Assessment of equity in the uptake of anti-retrovirals in Malawi

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Executive summary

Malawi, like the rest of southern Africa, has a high adult HIV prevalence (estimated at about 12% in 2004) yet the country's health sector is crumbling under severe pressure, largely due to limited investment. In 2004, the government of Malawi mobilised further local and international resources to commit itself to providing free antiretroviral therapy (ART) free to all patients, based on clinical need, in a large public sector-led programme.

This study was implemented under the fair financing theme in the Regional Network for Equity on Health in East and Southern Africa (EQUINET) and co-ordinated by the Health Economics Unit of the University of Cape Town. It aimed to assess equity in uptake of antiretroviral therapy in Malawi in 2005, especially according to age (children vs. adults), gender (men vs. women) and income. Particular reference is made to the scaling up of ART and the removal of fees for ART in 2004.

Informal interviews were conducted with health sector antiretroviral programme implementers and key policy makers in the Ministry of Health. The purpose of these interviews was to obtain their perceptions and experiences on a selected list of key issues affecting antiretroviral treatment rollout in the country. An interview guide was used. We also searched both published and grey literature to collect information on the history and operations of the Malawi public sector-led ART programme.

There were an estimated 11.9 million people in Malawi in 2004 – 5.5 million resident in the south, 5 million in the central region and 1 million in the north. The national adult (15-49 years) HIV prevalence was 11.8%, with the highest prevalence in the south (17.6%), followed by the north (8.1%) and the central region (6.5%). From the data on the distribution of the population by age and HIV prevalence estimates among adults and children, there were an estimated 831,990 infected people, of whom 748,007 (89.9%) were adults and 10.1% were children.

Retention rates remain high in Malawi's ART programmes (84%), which compare favourably with those elsewhere on the continent. Retention rates ranging from 44% to 85% after 24 months of treatment have been reported in ART programmes throughout Africa (Rosen et al, 2007). While there were some reports from key informants that the change from fee-paying ART services to free systems may have improved patient adherence to treatment regimes, the research did not provide conclusive evidence of the impact of cost of patients' medications on their adherence to their treatment regimens. Different adherence rates in different areas and programmes suggest that other determinants may be affecting affect this outcome. We suggest that there be further exploration of the barriers to treatment that men and children face in accessing care in Malawi, and further assessment of the factors affecting adherence.

Although children make up about 10% of Malawi's HIV+ population, they only comprise 5% of the total number of people receiving HAART, which suggests that they are under-represented by about 50%. In the Malawi District Health Survey (DHS), conducted in 2004, it was discovered that, among people aged 15 to 24 years, HIV prevalence was 3.9% in males versus 9.5% in females. However, for the age spectrum of 15-49 years, male prevalence was 11.2% compared to 11.8% in females. This suggests that there was a significant disparity in terms of HIV prevalence between young male and female adults (15 to 24 years) but not between older male and female adults. While higher prevalence rates in young women may be a cause, the reasons need to be further

explored. Social taboos against infidelity may also play a role in explaining why more women seek testing, with men reluctant to go for an HIV test because it's seen as an admission of infidelity. Another explanation that was offered was that prevention of mother-to-child-transmission programmes allow women to be diagnosed when they seek maternal car. There was, however, no clear evidence for this.

We uncovered some inequities that negatively affected the poorest quintile of the population (the poorest 20%). Based on reported illness and service uptake in the four weeks before the survey, we compared the poorest 20% of those people on ART with the richest 20%. We noted that the poorest 20% are more likely to be ill, less likely to access doctors and less likely to see a doctor when they fall ill than the richest 20% in both rural and urban areas. In the urban areas, the differences in levels of access and utilisation were not statistically significant (t-ratio = 1.36), but in rural areas, the differences were much higher and statistically significant (t-ratio = 2.73).

Our study was limited by a lack of relevant and reliable data; this points to an urgent need for further research into equity in ART programmes in Malawi. Hopefully, our equity analysis will be used by public health services planners and programme implementers in the future to identify and deal with inequitable gaps in ART coverage.

1. Introduction

Adult HIV prevalence in Malawi is estimated at 12%, according to the Malawi Demographic and Health Survey of 2004 (National Statistical Office and ORC Macro, 2005). For a population of about six million individuals aged 15 years and above, this translates to about 700,000 adults infected with HIV. It is estimated that 15-20% of them may currently be clinically eligible for antiretroviral therapy. No studies have been conducted yet to estimate the prevalence of HIV among children (younger than 15 years old), but it is estimated that between 80,000 and 100,000 children may be HIV+ (Malawi National AIDS Control Programme, 2000; Garbus, 2003). It's likely that a similar proportion of the infected children, namely 15-20%, may be eligible for ART.

