

Performance and capacity of second-
generation Comprehensive Care Management
and Treatment (CCMT) sites in Gauteng
Province

Research Report

January 2008

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CHP Monograph no 93

Acknowledgements

The research would not have been possible without the help of the managers, staff and patients at the four sites reviewed in this report. The HAST programme directors and regional and district managers in the Gauteng Department of Health also played an important role in supporting access to the sites. We would like to thank the fieldworkers who conducted interviews with patients. Four of the authors, Nicolette Prea Naidoo, Eka Williams, John Lubwama Kigosi and Rebecca Pursell completed MPH student projects on the basis of the research. The project was funded by the Canadian International Development Agency (CIDA) under their HIV/AIDS Rapid Response Fund.

Summary

Evidence on the feasibility and outcomes of public sector antiretroviral (ART) provision in South Africa has come mainly from what might be referred to as “innovator” programmes, led by motivated champions, often supported by non-governmental or academic institutions and receiving external donor funding. We conducted a comprehensive review of capacity and performance of four “second generation” Comprehensive Care Management and Treatment (CCMT) roll-out sites operating in the routine public sector environment of Gauteng Province.

Two community health centre (CHC) and two hospital-based CCMT sites were randomly selected from those initiated in 2004. Based on a chronic disease care framework, the dimensions of capacity assessed were productive interactions between motivated, adequately staffed teams and empowered, informed patients; systems design (including integrated service provision); and support and information systems. Performance was assessed through follow-up and adherence (self reported) rates and biological measures. Data were collected during 2006 and involved interviews/questionnaires with providers and managers, exit interviews with 713 patients and collation of routine data.

At the time of assessment, the numbers on ART being followed up in each site ranged from 600 to 1700 patients; they saw between 50 to 200 people a day. An estimated 27-30% of all patients enrolled since inception had been lost to follow up (deaths and drop outs). Between 8.2 and 14.6% of attenders at the four sites reported having ever missed a dose of treatment. Of those who had been on treatment for at least six months, the percentage with undetectable viral loads ranged from 83.6% to 91.6%.

In terms of the norms set by the national CCMT Plan, three of sites had staffing shortfalls. In all sites there had been turnover of doctors, and shortages of pharmacists, dieticians and social workers were reported. Nurses formed the stable core of the sites and were key to setting the “tone” of the service. Despite the shortages, the study found high levels of motivation and organisational loyalty among nursing staff working in the programme. This appeared to be related to good

leadership and possibly the attention and prestige associated with the CCMT programme. Some staff however did indicate that they were burnt out and intended to leave.

Patient knowledge was good. Across all sites few thought that ARVs could cure HIV/AIDS and a high proportion (78-93%) could state their latest CD4 result. Over 90% of patients agreed with the statements “the health care worker I see cares about me” and “the health worker provided you with feedback on whether the drugs were working or not”. The costs (mainly transport) incurred in attending services were around 18 rand per visit at the CHCs and 25 and 37 rand at the two hospitals, respectively. Patients spent between 4 and 6 hours at the clinic for each visit.

Within sites, VCT, TB, staging and ART services, if not physically integrated, were managed closely together, making it relatively easy, with some exceptions, for patients to move from one service point to another. All sites had active systems of treatment preparation and adherence management. Laboratory and drug supply systems functioned smoothly. Lack of space was a problem in three of the sites. Support and supervision while regular, were not structured and perceived as inadequate by sites. Despite a plethora of reports and forms, monitoring and evaluation systems were also weak across sites.

Overall the study concluded that the sites were performing well, and on a par with the first generation of model programmes. Outcomes at CHC-based sites were similar to those of hospital-based sites; CHC sites were also more accessible. Factors facilitating good performance included availability of resources, motivated site leadership, good relationships with patients, and attention to treatment preparation and laboratory and drug support systems.

At the time of the evaluation, the four sites had been in existence for 18 months to two years. In this period they had experienced a rapid growth in numbers and expansion was continuing unabated. The findings of this report represent a situation now out of date. By mid to late 2006, the two busiest sites were already showing evidence of saturation. Space and staff shortages had resulted in a waiting list for treatment initiation in one site, patients being turned away from the pharmacy in another,

services being cut back, and staff burnout and dissatisfaction. It is therefore possible that performance observed in this study has not been maintained, although the provincial government has recently introduced systems to down-refer stable patients to lower levels of care.

In the short-term, attention to improving chronic disease care systems, such as simplified follow-up protocols, reorganisation of roles and task shifting, improving patient flow, and importantly, designing better monitoring and evaluation processes will create efficiencies and allow for larger numbers to be seen without loss of quality. This in turn, will require the development of better support systems at national, provincial and regional level.

In the medium term, the CCMT programme faces a situation of demand that vastly outstrips supply. The current model, based on dedicated CCMT sites in a few facilities is unlikely to meet demand, even less need. There is now considerable evidence across the country of the feasibility of integrated, district based approaches that mobilise the whole health care infrastructure, and which achieve universal access while maintaining quality and outcomes. Scaling up these models will require a new cycle of planning that addresses, amongst other things, the need for new frameworks, methodologies and training, particularly in comprehensive district-based approaches. Also important will be to review human resource policies and norms for the primary health care system including core staff establishments to cater for expanded functions at this level.

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Abbreviations

ART: Anti retroviral therapy

ARV: Anti retroviral

CCMT: Comprehensive Care, Management and Treatment

CHC: Community Health Centre

HAST: HIV/AIDS, STI, TB

PMTCT: Prevention of Mother to Child Transmission of HIV

VCT: Voluntary Counselling and Testing

1 Background and rationale

Over the last few years compelling evidence has accumulated on the feasibility of providing anti-retroviral therapy (ART) in the public health systems of developing countries (Coetzee et al, 2004; Ferradini et al, 2006; Mugenyi et al, 2006). This has been made possible by an international context of greater drug affordability and the mobilisation of funds for developing countries. Most of the existing evidence on ART provision, however, comes from what could be referred to as “innovator” programmes, managed by motivated local actors, and often supported by non-governmental organisations (NGOs)¹ and/or donors. They have been animated by the need to demonstrate that a complex health intervention such as ART can achieve coverage while maintaining good outcomes in low resource settings. In the process they have introduced important innovations in service delivery. These include the participation of people living with HIV in programmes, extensive use of lay workers and the introduction of more effective chronic disease care systems to retain and manage patients in long-term care.

Table 15 (in the annexure) summarises the performance of some of these early treatment programmes, which collectively demonstrated outcomes that were similar in many respects to those of the developed world (Braitstein et al, 2006; Mills et al, 2006) and a lot better than those of other chronic diseases (such as tuberculosis and non-communicable diseases) in developing country health systems.

Since then treatment programmes have moved steadily into the mainstream of the health system. By March 2007, 264,423 people were reportedly receiving ART in 313 accredited sites across South Africa, most of them in the routine public sector institutional environment (SA Treasury, 2007). The Gauteng Department of Health has itself enrolled more than 95,000 people onto ART and has one of the largest and fastest growing programmes of the country (personal communication, M Moloi). Similar scale-up processes are being implemented in other African countries such as

¹ The international NGO, *Médecins sans Frontières*, has been a key player, both in initiating and in documenting early successes in anti-retroviral programmes in developing countries.

Malawi, Uganda and Botswana. Numbers now being reached in these programmes vastly outstrip those of the early model programmes.

This research evaluated the Comprehensive Care Management and Treatment (CCMT) Programme, as it is officially referred to, in second generation CCMT sites of Gauteng Province. The questions the research sought to answer were as follows: As the scale up of HIV treatment proceeds, are the promising initial outcomes being achieved elsewhere? Have the innovations of the first generation of HIV programmes been transferred? Has the public health system created the capacity (resources, chronic care systems etc.) to ensure the adequate performance of the CCMT programme? What are the prospects for universal access through the public health system?

The evaluation drew on the Wagner Chronic Care Model (Wagner 1998), which provides a comprehensive framework for understanding the elements of chronic disease care. According to the model (Figure 1), good chronic disease care focuses on outcomes (such as retention in care and adherence to medication) as well as the essential inputs and processes required to achieve these outcomes. The latter include the presence of well-staffed and motivated provider teams engaged in “productive interactions” with informed and empowered users, well designed support systems for both patients and health facilities, and supportive social (e.g. low stigma) and health system (e.g. adequate resources) contexts.

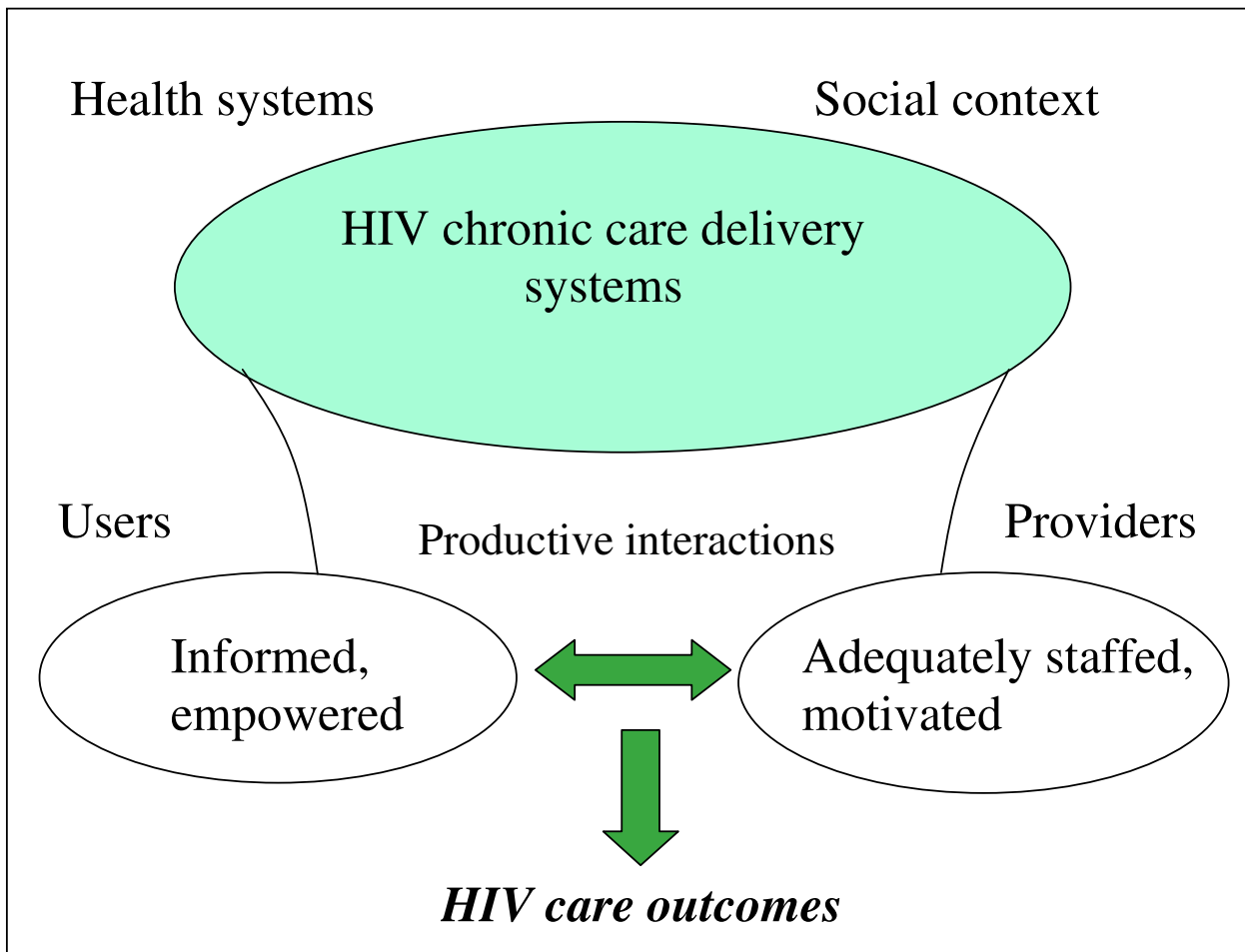


Figure 1: Model of HIV care (adapted from Wagner 1998)

2 Aim and objectives

The study aimed to evaluate the performance and capacity of ‘second generation’ Comprehensive Care Management and Treatment (CCMT) sites in Gauteng Province.

