

**Providing HIV/TB Care At The Primary Health Care Level**

# **Khayelitsha Annual Activity Report 2008-2009**



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## EXECUTIVE SUMMARY

The Khayelitsha programme was the first in South Africa to provide antiretroviral therapy (ART) at primary care in the public sector. It is also one of two pilot projects in the country to provide decentralized care for drug-resistant tuberculosis (DR-TB). This report highlights the key clinical, programmatic, and policy changes that have supported universal coverage for HIV and TB care and outlines future challenges and potential models for long term ART care.

**ART is feasible in poor settings.** The project was started in 1999 (first patients initiated on ART in 2001) to demonstrate feasibility of providing ART at primary care in a resource limited setting. Initial success contributed to the paradigm shift from the consensus that ART was not feasible in poor countries to making it a priority. In 2004, the project was incorporated into the provincial ART programme, and the objective shifted towards coverage of ART needs.

**Antenatal HIV prevalence has stabilized.** HIV antenatal prevalence increased from 15% in 1999 to 32% in 2006 and has remained stable since. The absence of further increase in prevalence despite the large expansion of ART and the reduction in HIV-associated mortality might result from a decrease in new infections. In the absence of reliable incidence measures, the effectiveness of prevention activities remains difficult to assess.

**Large scale condom distribution, 'opt out' integrated HIV testing and counselling, and men-oriented services.** The massive scale up of condom distribution in 2006 has been associated with a 50% drop in the incidence of sexually transmitted infections (STIs). The introduction of large scale voluntary counselling and testing by lay counsellors, the availability of prevention of mother to child transmission, and later the shift to 'opt-out' HIV testing and counselling for TB suspects, STI clients, family planning services, youth etc. resulted in the increase of people tested in Khayelitsha from less than 500 in 1998 to 40,000 in 2008. The opening of a male walk-in clinic in Site C led to a sharp increase in the proportion of men testing and STI consultations within the first year of implementation. To further scale up HTC alternative options should be explored in addition to facility-based HTC.

**Integration of ART within midwife obstetric units (MOU) and a very successful prevention of mother to child transmission (PMTCT) programme.** Almost 100% of pregnant women are tested for HIV in Khayelitsha. HIV-positive women with a CD4 count below 200 receive ART within the MOU at one pilot site; women not eligible for ART receive AZT from 28 weeks of pregnancy and single dose nevirapine during labour. This strategy has achieved to reduce HIV MTCT to 3.3%. To achieve universal coverage, it will be necessary to integrate midwife-led ART within antenatal consultations everywhere in South Africa.

**Decentralization of nurse-led, TB/HIV integrated ART services to every clinic** has resulted in more than 13,000 patients being on ART at the end of 2009 and ongoing increases of new enrolments despite the scarcity of staff. Outcomes were good, with 70 % remaining in care and less than 15 % with virological failure at 5 years on ART, a decrease in patients presenting with low CD4 counts, and decreasing mortality on ART. This primary care model was applied to children as well, for whom retention in care was better than adults at 87 % at 5 years on ART.

**The greatest challenge for the scale-up now is how to retain patients in care over the long-term, while at the same time increasing enrolment on ART.** As the number of people started on ART in Khayelitsha increased, so did the proportion of patients lost to follow-up. Adherence clubs were started in Khayelitsha to maximize clinic efficiency and improve support for stable patients on chronic ART. Early results of this pilot project are promising and it is expected that adherence clubs will play a major role in achieving the NSP targets of coverage. Youth proved to be at especially high risk of defaulting ART. Treatment literacy provided by the Treatment Action Campaign (TAC) in facilities and the community is an essential part of the programme.

Despite a well-functioning tuberculosis (TB) programme, the number of patients diagnosed with TB and drug-resistant TB (DR TB) in Khayelitsha increased massively in the past decade, and would appear to have reached a plateau.

**Integration of ART within TB services** have improved efficiency, decreased waiting times before treatment initiation (of both TB and HIV), and increased the proportion of TB/HIV co-infected patients accessing ART.

**The decentralization of care for patients with drug-resistant TB** has resulted in greatly increased case detection, reduced time to treatment and improved early treatment outcomes. Increased focus on infection control in health facilities as well as patients' homes is being implemented to curb transmission.

**Coordination and management** is based on a sub-district approach, with regular coordination and planning meetings involving all stakeholders. Monitoring, evaluation, training and mentoring (M&E) are also coordinated at sub-district level, allowing for a continuum between M&E and management, and between training and on-site mentoring.

**Operational research** is conducted in a pragmatic sense, where contribution of research to service delivery is central. This is only possible through collaboration between academic, government, and NGO partners.

In conclusion, the Khayelitsha project is the result of relentless efforts towards communication and collaboration between the Khayelitsha community, the Treatment Action Campaign, Medecins Sans Frontières, the Provincial Government of the Western Cape, the City of Cape Town, the Universities of Cape Town and Stellenbosch, and many others.

Khayelitsha represents an important model for demonstrating the feasibility of different strategies to achieve the targets set forth in the National Strategic Plan (NSP) for HIV/AIDS and Sexually Transmitted Infections (STIs), including achieving "universal coverage" of ART needs, by 2011.

## INTRODUCTION

Khayelitsha sub-district (population c. 500,000 inhabitants<sup>1</sup>) is located on the outskirts of Cape Town and has one of the highest burdens of both HIV and tuberculosis (TB) in the country. In 2008 antenatal HIV prevalence was measured at 31.1%; the TB case-notification rate reached nearly 1,600 per 100,000 in 2008, and TB/HIV co-infection is close to 70%<sup>2</sup>. The health infrastructure for the sub-district of Khayelitsha is managed by the Provincial Government of the Western Cape (PGWC) via 3 Community Health Centres (CHCs) and 2 Midwife Obstetric Units (MOUs), and the City of Cape Town via 1 CHC (Matthew Goniwe), 6 general clinics, 2 Youth clinics and 1 Male clinic (in a partnership between the City, PGWC and NGO's). Almost one third (31%) of all adults on antiretroviral therapy (ART) in the Cape Town Metropolitan area are treated in Khayelitsha.

In early 2000, MSF and PGWC started an HIV/AIDS care and treatment programme at the primary care level in three PGWC Community Health Centres in Khayelitsha. The first patient was initiated on ART in May 2001. Initially, the aim of this pilot programme was to demonstrate feasibility of ART at primary care level in a resource-limited, peri-urban setting. In 2004 the objectives shifted from demonstration to coverage, and the Khayelitsha ART programme was fully integrated into the Provincial ART Programme.

Over 13,500 people are now receiving ART in Khayelitsha through 10 sites. ART is available in most TB services, **making TB-HIV integration in the sub-district a reality**. The need to mobilize all available resources to respond to the exceptional TB/HIV burden of disease in the sub-district has challenged programme managers to revise traditional mandates and boost capacity in all clinics, to **make ART initiation available in all PHC clinics by 2010**. Furthermore, Khayelitsha is now a pilot district for **community-based, drug-resistant TB (DR-TB) treatment** which can be initiated in all PHC community clinics.

Since its inception, the Khayelitsha programme has been developed in close collaboration with both the Western Cape Department of Health and the City of Cape Town Health services. It is a Provincial sentinel monitoring site and receives significant technical support from the Centre for Infectious Disease Epidemiology and Research (CIDER) of the School of Public Health and Family Medicine at the University of Cape Town (UCT). Numerous local nongovernmental organisations have played a critical role in the success of this programme, in particular the Treatment Action Campaign (TAC), which has played an important role in promoting openness about HIV and empowering people living with HIV/AIDS (PLWHAs) through treatment literacy and other strategies.

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<sup>1</sup> The actual population of Khayelitsha is unknown. This figure is based on a 2001 census, and is widely believed to be underestimated, which makes coverage and other figures difficult to estimate.

<sup>2</sup> City of Cape Town Health Department, *Health Statistics*. 2009.

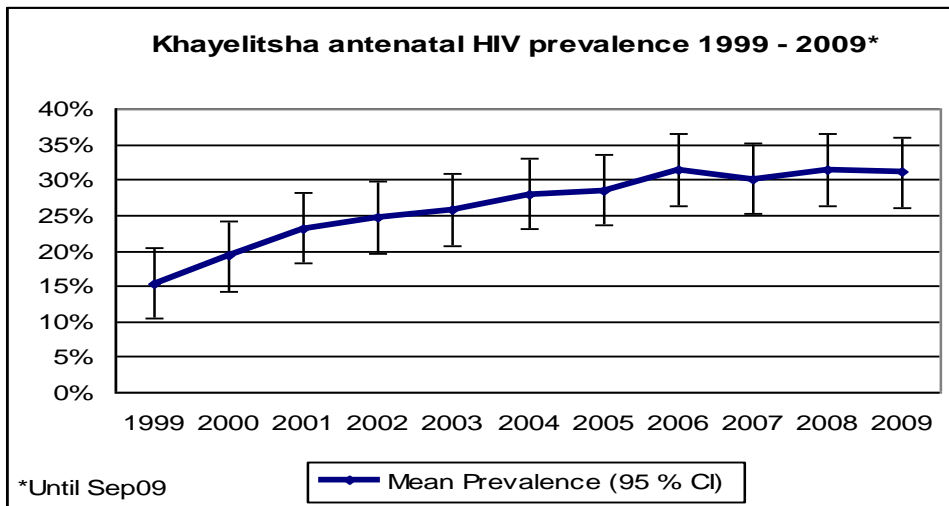
## HIV PREVENTION

Over the last decade, concerted efforts have been made to scale-up best-practice prevention interventions, with substantial improvements in PMTCT coverage, HIV testing and condom distribution and a reduction in sexually transmitted infections. Vertical transmission has been reduced, but no overall reduction in HIV incidence has been detected. Although the large expansion in ART and reduction in HIV-associated mortality might be offsetting averted infections, further effort is still required to scale up prevention interventions aimed at reducing new adult infections.

### HIV prevalence

HIV prevalence among women presenting for antenatal care (ANC) has been routinely measured since the beginning of the prevention of mother-to-child transmission (PMTCT) programme in 1999 (figure 1). Since 2003, more than 95% of mothers presenting for their first ANC visit have accepted HIV testing.

Figure 1: Antenatal HIV testing 1999-2009



Between January 1999 and 2005, the antenatal HIV prevalence doubled from 15 to 30%, reaching a peak at 32.5% in 2006, and stabilising since around 30-32 %.

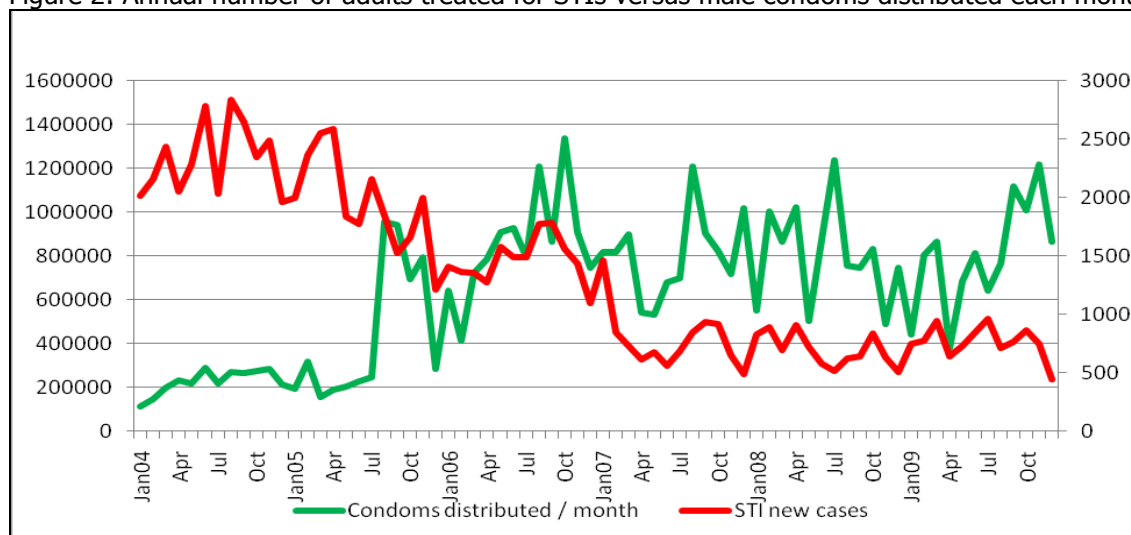
The absence of an increase in antenatal prevalence in recent years could be the result of the benefits of ART off-setting reduced new infections, although it is difficult to be certain without reliable incidence measures. This highlights the need for new tools to measure HIV incidence. Without such measures, it will be difficult to assess progress towards the NSP's target of reducing the rate of new infections by 50% by 2011.

### Condom distribution & sexually transmitted infections (STIs)

Khayelitsha represents approximately 11% of the total population in the City of Cape Town but 34% of the total STI disease burden (2004 data). Male condom distribution has been a major priority for health providers and NGOs, particularly TAC, and their efforts have resulted in an increase in condom distribution from 2.7 million in 2004 to 12 million in 2008 (figure 2). The focus of distribution shifted from health facilities to public distribution sites (public libraries, taxi ranks, toilets and shebeens).

During the period of 2006-2008, after condom distribution was massively increased, a 50% drop in STI incidence was reported in Khayelitsha (figure 2).

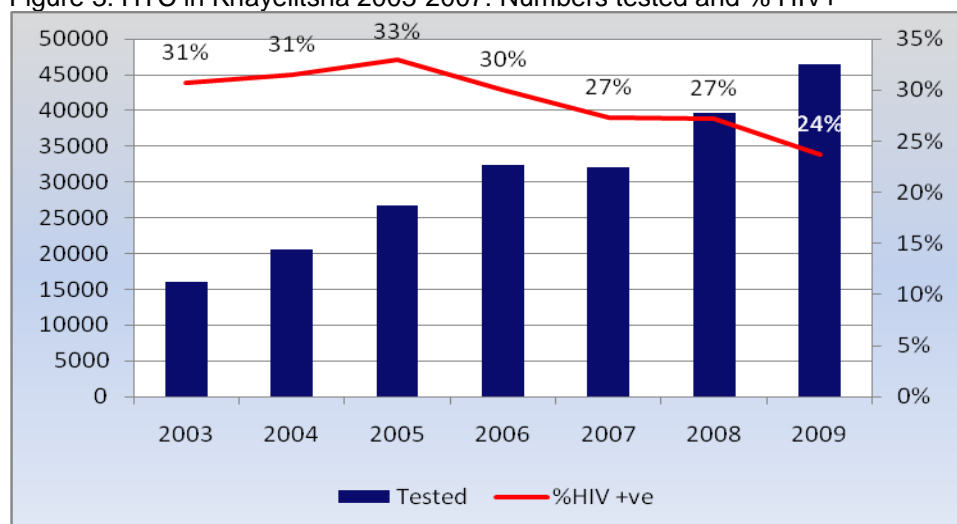
Figure 2: Annual number of adults treated for STIs versus male condoms distributed each month



Horizontal axis: months and year (J04: Jan 2004, A: August, O: October) 2004-2009. Left vertical axis: number of condoms distributed per month. Right vertical axis: number of new cases of STI per month.

## HIV testing and counselling (HTC)

Figure 3: HTC in Khayelitsha 2003-2007: Numbers tested and % HIV+



Bars show total number of people tested in Khayelitsha, including women from PMTCT. Line shows proportion of all tested who were HIV+. This decreased gradually, as more people were tested.

HIV testing evolved substantially over the last decade:

- In 1998, with ELISA testing, less than 500 HIV tests were carried out
- Large scale voluntary counselling and testing (VCT) started in 1999 using on-site rapid tests, employment of lay counsellors and the availability of treatment for HIV+ 'mothers to be'.
- In 2003 HIV testing was offered to all TB patients, and later extended to TB suspects, STI cases, family planning clients etc.
- Currently, HIV testing is done by clinicians who recommend HIV testing as part of routine package of PHC, using an approach<sup>3</sup> that reduces pre-testing barriers and focuses on follow-up counselling and linkages to HIV care.
- Non-clinical HIV testing sites and the opening of the Male Clinic has contributed to the escalation of HIV testing in Khayelitsha.

<sup>3</sup> ACTS – Advise, Consent, Test & Support



### Accelerated counselling & testing at Youth Clinics

Two dedicated youth clinics (for people < 25 years of age) have been opened in Khayelitsha: Site C Youth Clinic was built by MSF in 2004 and Site B Youth Clinic was built by the Evangelical Church in 2006. Both these clinics are important service points for family planning, STI treatment, HTC and prevention services for youth.