The Ministry of Health (MoH) in Malawi is the largest health care services provider; services are largely received at no cost to the patient. Within the public sector though, there is a small number of private patient facilities for those who can afford them. In 2004, the Malawi government decided to start providing antiretroviral drugs at no cost to all patients in public and private health facilities. In the private sector, patients would pay their own consultation fees to cover the non-drug costs of the private facilities. Prior to 2004, however, ART was available in selected public health facilities (Lilongwe, Blantyre and Mzuzu) at a cost of US$25 for a month’s supply of medication. Private clinics and hospitals were charging various amounts, depending on their own costs of procuring medications from their suppliers. Some patients were also accessing treatment via operational research projects run by Medecins sans Frontieres (MSF) in the Thyolo and Chiradzulu districts in southern Malawi.

This study was implemented under the fair financing theme in the Regional Network for Equity on Health in East and Southern Africa, co-ordinated by the Health Economics Unit of the University of Cape Town. We investigated how the removal of user fees in Malawi has impacted on access to antiretroviral therapy (ART) and public resources for HIV care and support, and our study has naturally taken the form of an equity analysis of the uptake of ART, mainly according to age and gender. We make particular reference to the scaling up of ART and the removal of fees for ART.

The government of Malawi aimed to preferentially target the poor in the delivery of treatment services. With this understanding, it was generally accepted that women, children, the elderly were the most vulnerable groups in society. But how much of the national health budget is spent on these vulnerable groups? Furthermore, how much is spent on the poor? (The 'poor' are defined according to the Malawi Poverty Index of the National Statistical Office, which describes levels of poverty by geographical area, based on the individual's material possessions and assets (National Economic Council, 2000; 2001).

While the government of Malawi aims to provide HIV treatment free to all Malawians, it is likely that some sections the community will remain underserved, such as the poor, largely as a result of limited human resources for health, the limited geographical distribution of health facilities approved to provide ART and other personal barriers to access, such as patients who cannot afford travel costs to and from facilities. We therefore conducted this study to assess whether ART was being accessed equitably between women and men, as well as between adults and children.

2. Methodology and objectives of this study

The primary objective of this study was to assess how equitable the provision of antiretroviral therapy is in Malawi, specifically with regard to age and gender. Particular reference is made to the scaling up of ART and the removal of fees for ART. In order to achieve the objective, the following actions were taken:

- an assessment of enrolment figures for antiretroviral therapy to identify the gender patterns of patients accessing access to ART;
- a comparison of access to treatment based on age (children versus adults); and
- a comparison of drug compliance among patients on treatment before and after the removal of user fees.

Informal interviews were conducted with health sector antiretroviral programme implementers and key policy makers in the Ministry of Health. The purpose of these interviews was to obtain their perceptions and experiences on a selected list of key issues affecting antiretroviral treatment rollout in the country. An interview guide was used (see *Box 1*). Eight key informants were interviewed to collect data within the following domains:

- what their assessment is of the current number of HIV-infected people on treatment;
- why there may be gender differences in proportions of patients on treatment;
- why there may be age differences in the proportions of patients on treatment; and
- what could be done to increase the number of clinically eligible patients on treatment.

Box 1: Guided questions for interviews with key informants

The following questions were used to guide the informal interviews with key informants in this study:

- How are the key issues within the HIV treatment program in Malawi?
- Do you feel women are accessing treatment as well as men? Please explain your answer.
- Why do you think women are accessing treatment more (or less) than males?
- Do you feel women have equal access to HIV testing services?
- Do you feel that HIV testing among pregnant women has had an impact on HIV treatment?
- Are there particular issues you would wish were addressed to ensure that all people have access to HIV treatment in Malawi?
- What other issues would you like us to know as we aim to understand the HIV treatment programme?

We also searched both published and gray literature to collect information on the history and operations of the Malawi public sector-led ART programme. Published literature was largely searched via MEDLINE (National Library of Medicine) using the following key words: “Malawi AND HIV”; Malawi AND ART”; “Malawi AND antiretroviral therapy” and “Malawi AND HAART”. Unpublished reports were obtained from the Ministry of Health’s HIV Unit and the Malawi National AIDS Commission. The purpose of the literature review was to collect data on the numbers of patients at each stage of the antiretroviral

treatment programme rollout, the gender and age distribution of patients, occupational categories of patients and the compliance rates of patients receiving follow-up treatment.

Data analysis was carried out both during the collection phase and at end of the study. The data collection team used guided questions to clarify issues at subsequent interviews. Transcripts were used to generate coded keywords and phrases. These were re-examined to confirm or modify the original keywords and also to generate new codes (de Wet and Erasmus, 2005; Whitley, 2004). This was done in order to identify recurring themes, compare the different groups and identify outliers.

Concentration indices of need for and use of ART were also calculated. This analysis was based on data collected as part of the resource tracking for HIV/AIDS, which was conducted in December 2005. The results presented in the report are based on 720 respondents who were interviewed during the survey. A principal components analysis was used to assign each respondent a weighted total value of his/her household and capital goods, which, in this paper, is referred to as 'wealth'. The measure of wealth was then used to divide the respondents into five equal groups, or quintiles, with each representing 20% of the population, according to which the analysis was conducted.

