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HIV and Health Systems in Southern Africa

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The UWC Centre for Research in HIV and AIDS was created in 2009 to foster synergies among research efforts across faculties and disciplines, actively engaging communities, schools, the health system, and gender and social equity advocates. Housed in the School of Public Health, Faculty of Community and Health Sciences and with a University-wide mandate, the Research Centre emphasizes systems and society, initially concentrating on : health policies and systems; education and learning; gender and gender –based violence; and capacity strengthening. The HIV In Context Working Papers seek and contribute to engage scholarship and debate that understands and addresses “HIV In Context”. They include a range of genres, from state of the art reviews of the literature to theoretical or methodological think pieces to reflect and experimental contributions from scholars, educators, practitioners, activists and policy makers. The opinions expressed in the Working Papers are those of the authors alone.

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Abstract

Before the HIV/AIDS pandemic, the health systems of sub-Saharan Africa were steadily improving the overall health status of the population with marked decreases in important indicators such as under five mortality. This could be attributed to higher quality of and increased access to various health services. However, with 22 million people in sub-Saharan Africa currently living with HIV¹ and an estimated 1.9 million new infections in 2007¹, the impact on the health sector over the next decade is likely to be significant.

What is the impact of HIV/AIDS on health systems sub-Saharan Africa? Until recently, there has been little effort to document this impact. To begin, HIV/AIDS has substantially increased the demand for health services. Patients seeking treatment for more traditional illnesses are being crowded out to peripheral health facilities. This has led to congestion at the secondary and tertiary levels, while weakening services at the primary level. Additionally, impacts of the epidemic on the health workforce include attrition due to illness and death, absenteeism, low morale, increased demand for provider time and skills, diversion of resources, budgetary and managerial inadequacies, and other effects of managing systems under stress. Furthermore, interventions and programmes to address HIV/AIDS have generally been 'magic bullet' type vertical interventions which often do not take health systems into account. Even seemingly simple interventions such as prevention of mother to child transmission of HIV (PMTCT) which initially only involved one drug given during labour, has struggled to have an impact on preventing new infections in children. This has highlighted how even simple interventions require well functioning health systems to be effective, medically complex or long term interventions, even more so.

The purpose of this paper is to provide an overview of the effect of health systems on the performance of HIV/AIDS programmes in Southern Africa with a particular focus on the prevention of mother to child HIV transmission programme (PMTCT). The WHO framework for health systems will be used as a conceptual framework throughout the paper to illustrate examples and cases of how weaknesses in each area of the health system can affect the performance of programmes as well as examples of interventions shown to improve the functioning of these components. Current policy and research priorities will also be included. Information for this paper came from review of journal articles, project reports and grey literature, personal communication with researchers and the authors own experiences as researchers in this field.

Background

Sub-Saharan Africa remains the region most heavily affected by HIV, accounting for 67% of all people living with HIV and for 75% of global AIDS deaths in 2007. The Southern African sub region carries the greatest burden with 35% of HIV infections and 38% of AIDS deaths in 2007¹. Women account for half of all people living with HIV worldwide, and nearly 60% of HIV infections in sub-Saharan Africa.

The high rates of HIV amongst pregnant women have led to an increasing impact of HIV on child survival in sub-Saharan Africa as 90% of child HIV infections are due to mother to child HIV transmission. In the most heavily-affected countries, such as Botswana and Zimbabwe, HIV

is the underlying reason for more than one third of all deaths among children under the age of five¹. Many of the high burden countries have seen a reversal of previous gains in child survival, making the fourth Millennium Development Goal totally out of reach².

Almost all of the countries most heavily affected by HIV are characterized by weak health systems with a severe human resource shortage. According to recent WHO estimates, the current workforce in some of the most affected countries in sub-Saharan Africa would need to be scaled up by as much as 140% to attain international health development targets such as those in the Millennium Declaration³. This situation limits the capacity of national governments to implement appropriate intervention programmes to deal with diseases such as HIV/AIDS and furthermore to see any benefit of these programmes.

The past ten years have seen a rapid increase in what are commonly known as global health initiatives (GHIs) which were put in place as an emergency response to accelerate the scale-up of control of the major communicable diseases, especially HIV/AIDS. GHIs are characterized by their ability to mobilize huge levels of financial resources, linking inputs to performance; and by the channeling of resources directly to non governmental civil society groups⁴. Three GHIs; the World Bank's Multi-country HIV/AIDS Programme (MAP), the Global Fund to Fight AIDS, TB and Malaria, and The President's Emergency Plan For AIDS Relief (PEPFAR) are contributing more than two thirds of all direct external funding to scaling up HIV/AIDS prevention, treatment and care in resource-poor countries⁴.

Whilst it would be expected that GHIs present an opportunity for overall health systems improvement in developing nations, this has seldom been realised⁵. Positive effects of GHIs have included a rapid scale-up in HIV/AIDS service delivery, greater stakeholder participation, and channeling of funds to non-governmental stakeholders. Negative effects however include distortion of recipient countries' national policies, notably through distracting governments from coordinated efforts to strengthen the health system and re-verticalization of planning, management and monitoring and evaluation systems⁴.

To fully understand the effect of health systems on the performance of programmes such as HIV/AIDS it is important to be clear what constitutes a health systems and what we mean by health systems performance. WHO defines health systems as "all organizations, people and actions whose primary intent is to promote, restore or maintain health"⁶. This definition includes efforts to address the determinants of health, besides direct activities to improve health. WHO has recently developed a framework for action which seeks to promote a common understanding of what a health system is⁶. This framework defines six "building blocks" that make up a health system. The building blocks are: service delivery; health workforce; information; medical products, vaccines and technologies; financing; and leadership and governance (stewardship). These are considered basic functions of a health system⁶.

A description of the aims and desirable attributes of these six building blocks is given below⁶:

- Good health services are those which **deliver** effective, safe, quality personal and non-personal health interventions to those who need them, when and where needed, with minimum waste of resources.
- A well-performing **health workforce** is one which works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given available resources

and circumstances. I.e. There are sufficient numbers and mix of staff, fairly distributed; they are competent, responsive and productive.

- A well-functioning **health information system** is one that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status.
- A well-functioning health system ensures equitable access to **essential medical products, vaccines and technologies** of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use.
- A good **health financing system** raises adequate funds for health, in ways that ensure people can use needed services, and are protected from financial catastrophe or impoverishment associated with having to pay for them.
- **Leadership and governance** involves ensuring strategic policy frameworks exist and are combined with effective oversight, coalition building, the provision of appropriate regulations and incentives, attention to system-design, and accountability.

Health system strengthening is defined as improving these six health system building blocks and managing their interactions in ways that achieve more equitable and sustained improvements across health services and health outcomes. It requires both technical and political knowledge and action⁶.

Effect of weak health systems on the performance of HIV/AIDS programmes: the case of PMTCT

Service delivery

The PMTCT programme, designed to reduce new HIV infections in children through vertical transmission by provision of antiretroviral prophylaxis at the time of labour and delivery and appropriate and safe infant feeding is a good example of the challenge of implementing even an apparently simple intervention in weak and strained health systems.