In 2006, the City of Cape Town implemented a pilot programme of routine ('opt-out') testing for youth ("advise, consent, test and support" or ACTS). This led to an immediate increase of youth testing for HIV at the youth clinics (from 3403 in 2005 to 6633 in 2006).

Over half (605) of clients attending these services are female, indicating a need to focus on enrolling more males (see below). Very few young people below the age of 18 years undergo HIV testing. Novel approaches such as HTC in schools are being piloted.

### Male Walk-In Clinic in Site C

A service dedicated to reaching men and offering VCT and treatment of STIs was opened at the end of 2007. The service, a walk-in-clinic advertised through taxi ranks at Site C, aimed to test the impact of a male run service on increased acceptance of HIV testing in men. This initiative is a partnership between PGWC, City Health, Hope Worldwide, and MSF. The service has become the biggest STI treatment sites in the Metro, overtaking Spencer Road clinic, which was the major STI treatment site for men, including those from Khayelitsha, prior to opening the male walk-in clinic. The number of STIs treated at the male clinic increased from 843 in 2007 to 2724 in 2008. The overall proportion of men testing in Khayelitsha has increased from 31 to 39 % in the last 3 years.

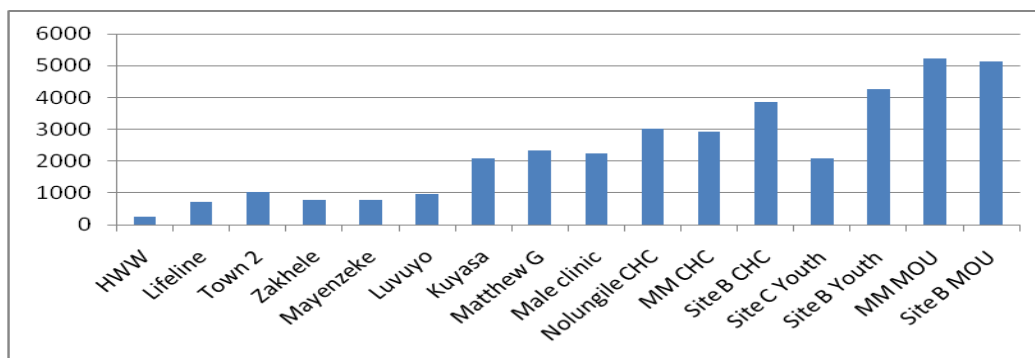
The success of this pilot demonstrates the need for more easily accessible service points, while on the way to or from town, offering male friendly services.

### How to further increase HTC level in Khayelitsha?

HTC sites are described in figure 4. The 2 largest HTC centres are the midwife obstetric units (MOUs), with approximately 98 % of ANC clients testing. Only 1 male tested in an MOU in 2008, indicating that MOUs are not an appropriate entry point for men. The 4 CHCs are the next busiest HTC sites, which is not surprising given their high patient load. The male walk-in clinic has rapidly demonstrated success and should be replicated elsewhere in the community to facilitate HIV testing for men. Due to the availability of TB services in site B Youth clinic, many more patients access HTC there as compared to site C Youth. HIV testing increased in the City clinics where ART was introduced (Kuyasa and Matthew G).

As facility-based HTC appears to reach its limit, alternative options should be explored, including community-based testing sites, HTC events, and testing in schools and businesses.

Figure 4: Numbers tested for HIV per clinic in 2008



### **PMTCT: a new model of care**

In December 2004, a pilot project was established to initiate ART for pregnant women with CD4 counts below 200 cells/ $\mu$ l within the midwife obstetric units (MOUs) as a one-stop service. Women with CD4 counts below 200 were counselled and enrolled onto a fast tracking system of weekly visits to facilitate the initiation of ART. These included intensified adherence counselling and routine ART work-up. In the absence of accreditation of the MOU, an outreach team from the ARV clinic initiated women on ART during a weekly visit. All women (pre- and post ART initiation) attended an adherence support group prior to the consultation. This strategy is particularly relevant now that national PMTCT guidelines have been revised to recommend ART for all HIV-positive pregnant women with CD4 counts **<350 cells/ $\mu$ l**.

The anticipated benefits to this model of providing ART at the MOUs were to reduce maternal morbidity and mortality through higher ART uptake, to reduce transmission of HIV from mother to child, to allow for women presenting late in their pregnancy to benefit from ART through fast-tracking, to reduce the number of losses to follow-up on ART during pregnancy, to create a one-stop service saving time for both the patient and the health services and to involve MOU staff in ART.

Of 5008 patients attending the MOU in 2007, all received VCT and a third of these (1665) tested positive. The majority of those testing positive (1562, 94%) had CD4 counts performed and 223 of these (14%) had CD4 counts below 200. Almost two thirds of these (135, 61%) were started on ART at the MOU.

The current model is only partially integrated, as ART consultations – although in the same facility – are separate from antenatal consultations and are held once a week. Raising the eligibility criteria from CD4 < 200 to 350 will increase the proportion of women requiring ART threefold. A midwife-driven model, with ART delivery completely integrated within antenatal consultation, will be necessary to achieve the NSP targets.

Integration of ART within the MOU resulted in increased uptake of ART compared to non-integrated ART facilities. In order to achieve integration major investments in terms of training of health staff, human resource planning and task shifting are required. This will be facilitated by training and allowing midwives to prescribe ART as an extension of their current prescribing of dual therapy for PMTCT.

Only 43 of 59 women (73%) referred postpartum to the Ubuntu ARV clinic in 2007 registered at Ubuntu. Early postnatal drop-out amongst women initiated during pregnancy has already been identified elsewhere as a concern. Strengthened referral and health information systems are needed to improve post-partum retention in care.

The rate of vertical transmission in Khayelitsha for 2008 as measured by HIV DNA polymerase chain reaction (PCR) at six weeks (73% of exposed newborns tested) was **3.3%**. This low rate of transmission is the result of 10 years of aggressive PMTCT which has led to a testing acceptance rate close to 100%, an active promotion of exclusive formula feeding with provision of infant formula milk for the first six months (as per the mother's choice), and a more effective PMTCT drug regimen (AZT from 28 weeks of pregnancy plus single-dose nevirapine during labour for the mother and AZT for seven days after birth for the baby) compared to the national standard protocol (single-dose nevirapine was implemented to reduce vertical transmission).

More than 30 % of pregnant HIV-infected women are on ART at their first postnatal visit. With the new threshold for initiation of ART at CD4 > 350, we can anticipate that this figure will increase to at least 40 %. Given emerging scientific evidence on the protection given by ART to the mother and/or child during the breast-feeding period, feeding options need to be reconsidered in order to offer the best trade-off between the risk of HIV infection and the risks associated with not breast-feeding in poor communities.

## ANTIRETROVIRAL THERAPY (ART)

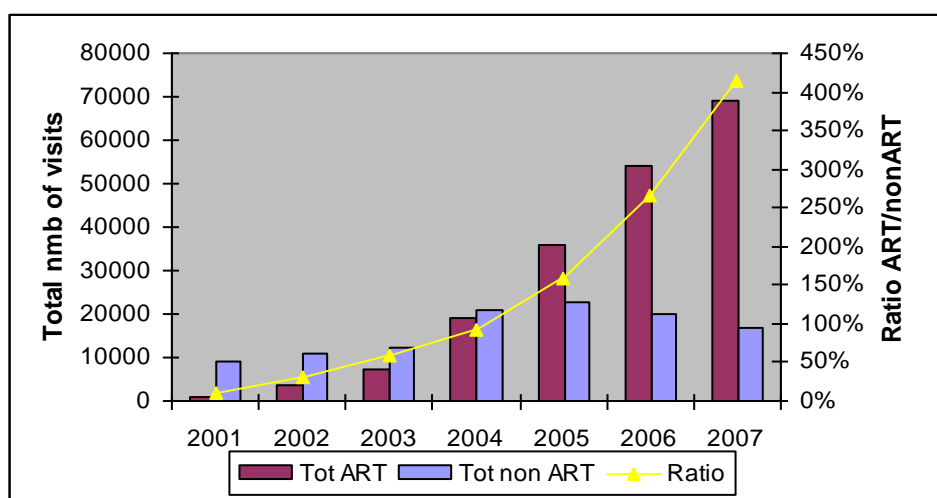
### Decentralization of ART in all PHC Clinics

Decentralization of ART to PHC clinics has been a step-wise process triggered primarily by workload pressure with 2 main steps:

#### 1. Decentralization of HIV care to all PHC clinics and maximising service effectiveness with task shifting in existing CHCs (2004-2006)

The number of consultations in the three ART sites in the CHCs in Khayelitsha (Ubuntu/Site B, Nolungile/Site C, Michael Mapongwana) has almost doubled each year between 2004 and 2007 to reach over 87,000 consultations by the end of 2007 (figure 5).

Figure 5: Evolution of total number of HIV related consultations in 3 initial CHC's



Initially all ART care was provided by doctors. As the programme expanded, the programme was forced to place a major focus on "task-shifting" to nurse-led services. This "de facto" nurse-based, doctor-supported policy was implemented in all three CHCs as of 2006. The decentralization of HIV care (excluding ART) and integration at primary care level was agreed upon with the City of Cape Town, together with a large scale HIV care training programme for all nurses working in these facilities: as a result, ten additional primary care clinics started to provide HIV care during 2005/06 as the CHCs slowly shifted from integrated HIV/ART services to specialised services for people eligible for ART.

#### Nurse-based services as a strategy to increase access to treatment

Health care worker shortage is one of the major bottlenecks in scaling up antiretroviral therapy both in peri-urban and rural areas. Task shifting is one of the strategies to adapt to this shortage. One of the objectives of the National Strategic Plan (NSP) on HIV/AIDS is to offer care to 80 % of people in need; this can only be done by allowing nurses to be the principal care givers of ART. The NSP predicts that by 2011 80 % of patients will be receiving ART in primary care given by nurses. In their 'task shifted' roles nurses manage opportunistic infections, perform clinical staging, initiate and monitor ART, manage drug supply and supervise adherence counsellors. This model has been shown to be effective in several settings to both improve quantitative but also qualitative programmes outcomes as it allows delivery of treatment closer to home, improving adherence<sup>a, b</sup>. One of the pre-requisites for this model to work is training and supervision. MSF has been running week long ART training courses 4 times a year in Khayelitsha for the last 10 years, training several hundred nurses (120/year) to keep pace with high staff turnover.

<sup>a</sup> Bedelu, M., N. Ford, et al. (2007). "Implementing antiretroviral therapy in rural communities: the Lusikisiki model of decentralized HIV/AIDS care." *J Infect Dis* **196 Suppl 3**: S464-8.

<sup>b</sup> Médecins Sans Frontières. Nurse-driven, community-supported HIV/AIDS treatment at the primary health care level in rural Lesotho: 2006-2008 programme report.

## **2. Decentralization of ART in all existing PHC clinics in Khayelitsha (2007-2010)**

As of 2007, the programme was facing 2 major challenges. First, enrolment capacity had reached saturation; the total number of newly admitted patients in the three clinics in 2007 (2,611 new cases) was less than in 2005 (2,717 new cases). Second, the cumulative patient load was increasing dramatically, necessitating a shift in approach to reduce the burden of stable ART patients on clinical staff (see section on adherence support below). In addition to decreasing enrolment capacity, the high patient burden resulted in overcrowding, longer waiting time during visits, and less time for counselling of poorly adherent patients and tracing of patients lost to follow up. This resulted in increased "staff burn out" and more chaotic conditions for staff and patients. As a result, while quantitative targets were plateauing, qualitative outcomes were in decline with substantial increases in losses to follow up (LTF).

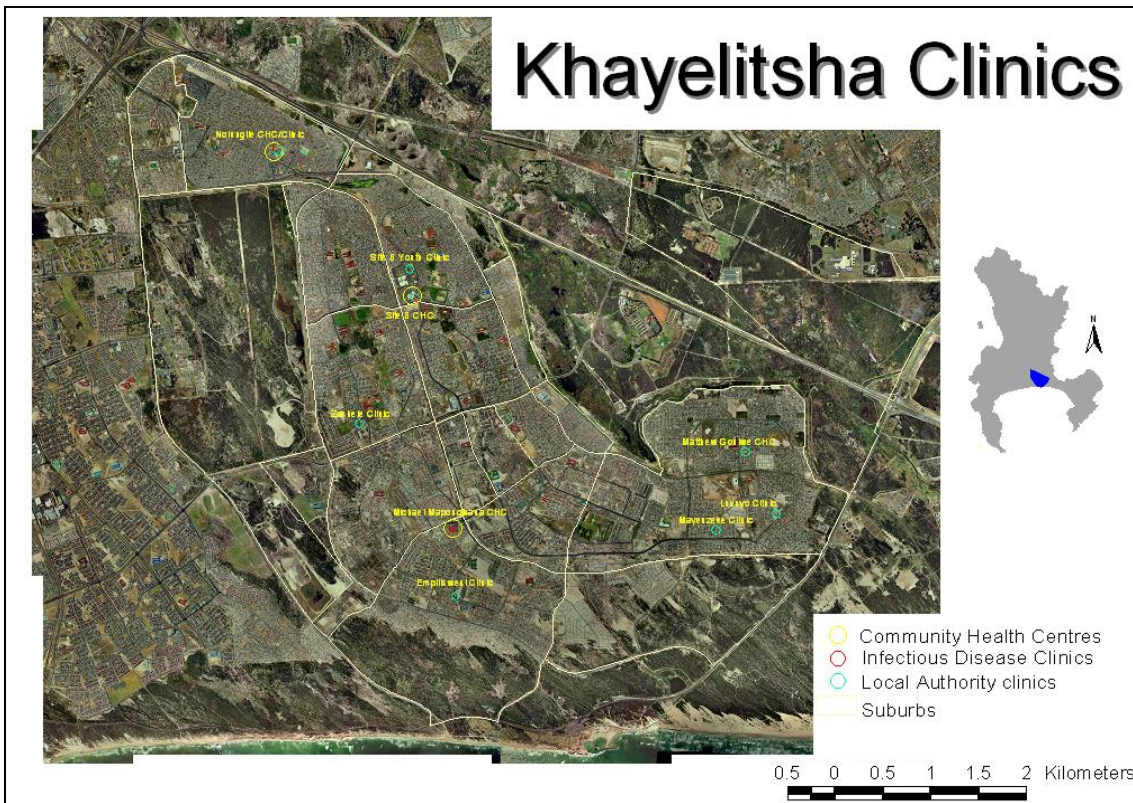
The lowering of staff to patient ratio together with staff burn out led to a decline in staff attention to patients at all levels, from reception staff, to counsellors, clinicians and pharmacists. The number of clinicians (doctors and nurses) has not increased significantly in any of the three CHC's since 2005.

Further decentralizing ART care was necessary to further decrease congestion in the CHCs. During the last quarter of 2006 two additional clinics started providing ART within a nurse-led, model from the outset. A mobile doctor team was made available to initiate patients (as per policy at the time) and attend to difficult cases.

Once the decision to provide ART at other facilities was taken, the most remote facilities in Khayelitsha were chosen in order to improve access. Areas underserved by current services were selected in order to reduce travelling time and the linked financial burden.

### **10 points for successful implementation of nurse-led doctor-supported ARV services at PHC level**

1. Redefine roles and responsibilities within each facility based on task shifting/sharing
2. Appropriate staffing (professional nurses, counsellors , pharmacist assistants and administrative staff)
3. Functional physical space, and fully equipped consultation rooms
4. Guaranteed supply chain for drugs, laboratory tests and management tools
5. Large scale clinical training and clinical mentorship (doctor supported roving teams)
6. Ongoing mechanism for efficient referral and/or telephonic doctor support, and red flags for difficult conditions requiring referral
7. TB/HIV integration and universal TB infection control
8. Quantitative and qualitative targets /facility based on NSP targets
9. Quality control and supportive supervision
10. Community involvement in patient support activities



## Down referral versus clinic initiation

To overcome the National policy constraint which did not allow nurses to initiate (prescribe) ART, an initial model of referring patients from existing CHCs to smaller, nurse-based clinics was offered, with support of regular visits by a mobile doctor. Patients living nearer to the new clinics were given the choice of transferring to a clinic closer to home. Despite referral being regularly offered, patients were reluctant to move once established on ART at the CHC. Furthermore, on the “receiving end”, it became apparent that nurses would assume responsibility more easily for patients initiated by themselves than for patient transferred-in from other services. There was a selective bias in initial down referral towards non-adherent patients (often linked to distance) which created a negative staff attitude at the receiving end.