In the analysis, we compared selected attributes related to the health of the respondents and their utilisation of health services, focusing on differences among the wealth quintiles. Particular attention was placed on the differences in the attributes between the first quintile (the poorest 20% of the respondents) and the fifth quintile (the richest 20%). A concentration index was then used to measure the extent of the difference in the health status and utilisation of health services by the respondents in different categories.

From grouped data, the concentration index (C) was computed in a spreadsheet programme, using the following formula (which was also used by Gwatkin et al, 2003; Kakwani, 1980; and O'Donnell et al, 2007):

$$C = \left(p_1 L_2 - p_2 L_1\right) + \left(p_2 L_3 - p_3 L_2\right) + \ldots + \left(p_{T-1} L_T - p_T L_{T-1}\right)$$

Where:

- *p* is the cumulative percent of the sample ranked by economic status;
- *pL* is the corresponding concentration curve ordinate; and
- *T* is the number of socioeconomic groups.

To test for the statistical significance of the concentration index, standard errors were computed, using the formula given by Kakwani et al (1999). The concentration index assumes values between -1 and +1; -1 if the poorest person has all the access to healthcare and +1 if the wealthiest person has all the access to the commodity, i,e. healthcare. In the absence of inequities, the value of the concentration index is zero.

3. Results of this study

3.1 Estimated distribution of HIV-infected people in Malawi

Data from the National Statistics Office was obtained to estimate national and district population by age and sex (www.nso.malawi.net). The 2004 population projection estimates were used, as this was the same year in which the Malawi Demographic and

Health Survey (DHS) was conducted. Reliable national HIV prevalence estimates were made with data from the 2004 DHS but, unfortunately, HIV prevalence estimates for Lilongwe districts could not be obtained due to survey-related problems. *Table 1* shows the country's estimated population and HIV prevalence statistics by age and place of residence (district). The districts from which data is presented here are those whose HIV prevalence was reported in the DHS report.

Table 1: Distribution of HIV-infected people by age and district in Malawi, 2004

Districts	Estimated total population (2004)	Estimated child population (<15 years old)	% adult HIV prevalence (>14 years old)	Estimated number of adults infected by HIV (>14 years old)	Estimated number of children infected by HIV (<15 years old)	Total infected by HIV (children and adults)
Northern districts						
Mzimba	574,384	269,386	5.2	15,860	4,041	19,901
Karonga	230,026	107,882	12.0	14,657	1,618	16,275
Total	1,427,807	669,641	8.1	61,411	10,045	71,456
Southern districts						
Blantyre	1,027,808	482,041	22.3	121,706	7,231	128,937
Machinga	417,594	195,851	11.8	26,166	2,938	29,104
Mangochi	711,179	333,543	20.8	78,548	5,003	83,551
Mulanje	506,598	237,594	19.8	53,263	3,564	56,827
Thyolo	539,610	253,077	21.0	60,171	3,564	63,735
Zomba	653,929	306,692	17.8	61,808	4,600	66,408
Total	5,517,374	2,587,648	17.6	515,632	38,815	554,447
Central districts						
Kasungu	589,019	276,250	4.1	12,824	4,144	16,968
Total	4,992,753	2,341,601	6.5	172,325	35,124	207,449
Total	**11,937,934**	**5,598,891**	**11.8**	**748,007**	**83,983**	**831,990**

Source: National Statistical Office and ORC Macro (2004)

As can be seen from the table, there were an estimated 11.9 million people in Malawi in 2004 – 5.5 million resident in the south, 5 million in the central region and 1 million in the north. The national adult (15-49 years) HIV prevalence was 11.8%, with the highest prevalence in the south (17.6%), followed by the north (8.1%) and the central region (6.5%). From the data on the distribution of the population by age and HIV prevalence estimates among adults and children, there were an estimated 831,990 infected people, of whom 748,007 (89.9%) were adults and 10.1% were children.

3.2 Numbers of patients on ART in Malawi

Published literature was reviewed to obtain data on the number of patients on antiretroviral therapy (ART) at various time points. A survey taken at the end of 2004 showed that 13,183 patients were registered in the ART programme, of whom 5,274 (40%) were male and 12,527 (95%) were adults, (Libamba et al, 2006). Of these patients:

- 82% (10,761/13,183) were still alive and taking antiretrovirals;
- 8% (1,026/13,183) were already dead;

- 8% (1,039/13,183) had been lost to follow-up (in other words, the treatment programme had no further information on them – they may have died, stopped treatment, migrated elsewhere or started therapy at new sites);
- less than 1% (106/13,183) had stopped treatment; and
- 2% (251/13,183) had transferred to another facility providing ART.

As can be seen from the above statistics, retention rates remain high in Malawi's ART programmes (84%), which compare favourably with those elsewhere on the continent. Retention rates ranging from 44% to 85% after 24 months of treatment have been reported in ART programmes throughout Africa (Rosen et al, 2007).