Since 2001 governments in many African countries have started implementing prevention of mother to child HIV transmission (PMTCT) programmes. By 2007 however, UNICEF estimated that only 21% of pregnant women who attended antenatal care were tested for HIV globally⁷. In the 10 countries with the highest estimated numbers of pregnant women with HIV worldwide, HIV testing coverage among pregnant women varied between 4% in Nigeria to 64% in South Africa and 65% in Zambia. The situation is similarly poor for antiretroviral coverage with about 33% of pregnant women living with HIV receiving antiretrovirals to prevent mother-to-child transmission in 2007⁷ (figure 1). These figures are extremely disappointing considering that these programmes have been operating for 5-6 years in most countries. However, they highlight the reality that implementation of programmes directed at focal diseases without concomitant health system strengthening will have limited impact.

For a PMTCT programme to be successful, a number of steps have to be undertaken.: In particular there must be: (1) good quality antenatal HIV counselling and testing; (2) CD4 cell counts for HIV positive women; (3) acceptance of antiretroviral therapy at health worker, pregnant women, family and community levels (4) correct administration of antiretroviral therapy within the health system and by pregnant women; (5) safe and appropriate obstetric practices; (6) appropriate infant feeding counseling for all women tested for HIV (7) continuity of care, including follow-up counseling and continuous support for optimal infant feeding (regardless of

feeding choice) and linkages to other services, such as neonatal and child health care as well as HIV care and treatment and (8) infant PCR testing at or before 6 weeks. At each step, losses may occur which will decrease the overall effectiveness of the programme (Figure 2)⁸.

PMTCT programme evaluations from a number of countries in Africa have found deficiencies in the delivery of various components of PMTCT programmes including uptake of antenatal HIV testing^{9 10}, receipt of test results¹¹, uptake of antiretroviral prophylaxis¹²⁻¹⁴ and postnatal mother-infant follow up⁹. These deficiencies are mainly due to the fact that PMTCT programmes are being introduced into already overburdened health systems.

A prospective cohort study in South Africa, known as the Good Start study, that aimed to assess the operational effectiveness of the PMTCT programme was undertaken between 2002 and 2005 in three sites. The sites included in the study were Paarl (Western Cape), Umlazi (KwaZulu-Natal) and Rietvlei (Eastern Cape at the time of the study but since been incorporated into KwaZulu-Natal). Paarl is a peri urban/ rural area, with a relatively higher socioeconomic profile, a relatively well-functioning public health system and an antenatal HIV prevalence of 9% during the study period. Rietvlei is a rural area in one of the poorest regions of South Africa, with 28% antenatal HIV prevalence. Umlazi, a periurban area with formal and informal housing, is considered to be intermediate with regard to health resources compared with the other two sites. The antenatal HIV prevalence was 47%. These three sites were among the 18 original national pilot sites and were deliberately selected to reflect different socioeconomic contexts, rural-urban locations and HIV prevalence rates found in South Africa.

The study followed HIV positive mother infant pairs, and a small group of HIV negative mother infant pairs from birth to 36 weeks postpartum. Structured interviews were conducted with mothers in the home by trained field researchers or trained community health workers at 3, 5, 7, 9, 12, 16, 20, 24, 28, 32 and 36 weeks to assess infant feeding practices and morbidity and to measure HIV transmission (3, 24 and 36 weeks).

The three sites were significantly different in terms of community infrastructure and quality of basic health services. In Paarl and Umlazi, 99% of families had access to piped water compared to 39% of families in Rietvlei. 79% and 56% of families in Paarl and Umlazi respectively had access to a flush toilet compared with 1% of families in Rietvlei. 58% and 66% of families in Paarl and Umlazi respectively used electricity or gas for cooking compared with 12% in Rietvlei. With regard to quality of health care, 99% & 83% of women in Paarl and Umlazi had a syphilis test performed during antenatal care compared with 29% of women in Rietvlei¹⁵.

With regard to HIV specific care, only 26% of HIV positive women in Rietvlei received nevirapine prophylaxis compared with 55% in Umlazi and 67% in Paarl. An in depth anthropological assessment was undertaken to understand these differences in coverage of nevirapine. The study found that the low rates of nevirapine coverage were mainly due to health systems failures including not being tested for HIV during antenatal care due to lack of counsellors or stock of HIV test kits, not receiving HIV test results, failure of health workers to administer nevirapine or giving incorrect instructions on when to take it¹⁶.

Despite the sub optimal coverage, the programme did have an effect in reducing early (3 week) HIV transmission with rates of 13%, 11% and 8% in Rietvlei, Umlazi and Paarl respectively. These rates are similar to what has been found in a randomised controlled trial in Uganda¹⁷. However marked difference were found in cumulative HIV transmission at 36 weeks and infant mortality between the sites. Cumulative transmission rates were 25%, 22% and 15% in Rietvlei,

Umlazi and Paarl respectively and mortality by 36 weeks amongst infants was 18%, 11% and 5% in Rietvlei, Umlazi and Paarl respectively. This led to vastly different rates of HIV free survival, the ultimate measure of effectiveness of PMTCT programmes, with 84%, 73% and 64% in Rietvlei, Umlazi and Paarl respectively¹⁵ (figure 3).

The biggest difference is seen between Paarl, which had rates of HIV transmission and/or death comparable with the treatment group in clinical trials of single-dose nevirapine¹⁷, and Rietvlei, which showed 36 week rates of HIV transmission and/or death similar to the placebo arm of an antiretroviral trial conducted in Tanzania, Uganda and South Africa¹⁸. Regression analyses suggest that a mother in Rietvlei with a similar viral load, gestational aged baby and infant feeding practice as a mother in Paarl is more than twice as likely to experience her child becoming HIV infected or dying by 9 months than the mother in Paarl. The analyses suggest that differences in the quality of healthcare services explain a significant portion of the difference in HIV transmission and/or death between Paarl and Rietvlei¹⁵.

These findings support the argument that the addition of new clinical interventions, such as HIV treatment and prevention programmes, to already under-resourced and poorly functioning health systems may not lead to improved HIV-related health indicators¹⁹. The Good Start study findings suggest that if the benefits of PMTCT interventions are to be realised then simultaneous attention to underlying socioeconomic conditions and healthcare infrastructure is needed, including the provision of additional resources such as staff and funding in disadvantaged areas with poorly functioning health services.

Health workforce

One aspect of PMTCT that is particularly dependent on quality health workforce is infant feeding. Reducing mother to child transmission through improved infant feeding requires high quality counselling and support provided to mothers. International guidelines²⁰ recommend that all HIV positive women should receive counselling which includes general information about the risks and benefits of various infant feeding options and specific guidance in selecting the option most likely to be suitable for their situation.

In many African countries, shortcomings in the implementation of these guidelines have been found. Inadequate training of health workers, particularly infant feeding counsellors, about the relative risks associated with infant feeding in the context of HIV have resulted in inappropriate feeding choices being made by women²¹. Even after training, health workers are often unsure of the risks of different feeding options. For example, an evaluation of the WHO/UNICEF infant feeding training in South Africa²² found low levels of knowledge amongst both participants and trainers. Most participants (88%) over-estimated the risks of breastfeeding for HIV positive women and very few (10%) knew of the health risks of formula feeding. Participants' confidence in counselling following training was also disappointing with 44% being uncomfortable counselling women experiencing breastfeeding difficulties.

A similar cross-sectional assessment of health worker knowledge was undertaken in a rural area of KwaZulu-Natal, South Africa²³. This study found that 71% of doctors would recommend water and 50% solids to breastfed infants under 6 months of age. The most commonly given responses by all health workers to problems of infants being thirsty or unsatisfied was to supplement with other fluids or feeds.