On-site initiation of patients rapidly became the preferred option at the new primary care service points.

The number of transfers-in (TFI) from other ARV sites initially averaged around 15-20 per quarter in both clinics and has remained constant in spite of the substantial increase in patient numbers at these clinics.

## “Referral-up”

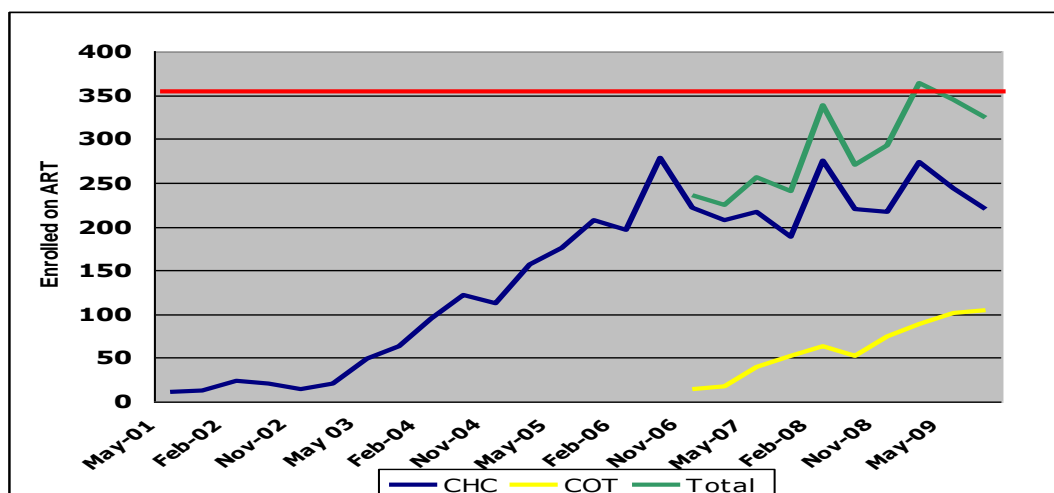
Acceptance of this major new responsibility by the clinic team was dependent on a number of essential conditions being met (see 10 points above). Amongst them, the flagging of difficult cases (such as patients with low CD4, advanced TB/HIV disease, immune reconstitution syndrome, and central nervous system involvement) and effective referral to secondary care where needed is essential. The management of such cases is supported by the mobile clinic team.

Khayelitsha North benefits since 2004 from the GF Jooste Infectious Disease Unit while the Southern part of Khayelitsha benefits from Tygerberg/ K. Bremer ID Unit support since 2007. Quarterly clinical meetings are organised between PHC clinicians and referral units.

## Impact of the ART decentralization strategy

### Quantitative impact

Figure 6: Monthly enrolment on ART by CHC and clinics 2001-2009



CHC: large community health centres; COT: City of Cape Town clinics. Increased enrolment on ART past 2006 has only been achieved thanks to decentralization to the smaller City clinics. The red line represents the target of 70% coverage of new WHO stage 4.

Figure 6 shows the saturation of initial existing ART service points at the end of 2006 (monthly enrolment plateau around 250 patients) and the impact of new clinics on enrolment, which allowed an increase in monthly enrolment to more than 350 new patients, the target fixed for the sub-district for 2009 in order to cover 70 % of need (defined by new WHO stage 4).

### ART Needs, Coverage & NSP Targets

The total number of people remaining in care was **13,500 patients end of 2009**

Projections made for the Global Fund Rolling Continuation Channel plan for 15,600 RIC in July 2010 assuming that new enrollees in Khayelitsha will constitute a constant proportion of all new enrollees in the Province:

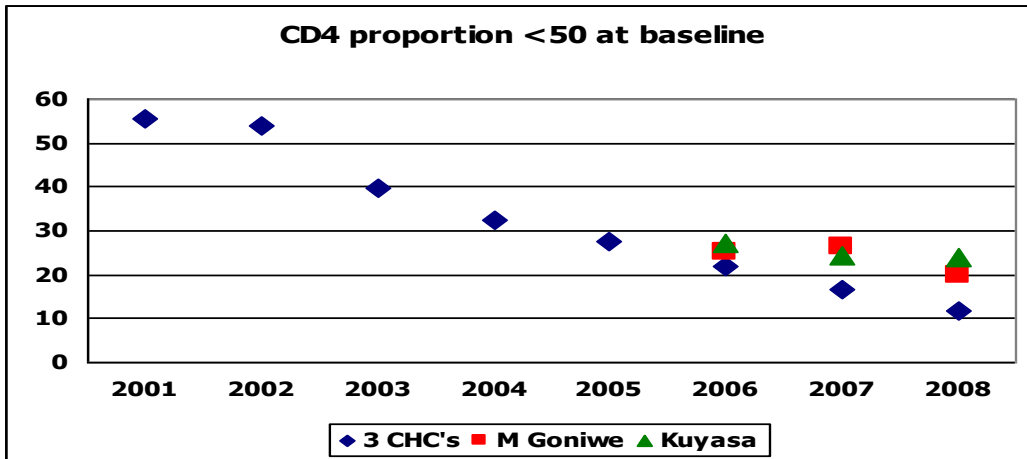
Year	Dec-09	Jul-10	Jul-11	Jul-12	Jul-13
RIC Khayelitsha	13,550	15,600	19,139	22,367	25,342
Enrolment/month **		429	369	337	285

Figures take into account the downward trend of HIV infected requiring treatment in the WC Province entered since 2010 (ASSA model 2003), hence reflects a diminishing number of people needing to initiate on treatment through the years. Note that these figures are based on a CD4 eligibility cut-off of < 200 while the new national protocol will increase this threshold to CD4 <350 for TB cases and pregnant women, which will substantially increase the number eligible for care.

### Evolution of Baseline CD4

The proportion of patients starting with a CD4 count < 50 cells/µl has decreased gradually over time, reflecting increased access to ART (figure 7). It is worth noting, however, that the newly open ART clinics have higher proportion of people arriving at this late stage in their illness. This suggests that the new clinics are improving access to ART for a proportion of the population who were previously unable to access care.

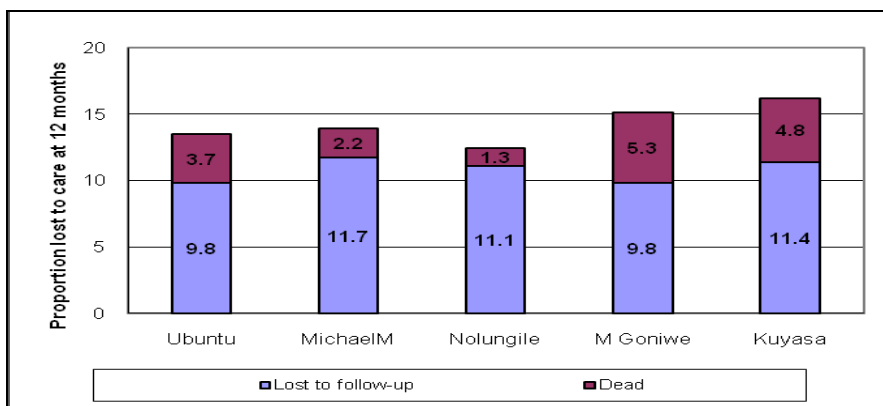
Figure 7: Proportion of patients with CD4 cell count < 50 cells/µl at initiation of ART



### Retention in care

The NSP target for retention in care at 12 months is 85%. This target has been reached in the larger CHCs (figure 8). The higher mortality in the smaller and newer City clinics is due to the higher proportion of patients with low CD4 counts starting ART (see above). The same phenomenon was observed during the early years in the CHCs; it points to the fact that each time a new ART site is opened, it starts to address a backlog of patients with advanced disease who did not access care before. In addition, since ART services in City clinics were started within TB services (see below), a higher proportion of patients are on TB treatment when starting ART. While the large CHCs grew modestly in early years, the City sites experienced a rapid growth of patient burden. In Khayelitsha, ART services were decentralized in a stepwise manner due mostly to political and resource constraints. Immediate decentralization, as in the MSF programmes in Lusikisiki and Lesotho,<sup>5</sup> has been found to result in more rapid coverage and earlier stabilization.

Figure 8: Retention in care at 12 months



<sup>5</sup> Cohen R, Lynch S, Bygrave H, Eggers E, Vlahakis N, Hilderbrand K, Knight L, Pillay P, Saranchuk P, Goemaere E, Makakole L, Ford N. Antiretroviral treatment outcomes from a nurse-driven, community-supported HIV/AIDS treatment programme in rural Lesotho: observational cohort assessment at two years. *Journal of the International AIDS Society* 2009, 12;23:1-8.

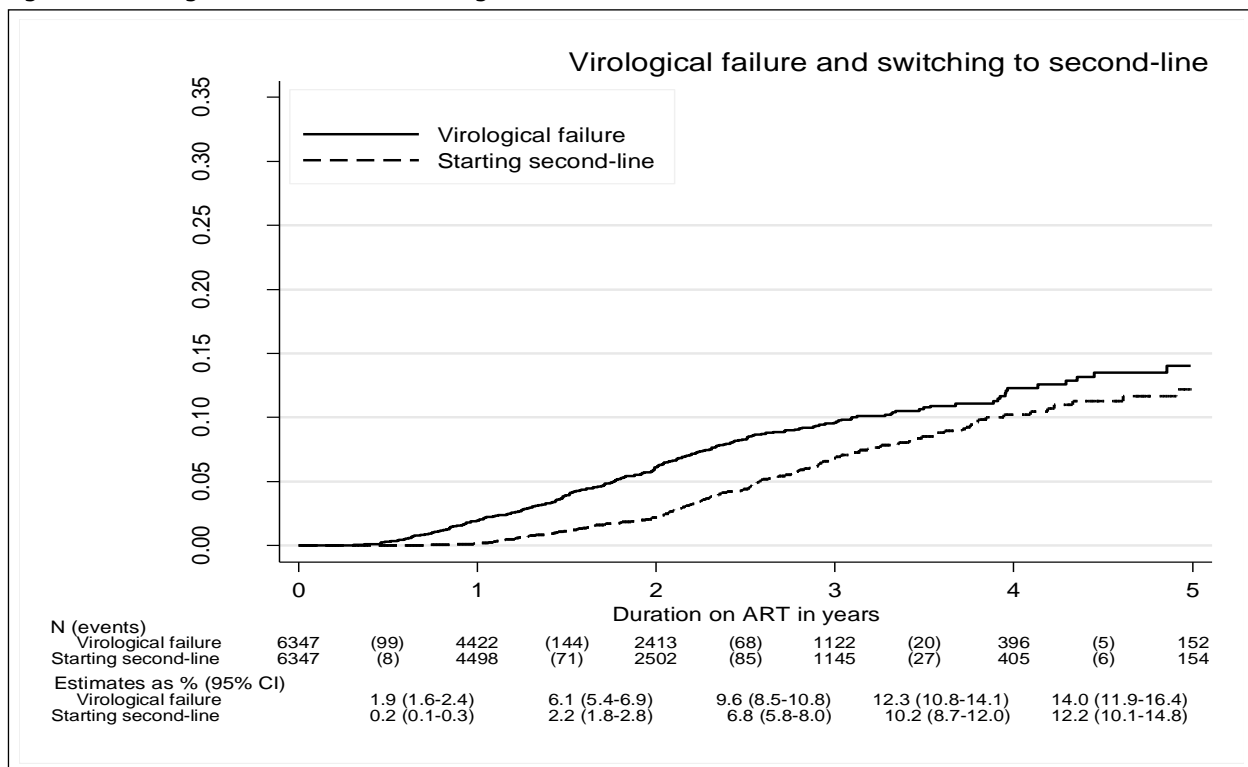
Overall, 87.3% of people are alive and on ART at 12 months and remaining in care (RIC) still remains high at 24 months at 80.4%. This drops to 75.2% at 36 months and 72.6% at 48 months, 69.8 % at 60 months and 65.1 % at 72 months (6 years). This trend can be improved in time with diminishing mortality rates (increasing baseline CD4) and an increased focus on adherence support.

In an analysis where patients who were lost to follow-up were matched with the national death registry, 32.8 % of patients lost to follow-up for at least 6 months were found to have died<sup>6</sup>.

### Treatment failure

An analysis of virological outcomes at five years on ART in patients starting ART at the three original CHCs found that a cumulative proportion of 14% had virological failure and 12% of these had been switched to a second-line regimen (figure 9)<sup>7</sup>. While the relatively low proportion of patients failing first line is reassuring, it also highlights the need to plan for an increasing number of patients requiring second-line ART. Current market price of second line drugs is still very high and long-term strategies are needed to ensure that South Africa is able to access the best available prices on the international market.

Figure 9: Virological failure and switching to second line



<sup>6</sup> Boule, A., G. Van Cutsem, et al. (2010) "Seven-year experience of a primary care antiretroviral treatment programme in Khayelitsha, South Africa." *Aids*. Published online ahead of print.

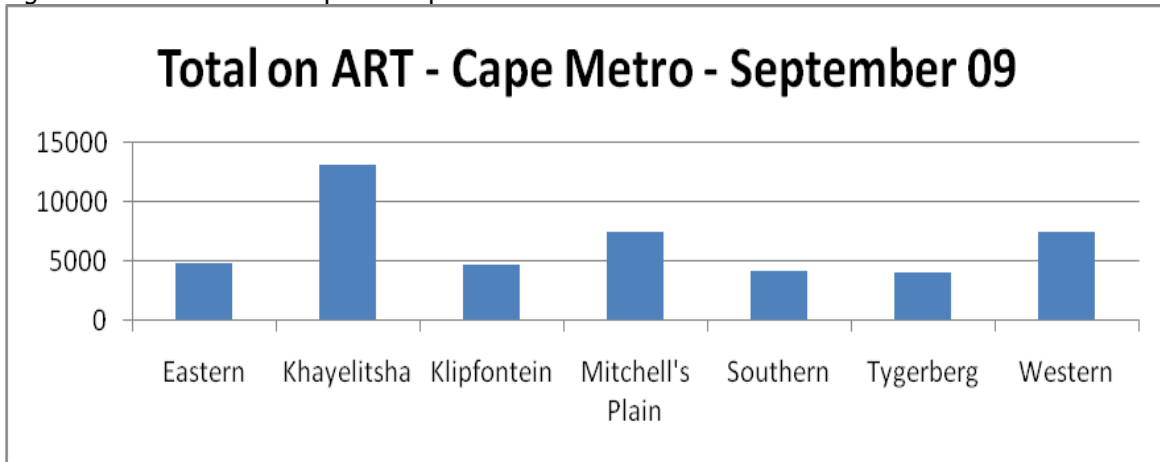
<sup>7</sup> Boule, A., G. Van Cutsem, et al. (2010) "Seven-year experience of a primary care antiretroviral treatment programme in Khayelitsha, South Africa." *Aids*. Published online ahead of print.



### Khayelitsha within the Cape Town Metropole and Western Cape Province

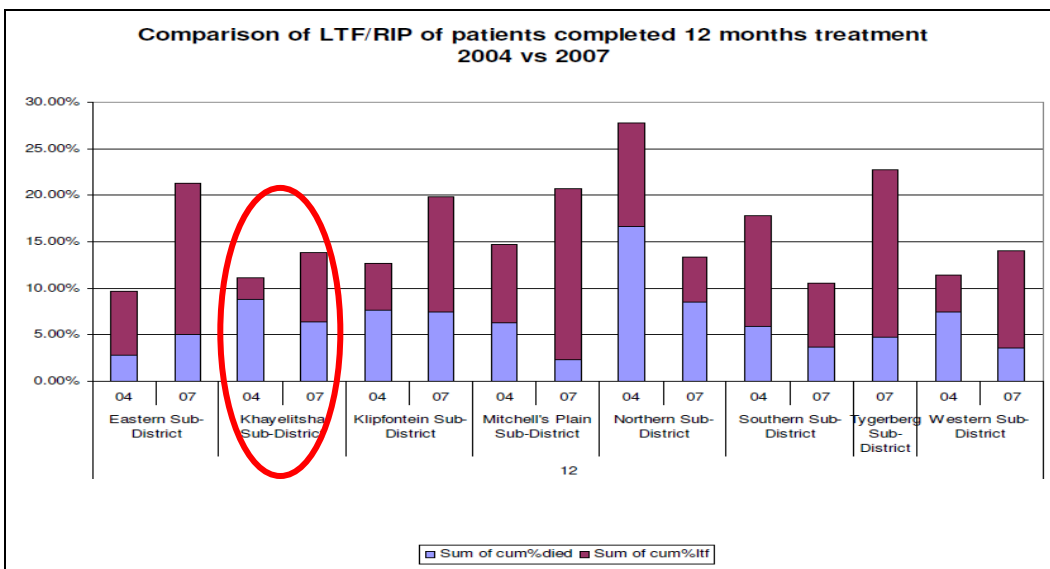
At the end of June 2009, 59,823 patients were on ART in 66 sites in the Western Cape Province, of which 42,331 (71%) were receiving ART from 41 sites in the Cape Metro (figure 10). With 12,288 patients on ART in 9 sites, Khayelitsha represents 20% of the Western Cape Province and 29% of the Cape Metro burden.