3.3 Children and highly active retroviral therapy (HAART)

A fixed-dose combination of stavudine, lamivudine and nevirapine ('Triomune') is the first-line regimen for both adults and children in Malawi. In the interviews with key informants, a lack of paediatric (child) drug formulations was reported to be the reason why Malawi's HIV treatment programme had initially not included children. There were no syrups or suspension medications for children because the general perception among programme implementers was that liquid drug formulations would not be stable enough as to maintain their effectiveness in the absence of refrigeration. It was therefore decided that normal adult tablets would be split and given to children, with doses estimated according to body weight.

The HIV unit of the Ministry of Health reported that, at the end of March 2005, there were 886 children (younger than 15 years old) on ART, comprising only 5% of all patients on treatment. The majority of the children (70%) were from the south, 26.6% were from the central region and 3.4% were from the north. The programme expanded and, by March 2006, out of a total of 46,702 patients (both adults and children) on ART, 2,718 (5.8%) were children. In comparison to the previous year's statistics, this represented a 16% growth in the proportion of children on ART.

While a regional disparity in the number of child patients on ART in Malawi was noted, the significance of such differences is not clear at the moment. The national population is unequally distributed – both the central and southern regions have almost equal populations but the north is sparsely populated. Furthermore, the prevalence of HIV among adults differs by region, as shown earlier in Table 1. While adult HIV prevalence estimates may be an indicator of HIV prevalence estimates among children, the extent to which this is the case is currently not known. It would appear though that the south is greatly over-represented compared to the central region, even though their population numbers are similar.

3.4 Children and HAART: Some equity issues

Although children make up about 10% of Malawi's HIV+ population, they only comprise 5% of the total number of people receiving HAART, which suggests that they are under-represented by about 50%. However, eligibility for HAART does not just depend on being HIV-infected but rather on clinical staging, and it is currently not known whether or not the disease progresses at the same rate in children as in adults. If it were known what proportion of HIV-infected children was clinically eligible for HAART, an

assessment could be done to assess equity in comparison with adults. In adults, it is generally estimated that about 15% of HIV-infected people are eligible for HAART.

Another way to assess coverage of HAART services by children would be to assess what proportion of new patients enrolled in HAART programmes are children. *Table 2* shows data from 2004 (when free ART was first offered) to March 2006. Please note that, in Malawi, until January 2006, a child was legally defined as a person aged 12 years and younger, which changed to 14 years or younger in line with guidelines from the World Health Organisation. The percentage refers to the percentage of children compared with all patients (adults and children) started on ART.

Table 2: Facilities offering ART to adults and children in Malawi, 2004-2006

Month and year of record	No. facilities initiating adults on ART	Cumulative no. adults initiated on ART	No. facilities initiating children on ART	% children cumulatively initiated on ART
December 2004	24	12,527	12	656 (5.0%)
March 2005	34	16,715	13	886 (5.0%)
June 2005	54	21,801	21	1,172 (5.1%)
September 2005	60	28,479	25	1,576 (5.2%)
December 2005	60	35,841	32	1,999 (5.3%)
March 2006	66	43,984	47	2,718 (5.8%)

Source: Ministry of Health, 2006

Table 2 shows that the proportion of children to the total number of people on HAART ranged from 5% to 5.8% for the period of March 2005 to March 2006. This percentage is lower than the estimated proportion of HIV-infected people who are children. However, there was a steady increase from 5% in December 2004 to 5.8% in March 2006. According to key informant interviews, this increase was possibly prompted by the completion of Paediatric Treatment Guidelines by the Ministry of Health. (Paediatric Treatment Guidelines were only put in place some time after adult treatment guidelines had already been in use.)

3.5 Distribution of patients on ART by gender

We reviewed published literature and programme documents to obtain distribution statistics of patients on ART programmes in Malawi according to gender. Key informants were also interviewed to help explain gender disparities, if any were observed. *Table 3* provides details on the distribution of ART patients by gender, as well as the names of the studies that provided the data.

Table 3: Distribution of adult ART patients by gender in Malawi, 2001-2006

Authors, year of publication	Period of case accumulation	Study site	No. adult patients on ARVs	Males (%)	Females (%)	Mean/ median age in years	Female: Male ratio
Hosseinipour et al (2004)	2003	Lilongwe	141	68 (48%)	73 (52%)	38.5	1.1
van Oosterhaut et al (2005)	2003	Blantyre	176	80 (45%)	96 (55%)	39	1.2
Zachariah et al (2006)	2003-2005	Thyolo	1634	572 (35%)	1062 (65%)	33	1.9
Ferradini et al (2006)	2001-2003	Chiradzulu	1308	481 (36%)	827 (64%)	34.9	1.7
Hosseinipour et al (2006)	2001-2003	Lilongwe	625	376 (51.5%)	354 (48.5%)	38	0.9
Bonnet et al (2006)	2001-2003	Chiradzulu	1033	367 (35.5%)	666 (64.5%)	35	1.8
Libamba et al (2006)	2001-2005	National	13183	5274 (40%)	7909 (60%)	Not specified	1.5
Phiri and Boxshall (2006)	2001-2005	Lilongwe	37840	14819 (39%)	23021 (61%)	33	1.6
Malawi MoH (2006)	2001-2006	National	46,702	18213 (39%)	28,488 (61%)	Not specified	1.6