The specific objectives with respect to *performance* were to assess:

- The proportion of patients enrolled into care at the four sites still alive and on treatment at the time of study
- Self reported adherence to drugs and follow-up appointments amongst patients attending the service
- The proportion of patients in care with undetectable viral loads

With respect to *capacity* the study assessed the presence of:

- Adequately staffed and motivated teams, in productive interactions with informed and empowered patients
- Delivery Systems Design: integration and referral relationships in pathways of care; treatment preparation, monitoring/managing adherence and tracing those lost to follow-up
- Support systems: infrastructure, drug supplies, laboratories, decision and programme support and mentoring
- Information systems: clinical and programme monitoring

3 Methods

A multi-method health service evaluation of four CCMT sites was conducted between May and October 2006. The study population included all CCMT sites established during the course of 2004, based in non-academic, non-NGO and non-specialised (e.g. TB) facilities, that is, in routine public sector settings, and located in Regions A and B of the Province.² In December 2005, when the study sample was drawn, there were 13 such sites in Regions A and B, which we refer to as “second generation” CCMT sites. Five of the 13 sites were based in Community Health Centres (CHCs) and eight in district or regional hospitals. A stratified random sample of two CHC-based and two hospital-based (total four) CCMT sites was drawn. This process happened to yield one site in each of the four districts covered by the study.

Specific items or indicators were identified for evaluation of the sites using the domains of the Wagner model as a template (Table 1). A similar study conducted in the Western Cape (Pienaar et al, 2006) also served as an important reference point.

Data collection processes in each site included:

- Exit interviews with 150-200 patients attending the service, recruited consecutively by a team of four trained fieldworkers (supported by a fieldwork

² Regions A and B include the Johannesburg and Ekurhuleni Metro and Sedibeng and West Rand District Councils. As research was already being undertaken in Region C (Tshwane Metro and Metsweding District Councils) sites, these were excluded.

supervisor) over a period of four weeks per site. Adult patients (+18 years) who had been on treatment for 4 months or more were interviewed. Patients attending the service were first briefed in the waiting area while they were waiting to be seen. Patients were then approached for interview as follows: as each interviewer completed an interview they approached the next eligible patient in the queue and if consenting, administered a structured interview schedule in the preferred language of the interviewee. Each interview took 30-40 minutes to complete. Clinical records of interviewees were simultaneously reviewed to obtain the latest CD4 and viral load test results.

- Semi-structured interviews with overall facility managers, CCMT site managers and staff working in TB, PMTCT and VCT services.
- Structured facility checklists to assess presence of essential drugs, supply, equipment and infrastructure and unstructured observations of the human environment and interactions between patients and staff.
- Completion of self-administered questionnaires on staff motivation. Questionnaires were distributed to all the staff working in the HAST services, and in the case of a smaller CHC (Site C), to all staff in the facility.
- Review of routine data obtained from both the facility and the provincial health information system.

The quantitative data were analysed using STATA. A principal component analysis was conducted to construct an asset index (as the measure of socio-economic status) of patients attending the services. The qualitative and semi-quantitative data were extracted and collated manually. The data for the four sites are for the most part presented separately and weighting procedures were not performed on the data.

Measuring staff motivation is not a simple task, especially with small total staff numbers in each facility. The self-administered questionnaires, limited by sample sizes served mainly as a source of triangulation with more unstructured observations.

Four component study protocols were submitted (by the four MPH students) and approved by the Medical Ethics Committee of the University of Witwatersrand. All interviewees received written information sheets and provided written consent for

interviews and access to personal data. Permission to conduct the research was also obtained by the Gauteng Provincial government, the regional and district authorities and the facilities themselves. Feedback sessions were held at the end of the research in three of the facilities studied.

Table 1: Measurement and data sources for domains evaluated

Domains	Measurement	Data sources
<i>(1) Outcomes</i>		
Self reported adherence	3 day recall, ever missed tablets or appointments	Patient exit interviews
Viral load suppression, CD4 count	<400 copies/ml; CD4>200	Record reviews
Retention in care	Defaulters; transfers; deaths	Routine facility data obtained both on site and centrally
<i>(2) Adequately staffed and motivated teams in productive interactions with informed and empowered patients</i>		
Adequately staffed teams	Staffing relative to norms set by CCMT Plan; turnover; vacancy rates; workloads	Facility and CCMT manager interviews
Provider motivation	23 item tool assessing motivation, determinants and outcomes	Self administered questionnaires
Informed, empowered users	Knowledge of ART, perceptions of service, access to social support, costs of utilisation	Patient exit interviews
Productive interactions	Researcher observations, patient perceptions	Observations and patient exit interviews
<i>(3) Delivery systems design</i>		
Service integration	Presence of clear care pathways, subjective and objectives assessments of integration	Facility, CCMT and HAST manager interviews and facility observations
Referral and networking relationships	Presence of referral relationships between services, NGOs and support groups	CCMT and other HAST manager interviews
Self management/ adherence and management systems	Methods of treatment preparation, maintaining adherence and tracing loss to follow-ups	CCMT manager interviews
<i>(4) Support Systems</i>		
Equipment and physical infrastructure	Presence of essential equipment and infrastructure	Facility checklists
Drug procurement and distribution	Drug supply system, presence of essential drugs	CCMT manager interviews and facility checklists
Laboratory capacity	Ability to do essential laboratory tests, turn around times	CCMT manager interviews
Guidelines, policies and protocols	Availability of guidelines, policies, protocols	CCMT manager interviews and facility checklists
Clinical and programme mentoring and decision support	Presence and sources of support	CCMT manager interviews
<i>(5) Information Systems</i>		
Clinical records	Structured to allow for clinical monitoring, registers to track drop outs	Facility observations and CCMT manager interviews
Mechanisms for tracking clinical outcomes; Programme monitoring	Structured systems, use of data locally, reports and feedback, electronic vs paper based	Facility observations and CCMT manager interviews

4 Results

4.1 Response rates

A total of 713 patients and 21 providers were interviewed in the four sites (referred to A, B, C & D). Between 11% and 29% of the official total patient population (July 2006) of the four sites was interviewed (Table 2). Only 17 patients declined to be interviewed.

Table 2: Patients interviewed and response rates per site

Site	Number on ART (July 2006)	Number interviewed	% of patients interviewed	Patients refusing interview	Response rate (%)
A	567	164	29	4	97.6
B	1139	194	17	7	96.5
C	775	164	21	1	99.4
D	1709	191	11	5	97.4
Total	4190	713	17	17	97.7

A total of 70 providers completed self-administered questionnaires. Apart from Site C, about half the self-administered questionnaires distributed were actually completed.

4.2 Profile of sites

The profiles of the four sites are summarised in Table 3. Site A is located in a District Hospital, Sites B & C in Community Health Centres, and Site D in a Regional Hospital. Apart from Site D (also the busiest), all sites provided both a wellness (pre-ART) and ART initiation and follow-up service in a largely stand-alone HIV treatment service within the facility. In one site (B), the CCMT service was integrated with the voluntary counselling and testing (VCT) service.

Table 3: Profile of four sites studied

Site	Description	CCMT site	Data collection
A	<ul style="list-style-type: none"> o District hospital in mining areas of West Rand District o 180 beds, including 30 TB beds 	<ul style="list-style-type: none"> o Operational since October 2004 o Runs Monday to Friday, 7am-4pm o Provides wellness (pre-ART), ART initiation and follow-up 	<ul style="list-style-type: none"> o Staff interviewed: 6 o Self administered questionnaires completed: 21
B	<ul style="list-style-type: none"> o Provincially managed CHC in Soweto, Johannesburg Metro District o Includes a 24 hr maternity service 	<ul style="list-style-type: none"> o Operational since October 2004 o Runs Monday to Friday, 7am-4pm o Provides VCT, wellness, ART initiation and follow-up 	<ul style="list-style-type: none"> o Staff interviewed: 5 o Self administered questionnaires completed: 14
C	<ul style="list-style-type: none"> o Provincially managed CHC in Sedibeng District 	<ul style="list-style-type: none"> o Operational since October 2004 o Runs Monday to Friday, 7am-4pm o Provides wellness (pre-ART), ART initiation and follow-up 	<ul style="list-style-type: none"> o Staff interviewed: 5 o Self administered questionnaires completed: 24
D	<ul style="list-style-type: none"> o Regional Hospital in Ekurhuleni District o 784 beds 	<ul style="list-style-type: none"> o Operational since July 2004 o Runs Monday to Friday, 7am-4pm o Provides ART initiation and follow-up (no wellness) 	<ul style="list-style-type: none"> o Staff interviewed: 5 o Self administered questionnaires completed: 11

One site began offering ART in July 2004 and the other three from October 2004. At the time of the research, according to central Gauteng Department of Health (DOH) data, the four sites collectively had more than 4,000 people on ART and enrolments were steadily increasing (Figure 2). By December 2006, they had 5,619 people on treatment, of which the largest number was in Site D (2,493).