Figure 10: Total on ART Cape Metropole



With 9 primary care sites, the sub-district of Khayelitsha has achieved the highest level of decentralization in the Province (followed by Western with 5 primary care sites). This is further evidence of the need for decentralization to reach the modest ART coverage of 70% of those in need, which is below the NSP target. Decentralization is only possible by adopting a nurse-based model of care. Figure 11 shows that despite decentralization and a very high workload, Khayelitsha compares very favourably with other sub-districts in terms of retention in care.

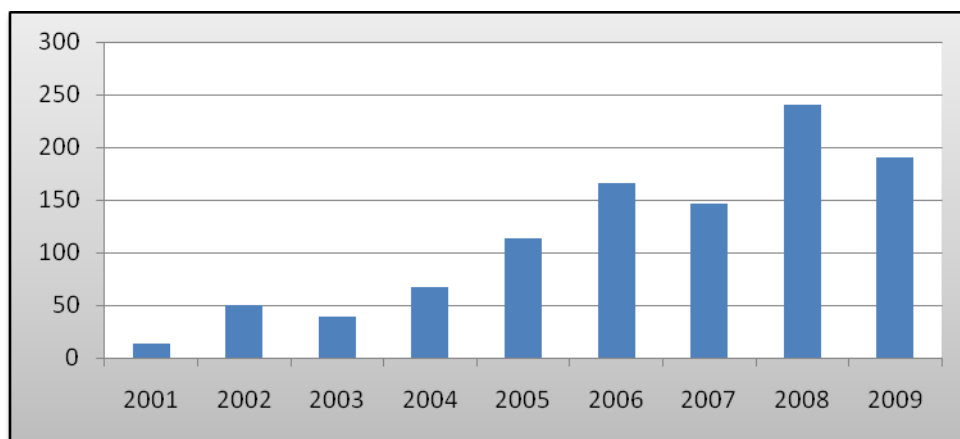
Figure 11: Mortality (blue) and loss to follow-up (red) at 12 months on ART in Cape Metro



## Children on ART

Initially, most children were accessing ART at tertiary hospitals. From 2004, paediatric ART was decentralized to primary care, and hospitals started to refer children to Khayelitsha clinics. There was a modest decline in enrolment of children in 2007, attributed to active recruitment by Tygerberg Hospital of all possible PCR (+) children for study purposes, but in 2008 the number of children initiated on treatment jumped and then has normalised in 2009 (figure 12).

Figure 12: Children started on ART per year (2001-2009)



The median age of children starting ART is around 4 years, but the range over time has extended to include older and younger children (range in 2001: 2 to 8 years; range in 2009: 2.4 months to 13.6 years). Few infants are being enrolled, possibly because they are still initiated at tertiary level, but also because PMTCT has reduced the rate of new infections. An increasing number of ageing children on ART are entering adolescence, an age group known to be at higher risk of poor adherence.<sup>8</sup> This high risk group will require more adapted interventions.

Children and adults are managed by the same clinicians at primary care, with nurses doing routine follow-up consultations and referring complicated cases to doctors. Tertiary hospitals provide telephonic and weekly on-site support for primary care doctors. Specific weekdays are allocated for paediatric consultations and in certain clinics a paediatric team has been established consisting of a counsellor, a nurse, and doctor with a special interest in children.

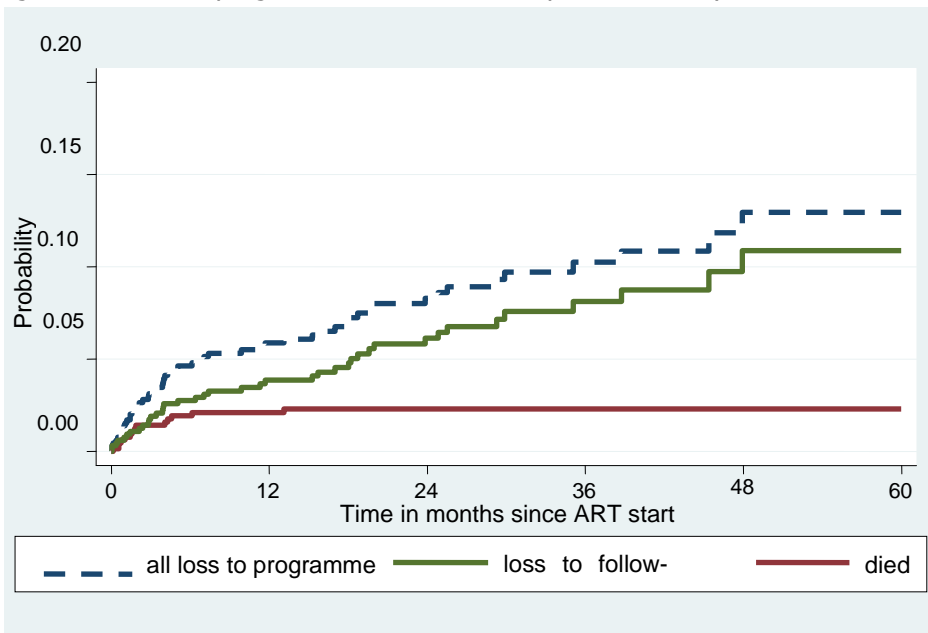
Task-shifting of paediatric ART was simplified by replacing syrups with tablets, using weight-based drug dosing charts, and integrating adult and paediatric care at primary care with mentoring and support of nurses by doctors, and doctors by paediatricians.

These strategies have resulted in good programme outcomes, with 87% of children remaining in care and 98% alive at 5 years on ART<sup>9</sup> (figure 13). This compares favourably with almost 70% retention in care at five years in adults.

<sup>8</sup> Nachega J, Hislop M, Nguyen H, Dowdy D, Chaisson R, Regensberg L, Cotton M, Maartens G. Antiretroviral Therapy Adherence, Virologic and Immunologic Outcomes in Adolescents Compared With Adults in Southern Africa. *J Acquir Immune Defic Syndr* 2009. 51: 65-71.

<sup>9</sup> Colvin C, Knight L, Van Cutsem G et al. *Paediatric Outcomes after Three Years on ART in Khayelitsha Township, South Africa*. 4<sup>th</sup> South African AIDS Conference, 2009. Oral presentation.

Figure 13: Loss to programme, loss to follow-up and mortality in children



For children on ART, specific adherence support is provided to their carers, but more needs to be done to educate and support children directly as primary beneficiaries. MSF and its partners have tried a range of approaches, including engaging the "Zip Zap" — a local circus school programme for children. The annual Zip-Zap World AIDS Day show, attended by thousands of children and youth, symbolizes positivity and hope of children living with HIV.

## **Long term challenges: a model of chronic care for stable patients**

There are many challenges in scaling up antiretroviral therapy (ART) in resource-limited settings, whilst at the same time promoting long-term retention in care for an expanding and ageing cohort. Given that lack of clinical staff – both doctors and nurses – is one of the main underlying factors affecting both increased access to and long term retention on ART, different models of care need to be adapted to the needs of different patients. Patients enrolling on ART, particularly those with low CD4 counts, need intensive clinical and counselling care during treatment initiation; for long-term, stable patients, the frequency and duration of clinic visits could be streamlined, with the majority being rapidly screened at two or three monthly medicine “pick up” points and clinical visits and safety bloods once or twice a year. Innovative models, including task shifting to cater to the differing needs of these two groups of patients, need to be found.

From 2001 to 2006, as the number of people started on ART each year increased, losses to follow-up also increased (figure 15). Services were saturated, staff turnover was high, staff morale was low, patients were frustrated by long waiting times, and the sheer volume of patients resulted in less contact time and counsellors doing patient preparation over fewer and shorter sessions. In 2007, the clinics reached maximum capacity, and overall enrolment on ART decreased. Ubuntu clinic alone was following over 2600 patients.

To meet enrolment targets and maintain an acceptable level of adherence, several service innovations were introduced to streamline, adapt, and improve adherence support in Khayelitsha.

### **Adherence Forum**

Since 2007, MSF is convening monthly *adherence forums* bringing together all adherence counsellors in Khayelitsha. This meeting allows for review of outcomes (including enrolment, loss to follow-up, etc.), enables counsellors to share experiences and receive training on new guidelines, and gives a platform for all parties to address gaps in support services.

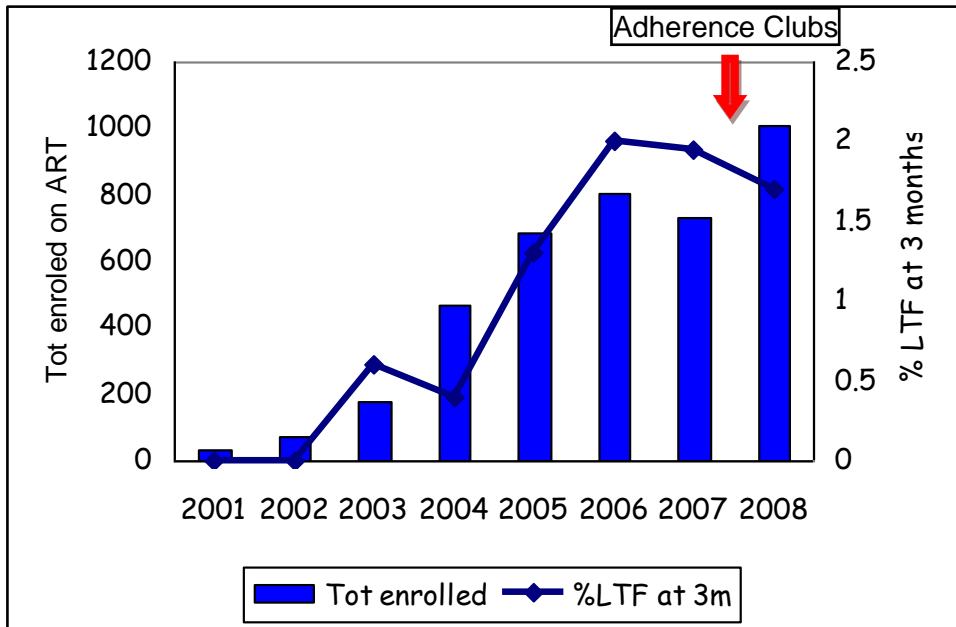
### **Adherence Clubs**

At the end of 2007, adherence clubs were established in Ubuntu Clinic, with the objectives of improving clinic efficiency to keep up with enrolment targets and improving long-term adherence by providing more patient-friendly services.

Adherence clubs are group clinic visits run by lay health workers who dispense pre-packed ARVs. Adherence Clubs are available on a voluntary basis for adult patients stable on ART for 18 months or more and with the two most recent viral load results being undetectable. The period of 18 months was chosen to minimize the risks of developing symptomatic hyperlactataemia (SHLA) that is associated with the use of D4T. Clubs comprise a maximum of 30 patients who meet every two months; they are reminded of their appointment by sms the day before. On “club days” the group meets in a room, where members are weighed and asked for any signs and symptoms of opportunistic infections or adverse events. A talk is given from a list of topics prepared in advance; in some cases, the group will ask for a particular topic to be discussed. If safety bloods are required, patients are first referred to the nurse for bloods, and then given their pre-packed medications. The aim of the clubs is for patients to be in and out of the facility within 2 hours. Should a person develop a problem, whether an opportunistic infection, a serious adverse event or a detectable viral load, or in the event of a person missing 2 or 3 consecutive club dates, they are referred to a clinician for more intensive follow up.

Patients attending the adherence clubs are seeing a clinician (doctor or nurse) once every six months, with their viral load and CD4 count results. An average club visit lasts 2 hours. There is very little waiting time as clubs occur at specific time-points. Before the introduction of adherence clubs, these patients had two-monthly clinical visits with a nurse and an average waiting time of three to four hours. Following the introduction of adherence clubs in Ubuntu, the enrolment rate has gone up, whilst losses to follow-up decreased (figure 14).

Figure 14: Yearly enrolment and 3 m LTF- Ubuntu



Ubuntu clinic: number of patients enrolled on ART per year versus percentage lost to follow-up (LTF) at 3 months. Adherence clubs were introduced at the end of 2007. This was followed by increase in enrolment and decrease in LTF.

The bringing together of the same group of people who have been on treatment for similar lengths, aims to encourage a dynamic of mutual support. Anecdotally this has been seen to be the case: when certain clubs became too large and members were asked to move to another club they refused, stating they felt attached to their particular club.

As of the end of 2009 there were a total of 13 clubs with over 700 people enrolled. An evaluation is ongoing and the results will guide the next steps. With more than 4400 patients on ART in Ubuntu clinic, many more patients are requesting enrollment into clubs. On average, every month, 140 to 160 new HIV patients arrive to the facility and 100 are initiated on ART.

While facility-based adherence clubs seem to have improved clinic efficiency, space constraints and increasing numbers on ART mean a new saturation point will be reached soon. The next step will be to move clubs to the community, and alter the meeting frequency from 2 to 3 months.

The potential for these clubs to be developed to provide support for other issues of importance to the community is being considered as a future adaptation.

## Enhanced Facility & Community-Based Adherence Support

The high volume of patients coupled with a recognition that adherence support is most critical for newly-initiated patients led to the decision to explore ways of enhancing the existing adherence model. A pilot *community treatment supporter programme* was launched for early adherence, through the strengthening of facility-based adherence counselling (long-term adherence was addressed by the *adherence clubs*).

The objectives of the community treatment supporter programme were to improve early adherence through pre-ART home visits, early defaulter tracing, and support groups during the first three months on ART. A team of 40 "Treatment Supporters" was assigned across seven clinics providing ARV services. MSF and the Treatment Action Campaign (TAC) oversaw the management of this programme in four clinics, whilst Fikelela (a local NGO) managed the treatment supporters in the three other clinics.

An early evaluation of the MSF/TAC community treatment programme found that the model was underperforming in terms of home visits and patient attendance.

- Over 5 months, 14 treatment supporters achieved an average of 49% of the established target of 32 home visits per month. This was only marginally better at smaller sites (56%) even with the use of a paper-based monitoring system and active involvement of MSF with both treatment supporters and adherence counsellors.
- Where patients had received a home visit because they were eligible for ART, only 30% were seen.
- Where patients defaulting treatment were recalled, 83% were seen, but only 50% returned to the clinic. Again, this was worst at a larger ARV site where, of the visits reported, only 43% could be traced back in the folders and only 7% returned to clinic

Overall, the programme has performed poorly with regards to the investment. The following barriers were identified: patients giving false addresses preventing tracing, difficulty in obtaining defaulter lists in larger ART sites due to electronic database problems, long distances between facility and patients' homes, poor collaboration between adherence counsellors and treatment supporters (especially where they are managed by different NGOs), inadequate integration of different monitoring systems, and difficulty to supervise home-visits.

In addition to this programme, a number of facility-based adherence interventions are being piloted. These include: an adherence screening for patients on ART presenting for routine visits using various tools; a system for tracing early defaulters on a timely basis via phone calls and home visits; revised counselling modules and tools to improve patient preparation for ART; education and support sessions to boost adherence for patients on ART at 6, 12, and 18 months; and separation into high and low adherence risk "track" system, similar to that used in Gugulethu, where high-risk patients are identified through criteria (such as detectable viral loads) and receive additional support via sessions with adherence counsellors, home visits and phone calls.