We originally hypothesised that females would be under-represented in treatment programmes, especially during the period when patients were required to pay for treatment. Before 2004, when ART programmes required patients to pay for medication, in Blantyre, 55% of all patients were female while, in Lilongwe, 48.5% were female. However, one year after the introduction of free medication (2004-2005), nationally, between 2004 and 2005, 61% of patients were female. By the end of 2005, the number of females had increased to 37,840, representing a nine-fold increase within 24 months. Clearly, females outnumber males among patients receiving ART within treatment programmes in Malawi. The trend was similar for both the period when patients had to pay for ART and the period when treatment was provided free of charge.

Over the period we reviewed, the proportion of females on ART ranged from 48.5% to 65%. Only one programme (in Lilongwe) had a majority of male patients, while the rest of the treatment sites reported a majority of female patients. The predominance of females was also reported by van Oosterhaut et al (2005) for a paying treatment programme in Blantyre, where males constituted 45% of total ART patients.

In order to accurately assess gender equity regarding the distribution of patients on HAART, one would also need to assess the gender distribution of HIV-infected people in Malawi. Probably the most reliable estimates are from the Malawi District Health Survey (DHS) conducted in 2004. In the DHS, it was discovered that, among people aged 15 to 24 years, HIV prevalence was 3.9% in males versus 9.5% in females. However, for the age spectrum of 15-49 years, male prevalence was 11.2% compared to 11.8% in females. This suggests that there was a significant disparity in terms of HIV prevalence between young male and female adults (15 to 24 years) but not between older male and female adults.

3.6 Voluntary counselling and testing (VCT) and gender equity

In order to explore why more women than men were on HIV treatment, we further reviewed data from the Malawi Demographic and Health Survey of 2004 to obtain HIV prevalence estimates and proportions of adults who have taken an HIV test, and these statistics were stratified by gender. The MDHS reported that 13.3% of women aged 15-49 years were HIV-infected, compared to 11.8% of men. In 2005, the Malawi AIDS Counselling and Resource Organisation (MACRO) tested 6,507 individuals aged 15-24 years for HIV, of which 4,627 (71.1%) were males and 1,880 (28.9%) were females. Of the males, 192 (4%) were HIV-infected, while 337 females (18%) were infected. Higher infection rates among women would probably explain why more women are on ART.

3.7 Impact of the free ART programme on patient numbers

As stated earlier, the public sector-led free ART programme in Malawi was started in 2004. At the beginning, there were some patients receiving treatment via operational research treatment programmes, a few patients in paying programmes in private hospitals and clinics and other patients who attended government-subsidised public clinics. In 2004, there were only nine health facilities in the country that provided HAART but, by December 2005, an additional 51 facilities had been added, which was made possible by training a further 118 medical doctors, 384 clinical officers, 23 medical assistants and 613 nurses.

In September 2006, following the launch of the free programme, the number of patients receiving treatment from private clinics was 2,777. A comprehensive distribution of patients receiving treatment by site is provided in *Table 4* overleaf. Currently, the Ministry of Health provides medications for free to all patients, including those in the private clinics. Patients, however, must pay for clinical care and any other ancillary services.

3.8 Occupational categories of patients

We assessed the distribution of patients on ART based on their self-reported occupational categories. Data was not available from all data sources. We used data from the HIV United aggregate summary of the distribution of patients on treatment based on occupation. Of a total of 35,841 patients who had accessed HAART between 2004 and 2005, the occupational categories were known for 26,172 (see *Table 5*).

Table 5: Occupational categories of adult patients on HAART, 2004-2005

Occupational category	No. patients	% total patients
Housewife	5,895	22.5
Farmer	6,035	23.1
Small-scale business	3,669	14.1
Uniformed forces	559	2.1
Teacher	1,127	4.3
Health care worker	616	2.4
Other	8,271	31.6
Total	**26,172**	**[100]**

Source: Ministry of Health (2006)

Table 4: Patients receiving free ART at private sector clinics, 30 September 2006

Town/city	Name of facility	No. patients on 30 September 2006
Blantyre	Chitawira Private Hospital	224
	Blantyre Adventist Hospital	420
	Blantyre Water Board	41
	Mwaiwathu Private Hospital	230
	Portland Cement Clinic	32
	ESCOM Chichiri Clinic	136
	Press Cooperation Clinic	119
	Welfare ADMARC	183
	Dr Makadam's Clinic (Blantyre)	42
	Unilever SEA Clinic	20
	Mtengoumodzi Private Hospital	134
	Carsberg/SOBO Clinic	108
	Shire Bus Lines Clinic	2
	Limbe Diagnostic Centre	10
Zomba	Chinamwali Private Hospital	2
	AHI Clinic	0
Mzuzu/ Mzimba	Msachi's Clinic	33
	Mumbwe Private Hospital	0
	Raiply Clinic	0
Lilongwe	Partners in Hope	157
	African Bible College	330
	City Centre Clinic	54
	Limbe Leaf Tobacco	44
	SSH Clinic	60
	Moyo Wathanzi Clinic	95
	Lingazi Private Clinic	37
	Lilongwe Health Clinic	18
	MARS	39
	ADMARC	19
	Kawale Medical Services	28
	Lilongwe Private Clinic	101
	Alliance One	12
	Dr D Livingstone Memorial	37
	Blessings Hospital	5
	Discovery Medi-clinic	5
	Mlolera Women's Clinic	0
Total patients		**2,777**