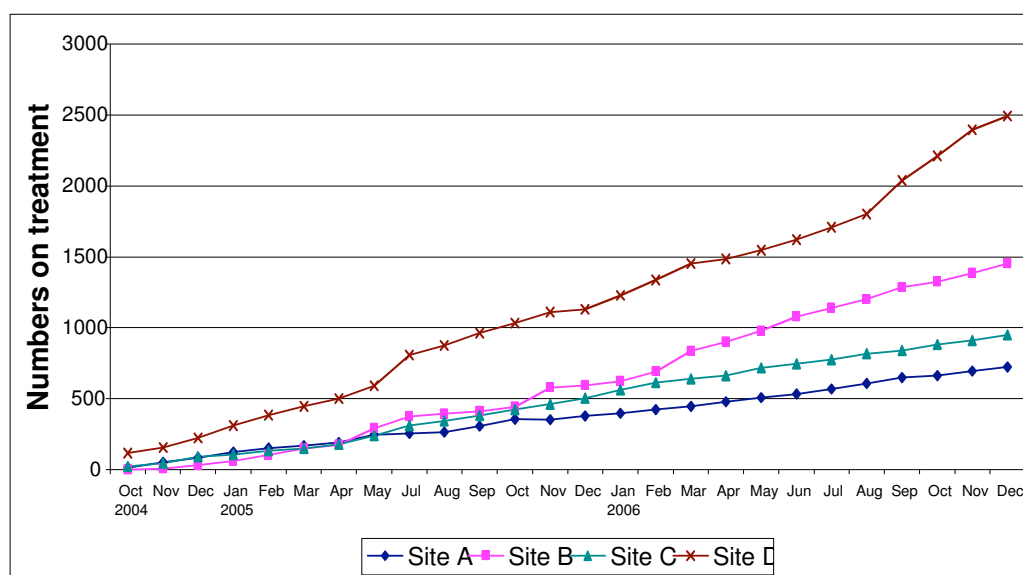


Figure 2: Growth in numbers on ART in four sites studied (Source: Gauteng DOH: ART Roll-out Report)

The monthly rate at which new patients were enrolled remained fairly constant over the course of 2006 in three of the sites and tended to decline in the fourth (Site D). This site was also the only one that reported a waiting list of eligible patients (357 adults and 13 children) unable to start ART because of bottlenecks in processing.

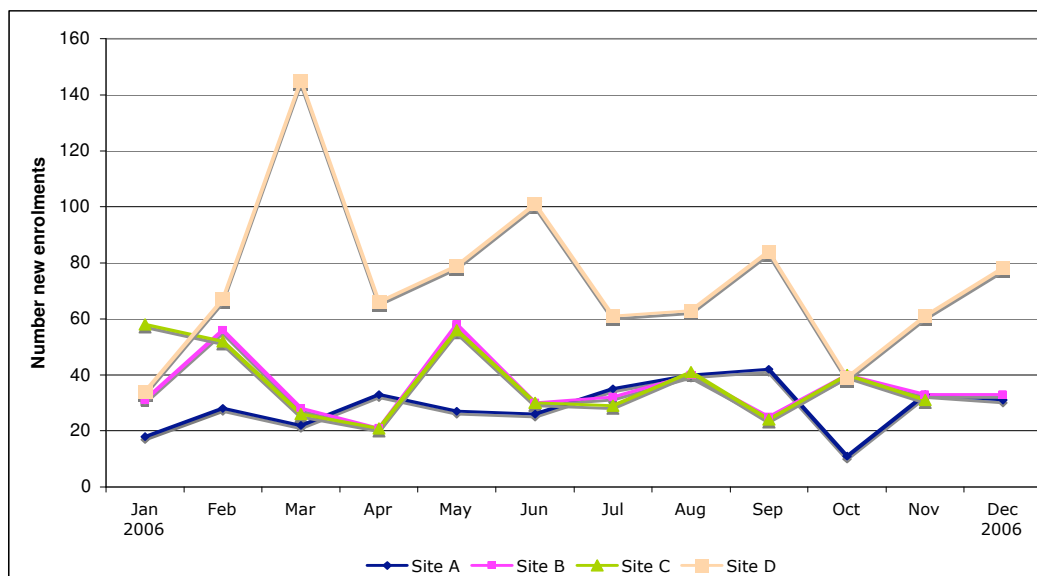


Figure 3: Monthly enrolment of new cases in four sites, Jan-Dec 2006 (Source: ART Roll-out Report, except for Site C: Indicators Report, Gauteng DOH)

All sites were managing both adults and children. The proportion less than 14 years of age was 13.8%, 6.2% and 6.9% for sites A, B and C respectively (Site D was unable to give the figure).

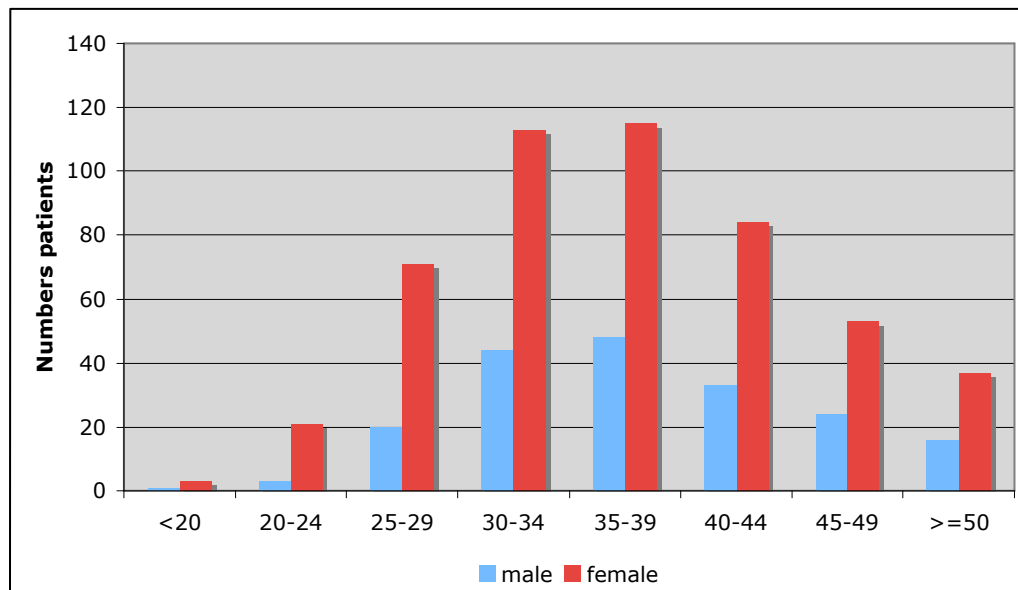
4.3 Socio-demographic profile of adult CCMT site attenders

Close to three-quarters of adult patients interviewed at the four CCMT sites were female, with a mean age in the range of 35-40 years. Patients in Site A (a mining town on the West Rand) had the lowest levels of education and were also the least likely to be employed (Table 4). Access to disability grants varied considerably from 37.3% in Site B to 78% of patients in Site A. Around half the respondents reported that their households experienced hunger sometimes or often.

Table 4: Socio-demographic profile of adult patients interviewed (n=713)

	Site A (n=164)	Site B (n=194)	Site C (n=164)	Site D (n=191)
Mean (median) age in years	37.6 (38)	37.3 (37)	37.4 (37)	36.3 (36)
Percentage male	27.6	28.4	28.2	26.1
Percentage female	72.4	71.6	71.8	72.5
Median grade of education achieved	8	11	9	10
Earned income in prior two weeks (%)	11.6	18.6	15.9	20.4
Receiving disability grant (%)	78.0	37.3	43.3	47.6
Household sometimes or often experiences hunger	47.6	57.2	54.3	48.7

A more detailed age-sex profile of the adult patients (Figure 4) interviewed shows a wide spread of ages, although the 30-39 age group predominates.

**Figure 4: Age-sex profile of adult patients attending CCMT sites (n=713)**

A more detailed socio-economic evaluation of the patients was done using household assets (type of housing, sanitation, telephone, etc.), on the basis of which Asset Scores (AS) were compiled. The distribution of asset scores obtained in each site has been compared with the sample as a whole, divided into 5 equal quintiles, where the AS1 quintile has the lowest availability of household assets and the AS5 quintile the highest.³ As can be seen from Figure 5, patients in Site A and C had a poorer asset profile than patients in Sites B and D. These findings are consistent with those on

³ Follow-up analysis is being conducted comparing the profile of users with the socio-economic status of populations using the public sector, and the age-sex profile of the population in need of HIV services.

employment and educational status (Table 4) and may reflect the overall geographical distribution of wealth and poverty in the province.

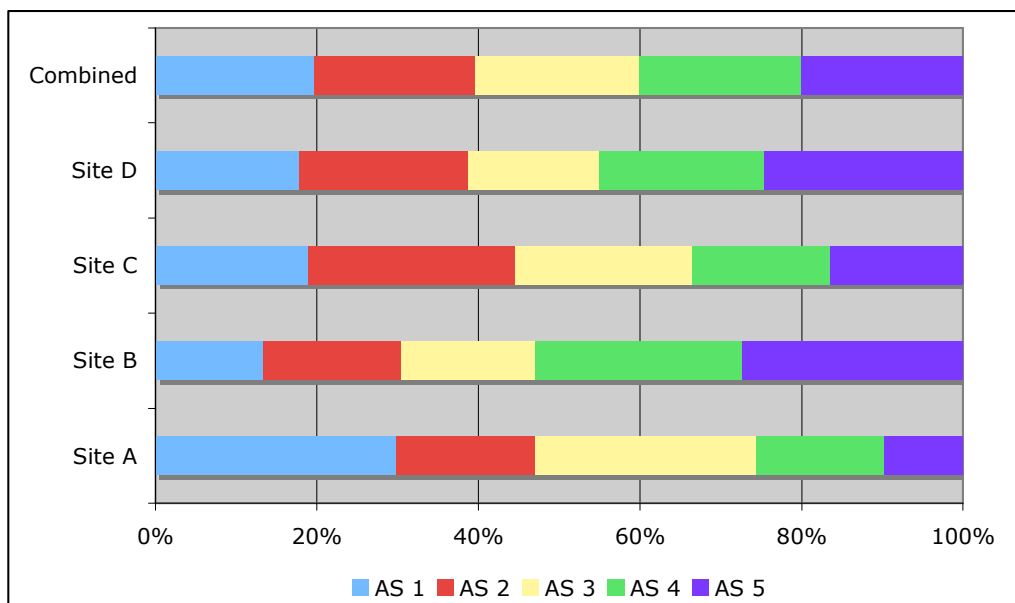


Figure 5: Distribution of Asset Scores (AS) per site, compared with combined patient sample (n=713) across all four sites.

4.4 HIV treatment and outcomes

The patients interviewed had been on treatment for a median of 9.5 to 13.8 months (range 1 to 78 months) (Table 5). Of the 713 patients interviewed, 28 (3.9%) had been on treatment for less than 4 months (despite intentions to exclude this group), 158 (22.2%) had been on treatment for 4-6 months (and therefore less likely to have a viral load result) and 536 (73.9%) for more than 6 months. The vast majority were still on first line regimens. Patients had known their HIV status for a median of 18 to 26 months. In two sites (C&D), one-quarter of patients had started treatment simultaneously to or very soon after (within three months of) the diagnosis of their HIV status.