## Adolescents and young adults

The NSP states that 'Young people represent the main focus for altering the course of the epidemic' and recognizes young people as a *population at higher risk*, who should be the *focus of all interventions*<sup>10</sup>. HIV testing and enrolment on ART of youth is low, and it is notoriously difficult to maintain young people in chronic care. The importance of this is compounded by the increasing numbers of patients who initiated ART during childhood who are now entering adolescence.

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<sup>10</sup> Department of Health. (2007). *HIV & AIDS and STI Strategic Plan for South Africa 2007-2011*. Pretoria: Department of Health.

A recent folder review revealed that less than 10% of patients testing for HIV at site C Youth Clinic are below 18 years of age, and only 33% are below 20 years. More than 70% of youth testing were female. HTC among youth, especially young men, is low. The review also identified that 61% of youth eligible for ART defaulted care before starting treatment. In analyses of patients on ART in the three CHCs in Khayelitsha, youth (especially 20-24 years) were found to be at higher risk of loss to follow-up and virological failure<sup>11, 12</sup> (figures 15 and 16).

Figure 15: Proportion remaining in care by age group

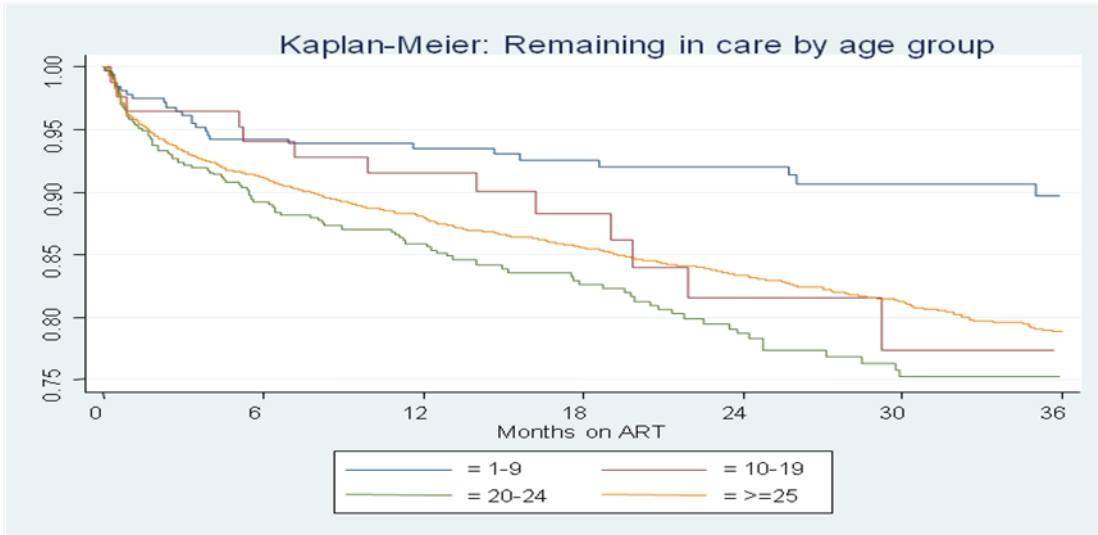
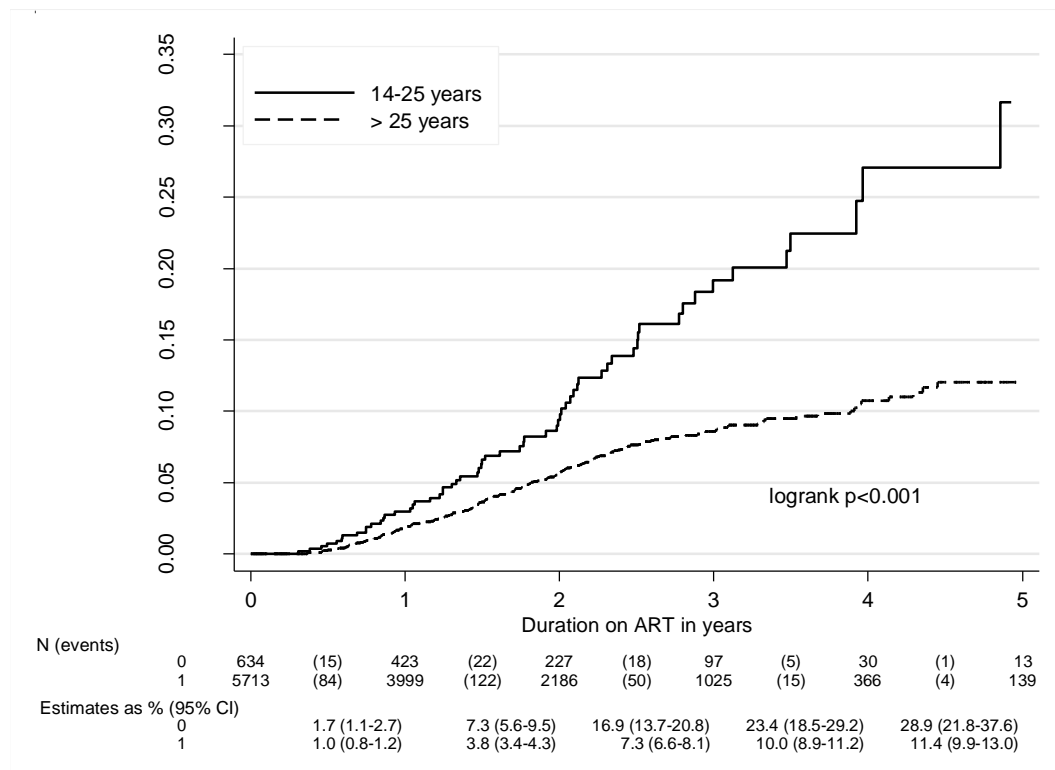


Figure 16: Proportion with virological failure



Kaplan-Meier analysis of patients on ART with virological failure, defined as 2 consecutive viral loads above 5000 copies/ml.

<sup>11</sup> Boulle A, Van Cutsem G, Hilderbrand K et al. *Seven-year experience of a primary care antiretroviral treatment programme in Khayelitsha, South Africa.* AIDS 2010. E-pub 6 Jan.

<sup>12</sup> Van Cutsem G, Hilderbrand K, Mathee S et al. *Loss to follow-up and associated factors at different durations of antiretroviral therapy in Khayelitsha.* 5<sup>th</sup> International AIDS Conference, Cape Town, 2009. Abstract WEPEB284.

In Khayelitsha, two Youth Clinics offer youth-friendly services comprising HIV testing and counseling, family planning, STI and general HIV care, integrated TB/HIV services (in site B only), termination of pregnancy (site C only), and health education. ART services were launched in the Site C and site B Youth Clinics during the first half of 2008.

In November 2009, 130 youth were on ART in site C and 110 in Site B Youth Clinic. Whilst virological suppression rates for youth in care were good, the rate of loss to follow-up continued to be higher than that seen in adults, highlighting the need for enhanced support.

A youth programme has been recently started with the following objectives:

- Increase the uptake of HIV testing and counseling by youth
- Decrease the gap between a positive test and receiving care
- Improve adherence and retention in care of youth on ART

Some progress has been made to achieve these objectives, but much more needs to be done to ensure adolescent-friendly services.

## **Treatment Literacy**

The Treatment Action Campaign (TAC) has been running a treatment literacy programme in Khayelitsha since 2001, focusing on rejection of discrimination, support of openness about HIV, adherence to ART, empowerment of PLWHAs, and community promotion of HIV prevention, VCT and TB/HIV care. Treatment literacy providers (TLPs) are running daily education sessions and discussions in all ARV clinics of Khayelitsha. In addition, TAC is running a large training programme, providing TB/HIV literacy to volunteers, NGOs and CBOs, and the community.

In addition to ART treatment literacy, TAC has placed a growing emphasis on TB and TB/HIV; 27 peer educators delivered daily sessions inside 12 clinics and during door-to-door campaigns in the community, covering topics such as drug resistant TB (MDR and XDR), infection control, use of masks, TB treatment adherence and complexities of TB/HIV co-infection, such as difficulty diagnosing smear-negative TB in HIV-positive clients.

In the youth clinics, to the work of treatment literacy educators is reinforced by HIV education programmes (the Siyanqoba Beat it Series) that are aired continuously on televisions. These have assisted and enhanced the education sessions facilitated by the treatment literacy educators.

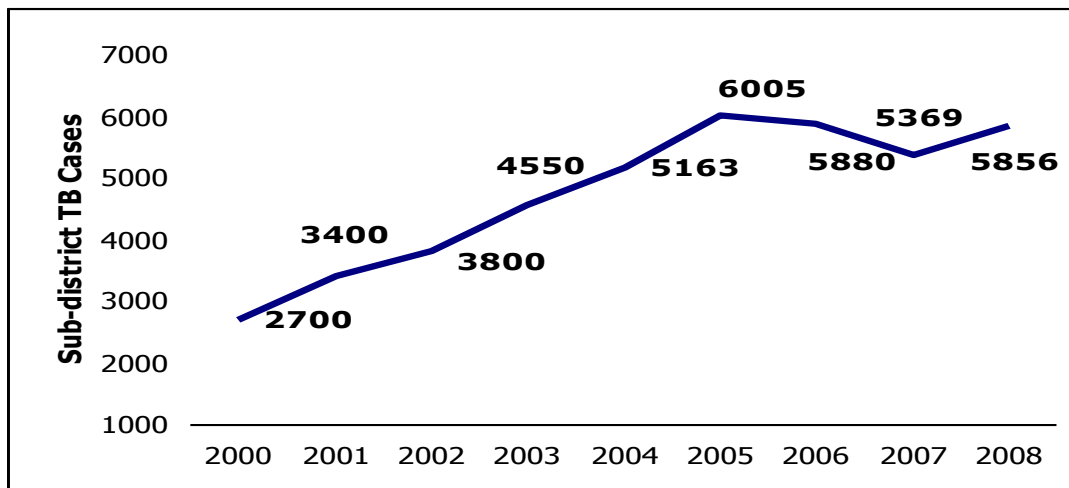


## TUBERCULOSIS

### The TB Epidemic in Khayelitsha

TB case notification rate has been rising sharply since early 2000 in Khayelitsha, levelling off from 2005 at an incidence at 1,596 per 100,000 (figure 17). The TB/HIV co-infection rate still oscillates around 67-70 %. The TB programme is performing relatively well; the cure rate for new patients was 76% in 2008.

Figure 17: TB case notification rate in Khayelitsha 2002-2008



While the total numbers of TB cases has remained constant, the presentation of TB has changed sharply, with a decrease in smear positive cases together with a strong increase of smear negative and extrapulmonary cases. The increase in clinical skills within the TB clinics through TB/HIV integration (see below) has allowed for a better detection of non-pulmonary clinical forms of TB. As detection has improved, the total number of TB cases has stopped increasing: this probably shows the impact of large scale ART coverage in reduction of TB incidence.

### TB/ ART integration at PHC level

TB is the main cause of mortality in co-infected patients<sup>13</sup>. With the highest HIV prevalence rate and highest TB case notification rate for the Western Cape, the integration of TB and HIV services was clearly a priority in a setting like Khayelitsha to achieve success at the individual (impact on mortality), population (reduction of TB incidence) and services (resource constraints) level.

In Khayelitsha, approximately 70% of patients with TB are HIV positive and approximately 50% of HIV patients starting ART have TB at the time of initiation.

Previously, patients were referred from TB clinics to distant ARV service points (and vice-versa), resulting in long waiting times and duplication of both clinical and laboratory investigations and medical records. Patients were also seen by different health care staff, which was a waste of resources and a confusion for patients.

The objectives of integration are to remedy these problems by providing a "one stop" service, close to the community. In 2004, a pilot clinic was launched—the Ubuntu clinic in Site B—where TB and HIV services, including ART, were integrated. This model has since been extended to other clinics in Khayelitsha.

<sup>13</sup> 2006 folder review at GF Jooste hospital : 56% of HIV deaths attributed to TB while only 15% on ART, Behroozi, IAS 2009

Specific objectives in the integration of TB and HIV services in Khayelitsha

- 1) Increased HTC amongst TB clients and CTX prophylaxis
- 2) Increased diagnostic of TB disease , including smear negative, pulmonary, and extra pulmonary TB
- 3) Improved access to ART for co-infected patients
- 4) Integrated clinical management of co-infected persons "one stop" service
- 5) Increasing service efficiency by optimizing resources use
- 6) Integrated approach to adherence support and defaulter tracing
- 7) Intearate M&E for both diseases

Integration of ART in TB clinics is an incentive for TB patients to take an HIV test: in 2008, 99% of TB patients received counselling and 95% accepted (opting –out strategy), 99% had a CD4 count done and were started on cotrimoxazole prophylaxis. Increased detection of TB in co-infected patients translates in ability to detect smear negative PTB and EPTB which traditional nurse-based TB services are not equipped to do.

Figure 18: Evolution of TB case notification by presentation in Khayelitsha 2002-2008

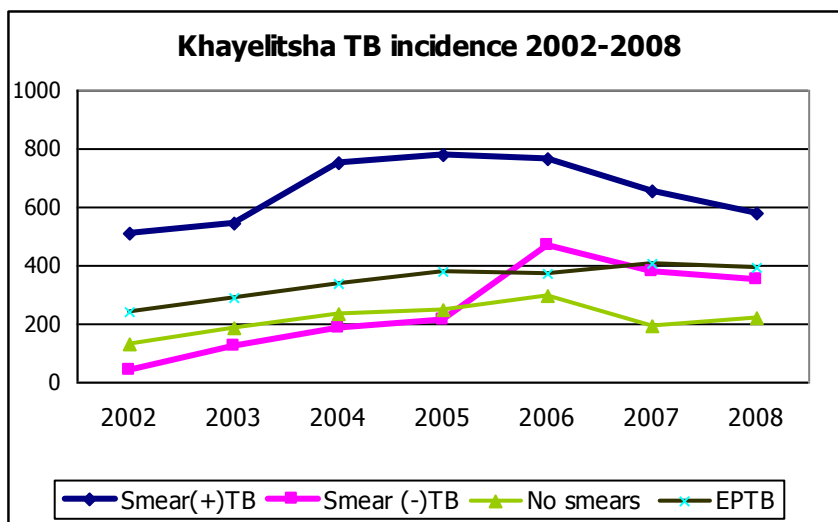
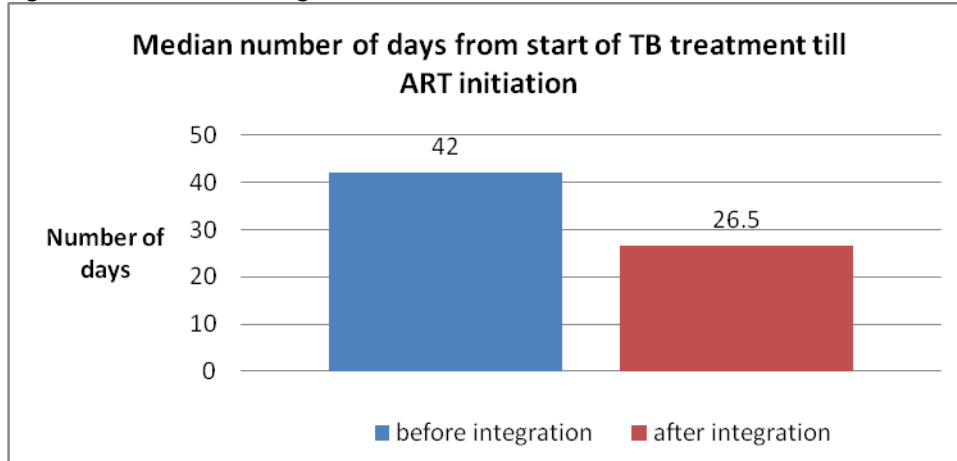


Figure 18 above shows the evolution of TB detection with marked increased of smear-negative PTB and EPTB. This requires the use of specific nurse-based smear-negative algorithms as well as extensive use of TB culture.

Enrolment on ART for TB patients was low prior to integration as most patients needed to be referred to another clinic (with the exception of Ubuntu clinic, the integrated TB/HIV clinic). In 2007, only 19 % of patient enrolled on ART in CHCs were referred from TB services. The newly integrated PHC clinics show a radically different picture: a folder review in Mayenzeke clinic reveals that up to 68 % of patients enrolled on ART are on TB treatment. This is close to 100% coverage of patients with TB requiring ART, given the co-infection rate of approximately 70%.

