,317	5,919,276	6,082,908	6,265,877	6,463,311	6,671,787	6,893,680	7,130,251	7,381,879	7,647,903	7,927,649	8,221,375
Male	2,909,050	2,985,596	3,069,174	3,162,611	3,263,351	3,369,595	3,482,559	3,602,858	3,730,642	3,865,566	4,007,374	4,156,201
Female	2,860,267	2,933,680	3,013,734	3,103,266	3,199,959	3,302,191	3,411,121	3,527,393	3,651,237	3,782,337	3,920,274	4,065,174
Children needing cotrimoxazole												
Total	223,210	229,477	233,685	235,814	238,629	239,135	237,143	233,437	226,060	216,114	203,861	191,354
Male	113,015	116,197	118,336	119,425	120,859	121,122	120,119	118,246	114,514	109,478	103,274	96,942
Female	110,195	113,280	115,348	116,389	117,771	118,013	117,024	115,191	111,546	106,636	100,586	94,412
Children receiving cotrimoxazole												
Total	0	0	0	235,814	238,629	143,481	154,143	151,734	146,939	140,474	132,509	124,380
Male	0	0	0	119,425	120,859	72,673	78,077	76,860	74,434	71,161	67,128	63,012

Female	0	0	0	116,389	117,771	70,808	76,066	74,874	72,505	69,313	65,381	61,367
Total need for ART												
Total	61,461	64,778	67,487	81,043	81,882	84,384	106,490	100,464	91,713	85,435	81,743	78,807
Male	31,026	32,707	34,082	40,936	41,367	42,639	53,817	50,774	46,353	43,181	41,317	39,835
Female	30,436	32,071	33,406	40,107	40,515	41,745	52,673	49,690	45,360	42,254	40,426	38,972
Total number receiving ART												
Total	6,048	7,361	8,675	9,995	12,935	16,494	22,758	31,461	39,257	46,613	52,337	56,474
Male	3,055	3,718	4,383	5,051	6,539	8,340	11,509	15,913	19,858	23,581	26,478	28,573
Female	2,993	3,643	4,292	4,944	6,396	8,154	11,249	15,548	19,399	23,033	25,859	27,901
PMTCT												
Number of HIV+ pregnant women	86,289	86,805	86,252	84,977	82,937	80,141	77,092	74,009	70,993	68,076	65,243	62,456
Mothers needing PMTCT	73,345	73,784	73,314	72,231	70,496	68,120	65,528	62,907	60,344	57,865	55,456	53,088
Mothers receiving PMTCT	2,719	5,076	9,231	23,158	36,344	29,172	29,689	50,609	52,565	57,865	55,456	53,088
MTCT rate at 6 weeks	21	20	20	18	14	15	14	8	4	1	1	1
MTCT rate including breastfeeding	38	38	37	35	32	33	30	20	10	6	5	5
HIV+ pregnant women in need of treatment	26,794	27,180	26,109	25,630	25,311	23,672	29,639	48,047	67,039	69,061	69,727	71,761
HIV population 15-17												
Total	17,680	16,846	15,742	14,570	13,955	13,522	13,322	13,637	14,401	15,544	16,989	18,536
Male	4,688	4,639	4,531	4,419	4,428	4,478	4,614	4,946	5,480	6,223	7,123	8,044
Female	12,991	12,207	11,211	10,152	9,527	9,044	8,708	8,691	8,920	9,321	9,866	10,492
Total receiving cotrimoxazole												
Number	0	0	117,907	237,222	191,055	148,812	152,939	149,336	143,707	136,492	128,445	124,380
Percent	0	0	50	50	50	60	65	65	65	65	65	65