Table 5: Regimens, duration on treatment and since first tested HIV +ve, exit interviews of adult attendees (n=713)

	Site A (n=164)	Site B (n=194)	Site C (n=164)	Site D (n=191)
% on first-line regimen	94.5	97.9	97.6	97.4
Mean (median) duration on treatment in months	11.6 (9.9)	11.8 (9.5)	12.9 (11.4)	14.0 (13.8)
% on treatment for:				
o <4 months (%)	2 (1.2)	16 (8.3)	8 (4.9)	2 (1.1)
o 4-6 months (%)	29 (17.7)	60 (31.1)	25 (15.2)	44 (23.0)
o +6 months (%)	133 (81.1)	117 (60.6)	131 (79.9)	146 (75.9)
Mean (median) duration since tested HIV+ve in months*	32.5 (24)	38.7 (25)	27.3 (18)	37.6 (26)
% started treatment within 3 months of diagnosis*	17.6	15.1	26.7	24.2

* Data obtained from 645 respondents only

Routine data on patient numbers are submitted from sites on a monthly basis. They report events (patient enrolled, deaths etc.) in all patients during the month, rather than separately for different patient cohorts e.g. loss to follow-up of patients on treatment for six months vs. one year. It was therefore not possible to compare loss to follow-up (deaths, drop-outs, transfers) in a manner that is comparable with outcomes reported in the literature (as patient cohorts). Furthermore, it also emerged during the fieldwork that there were different definitions in use for “defaulter”. In some instances those missing particular monthly appointment dates were recorded as defaulters and in other instances only when they failed to collect their drugs or attend the clinic altogether that month. Deaths are also likely to be under-estimated. It was thus hard to establish any figures on loss to follow-up (or its opposite, retention in care), as a key performance indicator. We report on what appeared to provide the best estimate: the responses of CCMT site managers when asked to indicate the total numbers enrolled since site inception, compared to the total remaining in care (Table 6). Apart from Site D, which was unable to provide a response, cumulative loss to follow-up (deaths, drop outs and transfers) since site inception, ranged from 27.7% in Site C to 30.7% in Site B.

Using central provincial data, there was a 13.2% cumulative loss to follow-up in Site D examined in the 2006 calendar year. In this period, the cumulative death rate ranged from 3.4% (Site D) to 5.4% (Site A).

Table 6: CCMT site manager reports on enrolments and loss to follow-up since inception of the service

	Site A	Site B	Site C	Site D
At time of interview, patients...				
o enrolled onto treatment	540	1001	804	+2000
o still on treatment*	377	694	581	?
Retention in care (%)	69.8	69.3	72.3	?
Time since inception of service (months)	19	20	24	26

* these figures of patients still on treatment are lower than the official provincial figures for those months.

With respect to adherence, patients were asked to indicate if they had missed any doses of treatment in the last three days or any time prior to that (Table 7). Eleven of the 713 patients interviewed reported missing a dose in the prior three days, and those reporting ever missing a dose (including the last three days) were between 8.2% (Site B) and 14.6 (Site C). Missed monthly clinic visits were reported by 7.3% of patients in Site A compared to 16.2% in Site D. However, only 19% of the 83 patients who reported missing a visit also reported ever missing a dose.

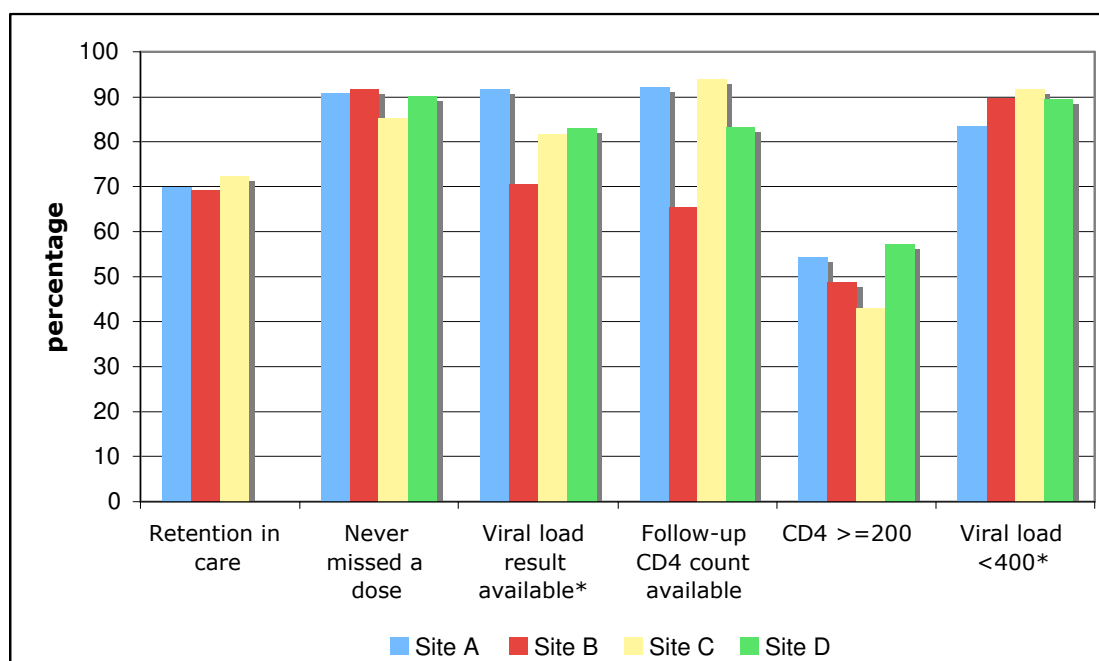
Of the 713 patients interviewed, 25% did not have viral load results recorded in their files. Of those who were eligible for a viral load test (attended for more than 6 months), between 8.3% (Site A) and 29.5% (Site B) did not have the results available. There was similar variation in the presence of follow-up CD4 counts. Additional efforts to obtain results directly from the central database of the National Health Laboratory Service confirmed that the tests had not been performed. Testing rates suggest variable performance between sites, although in those with results, viral load suppression rates appeared to be equally good across all four sites. Between 83.6% and 91.6% of patients on treatment for at least 6 months had viral loads <400 copies/ml. The percentage of patients with follow-up CD4 counts ≥ 200 varied from 42.9% (Site C) to 57.2% (Site D).

Table 7: Self-reported adherence to medication and attendance for follow-up visits, viral load results and CD4 counts in patients in four CCMT sites (n=713)

	Site A (n=164)	Site B (n=194)	Site C (n=164)	Site D (n=191)
<i>Self reported adherence and attendance</i>				
Missed a dose in last three days (%)	2.4	2.6	0.6	0.5
Ever missed a dose (incl last 3 days) (%)	9.1	8.2	14.6	9.9
Has there ever been a month when you could not come to the clinic for the visit? (% indicating yes)	7.3	11.5	11.0	16.2
<i>Last viral load</i>				
Viral load result available (n & (%))	143 (87.2)	120 (61.9)	110 (67.1)	158 (82.7)
Viral load <400 copies/ml in those with result (%)	76.2	74.2	90.0	88.0
Viral load missing, on treatment >6 months (%)	8.3	29.5	18.3	16.9
Viral load <400 copies/ml, on treatment >6 months, in those with result (%)	83.6	89.7	91.6	89.4
<i>Last CD4 count</i>				
Follow-up CD4 count available (n & (%))	151 (92.1)	127 (65.5)	154 (93.9)	159 (83.2)
CD4 count \geq 200 in those with result (%)*	54.3	48.8	42.9	57.2

*Excluding baseline CD4 counts

The performance of the four sites is summarised in Figure 6.

**Figure 6: Summary of performance of four CCMT sites**

* In those followed up for at least 6 months

Retention in care, self reported adherence, viral load and follow-up CD4 counts varied little between sites. However, viral load and CD4 results could be biased by the more variable rates at which patients were tested across sites.

4.5 Adequately staffed, motivated provider teams

South African policy on anti-retroviral access is laid out in the “Operational Plan for Comprehensive HIV and AIDS Care, Management and Treatment for South Africa” (Department of Health, 2003). This Plan stipulates amongst other things, norms of 12.5 staff per 500 patients, including one full time medical officer, two professional nurses, a pharmacist, dietician and part-time social worker, lay counsellors, data capturers and clerks (Table 8). Based on official patient populations for mid 2006, all sites except Site A had human resource deficits relative to the norms. Sites B and D had the biggest staffing deficits and therefore highest workloads per staff member.

Table 8: Staffing of sites relative to CCMT Plan norms^{\$}

		Site A		Site B		Site C		Site D	
Patients on ART (mid-'06)		567		1139		775		1709	
Daily numbers processed		+/-50		+/-200		+/-65		+/-180	
Staffing	Norms per 500 pts	No	Deficit	No	Deficit	No	Deficit	No	Deficit
Medical Officers	1	1	0	1	1	2 PT	0.5	2	1.5
Professional Nurses	2	2 ^{&}	0	2 ^{^^}	2	2 ^{&}	1	6*	1
Pharmacists	1	1	0	1	1	1 PT	1	1**	2.5
Dieticians	1	1 PT	0.5	1	1	0	1.5	1	2.5
Social Workers	1 (PT)	1 PT	0	1	0	1	0.5	1	0.5
Counsellors	5	5	0	7	3	5	2.5	5	12.5
Clerks	1	2	0	1	1	1	0.5	1	2.5
Data capturers	1	1	0	1	1	1	0.5	1	2.5
Total	12.5	13	0.5	15	10	13	7	18	25.5

^{\$} apart from patient numbers on ART, data obtained from CCMT managers

[&] in addition had one nursing assistant

^{^^} in addition had two nursing assistants

* 2 professional, 4 enrolled nurses

** also had a pharmacy assistant

It appears as if the initial accreditation processes established the staffing of sites, but that growth in human resource capacity was thereafter limited. There are a number of possible reasons for this, including the lack of funding to create additional posts, difficulties in recruitment (especially for scarce skills such as pharmacists and dieticians) and lack of space to house additional staff. As patient loads increased, sites adapted to this situation in a number of ways. The first was to ration services. Site D, the largest clinic, did not provide wellness (pre-ART) services and at the time of the

research, the manager was expressing a strong need for a down referral process for stable patients on ART. Certain activities (e.g. dietician consultations, individual briefings by pharmacists, follow-up of defaulters by social workers) proved hard to maintain across all sites. Another form of rationing was evident in Site B which continued to provide a comprehensive service but established daily quotas, restricting the numbers of patients who could be seen. As a consequence, patients returning on appointment dates were regularly turned away. In the exit interviews at this clinic, 29.3% of patients reported having left the clinic at least once without being helped since starting treatment (see Table 11 below). As numbers (and experience) increased, all four sites had begun informal processes of human resource substitution, shifting some tasks to less skilled categories (e.g. professional nurses to nursing assistants, pharmacists to pharmacy assistants).

The basic allocation of tasks remained fairly constant, however, and followed the CCMT Plan's recommendations, depending on doctors to initiate therapy and provide follow-up (with nurses assisting in this process), pharmacists to dispense medication and keep a record of defaulters, counsellors to conduct treatment preparation and adherence counselling, social workers (where available) to perform home visits and follow-up of defaulters, and professional nurses to provide overall management of the site. The sites relied on professional nurses as the stable core of the service and they played a key role in providing continuity and establishing the overall atmosphere and culture of the sites, even though their clinical functions were limited.