The median waiting time for TB patients to access ART initiation has decreased from 42 prior to integration to 27 days after integration (figure 19).

Figure 19: Median waiting time from start of TB treatment till ART initiation before and after integration

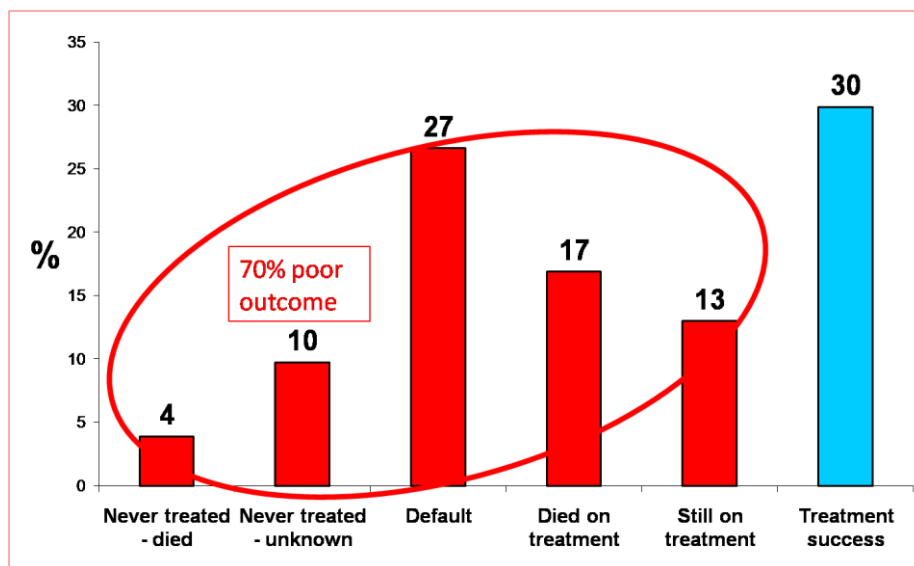


### Decentralized drug-resistant TB Care

Treatment outcomes for drug-sensitive tuberculosis are satisfactory in Khayelitsha, with 82 % success rate and 74 % cure rate (2007). However, an increasing number of patients have been diagnosed with drug-resistant tuberculosis (DR-TB) in recent years, including multidrug-resistant (MDR) and extensively drug-resistant (XDR) tuberculosis.

While current national policy is to admit all MDR-TB cases to a dedicated MDR-TB treatment centre for at least six months, the high patient load in Khayelitsha has outstripped capacity at the local TB hospital (Brooklyn Chest Hospital), resulting in delayed treatment (figure 20). Furthermore, as over two-thirds of MDR-TB patients in Khayelitsha are co-infected with HIV, this centralised approach created contradictions with the primary health care-based decentralised ART programme, and has led to patients feeling isolated and depressed, and defaulting from care.

Figure 20: Outcomes of DR-TB patients diagnosed in 2005-2006 in Khayelitsha based on a retrospective review of clinic records



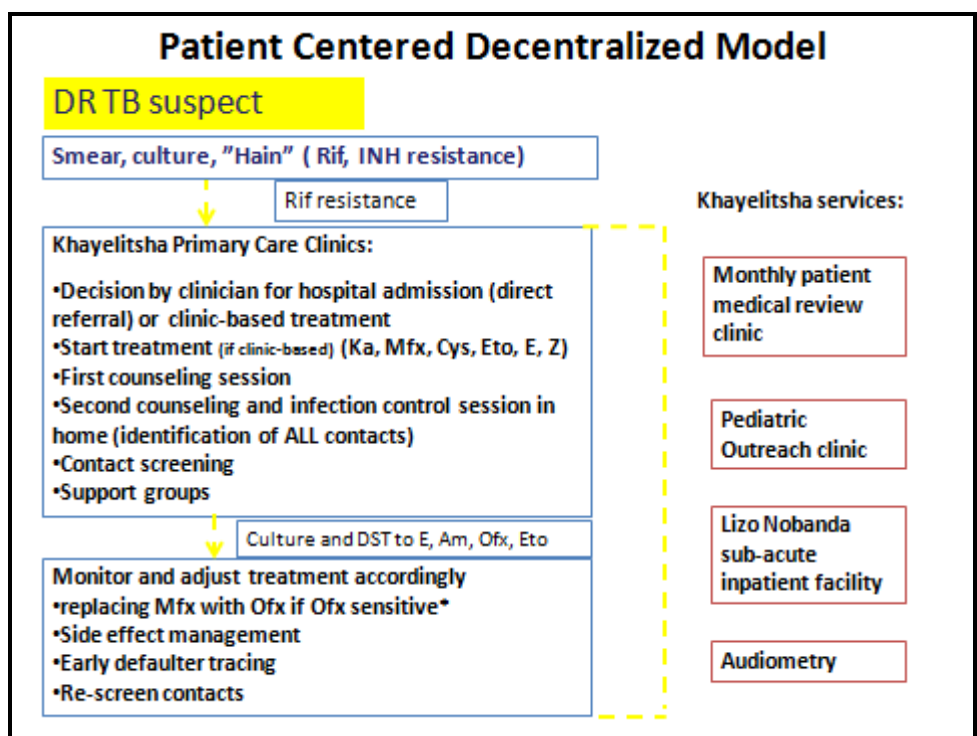
In response, a pilot project was established by MSF, the City Health Department and PGWC to develop strategies for the provision of decentralised DR-TB care into primary health care facilities in Khayelitsha. Individualised adherence support mechanisms, defaulter tracing, improved infection control measures (in health facilities, patient's homes, and in the community), together with staff

training in DR-TB and large scale social mobilisation, are all key elements of the approach. The principle aim of the Khayelitsha DR TB pilot is to improve the care and treatment of people with drug-resistant TB through a patient-centred approach.

- Primary objectives include:**
- 1. Improving case detection of DR-TB** with appropriate screening of DR-TB suspects and screening of all close contacts.
  - 2. Improving treatment outcomes** with reduced time to initiation of treatment, improved treatment regimen and patient adherence support.
  - 3. Decreasing DR-TB transmission**

A secondary objective is to develop a model of care that may be applicable to other peri-urban settings and document and disseminate lessons learned.

Figure 21: Current model of care for DR-TB patients diagnosed in Khayelitsha

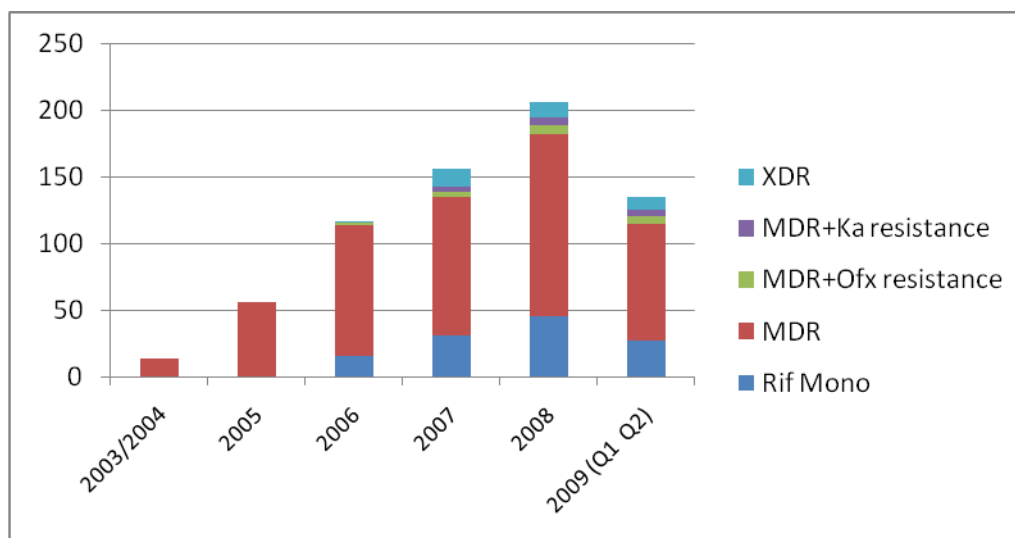


*\*See strengthened DR-TB standardized treatment regimen 2.3*

## 1. Improving case detection

An accurate assessment of patient numbers and treatment outcomes is not possible due to the lack of systematic registration of patients diagnosed with DR-TB prior to 2007. Nonetheless, data collected from both clinic files and laboratory reports prior to 2007 and systematically thereafter suggests that case detection has improved dramatically in Khayelitsha with the implementation of the pilot project (figure 22).

Figure 22: Cases registered in Khayelitsha by year and DR-TB classification at diagnosis



*Note: these numbers exclude patients who have restarted treatment and been re-registered*

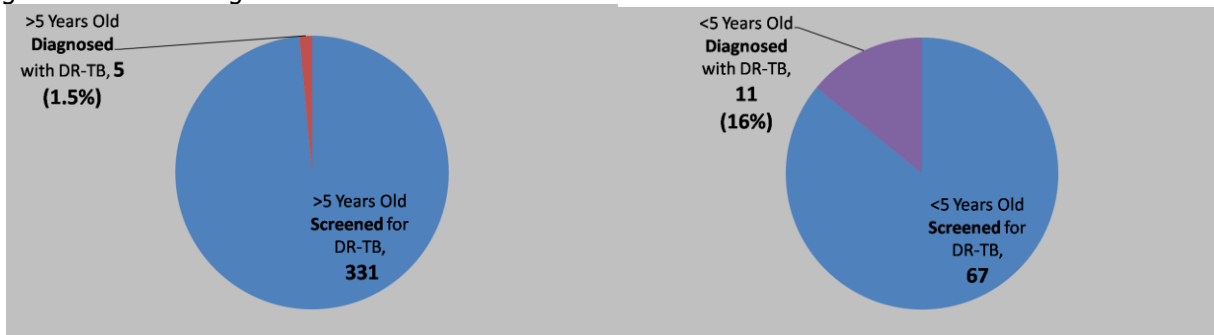
Given an estimated population of 500,000 people, the DR-TB notification rate in Khayelitsha has increased from 23/100,000 in 2006 to 42/100,000 in 2008. This 82% increase is most likely a reflection of improved case detection rather than increasing incidence, although the lack of adequate diagnosis and treatment in the past is likely to have also contributed to an actual increase in DR-TB incidence.

In 2008, MSF conducted a community-based representative survey to assess the extent of DR-TB in Khayelitsha. Rifampicin resistance tuberculosis was diagnosed in **5.2% and 11.1%** of new and previously treated cases. This equates to an estimated case-notification rate for rifampicin resistant tuberculosis of 77/100,000/year, with new cases constituting **57%** of the estimated total DR-TB burden. Based on the survey results, it is estimated that only 54% of rifampicin-resistant cases were actually detected in 2008.

### Screening of DR-TB Contacts

Close contacts of DR-TB cases are identified initially by the index case at diagnosis, and confirmed by a home visit by the DR-TB counsellor. Household and close contacts of DR TB cases are screened for symptoms and symptomatic contacts are further screened with culture and DST. Asymptomatic contacts are educated on the signs and symptoms of TB and given a letter stating they are a contact of a DR-TB case to present to the clinic should they develop symptoms of TB. Analysis of data from January 2009 to August 2009 is presented in the following figures.

Figure 23: DR-TB diagnosed in contacts of DR-TB Cases

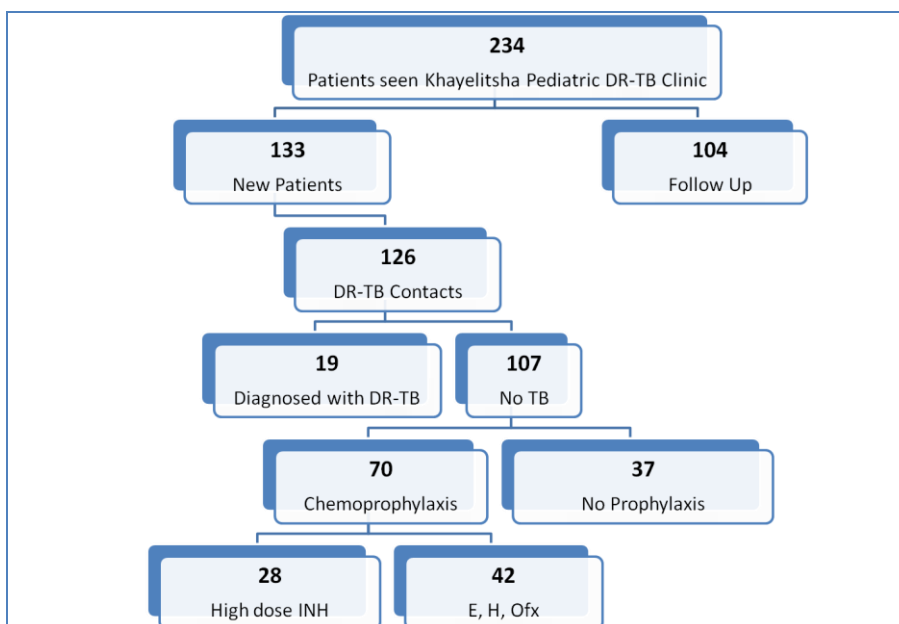


Preliminary data suggests that under 5s are most at risk for contracting DR TB (figure 23: 16% vs. 1.5% among adult cases). However, paediatric contacts are more likely to be screened than adults, so this data is not reflective of the total paediatric contact population.

*Khayelitsha paediatric DR-TB clinic*

In December 2008, a clinic for paediatric DR-TB cases and child-contacts of DR TB cases was established in Khayelitsha as a monthly outreach clinic by Tygerberg specialists. Prior to this date, children suspected of DR-TB and paediatric household contacts of DR TB cases were referred to Tygerberg Hospital, 25 km from Khayelitsha. It was found that many patients referred to Tygerberg never kept their appointments.

Figure 24: Children seen in 2009 (Jan-Dec) in the monthly Khayelitsha DR-TB paediatric clinic

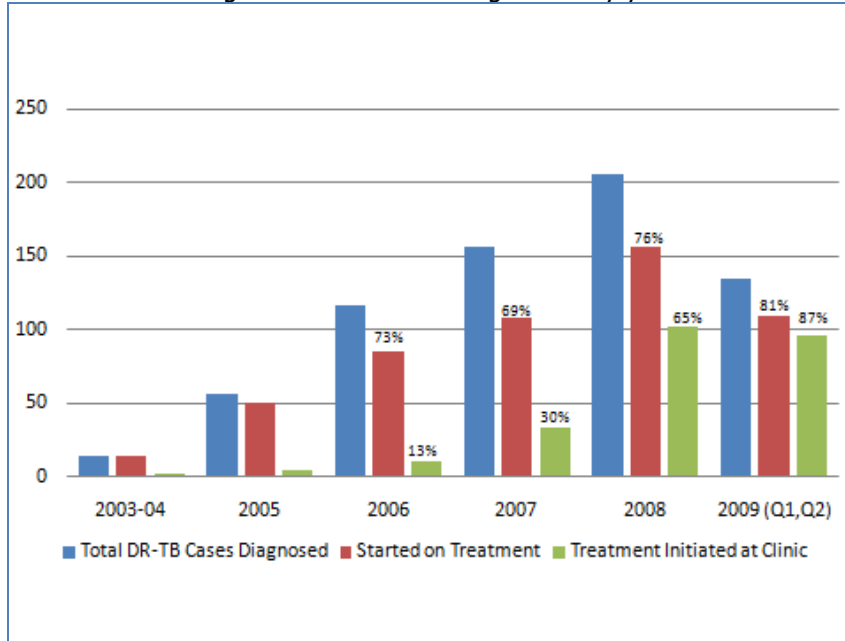


## 2. Improving treatment outcomes

### 2.1 Treatment Initiation

In total, 582 patients from Khayelitsha have been initiated on DR-TB treatment during the first 3 years of the programme (figure 25). Prior to 2007, very few patients who were started on treatment were registered; therefore many diagnosed cases were most likely missed during this time.