We did not have reliable reference data to compare the categories of occupations of patients on treatment with the national distribution among HIV-infected people. However, housewives, farmers and small-scale business people had high proportions of infection. Unfortunately, the data was limited because an individual was only allowed to report one occupational category, in other words, the one that best described them, despite the fact that people often perform more than one job. For example, a farmer could also be a housewife and a small-scale businesswoman, yet this multiplicity of socio-economic roles was not captured in the studies.

3.9 Patient drug adherence in ART programmes

The adherence of patients to their drug regimens (compliance) is important in the clinical management of HIV-infected individuals, as it affects an individual's clinical outcomes and lack of adherence leads to the development of drug-resistant strains of the virus. Many factors affect patient adherence to drugs such as the prohibitive costs of medication and transport to and from the health facility, as well as adverse side effects from the ARVs and co-morbidity (other illnesses that the patient may have in addition to AIDS, such as tuberculosis).

Different researchers have defined 'patient drug adherence' differently, which may affect any comparison of their findings. The two main methods of determining adherence are to use the AIDS Clinical Trials Group or the MASRI (Medication Adherence Self-Report Survey) Questionnaire (Liu et al, 2001; Koneru et al, 2007; Walsh et al, 2002). Adherence can also be evaluated by interviewing patients, or the number of pills taken may be calculated by counting the remaining pills in the patient's pill bottle and subtracting these from the number calculated at the previous visit. Both alternatives have their own limitations and strengths.

Ferradini et al (2006) assessed a free treatment programme run by MSF in the Chiradzulu district. Levels of adherence were calculated as follows:

- Patients who reported having taken medication in the previous four days 100% of the time were described as highly adherent.
- Those who took their medications at least 80% of the time but less than 100% of the time were classified as moderately adherent.
- Those who were adherent less than 80% of the time were described as being non-adherent.

Of the 383 individuals who were assessed using the interview method, 383 (96%) were highly adherent, 8 (2%) were moderately adherent and 15 (4%) were non-adherent, according to the above definitions. Using the pill-counting method on 367 individuals, 235 (64%) were highly adherent, 99 (27%) were moderately adherent and 33 (9%) were non-adherent.

In 2004, Harries et al assessed the free treatment programme in the Thyolo district. Patients were given 30 days' supply of medications and reviewed at the clinic every 28 days. If a patient had four or less remaining pills, they were defined as being 100% adherent. If they had five to eight tablets remaining, they were defined as having 95% drug adherence. In this assessment of 151 patients, 99% had 95% adherence. So, adherence levels were higher than those reported in the Thyolo district, even though both programmes were run by MSF and were free of charge. We could not account for this discrepancy.

We also investigated drug adherence of patients accessing ART services for which they have to pay themselves. During the time when treatment was only available through the paying system, van Oosterhaut et al (2005) assessed 176 patients in Blantyre. Only 92 (52%) reported having never missed a dose. 43% reported that they had missed medications because of unavailability of medications at the hospital's pharmacy, 32% because of lack of money and 27% had forgotten to take medications. Compared to the period between 2004 and 2005 when all medications were free, patients' adherence was 95% (19,964 patients) at the national level. Interviews with key informants supported the perception that the change from fee paying to a no-payment system may have improved patient adherence to treatment regimes.

Van Oosterhaut et al also reported that, from 2000 to January 2003, 717 new patients were started on ART, of whom 422 were lost to follow-up and 31 discontinued therapy for unknown reasons. Of the 264 patients whose data was available, 48% were non-adherent to therapy. The drop-out rate in March 2006 was 9%.

3.10 Programme costs of Malawi's ART programme

We assessed the costs of the ART programme in Malawi to gain a sense of how much the programme was demanding of national resources. Total programme costs were estimated by adding up the monthly costs of the *recurrent* key inputs to the programme, namely, human resources, drugs and overheads such as stationery. Human resources costs were based on monthly full time equivalents (FTE) of the three key cadres working on this programme. A full time equivalent for a particular cadre of workers is defined as the number of workers of that cadre who are working full time in ART for the period of one month. These equivalents were multiplied by the average public service monthly salary of each cadre, and the total sum of all cadres constituted the total human resource cost for the programme. Similarly, calculations of drug costs were based on the annual unit costs of ART, as provided in the MSF Guide. We also determined an average cost for overheads based on information from the staff of the HIV Unit in the Ministry of Health.