All four sites had experienced some turnover of medical staff over the prior year; two sites had also had turnover of counsellors. The remainder of the staff establishment appeared reasonably constant, with the exception of Site C which had had three different nurse managers since inception, and had also lost both its pharmacist and dietician in the last year, only one of whom had been replaced on a part-time basis.

Almost all the CCMT staff across the four sites had been trained, (typically over 3 to 5 days) to prepare them to work in the CCMT sites. Apart from clinical care, specific courses had also been provided for pharmacists, data capturers and counsellors.

Staff working in HAST-related services of the four facilities were asked to complete an anonymous questionnaire that rated their degree of agreement (strongly disagree, disagree, not sure, agree and strongly agree) with 23 items related to motivation, workload, organizational loyalty, attitudes to HIV and team work in the facility in which they worked. Respondents were mostly nurses (all categories), except in one site (Site C), which also included pharmacists and counsellors. See Table 16 in annexure for detailed responses.

Although hampered by small sample sizes, variability of respondents, and lack of comparable data from other settings, the findings suggest that staff working in HAST services have high overall levels of motivation. They express considerable organisational loyalty and are confident in their ability to the job. However, worryingly, a fair proportion (between a quarter and a half) of respondents indicated their intention to leave the facility, and in the busiest sites (B and D) staff were also more likely to report burnout (“I feel emotionally drained at the end of every day”). Staff in Site B, which processed the largest number of patients daily, were also the most likely to indicate that they were short-staffed. About two-thirds of respondents felt vulnerable to HIV in their personal lives. Staff in Site A were more likely to agree that “HIV positive patients make too much extra work for staff” than in other sites. Not surprisingly, staff in Site C were the most likely to agree with the statement, “There have been too many changes in this clinic in the last year”.

Responses to questions in the self-administered questionnaire on facility management and team work were mixed with no consistent pattern within or across sites. However, a key observation during fieldwork was of strong nurse leadership in at least three of the four CCMT sites. Some of these nurses had worked in “innovator” sites and had a particular interest in HIV. They came across as confident and respected by staff, not only in the CCMT sites themselves, but in the facility as a whole. They were able to leverage referral and clinical support for patients from other services in their facility, ensuring continuity of care. They also had good relationships with patients and fostered attitudes of respect and openness, both between patients and between patients and staff. This appeared to be an important source of motivation.

4.6 Informed and empowered users

4.6.1 Treatment literacy

Treatment literacy of CCMT service users was assessed through a series of questions on ARVs. Basic knowledge was generally good, although Site A respondents performed consistently worse across almost all the questions (Table 9). Only in one site (B) were the majority (70.6%) of patients able to name their drugs, although a high proportion of patients across all sites were able to state their latest CD4 count.

Table 9: Treatment literacy amongst CCMT site users (n=713)

	Site A n=164	Site B n=194	Site C n=164	Site D n=191
<i>Percentage giving correct answer (true or false) to following:</i>				
○ Unprotected sex is safe when one is taking ARVs	90.2	98.5	98.8	99.0
○ People receiving ARVs can still transmit HIV to other people through unprotected sex	79.9	96.4	95.7	96.9
○ It is acceptable to stop ARVs after gaining weight	92.7	98.5	97.0	97.9
○ It is acceptable to stop ARVs when one no longer suffers from opportunistic infections	93.3	97.4	97.0	99.5
○ ARVs cure HIV/AIDS	89.0	94.8	90.9	91.1
○ After a couple of years one can stop taking ARVs	94.5	98.5	97.0	96.9
○ Missing a few tablets of ARVs is acceptable	96.3	98.5	99.4	99.5
<i>Percentage able to:</i>				
○ Name ARV drugs	36.6	70.6	33.5	39.3
○ Point to ARV drugs on a chart	47.6	94.8	65.9	56.0
○ State latest CD4 count	78.0	90.2	93.9	87.4

4.6.2 Disclosure

The presence of social support enables retention in care and successful long-term follow-up of people on ART. An important pre-condition for the mobilisation of social support, particularly from social networks is disclosure of one's HIV status. More than 90% of patients interviewed had disclosed their status to someone outside of the health care setting, most commonly to families and partners (Figure 7). Disclosure rates to friends, religious leaders or neighbours were less frequent. Disclosure did not come without risks – one-quarter to one-third had had their status divulged to third parties without their permission.

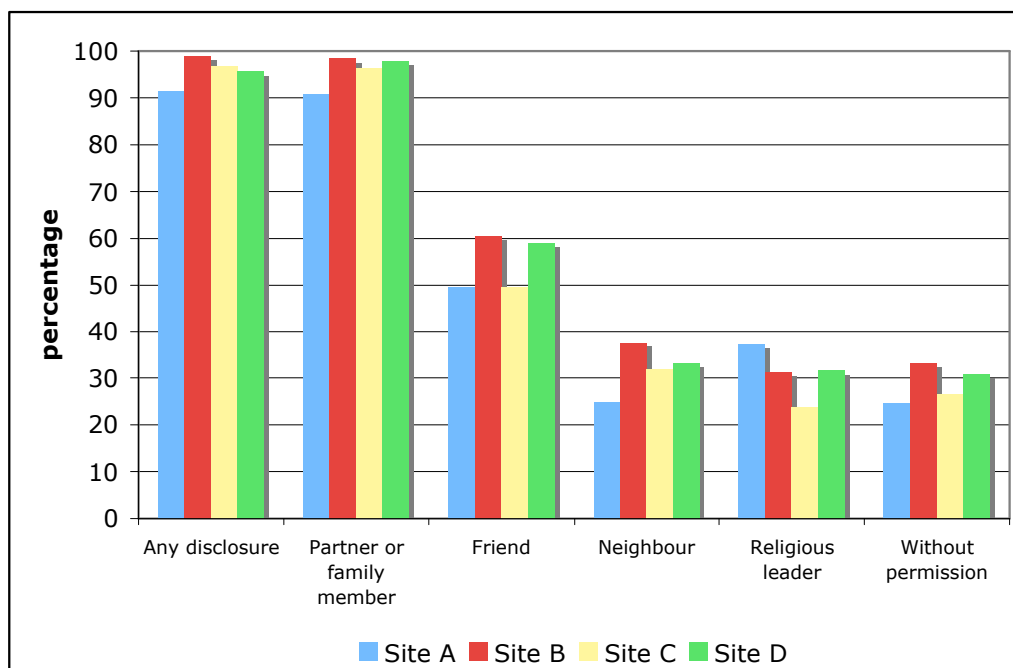


Figure 7: Disclosure of HIV status amongst patients attending CCMT sites (n=713)

4.6.3 Social support

The majority of patients described their family networks as supportive and drew on them extensively for emotional and material support (e.g. food and transport money to get to facilities) (Table 10). More formal structures of support appeared less frequently used. Although three of the sites ran formal support groups at their facility (Site D referred patients to community-based support groups), a minority of patients reported attending them: from 6.3% (Site D) to 18.5% (Site C). A small proportion received direct food support through the health/welfare system.

Table 10: Social support amongst CCMT attenders (n=713)

	Site A n=164	Site B n=194	Site C n=164	Site D n=191
Family perceived as supportive (%)	90.6	94.2	87.9	92.6
Type of support received from family: (%)				
o Emotional	86.6	88.6	87.2	93.2
o Food	78.0	77.7	73.8	77.0
o Transport money	77.4	66.8	73.2	84.8
Belong to a support group (%)	12.8	13.1	18.5	6.3
Receive food supplements/food parcels (%)	9.1	3.1	3.7	2.6

4.6.4 Barriers to access

Although CCMT services are free of charge at the point of use, patients still incurred considerable (transport, food, communication) costs in attending these services (Table 11). This was lower for the CHC-based sites (R18 per visit) than the two hospital-based sites (R25 and R37 per visit, respectively). They spent an average of 4 to 6 hours at the facility per visit. The costs of attending and the time spent waiting in CCMT services could form barriers to long-term follow-up. The vast majority of patients (particularly in Sites B and D) complained of long queues and as already reported, patients in Site B ran the risk of being turned away without being helped.

Table 11: Barriers to access amongst CCMT attenders (n=713)

	Site A n=164	Site B n=194	Site C n=164	Site D n=191
Mean (median) cost in rand of attending service	37.1 (30)	18.2 (15)	18.0 (17)	25.0 (20)
% incurring no transport costs (accessible by foot)	4.3	25.3	13.4	7.3
Mean time in hours spent at facility	4.3	5.9	3.9	5.7
“The queues to be seen by a doctor or nurse are too long” (% agreeing)	87.8	91.8	83.9	96.3
Has previously left clinic without being helped	3.7	29.3	5.6	5.3

4.7 Productive interactions

Almost all the patients believed that the health workers in CCMT sites cared about them (Table 12). They gave them individual feedback on the effectiveness of the drugs, and showed they understood the difficulties patients experienced in adhering to ART. However, especially in Site B, health workers were perceived as often too busy to listen to patients, some were disrespectful and patients did not find it easy to tell health workers if they had missed tablets. Language barriers were also an issue for some patients (especially in Site A).

Table 12: Perceptions of interactions with providers amongst CCMT attenders

	Site A n=164	Site B n=194	Site C n=164	Site D n=191
<i>% agreeing:</i>				
○ The health workers I see care about me	97.0	92.3	96.3	95.3
○ The health workers provided you with feedback on whether the drugs were working or not	94.5	97.4	92.7	97.9
○ The health workers understood the difficulty of taking drugs and assisted you where possible	97.6	97.4	95.1	96.9
○ The health worker was too busy to listen to your problems	22.0	41.2	31.7	21.5
○ Some staff do not treat patients with sufficient respect	50.0	69.1	40.2	38.7
○ It is a problem that the health worker doesn't speak your language	53.0	37.1	34.1	38.2
○ You find it difficult to tell the health worker when you have missed taking tablets	39.6	49.0	24.4	35.6
○ When you need to obtain other care that they cannot provide at this clinic, you are given enough help to get to the right place	92.0	96.9	93.2	97.9
○ You are able to talk to the health workers in private	89.6	70.5	79.6	86.9

4.8 Delivery system design

4.8.1 Pathways of care

An important aspect of chronic disease care is to ensure clear and simplified pathways into care and follow-up so as to remove obstacles to access and cater for different needs at different times in seamless fashion. With respect to HIV it includes access to easy diagnosis and staging, and the coordinated management of co-morbidities (TB in particular) and HIV in pregnancy. We interviewed managers from all HAST related services (CCMT, VCT, TB, PMTCT) to ascertain typical health care utilisation trajectories of patients attending the four study facilities (Table 13).

All four sites had protocols and procedures for the diagnosis and staging of HIV, screening for TB and initiation and follow-up of ART. Within facilities, VCT, TB, staging and ART services, if not physically integrated, were managed closely together, making it relatively easy for patients to move from one service point to another. This was confirmed in exit interviews, where the vast majority of patients felt that they were assisted in getting the right services when they needed them (Table 12). Functional integration was facilitated by the presence of well-established VCT and

TB services (including TB focal points for diagnosis/referral in the two hospitals), the mainstreaming of HIV staging (CD4 count) and TB screening functions into many service points and good informal relationships across different authorities (e.g. provincial and local government in Site B).