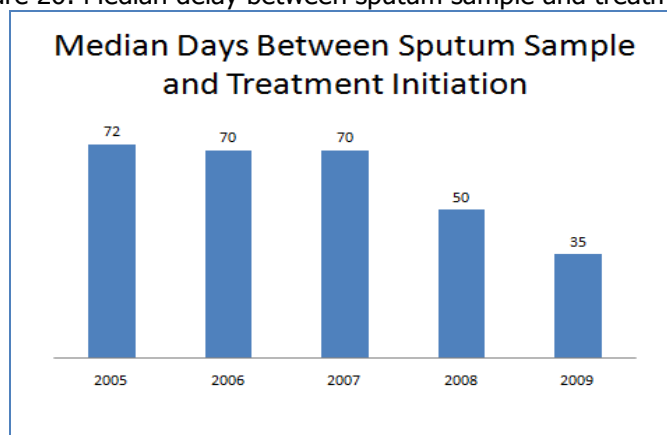
Figure 25: Treatment initiation among total DR-TB cases registered by year and initiation in clinic vs. hospital



### 2.2 Reducing time to treatment

Improvements in diagnostic delay through the implementation of the HAIN rapid line-probe assay by NHLS along with improvements in clinic processes have led to a 50 % reduction in the time between sputum sampling and starting patients on appropriate second line therapy from 72 days in 2005 to 35 days in 2009 (figure 26).

Figure 26: Median delay between sputum sample and treatment initiation

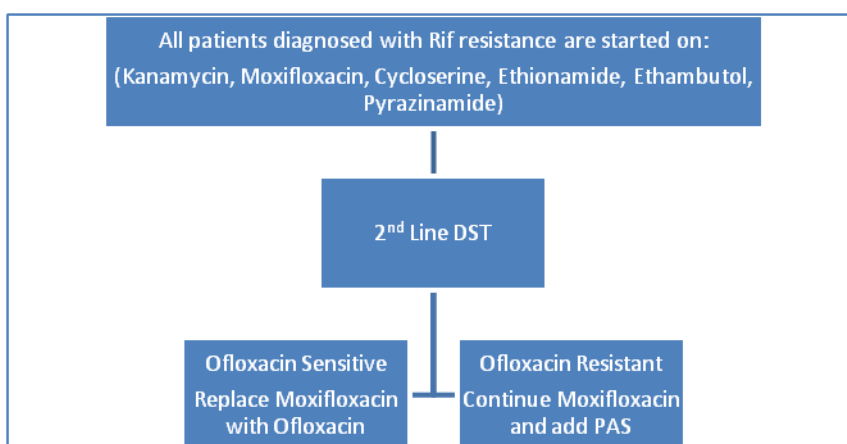


From January 2008 to June 2009, 73 patients diagnosed with DR-TB did not start treatment. Of these patients, 39 (53%) patients were known to have died whilst waiting for their results; the median time of death was 25 days from sputum sampling. It is therefore essential to further reduce the delay between sputum sampling and treatment initiation.

### 2.3 Strengthening DR-TB standardized treatment regimen

Up until September 2009, patients with rifampicin-resistant TB were started on a standardized treatment regimen as per the national South African guidelines (Kanamycin, Ofloxacin, Ethionamide, Ethambutol, and Pyrazinamide). When second-line resistance results became available, the treatment regimen was modified to provide at least 3 drugs to which the infecting strain was likely to be susceptible. However, given the delay in receiving second-line results, if initial second line resistance is shown, further resistance may have developed during this time. In September 2009, MSF strengthened the standardized treatment regimen for Khayelitsha patients presenting with rifampicin resistance; replacing Ofloxacin with Moxifloxacin and adding Cycloserine to the standardized regimen from the start of treatment (figure 27). This would allow an effective treatment regimen if and when further resistance is later demonstrated. If second-line drug sensitivity testing (DST) reveals the strain to be sensitive to Ofloxacin, then Moxifloxacin is replaced with Ofloxacin for the duration of treatment.

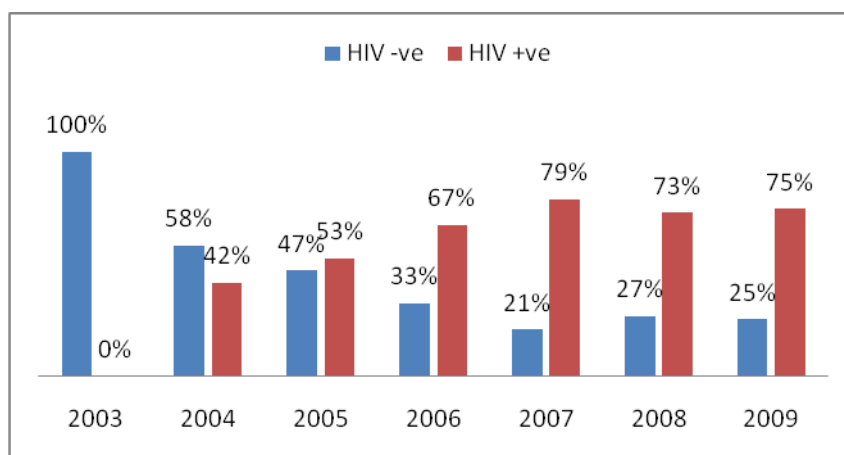
Figure 27: Strengthened DR-TB regimen for patients diagnosed with Rif resistance pending second line DST



### 2.4 HIV co-infection and ARV treatment

The proportion of DR-TB cases that are HIV co-infected has increased since 2005/2006 and is now comparable to the proportion among drug-susceptible TB cases in Khayelitsha (Fig. 29). This suggests an improvement in case detection and that in past years HIV positive DR-TB cases may have had higher mortality prior to diagnosis and may therefore have been missed (figure 28).

Figure 28: HIV status of registered DR-TB cases (2003 to Q2-2009)

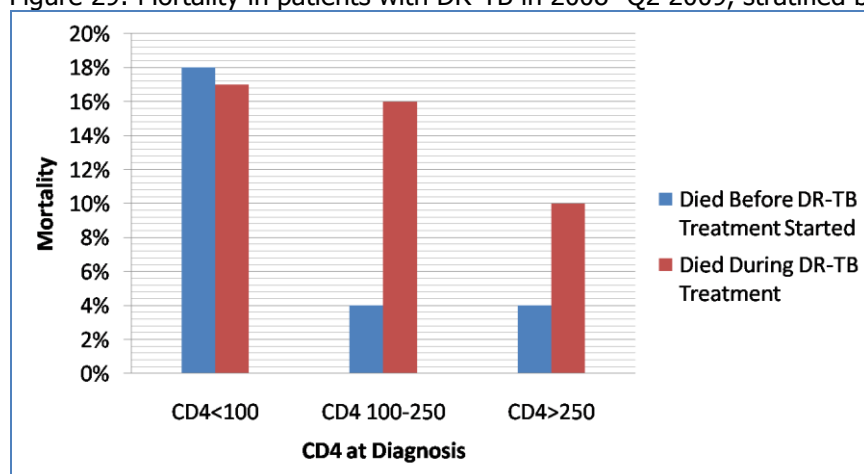


Of the 226 HIV infected patients diagnosed with DR-TB in 2008-(Q2) 2009, 206 have had a CD4 result at DR-TB diagnosis. Among these, the majority (43%) had a CD4 <100; 33% had a CD4 100-250, and the rest (24%) had a CD4 >250.



All patients diagnosed with DR-TB are eligible for ART in the Western Cape, regardless of their CD4 count. Patients with a low CD4 have significant mortality prior to starting treatment for DR-TB (between sputum sent and results received) and during treatment, as shown in figure 29.

Figure 29: Mortality in patients with DR-TB in 2008- Q2 2009, stratified by CD4



### 2.5 Patient Support

In Khayelitsha, DR-TB patients are offered treatment literacy and counselling as soon as possible after diagnosis. This is done by dedicated MSF DR-TB counsellors supported by 2 peer educators. Patients receive a second treatment literacy and counselling session in their home. The aims of this session are to:

1. Provide treatment literacy to patients and families about DR-TB;
2. Assess the risk of transmission of DR-TB in the household and develop strategies to minimise this risk.
3. Counsel household members and close contacts about the need for screening

All clinics have a DR-TB support group. Currently there are a total of 74 patients attending the weekly support groups.

### 2.6 Sub-acute care at the primary care level

Lizo Nobanda is a 12 bed sub-acute in-patient facility for DR-TB patients in Khayelitsha. Eight rooms are single isolation rooms with a mechanical ventilation system that provides at least 12 air changes per hour (ACH) in each room. Two rooms are double rooms reserved for patients who are culture negative. Admission is restricted to Khayelitsha residents and criteria for admission include: short term admission (1-2 weeks) for the initiation of treatment; advanced clinical stage, side effects, adherence problems; and palliative care.

Table 1: Reasons for admission and length of stay (LOS) to Lizo Nobanda (June to November 2009)

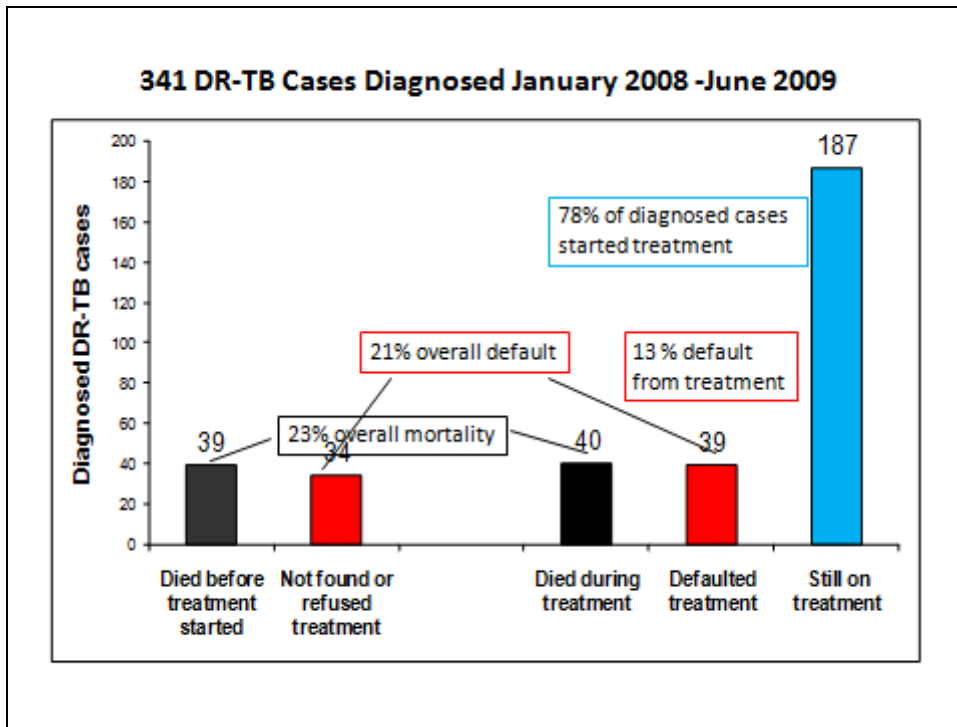
Reasons for admission	Number of admissions	Median LOS Days
Management of comorbidity	10	53
Treatment initiation	12	14
Adverse reactions to DR-TB drugs and/or ARVs	5	30
Palliative care	3	9
Other	6	

Patients are referred to Lizo Nobanda by the TB doctors from the peripheral health clinics in Khayelitsha and cared for by the referring doctor whilst admitted. The short term admission of

newly diagnosed patients allows for them and their family members to receive intensified counselling and treatment literacy, psycho/social/economic assessment and baseline audiometry. Access to immediate in-patient care for patients experiencing side effects to their medications, adherence issues and social problems, allows for the continuation of treatment whilst providing appropriate treatment support.

## 2.7. Early treatment Outcomes

Figure 1: Early Outcomes for DR-TB patients (diagnosed Jan. 2008- June 2009)



While the implementation of the Khayelitsha DR-TB pilot project is in its early phases, it is anticipated that the interventions will result in improved treatment outcomes. To improve treatment outcomes, patients need to be both diagnosed and initiated on treatment early. Mortality still remains high, with 50% of deaths occurring prior to the initiation of treatment, although the rate of defaulting from treatment has improved (figure 30).

### 3. Decreasing TB transmission / Infection control

The provision of effective treatment rapidly reduces infectiousness and it is assumed that much of TB transmission occurs prior to infectious patients being diagnosed and receiving treatment. Therefore the most effective measure to reduce transmission is the early diagnosis and treatment for DR-TB cases.

Given the congregation of many vulnerable individuals and the extent of undiagnosed and untreated DR-TB in health care facilities, universal infection control is essential for all health care facilities to provide a safe environment for staff and patients. Likewise, universal measures for prevention of TB transmission at homes and in the community at large are important.

#### 3.1 Reducing the risk of TB transmission in Khayelitsha health facilities

An infection control policy with emphasis on the three levels of TB infection control (administrative, environmental and personal protection) has been implemented in each health facility in

- Prompt case detection and treatment initiation
- Prompt screening and monitoring of household contacts
- Prophylaxis for those at risk of developing TB disease (children, elderly, immune compromised individuals, HCW's)
- ARV's for HIV infected individuals
- Community awareness on: signs and symptoms of TB; TB transmission and ways to decrease the transmission of TB (open windows, cough hygiene)
- Universal infection control at all health facilities

Khayelitsha. Administrative controls include the establishment of infection control committees in each facility with ongoing staff training, education in cough hygiene and identification of coughing patients, routine screening of health care workers and adjustments to patient flow in order to reduce overcrowding in poorly ventilated corridors.

Environmental controls are centred on improving natural ventilation. Natural ventilation is maximized by opening windows and doors leading outside. "Stop TB, Open Windows" stickers have been placed on all windows. Wind driven air extractor turbines

(whirlybirds) have been installed in indoor waiting areas, corridors and consultation rooms to increase natural ventilation. Wall or door grates have been installed to increase airflow if windows are closed during the winter months. Research is underway to evaluate the effectiveness of wind-driven turbines to deliver sufficient ventilation in clinics. Outdoor waiting areas are used where feasible and all health facilities have well-ventilated sputum collection booths outdoors.

Measures for personal protection include encouraging the use of N95 respirators by all clinic staff. Paper masks are provided to all clinic attendees in the reception and waiting rooms. These have helped to reduce the stigma around mask wearing.

#### 3.2 Reducing the risk of TB transmission in the homes of TB patients and the community at large

DR-TB patients receive a home visit where counseling on TB transmission is provided to all household members. Patients are encouraged to wear paper masks in closed environments until culture conversion. During the home visit, an assessment is made of the vulnerability of household members, crowding and ventilation, with a plan to reduce transmission, including arrangements for the patient to sleep separately, receive visitors outdoors and improve natural ventilation in the house. Contacts are identified and referred for investigations as appropriate.

To reduce the risk of TB transmission in the community, interactive education sessions for community groups on DR-TB and TB transmission are conducted. This includes various NGOs, community leaders, and community groups (including traditional healers, schools, church groups, health forums and even shebeens (local bars) owners. There are also weekly radio phone-in talk show and campaigns at train stations and taxi ranks.

#### **4. Disseminating lessons learned**

The DR TB project in Khayelitsha is now officially recognized as one of two pilot projects of decentralized management of DR TB in South Africa. The success of the project has resulted in adoption of the model in the new draft national DR TB guidelines as well as model for the Western Cape Province. Some of the “best practices” of the model have been rolled out into other sub districts in the Cape Metro Region, with the support of the MSF DR-TB Team.

## **COORDINATION AND MANAGEMENT: A (SUB) DISTRICT APPROACH**

Decentralization of management, monitoring and evaluation, and training is at the core of the Khayelitsha programme and has largely contributed to its success in expanding access to appropriate treatment, care and support to HIV positive people and their families, as aimed by the NSP.

While the Provincial Government of the Western Cape, the City of Cape Town, Médecins Sans Frontières, and the many other actors involved in TB/HIV in Khayelitsha are not always in agreement, and have at times been at odds, continuous efforts have been made to maintain communication and coordinate strategies.

### **Sub-district management**

Importantly, PGWC as well as City Health have decentralized management of HIV services. This is a recent development for PGWC and has greatly improved reactivity and problem-solving at facility level. Until 2008, monthly Khayelitsha HIV/AIDS District Task Team Meetings brought together representatives from all actors in the sub-district: government, NGOs, and community representatives. Venue and chair rotated to allow fair representation. Proximity with the community and health facilities led to pragmatic decision making. In 2008, these meetings were replaced by the Integrated District Management Team Meetings, comprising PGWC and City Health, with limited participation of NGOs. Meetings between PGWC, City Health, and NGOs are still being organized ad hoc; joint district annual planning is to resume in 2010. A structured NGO forum will be established which should enable this sector to interact directly with district management.