A qualitative interview study undertaken with 19 health workers in Malawi²⁴ found that none had received formal training, although many reported counselling mothers on infant feeding. There was generally good knowledge of the definition of exclusive breastfeeding, and all the health workers had concerns about early cessation of breastfeeding despite this being the national recommendation for HIV positive women.

A rapid assessment of infant feeding support for HIV positive women in Kenya, Malawi and Zambia²⁵ found that infant feeding counselling has been given low priority within programmes aimed at prevention of MTCT (PMTCT) of HIV. This is manifest in the lack of human resources to support infant feeding counselling. For example in Zambia, the Ministry of Health has only two nutritionists at the central level and no nutritionist at the provincial level. This has resulted in poor support and supervision of counselors.

Within the context of busy antenatal clinics, it is not surprising that the quality of infant feeding counselling has generally been found to be poor. Staff shortages and the associated lack of time to counsel properly, even for those adequately trained in infant feeding counselling, are important barriers to the provision of informed infant feeding choices.

Health information

A well functioning health information system is one that ensures the production, analysis, dissemination and use of reliable and timely health information by decision-makers at different levels of the health system, both on a regular basis and in emergencies⁶. PMTCT is a good example of the struggle of moving from an intensive research oriented information system for the initial 18 pilot sites to a limited information system integrated into the national essential primary health care dataset for the expanded programme⁹. Even once the programme had been scaled up across the country, many provinces still collected the full research dataset using numerous registers. The programme also established a parallel data flow system for the reporting of routine PMTCT data which went straight from facility to a provincial co ordinator and then national level. This has led to confusion and longstanding data quality problems which have made the usefulness of this data for programme management extremely limited.

A recent survey of PMTCT data in three districts in South Africa²⁶ found deficiencies in both accuracy and completeness of data. Data elements were reported only 50.3% of the time and were “accurate” (i.e. within 10% of reconstructed values) 12.8% of the time. The data element “Antenatal Clients Tested for HIV” was the most accurate data element 19.8% of the time, while “HIV PCR testing of baby born to HIV positive mother” was the least accurate with only 5.3% of clinics meeting the definition of accuracy²⁶.

National health systems rely on this type of data for national reports and to plan resources including financial allocations for the future. Such data might also be used to track system processes and outcomes to improve performance. Until these issues are addressed, routine data cannot be used to reliably inform efforts to improve PMTCT care. Medical products and technologies

A well-functioning health system ensures equitable access to essential medical products, vaccines and technologies of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use⁶. In the context of PMTCT, a regular, uninterrupted supply of items such as rapid test kits, antiretroviral medication for mother and infant and formula milk are essential to the optimal functioning of the programme. Programme evaluations have found that the procurement system for drugs and supplies for PMTCT in South Africa has

generally been good for rapid test kits and medicines^{9 27}. However, supply of formula milk has been found to be erratic and poorly managed^{28 29}. Qualitative research with HIV positive women in South Africa has reported examples of women running out of formula due to inadequate stock being given as well as stock outs at clinics^{28 29}.

A similar problem has been reported in Botswana, the only other country in Africa where the government provides free formula milk to HIV positive women. This country suffered a serious flood in 2006 which resulted in contamination of the public water supply. Between January and March 2006, 35,046 cases of diarrhea and 532 deaths were reported. During a Centers for Disease Control and Prevention (CDC) investigation it was found that not breastfeeding was the largest risk factor for diarrhea with an odds ratio of 50³⁰. Record reviews of formula recipients who had died identified that the children had only received 51% of expected formula supplies prior to their illness. In many cases mothers had returned to clinic several times a month but were not given adequate supplies³⁰.

A sustainable supply of formula is essential for women who have chosen not to breastfeed as inadequate supply can place already vulnerable children at risk for growth faltering, morbidity and death.

Financing

The existence of large GHIs such as the Global Fund and PEPFAR has led to large increases in expenditure on HIV/AIDS programmes in sub-Saharan Africa however several studies report that GHIs, which focus on the same diseases, channel funds through many different routes, both within and outside the public sector⁴. While there are clear advantages to involving a greater diversity of actors, many countries have found it difficult to cope with the complexity. A review of reports and published articles to assess the impact of GHIs on country health systems provides good examples of this⁴. The article reports that in Angola the World Bank Multi-Country AIDS Programme (MAP) channelled funds through the Ministry of Planning rather than the Ministry of Health, which was the usual channel, and the Global Fund did so through the United Nations Development Programme, UNDP. PEPFAR, on the other hand, chose to channel its funds outside the public sector, mainly through international (often US-based) NGOs. These NGOs then fund country-based civil society and faith-based groups. The review identified concerns in South Africa, Uganda, Benin, Ethiopia and Malawi about the rapid growth of the NGO sector, where many new NGOs were seen as having limited capacity and were only weakly accountable⁴.

GHI funding has created additional workload for public sector staff who have to cope with often extensive monitoring and reporting. This situation, together with and restrictions on public health staffing levels and remuneration in most sub-Saharan African countries, have increased the strain on public sector health workers. This has been further exacerbated when GHI-funded activities accelerated staff leakage to the NGO sector⁴. The early focus of PEPFAR was to strengthen the skills of existing health workers to provide HIV care and treatment services and, similar to the Global Fund, funding could not be used to top-up the salaries of existing public sector staff or to hire additional staff³¹. However, in Uganda, the salaries of staff hired by NGOs were supported by PEPAR funds, which enabled them to attract the best health workers from the public sector⁴.

It is these distortions created through the development of a separate cadre of better paid

health workers for GHI funded NGOs that serves to deplete the public sector and to demotivate staff who do not benefit from higher pay or better conditions³².

The ability of countries to absorb and manage the increased funding for HIV/AIDS programmes has also been noted as an area of weakness which is exacerbated by parallelism in financial and programmatic management systems and cycles of the different GHIs, which have created fragmentation and increased the administrative burden for already overloaded staff⁴. In South Africa, when the PMTCT programme was initiated funding was provided through conditional grants which were specific for this programme. An early evaluation of this programme found problems in several provinces with the expenditure of these funds and in many cases under expenditure. This was found to be due to weak management capacity at the provincial level and poor co ordination between provincial treasuries and programme units⁹. The weak capacity for absorbing funds can be seen in the discrepancies in per capita expenditure on primary health care at district level in South Africa. The latest District Health Barometer report³³ found the per capita expenditure in the rural districts was almost R50 lower than the national average and in one district in the Eastern cape and one in the Free State per capita expenditure has decreased over the past few years³³.

As the levels of funding for HIV/AIDS programmes increase greater support for the management and utilisation of funds is needed to ensure that the expected effects on programmes are achieved.

Leadership and governance

Leadership and governance are large and complex areas that are at play at every level from global policy formulation to local decision making and management of districts and health facilities. An aspect of leadership that is particularly relevant to co ordinated health systems functioning is congruence on policy and practice guidelines.

The effect of weak leadership and governance is particularly well illustrated with the example of HIV and infant feeding policies and guidelines. In order to guide health workers in assisting women to make appropriate infant feeding choices, WHO and UNICEF developed the Global Strategy for Infant and Young Child Feeding²⁰. The recommendation for women known to be HIV positive is avoidance of all breastfeeding if replacement feeding is acceptable, feasible, affordable, sustainable and safe. Otherwise exclusive breastfeeding for the first months of life is recommended, and should be discontinued as soon as it is feasible, when conditions for safe replacement feeding can be met. These are global guidelines which countries have adapted and modified to suit their own circumstances.