Difficulties were experienced when not all services were provided within the same facility, and patients had to move from one facility or level to another. This applied particularly to the hospital services where patients are referred to primary health care services for TB care. Patients on therapy for both TB and HIV have to incur the travel and time costs of attending two separate services on a monthly basis. Staff interviewed also felt that many patients were lost to the system when HIV wellness care (Site D) or TB services (Sites A and D) were provided at separate sites from ART services. Finally, in two of the facilities (A and D) staff working in the maternal health/PMTCT services felt their services were not well coordinated with other HIV-related services.

Table 13: Integration and referral relationships for comprehensive HIV care in the four study facilities

	Site A	Site B	Site C	Site D
<i>Within facility</i>				
○ Integrated services	Wellness, ART, support group	VCT, wellness, ART, support group	Wellness, ART	ART
○ Services in referral relationship	VCT, TB focal point (TB diagnosis, HIV-TB collaboration), out and in-patients, maternal health (post-natally)	TB diagnosis and follow-up (local government clinic on same grounds), ANC, PMTCT	VCT, TB diagnosis and follow-up, PMTCT, support group	VCT (incl staging and treatment preparation), TB focal point (TB diagnosis and initiation of treatment)
<i>Outside facility</i>	TB treatment initiation and follow-up	Hospital in-patient referrals	Hospital in-patient referrals	TB follow-up, wellness management
Strengths	Good TB-HIV collaboration: shared line manager and close physical proximity of TB “focal point”. Register of patients with dual HIV-TB infection; hospital checks follow-up at clinics. Except for pregnant women, services well coordinated within facility.	Integration of VCT, wellness and ART services, good referral relationships with antenatal/PMTCT services and good functional integration with local government TB services. Staging and TB screening done in ANC.	All services in close proximity and run together even though in separate rooms, achieving functional integration. Some staff have overlapping functions.	All outpatient HAST-related services report to one manager and well coordinated. TB and VCT services integrated
Weaknesses	Poor links between levels of care (clinics and hospitals) especially in maternal health services. PMTCT not well coordinated with other HIV services in hospital. Patients pay fees for TB services in hospital.	Integrated services results in staffing and space constraints.		Poor links between in-patient and outpatient services, PMTCT and CCMT services and between community and hospital-based services. Delays and high mortality between staging (in VCT and TB services) and initiation of ART.

4.8.2 Treatment preparation and adherence management systems

All four sites described active processes of treatment preparation and management of adherence (Table 14). The treatment preparation phase was conducted over a number of sessions (although fast tracking mechanisms were also available), was structured and involved most of the site personnel in one way or another (counsellors, nurses, social worker, dietician, pharmacist and doctor). In one site (B), the social worker also conducted home visits. Counsellors played an important role in assessing adherence (through for example pill counts), and pharmacists were relied upon to identify patients not returning for treatment. Those failing to attend visits were contacted telephonically (in the two hospital-based sites) or through home visits by either a

social worker or DOTS supporters based in community-based organisations (at the two CHC-based sites).

Ensuring retention relied mostly on facility (as opposed to community) based strategies, including an active treatment preparation phase, training of treatment supporters and monitoring at follow-up visits. The importance of friendship networks established between patients attending the service over time was recognised as important for retention by staff interviewed.

Table 14: Treatment preparation and adherence management systems

Tools and methods	Site A	Site B	Site C	Site D
<i>Treatment preparation</i>				
Individual counselling/briefing	√ each patient has an assigned counsellor who provides ongoing support, pill counts	√ three stage process of counseling	√ three to four structured individual adherence counseling sessions, plus dietician if necessary	√ three individual sessions involving lay counsellor and nurse, social worker & dietician
Group education	√ for families	√	√ involves Treatment Action Campaign.	√ mostly interactions with CCMT manager
Nomination of treatment buddy/supporter	X Rely on peer support developed informally between patients	√	√	√
Home visit	X (lack of transport)	√ by social worker	X	X In exceptional circumstances only (lack of transport)
Knowledge questionnaire	X	X	√ by doctor	X “it would make people uncomfortable”
Consent/patient contract	X	X	√ kept in patient files	X
Written information	√	√ in different languages	√ Khomanani (official IEC programme)	√
<i>Treatment support</i>				
Follow-up appointments	√	√	√	√
Pill boxes	√	X	X	X
Tick sheets/diary	√	√	√	√
Support groups	√	√	√	X refer patients to CBOs
<i>Adherence assessments and follow-up of missed appointments</i>				
Self reported adherence (3 - 14 day recall)	√	√	√	√
Pill count	√ by counsellors	√ by counsellors	√ depending on availability of staff	√
Identifying patients who miss appointments	Done by pharmacist and clerk (booking register). Patients also notify staff when other patients miss appointments.	Done by pharmacist	Done by pharmacist	Done by pharmacist
Action	Contact telephonically, but limited access to telephones	Counsellors contact telephonically, if necessary home visits by social worker	Home visit by DOTS supporters from three NGOs associated with the CHC; networks with traditional healers	“Difficult”. Contact telephonically. Give extra counselling, involve family and treatment supporter. Weekly collection of treatment and referral to social worker.

4.9 Support systems

The establishment of a high volume and complex new service has space implications. Only one Site (A) had spare space available at the time of programme inception into which the service could be comfortably moved. The other three had to displace other services and/or create extra rooms through use of containers. Apart from Site A, the physical configurations of the CCMT services were thus not ideal. Waiting rooms, in particular, were cramped and in some instances (Site B in particular), privacy was not always possible. Only 70.5% of patients interviewed at Site B indicated that they were able to communicate with the health workers in private, compared to 89.6% at Site A (Table 12).

Apart from specific short-lived problems (such as running out of the paediatric formulation of Stavudine in mid 2006), availability of antiretroviral and other drugs and supplies (gloves, specimen jars etc.) was reported as excellent in all four sites (see Table 17 in annexure for detailed inventory). A key constraint, already alluded to, was the availability of pharmacists. At the two hospital sites, the CCMT service although managed independently, could rely on the systems and back up of the central pharmacy. This was less easy at the CHCs. In Site B, the CCMT pharmacist established a quota system in which only 40 patients were seen on any given day and patients were regularly turned away. There appeared to be some variability between sites in the extent to which pharmacists had or expected to have face-to-face contact with patients. One pharmacist expressed frustration at her inability to fulfil the role as counsellor to patients: “Often we have to be fast in our dispensing mechanisms and sometimes patients don’t get the best quality out of our service. We are pushed for time [...] that’s not how I want to be, because pharmacy is a complicated issue. There are some finer details that you sometimes have to take the time to explain to your patient.”

As with drug supplies, laboratory systems were experienced as smooth and unproblematic by staff in the sites (see Table 18 in annexure for turn-around times for essential tests in the four sites). Apart from PCR tests (for diagnosis of HIV in children) all test results were available within one week.

Sites had a wide variety of policies, guidelines and treatment protocols available to them (Table 19 in annexure). Doctors and managers in the four facilities provided day-to-day decision support (clinical and programmatic) at the four sites. The two CHC-based sites also received regular visits from district based HAST managers and Site B benefited from a paediatric clinical mentoring programme (“ECHO” programme). All sites in the province attended quarterly provincial CCMT site meetings where feedback was provided. There were no structured, regular reports on performance sent to individual sites from district or provincial HAST structures, nor any standardised supervisory processes in place. In at least three of the sites, staff expressed the need for more and better external support and opportunities for debriefing.

4.10 Information systems: clinical and programme monitoring

Comprehensive clinical records were kept in all four sites. In two sites (A and B) patients received copies of their files. However, patient records followed no standard design and were not linked to any standardized system of data aggregation. There were no registers recording individual patient visits and outcomes over time, nor any evidence of attempts at cohort analyses (as with TB patients). All sites kept a variety of (mostly) manual registers for each of the various stations (registration, booking, counseling, pharmacy, social worker, etc.), some of which served to track patients who failed to turn up for appointments. These various sources of data were drawn upon to complete the reports required for both provincial and national government. The latter included for example, the “DORA” (Division of Revenue Act) conditional grant indicators required by Treasury. All sites were equipped with functioning computers and had data capturers on their staff establishments.

5 Discussion

Based on the evaluation of four randomly selected facilities, the performance (with respect to ART outcomes) of second generation Comprehensive Care Management and Treatment of HIV/AIDS (CCMT) sites in Gauteng Province appears to be on a par with the first generation, innovator programmes in South Africa and sub-Saharan Africa. Although the absence of cohort data makes comparisons difficult, cumulative loss to follow-up in the sites (combining death, drop outs and transfers) since site inception was of the order of 30%. This figure is somewhat higher than that reported from the better performing model sites (see for example Braitstain et al, 2006) and similar to that reported in a more recent review (Rosen et al 2007). However, the loss-to-follow-up estimates of the Gauteng sites include the mixed experiences of older and more recently enrolled cohorts, where drop outs and mortality, respectively, may be higher. The truly comparable figure may thus be lower. Self-reported adherence and biological measures (viral loads) were as good as those reported elsewhere.

Outcomes of sites based in community health centres were no different to those based in hospitals. If anything, CHC-based sites were more accessible, with patients incurring lower costs of utilisation, providing a more comprehensive range of services (especially TB care), in a more coordinated fashion (with, for example, antenatal services), and were better able to mobilise outreach and community resources for support and tracking of patients.

Performance (and the systems driving it) did not vary much across sites, suggesting a more broad-based institutionalisation of programme functioning, at least in Gauteng Province. The intense planning, preparation and support (such as drug supplies and laboratories) and ring-fenced resources that accompanied the introduction of the CCMT in the public health system have no doubt played a major role in creating the capacity for performance in these sites. There was also evidence of lesson transfer from the innovator models in South Africa, particularly with respect to treatment preparation, the involvement of people living with HIV, attention to adherence and more patient-centred experiences of care. The sites attracted managers who were interested and committed. Our observations (and confirmed in subsequent in-depth

interviews with patients) are that CCMT sites, in a context of widespread stigma, provided an important and rare space of acceptance and care for people with HIV.

The four CCMT sites functioned largely as standalone HIV wellness and anti-retroviral programme treatment sites, but were able to leverage good coordination and referral relationships with other related programmes, providing an experience of continuity of care. The important exceptions to this were follow-up TB care for patients attending hospital-based sites and poor links with antenatal and PMTCT programmes in some sites.

Despite the attention given to developing and collecting data on indicators for the CCMT programme, both nationally and provincially, it was very hard to establish the numbers of patients on treatment or lost to follow-up in the provincial CCMT programme with any degree of certainty. Numbers provided by sites often did not tally with those obtained centrally (which appeared to over-estimate those still on treatment). The key weakness identified in the evaluation was the absence of a simple, coherent and standardized monitoring and evaluation system for the sites, starting with structured clinical monitoring, to identifying of defaulters (e.g. patient register) to aggregated reporting systems and data feedback to sites.