Malawi's estimated monthly programme costs for March 2006 were as follows:

- Estimated drug costs, including overhead expenses, were MK75,592,160 or US$539,944 (2006 exchange rate: MK140 = 1US$).
- Staff costs were estimated at MK4,044,032 (US$28,886).
- Therefore, the total monthly programme costs (drug + staff costs) were estimated at MK79,636,192 (US$568,830).

3.11 Equity analysis according to income of patients

In our survey, we gathered various responses from people living with HIV/AIDS (PLWHAs) who accessed or were seeking access to health services. For example, respondents were asked if, in the four weeks prior to the survey, they experienced some signs of illness or not. This question was designed to give us some indication of their current, and recent, state of health. Their responses were categorised according to income; in other words, they were divided into five wealth quintiles as shown in *Table 6*. Note that each quintile represents 20% of the national population, so quintile 1

represents the poorest 20% and quintile 2 represents the next 20%, up until quintile 5, which represents the richest 20%.

Table 6: Current and past state of health of PLWHAs in Malawi, 2005

Question	% of respondents who answered yes, divided by wealth quintiles					Quintile ratio (poorest/ richest)	Concentration index	t-ratio
	Q1	Q2	Q3	Q4	Q5			
Have you been ill during past four weeks?	43	40	43	44	33	1.30	-0.0315	-1.06

Note that the t test, from which the t-ratio is calculated, sets up a sampling distribution of differences with a mean of zero. If the groups compared were really the same, then the difference between the means (and your t-score) should be close to zero. A deviation from zero suggests that the differences are less likely due to chance. The t-score is made up of a relative score by dividing the difference between the means by the standard error of the difference, which is like the standard deviation in a score.

As can be seen from Table 6, 43% of the respondents in quintile one (the poorest 20% of the population) were sick during the past four weeks. In the richest quintile, quintile 5, the figure was less, at 33%. The quintile ratio, which compares these two extreme quintiles, indicates that the poorest 20% of the people on ART are 30% more likely to fall ill than the richest 20%, and the concentration index only confirms this result. However, the result is not statistically significant, as indicated by the t-ratio of -1.06, which is below -1.96, the minimum requirement.

The respondents who said they were sick in the previous four weeks were asked if they saw a doctor/clinician during that time. This question allowed us to estimate levels of utilisation of health services among PLWHAs in Malawi. Their responses are provided in *Table 7*, where they are analysed and presented in the same way as the results for Table 6.

Table 7: Levels of utilisation of health services by PLWHAs in Malawi, 2005

Question	% of respondents who answered yes, divided by wealth quintiles					Quintile ratio (poorest/ richest)	Concentration index	t-ratio
	Q1	Q2	Q3	Q4	Q5			
Have you seen a doctor in the past four weeks?	61	68	70	68	82	0.74	0.0448	2.11

The concentration index and t-ratio from Table 7 show that there are differences between the wealth quintiles regarding access to a doctor/clinician. People in the wealthier quintiles appear to use doctors/clinicians more often when they are sick than those in poorer quintiles, who may have relatively less access to doctors. In this regard, the utilisation of health services by PLWHAs is inequitable between the wealthy and the poor.

We also analysed utilisation by PLWHAs who were actually sick at the time of the survey by comparing access to services between urban and rural areas. The results are presented in *Table 8*. The following tables are specific to those who felt unwell and accessed health care, not to those who were HIV+ but still healthy.

Table 8: Utilisation of services by PLWHAs in Malawi: Rural vs urban areas, 2005

Question	% of respondents who answered yes, divided by wealth quintiles					Quintile ratio (poorest/ richest)	Concentration index	t-ratio
	Q1	Q2	Q3	Q4	Q5			
Are you an **urban** patient and currently seeing a doctor?	63	71	87	65	83	0.76	0.0369	1.36
Are you a **rural** patient and currently seeing a doctor?	60	67	65	69	80	0.75	0.0493	2.73

It may be discerned from the quintile ratios given in the table that, in both urban and rural areas, the wealthiest 20% were more likely to see a doctor when ill than the poorest 20%. The concentration indices also indicate inequities in the utilisation of doctors, favouring the wealthy in both urban and rural areas. In urban areas, the difference in utilisation is not significant (t-ratio = 1.36) but, in the rural areas, the difference is much higher and the ratio is significant (t-ratio = 2.73). This shows that, in rural areas, there are inequities, based on wealth, in the utilisation of health services by sick people who are on ART.

3.12 Qualitative research results

The purpose of the qualitative aspect of this study was to gain further insight into our quantitative results. In particular, we wanted to understand what key informants' perceptions were regarding the influence of gender on access to ART in Malawi.

There seemed to be a general agreement among respondents that women had greater contact with the health system, which created more opportunities for them to access HIV testing and treatment. A Ministry of Health official, however, indicated that the number of women accessing treatment through mother-to-child prevention programmes was limited. However it was not clear whether HIV testing in maternity units would affect any decision to register for treatment at a later date; in other words, although few women were enrolled in ART via the mother-to-child prevention programmes, many women tested through these programmes may access ART later, when the link between their earlier testing and current treatment may not be obvious.