The South African Department of Health PMTCT Protocol³⁴, has its own specific recommendations relating to HIV and infant feeding. The recommendation is that “for each woman, the Acceptability, Feasibility, Affordability, Safety and Sustainability criteria (AFASS) should be assessed and discussed, and the woman should be assisted to make the feeding choice that would be most appropriate for her individual situation.” The feeding options for the first 6-months of life are exclusive breastfeeding or exclusive formula feeding. For women who choose to formula feed, the South African protocol makes provision for 6 months of free commercial formula milk.

Infant feeding recommendations for HIV positive women should ideally be situated within a broader policy framework for infant and young child feeding. The South African government

recently finalized an Infant and Young Child Feeding Policy which is great progress since it has been long awaited. However another important policy is still awaiting ratification. The WHO/UNICEF Code of Marketing of Breastmilk substitutes³⁵ applies to the marketing of breastmilk substitutes, including infant formula, when marketed or otherwise represented to be suitable for use as a partial or total replacement of breastmilk. The code deals with information and education needs concerning the feeding of infants, advertising or other forms of promotion to the general public, and standards for product labelling and quality. The Code is currently a discussion paper in South Africa and has been for several years, despite the fact that the government is providing free formula milk for the PMTCT programme.

Another key strategy to support infant feeding is the Baby Friendly Hospital Initiative (BFHI) which is a WHO/UNICEF approach to support appropriate infant feeding practices in hospitals³⁶. At the end of 2005 there were only 178 hospitals (24%) in South Africa that had BFHI accreditation.

It is against this policy background that infant feeding recommendations for HIV positive women are being introduced. Without a revitalisation of the baby Friendly Hospital Initiative, especially the encouragement of exclusive breastfeeding for the general population, achieving high quality infant feeding counselling and safe practices amongst HIV positive women will continue to be a challenge.

HIV and infant feeding is an area where knowledge is advancing rapidly through research and it is vital that policies and guidelines keep up with and reflect the changing scientific evidence. Leadership and management also need to prepare health workers for changes in policies and for these changes to be clear and rapidly implemented.

Interventions to strengthen the health system

Strengthening health systems to support the unprecedented challenge of scaling up HIV prevention, treatment and care interventions requires careful stewardship and integrating HIV programmes with other areas of the health system. All health systems have to carry out some basic functions to meet their goals, regardless of how they are organized. The WHO health system framework will be used in this section to describe health systems strengthening interventions addressing each of the six building blocks of a health system. This section will focus on examples of interventions that use a systems focused rather than disease focused approach to highlight the opportunities for HIV/AIDS interventions to strengthen rather than deplete health systems.

Health service delivery interventions

One intervention that has been used to strengthen health service delivery is integration of services and programmes. This has been seen particularly in the case of TB and HIV/AIDS services. Efforts to integrate interventions for tuberculosis and HIV/AIDS have shown some evidence of positive effects on service coverage. An intervention in the Democratic Republic of Congo assessed the feasibility of integration of HIV/AIDS care in the delivery model for tuberculosis. The extension of services for tuberculosis to scale up access to HIV/AIDS care was positively associated with the service coverage for HIV/AIDS without any adverse effects on pre-existing services for tuberculosis⁵.

Similarly, integration of services for the treatment of these two diseases in primary care in Zambia resulted in a 38% increase in the proportion of individuals enrolled in the antiretroviral treatment programme who were co-infected with HIV and *Mycobacterium tuberculosis*³⁷.

There are also examples of integration within the PMTCT programme to increase coverage of family planning. Introducing contraceptive services into a Rwandan voluntary counselling and testing clinic resulted in increased use of hormonal contraception, reduced contraceptive discontinuation (from 50 to 15%) and a significantly reduced annual pregnancy rate in HIV-positive women (from 22% to 9%)³⁸. Integration also increased service use in Uganda and Cambodia³⁸. These findings might be explained by the fact that HIV-specific resources were also used to invest in, for example, construction of health facilities, and improved laboratories and training programmes for health workers⁵. In Haiti, integrated prevention and care of HIV/AIDS had a positive association with several primary care goals such as vaccination, family planning, case detection and cure of tuberculosis, and health promotion. In this case, the HIV/AIDS programme was designed, from the outset, to generate simultaneous improvements in a range of health outcomes and not just HIV services.

Decentralization of services to district level has also been found to increase access to services, especially for populations of poor rural areas. A review published recently in the *Lancet* showed that in Cameroon, HIV services can be delivered by district facilities in rural areas with equal efficiency and effectiveness as those provided by provincial or central facilities, and that treatment in the district facilities can reach service users with low socioeconomic status and in difficult-to-reach rural areas⁵.

Health workforce interventions

The health workforce continues to represent one of the most significant challenges in scaling up priority HIV interventions. Using the example of South Africa, there are 34 687 medical practitioners registered with the Health Professions Council (HPCSA), of which only 10 653 work in the public sector. In the Western Cape province, 7 396 medical practitioners are registered with the HPCSA, yet only 1 418 work in the public sector. In total, only 30 percent of doctors work in the public sector, the remainder serving the minority 16 percent of the population with private medical insurance and some uninsured who pay out-of-pocket. South Africa currently has a total of 178 404 nurses (professional, enrolled and nursing assistants) but it is estimated that only 42 percent of these work in the public sector. Alarming, vacancies in the public sector remain high both because of difficulties in recruitment and freezing of posts because of budget cuts. Almost 35 percent of medical practitioner positions and 40.3 percent of professional nurse positions were vacant in 2008. Furthermore, 40 percent of registered nurses may retire within the next 10 years³⁹.

Since 1994, there has been a dramatic decrease in the ratio of nurses to the population. In 1998, there was an average of 149 professional nurses/100 000, but by 2007 the ratio had dropped to 110.4/100 000. A study of the HR requirements for PHC in South Africa in six of the poorest districts found only 7 percent of the required doctors at clinics and community health centres (CHCs). Unless both rapid production and the distribution of HR are prioritised, this will remain a big impediment to scaling up HIV interventions.

One of the strategies proposed to address the human resource crisis in low and middle income countries is task-shifting, which entails moving specific tasks, where appropriate, from highly qualified health workers to other health workers or community workers. Task-shifting was used successfully before the HIV epidemic emerged to address shortages of physicians in resource-limited settings, and several studies have demonstrated that this strategy is not only cost-

effective but that auxiliary staff perform some tasks better than fully trained health care workers do⁴⁰.

In Mozambique, surgically trained assistant medical officers have been trained to perform major obstetric surgery. Research has shown that this cadre has quality of care outcomes comparable to physicians and the cost per major obstetric surgery was less than a third that of obstetricians/gynaecologists⁴¹. A similar intervention with clinical officers has been undertaken in Malawi. A study to compare maternal outcomes following obstetric surgery between those undertaken by clinical officers and those undertaken by medical officers found that postoperative outcomes were almost identical in the two groups in terms of maternal general condition - both immediately and 24 hours postoperatively⁴².

Uptake of task-shifting in the delivery of HIV services has also demonstrated beneficial results. A recent study in South Africa⁴³ found that, after six months of follow-up, outcomes such as viral suppression, adherence and retention of patients at sites without doctors were similar to those at sites with doctors.