At the time of the evaluation, the four sites had been in existence for 18 months to two years. In this period they had experienced a rapid growth in numbers, and when we conducted feedback sessions during 2007, expansion was continuing unabated. The findings of this report represent a situation now out of date. However, already at the time, the two busiest sites showed evidence of saturation. Space and staff shortages resulted in long waiting lists, patients being turned away without drugs, inadequate level of follow-up testing (CD4, viral load), a lack of focus on tracing drop outs, and increasing staff burnout and dissatisfaction. It is therefore possible that performance observed in 2006 has not been maintained. Based on the experiences of the four sites, a critical quality threshold appears to be reached when more than 1,000 and 1,500 patients are being followed up in CHC-and hospital-based sites, respectively.

6 Conclusions and way forward

The development and implementation of the CCMT programme has shown that it is possible to introduce quality chronic disease care on a wide scale in the public health system. This has relevance for other major national challenges, in particular for the epidemics of tuberculosis and chronic non-communicable diseases.

With respect to the CCMT programme, ongoing attention to improving chronic disease care systems, such as simplified follow-up protocols, reorganisation of roles and task shifting, improving patient flow and triage systems, and importantly, instituting better monitoring and evaluation processes, will create efficiencies that allow for larger numbers to be seen without loss of quality. This in turn, will require the development of better and more structured support systems at national, provincial and regional level.

However, in the medium term, the CCMT programme faces a situation of demand that vastly outstrips supply. During the course of 2006, new enrolments on ART across the country addressed only 24% of the need, whereas the goal of the National Strategic Plan is to reach 80% of need. The current model, based on dedicated CCMT sites in a few facilities is unlikely to meet demand, even less need. There is now considerable evidence across the country of the feasibility of integrated, district based approaches that mobilise the whole health care infrastructure, and which achieve universal access while maintaining quality and outcomes. Implementing this on a wide scale will require a new cycle of planning that addresses, amongst other things, the need for new frameworks, methodologies and training, particularly in comprehensive district-based approaches. Also important will be to review human resource policies and norms for the primary health care system including reassessing core staff establishments and increasing the availability of posts and career paths for mid-level workers (counselors, community health workers and pharmacy assistants).

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ANNEXURES

Table 15: Outcomes in early anti-retroviral programmes in South Africa and other African countries

Title	Authors	Journal/ Source	Setting	Design	Outcomes				
					Patient numbers	Loss to follow up		Viral loads	Other
Death	Retention								
Outcomes after two years of providing anti-retroviral treatment in Khayelitsha, South Africa.	Coetzee, D., Hildebrand, K., Boule, A., et al	<i>AIDS</i> , 2004 18(6): 887-895	Khayelitsha MSF programme, Western Cape	Cohort analysis of patients enrolled 2001-2003	287 patients enrolled from 2001-2003	38/287 (13.2%) died. Cumulative probability of survival after 24 months: 86.3%	4/287 (1.4%) lost to follow-up	89.2%, 84.2%, 75% and 69.7% of patients had VL<400copies/ml at 6, 12, 18 and 24 months respectively	District and primary health care based site
Rapid scale-up of a community-based HIV treatment service – Programme performance over 3 consecutive years in Gugulethu, South Africa	Bekker, L-G., Myer, L., Orrell, C., Lawn, S., Wood, R.	<i>S Afr Med J</i> , 2006 96 (4): 315-320	Gugulethu clinic in the urban Nyanga district, Cape Town;	Analysis of three successive cohorts enrolled 2002-2005	1139 enrolled onto ART in three years	78/1139 (7%) patients died after starting ART, 63% of deaths occurring in the first 90 days of ART	The overall loss to follow up was 2.9% (excluding deaths and transfers out)	98%-100%, patients had VL <400 copies/ml in the three cohorts	Specialised referral site staffed by 4 doctors, 3 PNs and 28 adherence counsellors
The Western Cape Anti-retroviral Programme: Monitoring Report, June 2006	Western Cape Department of Health	Western Cape Provincial Department of Health Report, 2006	Western Cape Province	Programme monitoring data, based on cohort analyses	16,234 by March 2006	Decline in mortality between 2001 – 2005, from 13% to 6% in the first 6 months on ART By 4 years, 15% cumulative mortality	7/10 retained in care after 4 years. By 4 years, 17% on second-line regimens. 6 month drop out rates increased from 0-4.3% over 4 years	>90% of treatment naïve patients had VL<400 copies/ml at 6 months on ART; 88% at 1 year	Predominance (70%) of women
Sustainability of long-term treatment in rural district: the Lusikisiki	Ford, N., Reuter, H., Bedelu, M., Schneider, H.,	<i>Southern African Journal of</i>	Lusikisiki, Eastern Cape, MSF	Cohort analysis of 1025 patients enrolled in 2004	2,200 enrolled over three years ('04-	17% mortality at clinics vs. 13% at the hospital	Overall 81% at clinics, 32% at the hospital	Undetectable VL 90% and 78% for the clinics	Decentralised PHC based service

Title	Authors	Journal/ Source	Setting	Design	Outcomes				
					Patient numbers	Loss to follow up		Viral loads	Other
						Death	Retention		
model of decentralised HIV/AIDS care	Reuter, H.	<i>HIV Medicine</i> , December 2006: 17-22	programme	and 2005 and on treatment for at least 12 months, comparing PHC and hospital based cohorts	'06).		(2% drop outs at clinics vs. 19% at hospital)	and hospital, respectively	
High rates of non-fatal toxicities in a 24 month Cohort Receiving Publicly funded HAART in South Africa	Wong EB, Murdoch DM, Wing, J et al.	Poster presentation 14 th CROI, 2007	HIV Clinic, Jhb Hospital, Gauteng	File review of 24 month treatment cohort of 305 patients	Not reported	5.6% of patients	?	81.3% patients had at least one undetectable VL after ART initiation	Tertiary hospital based site
A study to explore the impact of socio-demographic factors on the response to anti-retroviral therapy in Gauteng Department of Health	Majuru, H	MPH research report, Wits University, 2007	HIV Clinic, Chris Hani Baragwanath Hospital, Gauteng	Retrospective cohort based on file review of sample of patients enrolled between Apr '04 and Mar'05	?	19% of enrolled patients	6% patients defaulted in the first year of treatment	79.9% VL <=400 copies/ml at 12 months	Tertiary hospital based site
Scaling up highly active antiretroviral therapy in a rural district of Malawi: an effectiveness assessment	Ferradini, L, Jeannin A, Pinoges L et al	<i>Lancet</i> 2006; 367:1355-42	MSF programme Chiradzulu District, Malawi,	Analysis of outcomes in patients enrolled since 2002 and on treatment for at least 6 months	1308	19%	74% at median of 8.3 months (7% loss to follow-up)	84% had VL <400 copies/ml	
HIV treatment in a conflict setting: Outcomes and experiences from Bukavu, Democratic	Culbert, H., Tu, D., O'Brien, D.P., Ellman, T., Mills, C. et al.	<i>PloS Med</i> , 2007 4(5): e129	MSF programme, Bukavu city Eastern DRC	Cohort of patients on treatment	494	7.9% mortality at 12 months	5.4% loss to follow up at 12 month	Not reported	

Title	Authors	Journal/ Source	Setting	Design	Outcomes				
					Patient numbers	Loss to follow up		Viral loads	Other
						Death	Retention		
Republic of Congo									
Anti-retroviral therapy at a district hospital in Ethiopia prevents death and tuberculosis in a cohort of HIV patients	Jerene, D., Naess, A., Lindtjorn, B.	<i>AIDS Research and Therapy</i> , 2006 3: 10	Ethiopian district hospital	Cohort of patients on ART	178	13.9% mortality, mostly first three months of therapy	2.8% lost to follow up	Not done	
Initial response to highly active anti-retroviral therapy in HIV-1 infected adults in a public sector treatment program in Botswana	Wester, W.C., Kim, S., Bussman, H. et al.	<i>Journal Acquir Immune Defic Syndr</i> , 2005 40 (3): 336-343	Public sector anti-retroviral treatment program in Gaborone, Botswana.	Cohort analysis of patients enrolled Apr 2001 to Jan 2002	153	15.7% during the follow up period (median 96 weeks)	8.4% loss to follow-up at 1 year	undetectable HIV RNA levels; 87% at 24 weeks	
Mortality of HIV-1 infected patients in the first year of anti-retroviral therapy: a comparison between low-income and high-income countries	Braitstein P, Brinkhof MW, Dabis F, Schechter M, et al (ART-LINC Collaboration and ART-CC groups)	<i>Lancet</i> , 2006 367: 817-24	18 HAART programmes in Africa, Asia, and South America & 12 from Europe and North America	Cohort study of baseline characteristics and mortality during 1 st year of HAART between HIV-1 infected patients	4810 from low income and 22,217 from high income countries	Mortality at year 1 at 6.4 % in low-income programmes with active follow up and 2.3% with passive follow up. HIC had a 1.8% overall mortality	727 (15%) and 1104 (5%) patients were lost to follow up during the first year in LINC and HINC respectively.	76% in low income settings and 77% in HINC had HIV-1 RNA levels lower than 500 copies/mL at 6 months	
Patient Retention in Anti-retroviral Therapy Programs in sub-Saharan Africa	Rosen, S., Fox, M., Gill, C.J.	<i>PLoS Med.</i> 2007 16;4(10):e298.	Sub-Saharan Africa,	Systematic Review of publications on 33 patient cohorts reporting retention after 6 months or longer	74,192 patients, 13 countries	40% of attrition accounted for by death	Weighted average of 77.5% retention at 9.9 months	Not reported	Not reported

Title	Authors	Journal/ Source	Setting	Design	Outcomes				
					Patient numbers	Loss to follow up		Viral loads	Other
Death	Retention								
Adherence to Anti-retroviral therapy in sub-Saharan Africa and North America	Mills, E.J., Nachega, J.B., Buchan, I., et al	<i>JAMA</i> , 2006 296 (6): 679-690	North America and sub Saharan Africa	Meta-analysis of Systematic review 31 studies from North America and 27 from Sub Saharan Africa		Not reported	Not reported	Not reported	Self reported Adherence 77% in Africa vs. 55% in North America

Table 16: Self reported motivation of staff working in CCMT sites. Numbers of respondents in each category provided (proportion in brackets)