District coordination meetings, with clear minutes and action points, not only facilitated communication and better coordination, but most importantly created a *common vision*.

### **Monitoring and evaluation**

The project has included a pilot monitoring system that aims to equip future managers with adequate monitoring tools. The monitoring and evaluation (M&E) system is three-tiered, with different levels of sophistication depending on the size of the clinics. Clinics with less than 1000 patients on ART have a paper-based system using ART registers; clinics with more than 1000 patients use a simple electronic register, and the large CHCs, with more than 3000 patients on ART use an online electronic database which is used for sentinel surveillance. In these larger CHCs clinical record keeping remains paper-based, and the structured clinical records are captured by dedicated data-capture staff, ideally on the same day, prior to re-filing.

Ongoing district-based supervision and mentoring of data capturers, clinicians, and facility managers promote the use of local statistics to influence local management and policy.

Monthly and quarterly reports are fed back to clinic staff in monthly ARV meetings and facility managers are encouraged to organize meetings at facility-level to discuss monthly reports and actions to be taken.

## Training, mentoring, and supervision

### Training

Training and mentoring are coordinated at district level and occur across a continuum. Since 2001, MSF, in collaboration with PGWC and the City of Cape Town, has organized quarterly training for nurses on the clinical management of HIV and TB, including ART. The training methodology seeks to link theoretical knowledge with practical cases, and the majority of the lecturers are doctors and nurses working in Khayelitsha. The advantages are that experienced clinicians can continue to mentor nurses in their clinics after the course, and that district team spirit is fostered in the process. More than 500 nurses have been trained through this programme.

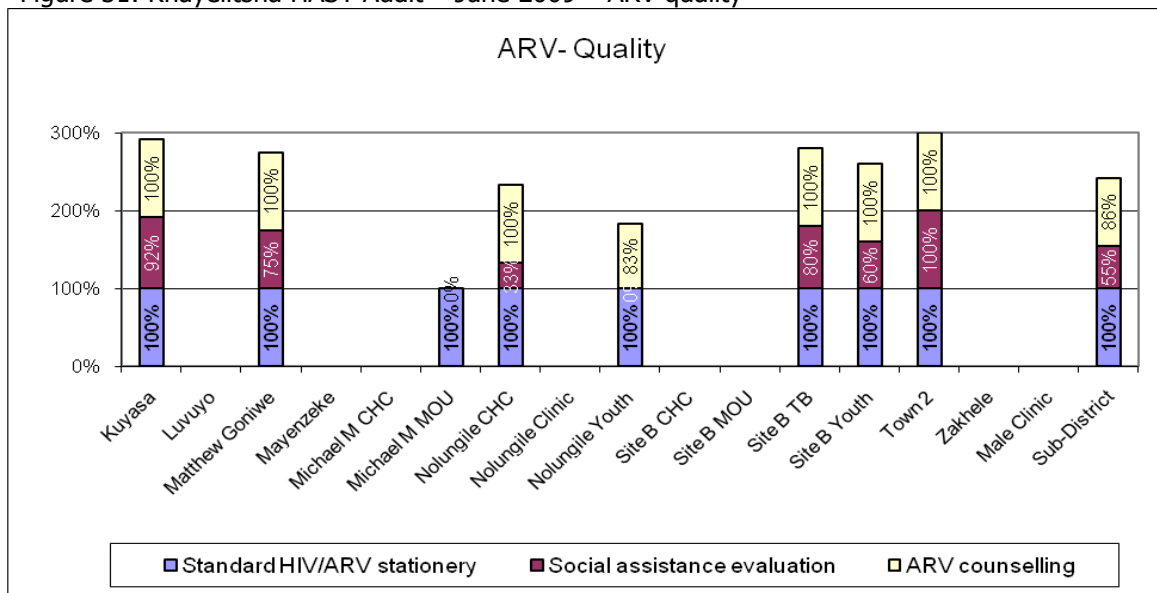
### Mentoring

Mentoring is part of clinicians' job description and is essential to support nurse-based services. Alternate doctor and nurses' rooms and rooms with connecting doors facilitate ongoing communication during consultations. In addition, medical meetings with case discussions, expert presentations, and policy reviews are held on a two weekly basis. Case discussion meetings at facility-level are also encouraged. During the first few months of integration of ART in a new clinic, an experienced nurse is added to the existing staff to mentor and help with the implementation of this new programme.

### Audit

PGWC and the City of Cape Town initiated a vast HIV/AIDS/STI (HAST) auditing exercise to monitor and improve quality of care. This audit is done every six months by means of folder reviews, audit of equipment & stationary, register reviews, and interviews with facility management. Facilities are being audited by health staff of other facilities in the district. Audit results are fed back to clinic staff, facility managers, and up to provincial and city level. An example of audit outputs is provided below (figure 31). The audit tool serves not only to monitor quality of care, but also as an excellent supervision tool. It helps health staff to identify specific shortcomings and prioritize areas of improvement.

Figure 31: Khayelitsha HAST Audit – June 2009 – ARV quality



Percentages are based on an audit of 10 randomly selected folders per facility and help identify areas needing improvement and in creating awareness around priority areas among clinic staff.

## **OPERATIONAL RESEARCH**

The Khayelitsha project has benefited since its inception from fruitful collaborations with academic institutions. The University of Cape Town's Centre for Infectious Disease Epidemiology and Research (CIDER) at the School of Public Health and Family Medicine has been supporting monitoring and evaluation since the beginning of the project, providing detailed cohort analyses via enhanced sentinel surveillance. Key findings include the publication of the early programme outcomes<sup>14</sup>, demonstrating the feasibility of ART in a resource-limited, primary care setting, and the description of high rates of lactic acidosis with d4t<sup>15</sup> that contributed to the withdrawal of this drug from WHO guidelines.

Khayelitsha is also part of the International epidemiological Databases to Evaluate AIDS Southern African Collaboration (IeDEA-SA), established to systematically review the effectiveness of antiretroviral therapy in various regions, and to compare the experience between these regions. This collaboration includes 11 ART programmes in South Africa and provides a unique opportunity to report on the national ART programme.

Other academic partners include the Department of Pharmacology, the Clinical Infectious Diseases Initiative, the School of Public Health and Family Medicine and the Health Economics Unit at the University of Cape Town, the Infectious Disease Unit at GF Jooste Hospital and the Centre for Molecular and Cellular Biology at the University of Stellenbosch. Some of the ongoing research include a randomized trial of isoniazid prophylaxis versus placebo in patients on ART, a survey of drug resistant tuberculosis (including molecular epidemiology), and the field testing of a novel molecular diagnostic test for tuberculosis (Cepheid's GeneXpert) in collaboration with FIND and UCT.

Khayelitsha project has put in place a committee to ensure that research is done in a way that contributes to service delivery and involves local partners. One of the aims is to ensure that local clinicians are involved as much as possible in operational research. This also constitutes an incentive to their daily routine work and contributes to retain health staff. Faced with an increasing number of requests from several research groups due to Khayelitsha worldwide notoriety in the HIV/Aids world, the Ubuntu Clinic Research Committee was established in 2007 to: ensure that patient care is not disrupted by research; ensure that research is relevant and of benefit to the community in which it is being undertaken; involve wherever possible local health care providers in research projects to maximize local capacity building and ensure there is overlap with the interests of providers where research impacts on their work; and ensure synergy and coherence between projects and that the investment of research partners is not compromised.

The Centre for HIV/TB Operational Research and Training (COHORT) is currently being setup to further coordinate operational research in Khayelitsha and ensure that research and service delivery operate in a complementary manner.

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<sup>14</sup> Coetzee D, Hildebrand K, Boulle A, Maartens G, Louis F, Labatala V, Reuter H, Ntwana N, Goemaere E. Outcomes after two years of providing antiretroviral treatment in Khayelitsha, South Africa. *AIDS* 2004. 186:887-95.

<sup>15</sup> Boulle A, Orrel C, Kaplan R, Van Cutsem G, McNally M, Hilderbrand K, Myer L, Egger M, Coetzee D, Maartens G, Wood R; International Epidemiological Databases to Evaluate Aids in Southern Africa Collaboration. Substitutions due to antiretroviral toxicity or contraindication in the first 3 years of antiretroviral therapy in a large South African cohort. *Antivir Ther.* 2007;12(5):753-60.

## FUTURE CHALLENGES

Figure 32: Khayelitsha scenario for 2019

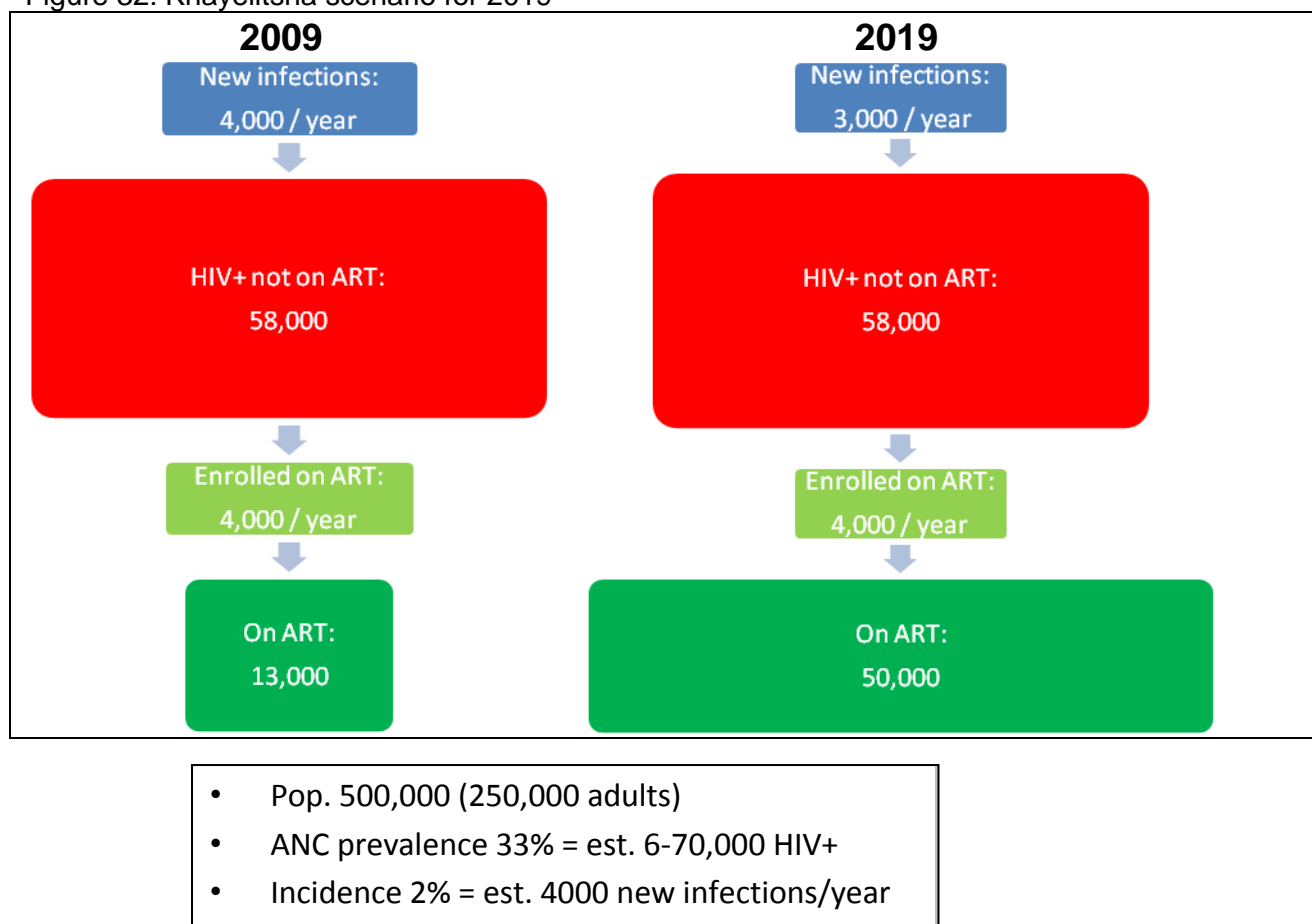


Figure 32 summarizes the key future challenges for a sub-district like Khayelitsha by looking at a likely scenario in 10 years time:

1. A slight decrease in incidence will not reduce significantly the pool of HIV-positive people in the community
2. clinics will need to recruit at least 4,000 new patients /year
3. this will create an enormous population of patient on ART

New models of care will need to be developed to increase patient retention while alleviating the clinic workload. Khayelitsha, despite an exceptionally high disease burden and substantial resources constraints, has demonstrated that most NSP targets are achievable: with 13,500 on treatment by end 2009 and an enrollment capacity around 400 patient/month it is likely that, thanks to the decentralization strategy involving all PHC clinics, Khayelitsha will be able to accommodate the announced ART initiation CD4 threshold of 350 for TB patients and pregnant women. Qualitative outcomes are within range with 87 % remaining in care at 12 months. This supports the urgency to remove, at national level, policy barriers which prevent decentralization and integration at primary care level, such as stringent accreditation criteria and barriers to nurse initiation of ART.

This report shows excellent initial outcomes of TB/HIV services integration, which becomes even more evident when resources are scarce. Decentralization of DR-TB treatment is also possible, provided that certain stringent conditions are adhered to.

All of the achievements described in this report have been made without a proportional increase in staffing. This requires consistent efforts to support the staff morale and make them feel ownership of the programmes successes. Non-financial incentives are mandatory such as ongoing training,



clinical on-site coaching and ongoing supervision informed by monthly meetings reviewing achievements against targets.

What might not transpire from the NSP is what it requires in terms of management:

1. a dedicated district management team open to regular meetings with community organizations
2. constant program adjustments informed by a rigorous M&E system
3. streamlined decision-lines to allow for quick decisions and additional resource-allocation where justified

One essential NSP target will not be achieved: a **50 % reduction in HIV incidence by 2011**. Aside from anything else, incidence remains very difficult to measure, which makes it impossible to properly assess the impact of various prevention strategies.

Another outstanding issue will be the challenge of long-term care for patients, including difficult groups such as adolescents.

Finally, the various approaches outlined in this report highlight the high value of operational research, which has enabled development of a number of important clinical advances, including tools to support nurse diagnosis of smear-negative TB, the management of side-effects such as lactic acidosis using newer medicines, the use of viral load to promote adherence and detect drug resistance early, and the piloting, in South Africa, of more effective drug regimens for the treatment of MDR-TB.

## CONCLUSIONS

Khayelitsha sub-district represents an important and time-appropriate demonstration of the feasibility of targets set forth in the National Strategic Plan (NSP) for HIV/AIDS and Sexually Transmitted Infections (STI), including achieving "universal coverage" of ART needs by 2011 in a high HIV prevalence and very high TB incidence area with limited human resources.

More than ever, large integrated pilot projects such as Khayelitsha have an important role to play both nationally and internationally in demonstrating how existing services can adapt to face these major dual epidemics. It demonstrates how achievements of ambitious targets can successfully impact on disease mitigation, mortality reduction and altogether community adherence to common goals. This comes at an important time when at international level doubts are raised about the impact of such programmes, resulting in previous commitments to provide universal coverage by 2010 being disregarded.

As the oldest public health ART programme in South Africa, Khayelitsha represents a "window into the future", illustrating tomorrow's challenges to keep ahead of the dual epidemics. The main challenge however remains to reduce incidence while keeping a large number of ART patients in chronic care, mostly in non clinical settings.

Further incidence reduction will be achieved with both increased ART coverage (lower CD4 threshold) and new interventions targeting HIV(-) youths.

Initiatives to retain ART patients in chronic care show promising initial results but will need further fine-tuning and adaptation to local contexts to ensure good outcomes while improving patient satisfaction, essential for long term adherence.

Results show how much adolescents on ART, mostly the vertically infected, present particularly challenging adherence issues for which novel types of interventions still need to be found.

The manner in which chronic ART care programme are being profiled will inevitably improve community involvement and responsibility sharing in carrying the disease burden. The successful community based DR-TB programme illustrates this clearly as this condition is still considered in most parts of the country as State hospitals' responsibility.

While everyone questions health service capacity to take on further load, the Khayelitsha programme design pays particular attention to both re-enforce existing health services in a creative way while boosting community responsibility, promoting the spirit of 'Ubuntu'.

This might be the strongest achievement of this programme, the product of an ongoing drive to harness all willing forces, from community based NGO's to City and Provincial health services as demonstrated by this report.

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