An intervention in the Free State province of South Africa has had success in training nurses to deliver comprehensive HIV/AIDS care in primary health care centres. The PALSA PLUS programme is a health systems-based approach to training for primary care providers which attempts to capitalize on the opportunity provided by the ART roll-out to ensure that training for the ART programme is also used to strengthen overall health service delivery.

The training intervention included two main components: (1) a comprehensive set of algorithm-based syndromic guidelines for the PHC nurse clinical management of respiratory diseases and HIV/AIDS; and (2) a training programme to facilitate guideline implementation. PALSA PLUS nurse-training was based on the principles of educational outreach. These principles include the provision of short, face-to-face, in-service, interactive training by a trusted outsider. In accordance with educational outreach strategy, both the guidelines themselves and the training programme emphasized specific key behaviour change messages which were seen to be most strongly correlated with improved treatment outcomes. Using a 'cascade' training approach, nurse-trainers were trained in both the content of the guidelines and learner-centered group facilitation in order to transfer relevant knowledge and skills to PHC nurses at clinic level. Nine nurse-trainers, with varying degrees of medical knowledge and prior nurse-training experience and already employed by the provincial Department of Health as TB and HIV co-coordinators, were trained in a five day intensive live-in course. This training was followed by three six-weekly support visits from the core guideline and training development team during the course of each nurse-trainer's provision of training to PHC nurses at clinics province-wide.

A qualitative assessment of the intervention⁴⁴ found that the ongoing on-site training of all PHC nurses, as opposed to the once-off centralized training usually provided for ART nurses enhanced nurses' experience of support for their work by allowing, not only for ongoing experiential learning, supervision and emotional support, but also for the ongoing managerial review of all those infrastructural and system-level changes required to facilitate health provider behaviour change and guideline implementation. The choice of district-based HIV/AIDS and TB co-coordinators as nurse-trainers placed these trainers in an especially strong position to bring emerging issues to the attention of district managers, as well as to engage both clinic and district-level management in resolving operational bottlenecks in the health system.

Task shifting together with decentralization of services has also been successfully used to scale up access to ARVs in Lusikiski district in the Eastern Cape, South Africa. The organization Medicines Sans Frontiers (MSF) has been working in this district supporting the role out of the ARV programme⁴⁵. Their approach has been to move ARV provision from hospitals to primary health care clinics and to allow nurse initiation of treatment with significant involvement of adherence counsellors and community caregivers. Physicians visited clinics periodically to deal with difficult cases and to provide ongoing training and mentoring of nurses. This approach has allowed for a rapid scale-up of treatment with satisfactory outcomes. One year outcomes in Lusikisiki are comparable in the clinics and hospital. The greater proximity and acceptability of services at the clinic level has led to a faster enrollment of people into treatment and better retention of patients in treatment (2% vs. 19% lost to follow-up in clinics versus hospitals respectively). In all, 2200 people were receiving ART in Lusikisiki in 2006, which represents 95% coverage⁴⁵.

Using Health Information for Quality Improvement

Quality improvement studies in developed countries have found that feedback on performance and small group meetings have shown positive effects on changing health worker behaviour⁴⁶. One of only two reviews including studies from low income countries has also suggested that approaches such as supportive supervision and audit with feedback may be effective in improving health worker performance in these settings⁴⁷.

An intervention implemented in the rural district of Amajuba, South Africa²⁷ has been shown to increase the coverage of PMTCT through a participatory quality improvement approach. The intervention consisted of a participatory assessment phase followed by a feedback and planning phase and then an implementation and monitoring phase. Each phase of the intervention had a focus on using routine data for problem identification, target setting and monitoring.

A task team consisting of programme managers for HIV, PMTCT, MCH, unit managers for hospital labour and postnatal wards and PHC clinic supervisors was formed to lead the intervention. The initial assessment of facilities was undertaken by this team. Data were collected on the key conditions of effectiveness (quality of services and human resources, access and continued use of services, and availability of key resources and management systems) that are needed to move a programme from efficacy to effectiveness.

The assessment phase highlighted weaknesses in training and supervision. Review of routine data revealed poor coverage of all programme indicators except HIV testing. Following a feedback workshop, monthly support to all facilities took place including an orientation to the PMTCT protocol, review of local data and identification of bottlenecks to optimal coverage using a continuous quality improvement approach. One year following the intervention large improvements in programme indicators were observed. Coverage of CD4 testing increased from 40 to 97%, uptake of maternal nevirapine from 57 to 96%, uptake of infant nevirapine from 15 to 68% and six week PCR testing from 24 to 68%. (Figure 4)

This study has shown that the development of a comprehensive programme evaluation framework, identification of key indicators and relatively simple data collection tools allow district and sub-district level managers to collect relevant data rapidly on the individual effectiveness of each programme component, as well as identifying possible efficiency gains and missed opportunities for improved programme performance. It could be further developed as a model for participatory programme improvement.

A further initiative in South Africa known as 'health system optimisation' has been implemented by the Institute for Health Care Improvement (IHI) to improve the provision of ARV treatment in South Africa⁴⁸. Similar to the model used in Amajuba this approach involves bringing together networks of health care facilities at regular intervals to set common aims, to learn more about improvement science and methods, to share ideas and results, and to jointly identify and solve problems. IHI and its partners support the teams as they test innovations at the point of care and iteratively apply and locally adapt successful strategies. This participative strategy has been a major factor in accelerating "buy-in" and revitalization of demoralized staff who are overburdened with the sheer volume of care and disempowered by a traditional "top-down" approach to health care improvement.

A major driving factor for improved care is the establishment of outcome goals that are closely tied to the common aim of providing access to HAART for all the people who need treatment in the district or defined area. A crucial first step is for the participants in the collaborative network to define the gap between the current monthly HAART initiation rate and the rate that would ensure treatment for all patients in need. A common aim emerges and becomes a rallying point to obtain buy-in for the changes to the system necessary to reach those goals. Thereafter, the participatory approach to identifying obstacles to reaching that goal and designing potential solutions to overcome the obstacles promotes local ownership of the responsibility for HIV/AIDS care. The project has been working in several rural and urban districts and has shown impressive improvements in HAART coverage without adding additional resources and utilising existing district staff to 'optimize' the health system⁴⁸.

Access to medical products, vaccines and technologies

The rapid scale up of services for HIV/AIDS has undoubtedly increased access to antiretroviral drugs, which as a result of GHIs, have usually been given free of charge⁵. The number of people given antiretroviral drugs in low-income and middle-income countries has increased ten-fold in 6 years, and was 3 million by the end of 2007⁵.

In many cases the additional supplies of antiretroviral drugs have led to the establishment of parallel procurement systems as a result of numerous funders with their own systems and the increase in the amounts of commodities being supplied to countries has not been matched by improvements in the distribution of supplies. However there have been cases where the national capacity for procurement has been strengthened, most notably in Malawi⁵. The national drug procurement and distribution system used in Malawi is adapted from a previous parallel procurement programme for a disease-specific initiative⁵.

An intervention in Cape Town is currently testing a model of lay health worker supported self-supervision of TB treatment, based on the ART delivery model. This intervention has the benefit of easing the workload of nurses by transferring the major responsibility for compliance to a lay health worker. From the patient perspective it prevents the treatment from disrupting their daily life since it can be taken when arranged with the lay health worker as opposed to dictated by clinic hours and it is less of a punitive approach to care. An early evaluation of the intervention has found that it does not impact negatively on TB treatment outcomes, and may offer opportunities to integrate support for TB and HIV/AIDS treatment⁴⁹.