Statement	SITE A				SITE B				SITE C				SITE D			
	Disagree *	Not Sure	Agree	n	Dis-agree	Not Sure	Agree	n	Disagree	Not Sure	Agree	n	Dis-agree	Not Sure	Agree	n
<i>Overall motivation</i>																
Overall, I am satisfied with my job	2 (0.10)	5 (0.24)	14 (0.66)	21	3 (0.21)	0	11 (0.79)	14	4 (0.17)	2 (0.08)	17 (0.74)	23	1 (0.09)	1 (0.09)	9 (0.81)	11
I am motivated to carry out my duties	2 (0.1)	6 (0.3)	12 (0.6)	20	3 (0.21)	0	11 (0.79)	14	6 (0.25)	3 (0.13)	15 (0.62)	24	1 (0.09)	0	10 (0.9)	11
I only do t his job to get paid at the end of the month	16 (0.8)	1 (0.05)	3 (0.15)	20	14 (1)	0	0	14	21 (0.91)	1 (0.04)	1 (0.04)	23	8 (0.72)	2 (0.18)	1 (0.09)	11
I feel I'm positively influencing other people's lives through my work	2 (0.1)	4 (0.2)	14 (0.7)	20	1 (0.08)	0	12 (0.92)	13	4 (0.17)	1 (0.04)	19 (0.79)	24	0	0	11 (1.0)	11
Major satisfaction in my life comes from my work	3 (0.14)	4 (0.19)	14 (0.66)	21	2 (0.15)	0	11 (0.85)	13	10 (0.43)	0	13 (0.56)	23	4 (0.36)	1 (0.09)	6 (0.54)	11
These days I don't feel motivated to work as hard as I could	9 (0.45)	2 (0.1)	9 (0.45)	20	5 (0.36)	0	9 (0.64)	14	8 (0.35)	2 (0.08)	13 (0.57)	23	5 (0.45)	1 (0.09)	5 (0.45)	11
<i>Organisational loyalty and commitment</i>																
I am proud to be working at this facility	3 (0.15)	5 (0.25)	12 (0.6)	20	1 (0.08)	0	13 (0.92)	14	1 (0.04)	1 (0.04)	22 (0.92)	24	0	2 (0.18)	9 (0.81)	11
I am glad I work for this fa cility rather than other facilities in the province	7 (0.33)	6 (0.29)	8 (0.38)	21	2 (0.14)	1 (0.07)	11 (0.79)	14	2 (0.08)	5 (0.21)	17 (0.71)	24	1 (0.09)	1 (0.09)	9 (0.81)	11
I prefer to work in the public sector than in the private sector	4 (0.19)	2 (0.10)	15 (0.71)	21	3 (0.23)	2 (0.15)	8 (0.62)	13	4 (0.16)	1 (0.04)	19 (0.79)	24	1 (0.09)	2 (0.18)	8 (0.72)	11
I feel ve ry little commitment to this hospital/clinic	12 (0.63)	1 (0.05)	6 (0.32)	19	8 (0.57)	0	6 (0.43)	14	16 (0.69)	1 (0.04)	6 (0.26)	23	10 (0.90)	1 (0.10)	0	11
I intend to leave this hospital/clinic	10 (0.48)	4 (0.19)	7 (0.33)	21	4 (0.31)	3 (0.23)	6 (0.46)	13	9 (0.5)	7 (0.39)	2 (0.11)	18	5 (0.45)	3 (0.27)	3 (0.27)	11
I can see myself working overseas in the future	8 (0.4)	5 (0.25)	7 (0.35)	20	4 (0.29)	4 (0.29)	6 (0.43)	14	13 (0.56)	4 (0.17)	6 (0.27)	23	5 (0.45)	3 (0.27)	3 (0.27)	11
<i>Workload and staffing</i>																
The amount of work I have to do is too demanding	5 (0.24)	1 (0.05)	15 (0.71)	21	4 (0.29)	0	10 (0.71)	14	9 (0.37)	2 (0.08)	13 (0.54)	24	3 (0.27)	2 (0.18)	6 (0.54)	11
There are enough staff to work in this unit	13 (0.68)	4 (0.21)	2 (0.11)	19	12 (0.92)	1 (0.08)	0	13	17 (0.71)	3 (0.12)	4 (0.16)	24	7 (0.63)	0	4 (0.36)	11

Statement	SITE A				SITE B				SITE C				SITE D			
	Disagree	Not Sure	Agree	n	Dis-agree	Not Sure	Agree	n	Disagree	Not Sure	Agree	n	Dis-agree	Not Sure	Agree	n
<i>Burnout</i>																
I feel emotionally drained at the end of every day	7 (0.33)	2 (0.10)	12 (0.57)	21	2 (0.14)	0	12 (0.86)	14	5 (0.22)	5 (0.22)	13 (0.57)	23	2 (0.20)	1 (0.10)	7 (0.7)	10
<i>Management and team work</i>																
Hosp/clinic management communicates well with staff	5 (0.25)	5 (0.25)	10 (0.5)	20	5 (0.36)	0	8 (0.57)	14	4 (0.18)	2 (0.09)	16 (0.73)	22	1 (0.1)	4 (0.4)	5 (0.5)	10
If I had a personal problem which affected my work I would feel free to discuss it with my supervisor or manager	5 (0.24)	1 (0.05)	15 (0.71)	21	2 (0.14)	0	12 (0.86)	14	6 (0.26)	4 (0.17)	13 (0.57)	23	1 (0.09)	2 (0.18)	8 (0.72)	11
In this facility, conflict hampers our work	9 (0.53)	2 (0.12)	6 (0.35)	17	11 (0.79)	0	3 (0.21)	14	18 (0.78)	3 (0.13)	2 (0.09)	23	6 (0.66)	1 (0.11)	2 (0.22)	9
There have been too many changes at this hospital/clinic in the past year	7 (0.33)	5 (0.24)	9 (0.43)	21	9 (0.64)	1 (0.07)	4 (0.29)	14	3 (0.14)	2 (0.09)	17 (0.77)	22	6 (0.54)	1 (0.09)	4 (0.36)	11
In the last month a colleague has been unexpectedly absent	12 (0.57)	0	9 (0.43)	21	10 (0.71)	0	4 (0.29)	14	15 (0.63)	2 (0.08)	7 (0.29)	24	8 (0.73)	0	3 (0.27)	11
<i>Individual/ personal factors and attitudes</i>																
I am confident about my ability to do my job	1 (0.05)	0	19 (0.95)	20	0	0	14 (1)	14	0	0	24 (1.0)	24	0	0	11 (1.0)	11
I feel vulnerable to HIV in my personal life	5 (0.28)	0	13 (0.62)	18	4 (0.29)	0	10 (0.71)	14	8 (0.35)		15 (0.65)	23	4 (0.36)		7 (0.64)	11
HIV positive patients make too much extra work for staff	8 (0.42)	0	11 (0.58)	19	10 (0.71)	2 (0.14)	2 (0.14)	14	18 (0.75)	1 (0.04)	5 (0.20)	24	6 (0.6)	1 (0.10)	3 (0.3)	10

Table 17: Availability of drug and other supplies at CCMT sites

	Site A	Site B	Site C	Site D
<i>General drugs and supplies</i>				
Ciprofloxacin tablets	√	√	√	√
Metronidazole 400mg	√	√	√	√
Erythromycin 250mg tabs	√	√	√	√
Doxycycline 100mg tabs	√	√	√	√
Nystatin	√	√	√	√
Paracetamol	√	√	√	√
Cotrimoxazole syrup	√	√	√	√
Cotrimoxazole tablets	√	√	√	√
Acyclovir 200mg	√	√	√	√
Amitryptaline 10mg	√	√	√	√
Hydrocortisone cream	√	√	√	√
Loperamide 2mg	√	X	√	√
Rapid HIV/AIDS testing kits	√	√	√	√
Purple topped blood specimen containers	√	√	√	√
Sharps disposal containers	√	√	√	√
Condoms	√	√	√	√
<i>Antiretroviral drugs</i>				
Nevirapine tablets 200mg	√	√	√	√
Nevirapine suspension 50mg/5ml	√	√	√	√
Stavudine caps 30mg (Stavir/d4T)	√	√	√	√
Stavudine caps 40mg (Stavir/d4T)	√	√	√	√
Stavudine solution 1mg/ml (Stavir/d4T)	√	√	√	√
Lamivudine tabs 150mg (3TC)	√	√	√	√
Lamivudine solution 10mg (3TC)	√	√	√	√
Efavirenz caps 200mg (Stocrin /EFV)	√	√	√	√
Efavirenz caps 50mg (Stocrin /EFV)	√	√	√	√
Efavirenz tabs 600mg (Stocrin /EFV)	√	√	√	√
Didanosine tabs 200mg (Videx/ddI)	√	X	X	X
Didanosine tabs 100mg (Videx/ddI)	√	√	X	√
Didanosine tabs 50mg (Videx/ddI)	√	√	X	√
Zidovudine tabs 300mg (Retrovir/AZT)	√	√	√	√
Zidovudine syrup 50mg/5ml (Retrovir/AZT)	√	√	√	√
Lopinavir/Ritonavir caps 133/33mg (Kaletra)	√	√	√	√
Lopinavir/Ritonavir suspension 80/20mg/ml (Kaletra)	√	√	√	√
Ritonavir suspension 80mg/ml (Norvir)	X	X	X	X
Ritonavir caps 100mg (Norvir)	√	√	X	X

Table 18: Turn-around times for essential laboratory tests in CCMT sites

	Site A	Site B	Site C	Site D
Rapid HIV test	Immediate	Immediate	Immediate	Immediate
Pregnancy	Immediate	Immediate	Immediate	Immediate
Haemoglobin	Immediate	Immediate	Immediate	6-24 hours
Syphilis (rapid RPR)	Immediate	Immediate	Immediate	Immediate
HIV (ELISA)	3 days	3 days	5 days	24 hours
CD4 Count	4 days	3 days	48 hours	48 hours
Viral Load	4 days	3 days	5-7 days	4 days
PCR	2 weeks	2 weeks	5-7 days	?
Sputum AFBs	?	Sent to LG clinic	48 hours	24 hours
Full Blood Count	24 hours	2-3 days	48 hours	24 hours
Liver Enzymes	24 hours	2-3 days	48 hours	3-4 days
Electrolytes	24 hours	2-3 days	48 hours	24 hours

Table 19: Policies and protocols assessed

Policies and protocols assessed	Site A	Site B	Site C	Site D
tion and treatment of opportunistic and HInes	√	√	√	√
Managing HIV in children	√	√	√	√
Prevention and treatment of opportunistic and HIV related diseases in adults	√	√	√	√
Prevention of mother-to-child HIV transmission and management of HIV positive pregnant women	√	ANC	√	ANC
Protocol/guidelines for PMTCT	√	ANC	√	ANC
Feeding of infants of HIV positive mothers	√	√	√	√
VCT protocol/manual/booklet	√	√	√	√
The South African TB Control Programme Practical Guidelines 2000 (or more recent)	√	√	√	√
Tuberculosis (TB) and HIV/AIDS	TB focal point	√	√	√
Flow charts on TB diagnosis	√	√	√	√
Protocol for management of a person with a STI	√	√	√	X
Management of occupational exposure to HIV (PEP guidelines)/Protocol for needle-stick injury	√	√	√	√
National guideline on home-based care and community based care	X	X	√	X
Essential drug list and standard treatment guidelines for S.A Primary Health Care services	√	√	√	√
HIV strategic plan for South Africa 2000-2005	√	√	√	√