Key informants also suggested that men were less likely to access treatment for fear of negative consequences from spouses. In general, men who test positive are regarded as having contracted the disease as a result of infidelity because most women perceive any HIV infection that occurred within the marriage as a sign of their spouse's infidelity.

Women were perceived as being less reluctant to go for testing because, if a woman tests positive, it is automatically assumed that the male partner had infected her as a result of his infidelity. If a man were HIV-infected when the HIV status of his spouse was negative or unknown, he would be told, “I told you so!” by his wife, meaning that he was irresponsible because should have understood the risks of having sex outside the marriage. It was not clear among key informants what would be the response of the man in the event that the woman was HIV-infected and the male was not.

Key informants generally indicated that females were more likely to access HIV testing through maternity services and childcare facilities. Since 2004, the Ministry of Health has encouraged HIV testing among all pregnant women in order to enrol them for mother-to-child prevention treatment when they give birth, if necessary. The levels of coverage for the testing are considered to be poor, but key informants still saw it as an avenue through which women could access testing. Jereni and Muula (2008) reported that, in Blantyre, more females than males were accessing HIV testing in government health centres. Contrasting data from MACRO, however, shows that more males than females were going for HIV tests in 2004.

In summary, key informants suggested that women were more likely to know more about HIV testing and access testing than males, which could explain why more of them are being diagnosed with HIV and accessing treatment afterwards. Furthermore, more adult women were infected than men, especially among younger women and men. However the disparities in accessing care could not be fully explained by different HIV prevalence estimates, as prevalence estimates were almost the same for males and females in the age group older than 24 years old.

4. Conclusion and recommendations

Our analysis of the Malawi HIV treatment programme has found that men and children are under-represented in the programme. It would appear that, while there were almost equal proportions of women and men or only a slight under-representation of men when treatment was available at cost to patient, free treatment has been largely associated with a predominance of female patients. The situation among children continues to improve. According to key informant interviews, the increase in the proportion of children on treatment was possible as a result of the completion of the Paediatric Treatment Guidelines by the Ministry of Health.

While there were some reports from key informants that the change from fee-paying ART services to free systems may have improved patient adherence to treatment regimes, the research did not provide conclusive evidence of the impact of cost of patients' medications on their adherence to their treatment regimens. Different adherence rates in different areas and programmes suggest that other determinants may be affecting affect this outcome. We suggest that there be further exploration of the barriers to treatment that men and children face in accessing care in Malawi, and further assessment of the factors affecting adherence.

Key respondents also believed that gradually more men would be educated about ART through the women in their lives and it was only a matter of time before they would start realising the benefits of seeking ART, especially the fact that it could save their lives. As

treatment programmes mature, the gender disparities in the proportion of patients accessing treatment are expected to diminish.

We uncovered some inequities that negatively affected the poorest quintile of the population (the poorest 20%). Based on reported illness and service uptake in the four weeks before the survey, we compared the poorest 20% of those people on ART with the richest 20%. We noted that the poorest 20% are more likely to be ill, less likely to access doctors and less likely to see a doctor when they fall ill than the richest 20% in both rural and urban areas. In the urban areas, the differences in levels of access and utilisation were not statistically significant (t-ratio = 1.36), but in rural areas, the differences were much higher and statistically significant (t-ratio = 2.73).

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Acronyms

ART	Antiretroviral therapy
AIDS	Acquired immune-deficiency virus
DHS	Demographic and Health Survey
HAART	Highly active antiretroviral therapy
HRT	Human resources for health
HIV	Human immune-deficiency virus
MACRO	Malawi AIDS Counselling and Resource Organisation
MASRI	Medication Adherence Self-Report Survey
MDHS	Malawi Demographic and Health Survey
MK	Malawi Kwacha (national currency)
MoH	Ministry of Health
MSF	Medecins sans Frontieres
NSO	National Statistical Office

Equity in health implies addressing differences in health status that are unnecessary, avoidable and unfair. In southern Africa, these typically relate to disparities across racial groups, rural/urban status, socio-economic status, gender, age and geographical region. EQUINET is primarily concerned with equity motivated interventions that seek to allocate resources preferentially to those with the worst health status (vertical equity). EQUINET seeks to understand and influence the redistribution of social and economic resources for equity oriented interventions, EQUINET also seeks to understand and inform the power and ability people (and social groups) have to make choices over health inputs and their capacity to use these choices towards health.

EQUINET implements work in a number of areas identified as central to health equity in the region:

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- Poverty, deprivation and health equity and household resources for health
- Health rights as a driving force for health equity
- Health financing and integration of deprivation into health resource allocation
- Public-private mix and subsidies in health systems
- Distribution and migration of health personnel
- Equity oriented health systems responses to HIV/AIDS and treatment access
- Governance and participation in health systems
- Monitoring health equity and supporting evidence led policy

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