Health financing interventions

Two health finance interventions are currently being implemented in low and middle income countries namely performance based financing for health workers and conditional cash transfers. Rwanda is leading the way with their ambitious incentive scheme for health care workers. Three years ago Rwanda adopted a national incentive scheme for health workers. This performance based financing (PBF) is a public to public contract, which means an internal contract between one level of the government and another level, for instance between the Ministry of Health central level and district administrative, and then further down between the latter and health facilities in its area of responsibility. Though established as voluntary, practically all facilities participate in the PBF scheme, as the national policy is targeting all public and certified health facilities. PBF in Rwanda relies essentially on paying a premium to the health facilities according to the number of services delivered for a set of previously agreed indicators. The contracting agency “buys” a package of services at a predetermined rate from the health centres and district hospitals, who then share the amount between staff (75% maximum) and structural investments (25% minimum). Staff incentives are provided on top of salaries to retain health personnel at their respective place of duty and increase their performance.

Financing of the scheme (operations and payment to health facilities) is ensured by two main funding sources: a PBF budget line in the official budget of the Government of Rwanda and contributions of many partners through the Ministry of Health coordination mechanism for PBF. A large contribution is made by donors active in HIV and AIDS, notably the Global Fund who is paying for HIV indicators in their supported area. For general health services the national model has retained 14 primary health indicators and 10 HIV service indicators.

Assessment of the effect of this intervention is difficult due to the short implementation period, however early positive effects have been noted. Family planning (FP) users per month (increased by 306%); FP new users (increased by 209%); ante-natal consultations with second dose of tetanus toxin (increased by 150%); new curative consultations (increased by 51%); institutional deliveries (increased by 78%)⁵⁰.

There have also been some negative effects reported. The mechanism of monitoring and evaluation causes a large burden for health facilities in terms of human and financial resources. Data collection as well as further preparation for the frequent assessments conducted by the district PBF steering committees creates heavy administrative workload for health staff. The implementation of the PBF scheme does not take supply-side constraints into consideration. In other words, health facilities are put in competition without taking account of their initial differences and contexts (for example the quantity and quality of personnel or the availability of equipment and infrastructure). According to the scheme, it is up to each health facility to find the means to produce more and better. Theoretically, it is the 25% of the premium paid to the health facility for structural investments, which is to be used for that purpose. Data manipulation such as rearrangements of the data sources to benefit from larger incentives – a risk foreseen with the implementation of PBF – starts to appear at the level of the health facilities. Although mechanisms of fraud prevention, such as audits and re-control, have been included in the PBF implementation scheme, they are not functioning optimally yet. Another adverse effect of PBF is the fact that the services, which are not included in the PBF scheme are neglected by the health facilities or health staff, as they are not rewarded by incentives. An example of the adverse effect on non-PBF indicators, is the Integrated Management of Childhood Illness (IMCI). The IMCI strategy has been adopted and is currently being implemented in Rwanda. Although child examination using the IMCI method is highly time-consuming, but is not part of the quality criteria within the PBF scheme. This implies that the health facilities that correctly apply the IMCI

methods are likely to lose money in comparison to facilities, which do not apply IMCI methods at the time of PBF evaluations. The adverse effects of PBF on IMCI implementation contradict national strategies for the improvement of health care delivery particularly for children under 5 years old, which in turn may have a negative impact on the achievement of related MDGs.

The lack of evidence on the impact of PBF on the health system on a wider scale, and current observations of positive and negative effects of PBF in the Rwandan context, makes PBF rather a complementary strategy than a general solution for health systems performance problems. Although the PBF scheme allows tackling some important issues (incentives, performance improvement on some indicators, retaining of health staff), it does not show an effect on others⁵⁰.

Conditional and cash transfers have been implemented in several middle and low income countries as a poverty alleviation measure and to encourage improved health seeking behaviour (when conditional on certain health actions). A systematic review of conditional cash transfers including five studies from South America and one from Africa found that conditional cash transfer programs are effective in increasing the use of preventive services and in some studies, improving health status⁵¹.

In South Africa the Child Support Grant (CSG) is the state's largest social assistance programme in terms of the number of beneficiaries reached. The primary objective of the grant is to ensure that caregivers of young children (under 14 years) living in extreme poverty are able to access financial assistance in the form of a cash transfer to supplement, rather than replace, household income. This is an unconditional grant with a means test being the only eligibility criteria.

An assessment of the child support grant⁵² found that food formed the largest category of expenditure. CSG recipients were most likely to report increased spending on food since receiving the grant, with school fees, uniforms and electricity also being mentioned. This is in line with the growing body of evidence that the CSG is used for essentials such as food, basic services and education-related costs.

Leadership and governance

Stewardship of health services at both a local and a national level are vital for the successful implementation of interventions. At the local level in South Africa there is evidence for the role of supportive management in the successful implementation of an intervention aimed at improving the management of severely malnourished children⁵³. An intervention consisting of training and support for the implementation of the WHO case-management guidelines was implemented in eleven hospitals in the rural Eastern Cape. Despite similar intervention inputs, some hospitals reduced their case-fatality rates by at least half, whereas others did not. An in depth study was undertaken to determine the reason for the success in the well performing hospitals. Structured observations of ward procedures, compilation of hospital data on case-loads and resources, and staff

interviews and discussions related to attitudes, teamwork, training, supervision, managerial support and leadership were undertaken. The study found that clear differences existed between the two sets of hospitals in the leadership shown by superintendents and nurse managers, including providing resources, establishing communication channels that fostered teamwork, information-sharing and feedback, and acting as role models by demonstrating a willingness to change, all of which are considered enabling and reinforcing factors in the assimilation and routinization of innovations.

The above example highlights the effect of the quality of management on staff performance. Very little research has been done in Sub Saharan Africa focussing on management interventions yet leadership and management are often found to be the weakest component and contributing factor in poor performance of districts. This area requires far greater attention as programmes are scaled up.

Policy and research priorities

There has been significant debate in recent years about disease-specific programmes versus horizontal (health systems) investments. Some concern has been raised that funding for vertical programmes, such as those directed at providing HIV prevention, treatment and care services, distort the health system by diverting scarce resources in low- and middle-income countries away from other areas of the health system and complicating budgeting and planning processes. In response, several stakeholders have noted the false dichotomy of vertical HIV programmes versus horizontal investment in health systems as if they were mutually exclusive. They suggest that, although concerns about distorting health systems are valid, effective design of disease-specific programmes and integration with other components of the health system can leverage disease-focused investment to strengthen other areas of under resourced health systems³².

The debate has stimulated significant discussion and evaluation on how HIV programme delivery affects the health systems of low- and middle-income countries⁵⁴. Several recent analyses of HIV programme implementation have provided new information on this, suggesting that investment in priority HIV interventions has effects throughout the health system, such as upgrading laboratory and clinical infrastructure. However it can also have negative effects such as attracting health workers out of the public service to work for NGOs who are able to pay higher salaries through foreign funding. These private or non-government programmes are often striving to reach high targets in a short space of time and their approach does not address the staffing, pay levels, and working conditions of health personnel in public health services but rather establishes a parallel service⁵⁵. There is increasing pressure on global funding agencies to invest more in health systems rather than going for 'quick fix' approaches that will allow them to reach narrow targets⁵⁶.

Particularly with access to ARVs many countries' programs with significant donor influence have resulted in inequitable distribution of ARV services, with rural areas being the most disadvantaged. Urban areas which are usually better resourced are easier starting points for programmes and are more likely to attain necessary targets in the required time frames.

Several studies have indicated that HIV services need to be integrated with other health services to maximize the impact of investment in HIV interventions⁷. WHO has developed integrated tools and training materials health workers can use in delivering health services to people living with HIV. The Integrated Management of Adolescent and Adult Illness (IMAI) approach was built on the model of the Integrated Management of Childhood Illness (IMCI), which has been implemented in countries since 1999. Rather than utilising separate tools from different disease programmes, the IMAI and IMCI tools provide health workers with an integrated case management approach to managing multiple health problems while delivering priority prevention interventions. Both approaches support a decentralized model of scaling up of health services that optimizes the use of human resources and fosters networks of health care provision at the district level. These district

networks link communities, health centres and hospitals through systems of referral, consultation and mentoring and facilitate patient self-management. Such approaches also enable laboratory and clinical infrastructure and supply management to be strengthened and have the potential to strengthen the broader health system.

Community health workers play an essential, yet often undervalued, role in increasing access to health services, particularly in HIV/AIDS care. While there are thousands of them working in health systems across Africa, there is generally no defined scope of practice, standardised training or model of working. Many work on single issue (especially HIV) programmes; there is no career progression; and despite carrying out essential health services, the CHWs (who are most often women from the most disadvantaged communities), are often paid a stipend, or expected to volunteer. As more 'task-shifting' continues policy makers also need to consider the recognition of community health workers as an important part of the public health service to provide them with training, support and remuneration commensurate to the vital role they play. Until recently, little attention has been paid to systematic research and very few rigorous evaluations conducted on the broader impact, whether positive or negative of the HIV-specific programs on other health services. In addition, lessons about successful and unsuccessful approaches have not been widely shared beyond a few case studies presented at international AIDS conferences. We also require greater understanding of the methodologies required and ways in which to rigorously evaluate and answer vital questions on the impact of HIV scale-up on health systems and on how best to leverage HIV scale-up to strengthen weak health systems.

There is presently a large gap in the evidence base for the effects of HIV programmes on health systems. Both primary research and systematic reviews are needed in a number of areas to strengthen the knowledge base to inform scale up of effective interventions. Primary research is needed to evaluate interventions to improve governance and leadership, rigorous evaluations of conditional cash transfer programmes are needed in sub Saharan African settings, and evaluation of the effects of task shifting in HIV/AIDS care in sub Saharan Africa. Systematic reviews are needed of decentralisation of primary health care planning, remuneration strategies for primary health-care workers in low-income and middle-income countries and interventions to promote intersectoral collaboration at district, regional and central levels to improve primary health-care delivery and outcomes.

In terms of routine monitoring and evaluation, HIV/AIDS programmes should also include human resource indicators so that changes in human resource capacity can be monitored and addressed in programmes.

If the potential to leverage highly-resourced HIV programs to strengthen health systems is to be realised, greater emphasis is needed on integration of services, enhancing infrastructure and laboratory capacity, buttressing the health care workforce, improving data management, supporting community-based organizations, and establishing effective, comprehensive models of care more conducive to the provision of continuity services.

Conclusion

This paper has presented evidence of the effect of health systems on HIV/AIDS programmes and has highlighted the limited effectiveness that is achievable when programme are introduced into weak health systems. The example of the PMTCT programme has underscored that even apparently simple interventions require a well functioning health system in order to be effective

in achieving changes in health. Many interventions addressing HIV/AIDS have taken disease focussed, 'magic bullet' type approaches which have either neglected or through their implementation weakened health systems by establishing parallel systems or attracting human resources out of the public sector to NGOs.

There are however examples in this paper of approaches to HIV/AIDS care that can strengthen health systems and through a more integrated focus. These promising health systems strategies need to be tailored to local circumstances and health systems, and accompanied by rigorous evaluation in order to strengthen the evidence base.

The scale up of ARV treatment and introduction of more efficacious ARV interventions will yield only marginal reductions in HIV infections and related mortality unless health systems are strengthened. Investment in, and support for the mechanisms of delivering and sustaining HIV/AIDS interventions at scale are required if gains in health and survival are to be realised in countries highly affected by HIV. The HIV epidemic has provided an enormous opportunity for leveraging significant resources for low income countries. This opportunity however needs to be used to garner these resources for initiatives that strengthen rather than deplete health services and that try to break down rather than reinforcing existing inequities. This will require innovative approaches such as task shifting, greater involvement and support for community caregivers and participatory approaches to engage health workers.

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Figures

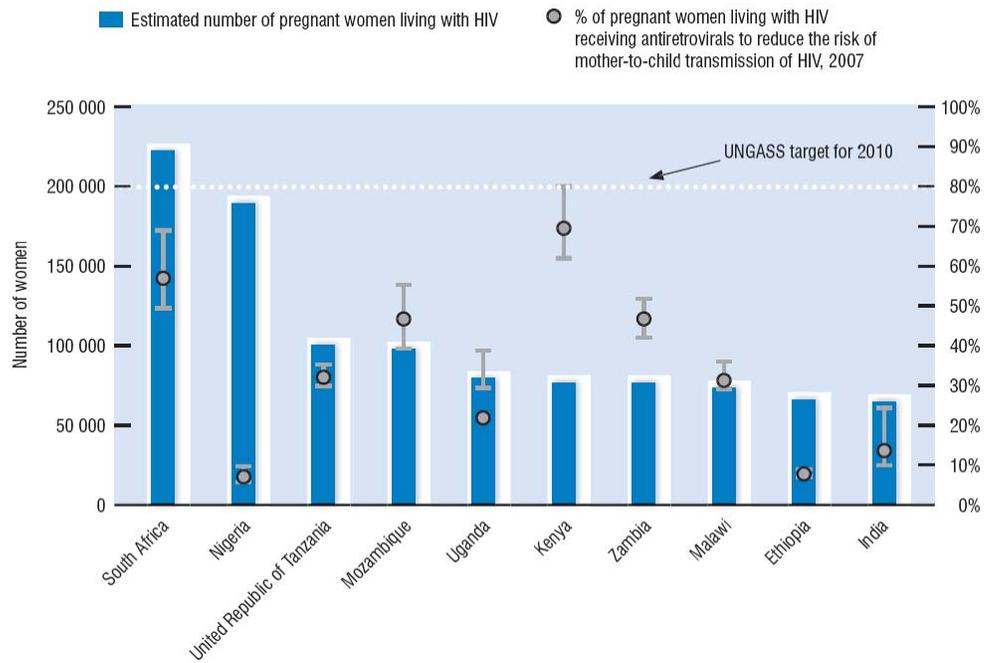


Figure 1: Percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission of HIV in the 10 countries with the highest estimated number of pregnant women living with HIV, 2007⁷.

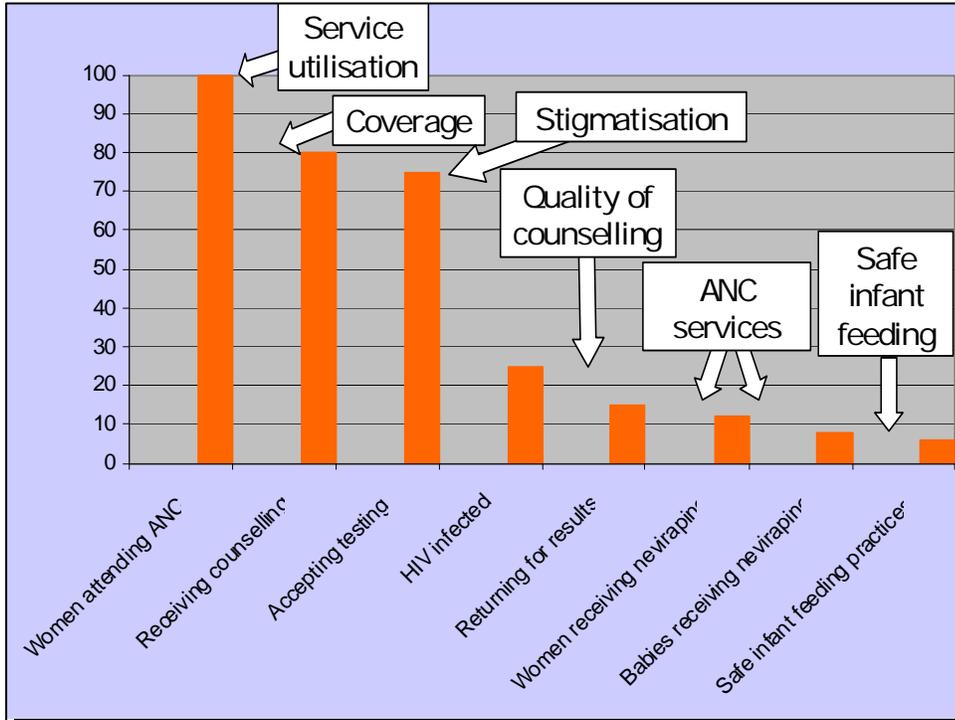


Figure 2: PMTCT Cascade. Adapted from WHO 2001⁸

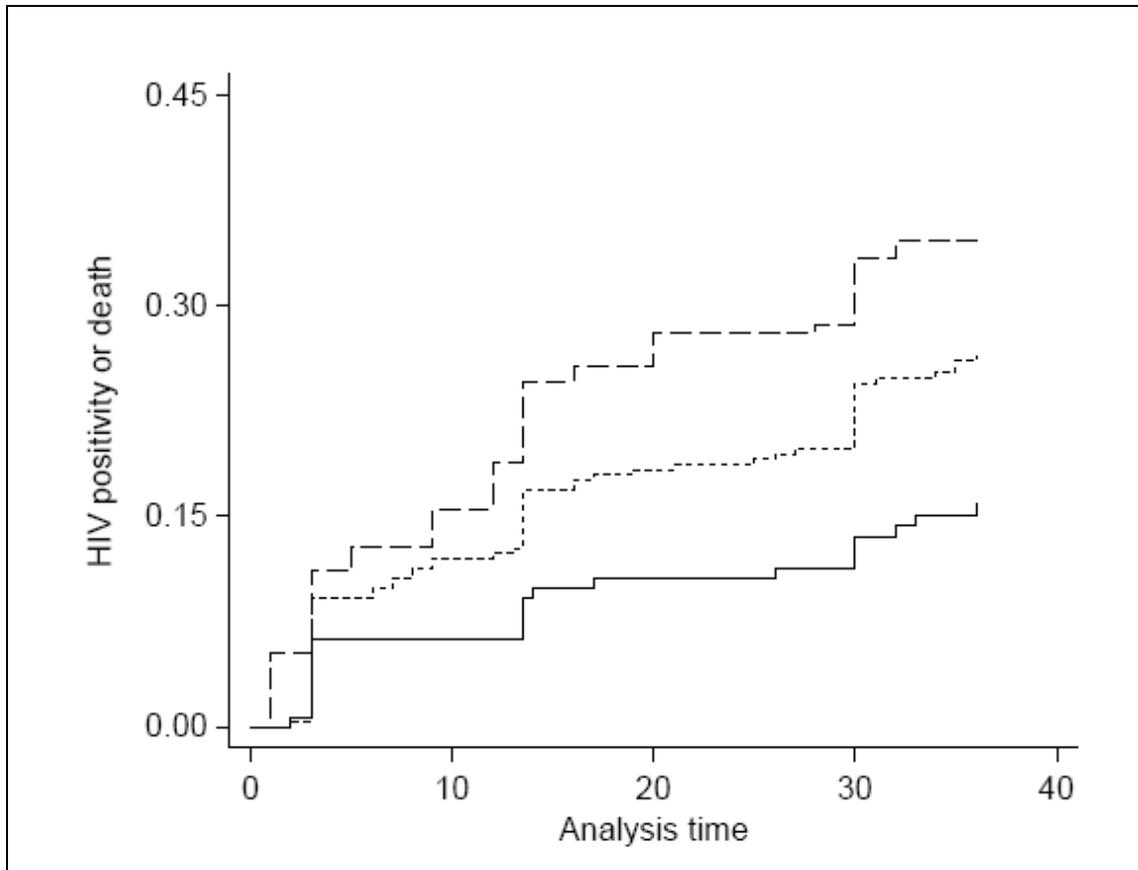


Figure 3: Kaplan–Meier plots of infant HIV positivity and/or death by 36 weeks of age amongst infants born to HIV positive mothers. —, Paarl; - - -, Umlazi; — — —, Rietvlei. Differences across sites by log rank χ^2 test for equality of survivor functions (two degrees freedom) $\chi^2 = 16.42$; $P = 0.0003$.¹⁵

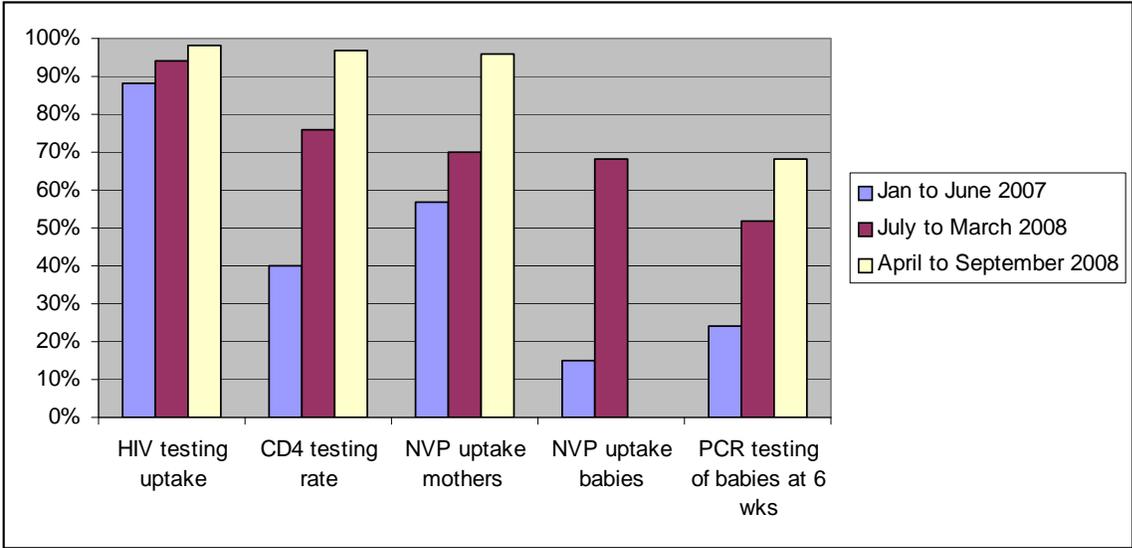


Figure 4: PMTCT Indicators for Amajuba District, South Africa