Innovative Medicines South Africa

National Health Insurance
Policy Brief 4

The Impact of HIV on a Future NHI

The purpose of this series of policy briefs on National Health Insurance (NHI) and the related IMSA web-site is to put in the public domain material and evidence that will progress the technical work of developing a National Health Insurance system in South Africa. This includes tools for costing NHI and evidence on where savings could be achieved in moving to a future mandatory system with universal coverage.

South Africa has the largest number of people living with HIV/AIDS in the world, estimated[1] to be some 5.7 million people by 2009, or 11.7% of the total population. This policy brief deals with predicting the course of the epidemic, costings of treatment that have been performed and the success of HIV disease management programmes. The intention is to gather the best available material for use when costing the impact of HIV and related diseases on a future NHI system.

1. The HIV Epidemic in South Africa

The early history of the HIV/AIDS epidemic in Africa is summarised by UNAIDS and the World Health Organisation (WHO) as follows[2]: "In 1981, a new syndrome, the acquired immune deficiency syndrome (AIDS), was first recognized among homosexual men in the United States. By 1983, the etiological agent, the human immunodeficiency virus (HIV), had been identified. By the mid-1980s, it became clear that the virus had spread, largely unnoticed, throughout most of the world."

"Most of the available epidemiological data indicate that the extensive spread of HIV started in sub-Saharan Africa in the late 1970s. By the early 1980s, HIV was found in a geographic band stretching from West Africa across to the Indian Ocean, [while] the countries north of the Sahara and those in the southern cone of the continent remained apparently untouched." But the epidemic began to move south.

Prof Rob Dorrington of the University of Cape Town (UCT) records[3] that the "first two AIDS cases in South Africa were diagnosed in 1982 with the first recorded death occurring in 1985 (although there were undoubtedly others before this that went unnoticed). By the end of 1990 Pattern II (heterosexual) had overtaken Pattern I (homosexual/bisexual) as the dominant form of transmission of the reported cases. Pattern I transmission appears to have peaked around 1990. By February 1993 all but two of the 46 cases diagnosed as AIDS from 1982 to 1986 had died."

Dorrington warned in 1999 that[3] "South Africa has all the ingredients to ensure that the HIV/AIDS epidemic in this country will be the most explosive and extensive of any country in the world:

- the most developed infrastructure (roads, railways, airports, urban conglomerations) of any country in Africa;
- an entrenched system of migrant labour;
- the return of an estimated 40 000 MK guerrillas (from Zambia, Uganda, Angola and Tanzania, countries with a high prevalence of HIV) and their distribution to military bases throughout the country [see Shell[4] for more detail on these issues];
- a changing of priorities and the influx of refugees due to a long war for southern African independence; and the worst drought this century (1992-93) coupled with economic structural adjustment programmes in most countries not 'at war'; ...
- the early stages of the epidemic were mismanaged by an illegitimate government who only as late as 1992 permitted the advertising of condoms on TV (and then only late at night).
- Followed by the first democratically elected government whose primary concern, perhaps understandably, was to ensure transformation."

Yet the "blue-print" for South Africa's health system after the transition to democracy, the ANC Health Plan of 1994[5], recognised that "HIV/AIDS is emerging as a major public health problem". Forecasts to the year 2005 were given, including the expected numbers with HIV, expected deaths and expected number of orphans. "In view of the devastating implications of the HIV/AIDS epidemic for South Africa, it is mandatory to define prevention and control interventions plus comprehensive care for those already infected, within the context of the Bill of Rights".

The ANC policy on HIV/AIDS[5] said: "HIV/AIDS must not be addressed as a single issue or by a vertical programme. A multi-sectoral approach is a pre-requisite for the containment of the spread of the infection. HIV/AIDS must therefore be taken into account in all policy areas." Specific measures included:

- Development of an education programme for school children, adolescents and teachers, around health promotion, including sexuality and safer sexual practises. ... All schools to be running comprehensive education programmes on a regular basis by January 1996.
- Develop and implement an effective HIV/AIDS strategy by end 1995.
- Develop STD[a]/HIV counselling and support services at all Community Health Centres (CHCs) by end 1999."

Yet very little of this plan was implemented and AIDS-denialism took hold. Dorrington quotes a letter by Donald McNeil to the Mail and Guardian in 1999: "Many South Africans still don't believe in AIDS because they haven't seen enough bodies yet. But they will. It's going to change this country in ways no one is able to predict."

The graph below shows that cumulative AIDS deaths are estimated to have exceeded 1 million by 2004 and are expected to exceed the total number of people living with HIV by 2017, some 6 million people. The crucial years for the expansion of the epidemic were from the early 1990s when attention of the governments of the day was on political issues rather than healthcare. The period 1994 to 2003 saw an increase in total HIV infections from an estimated 533,000 to 4,742,000 people.

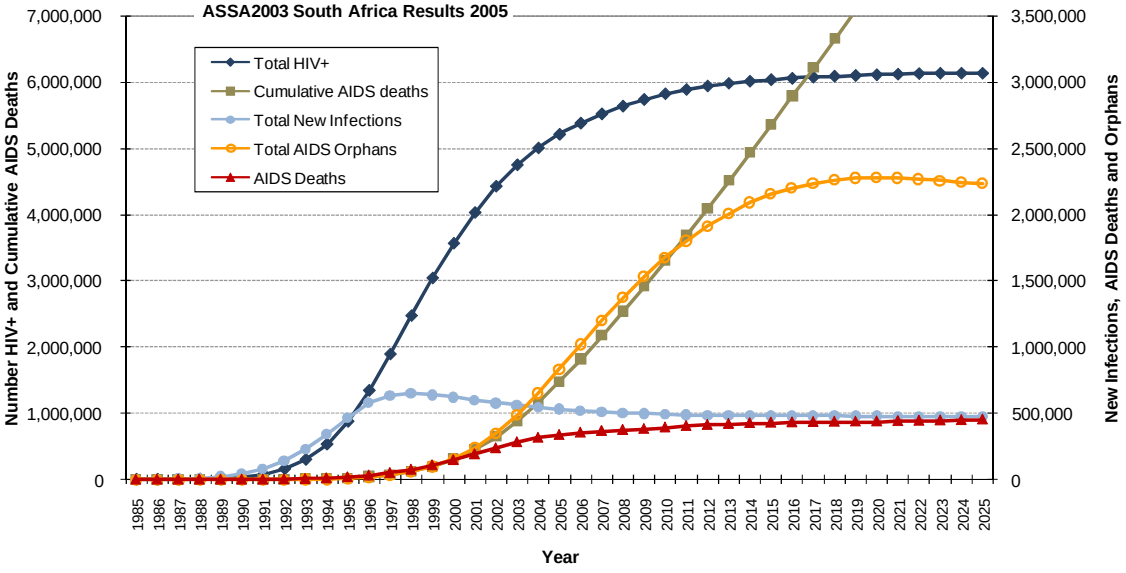

Figure 1: Waves of the HIV/AIDS Epidemic in South Africa using the ASSA2003 Model[1]

[a] STDs are sexually transmitted diseases such as syphilis, genital herpes, chancroid, gonorrhea, chlamydial infection and trichomoniasis[13].

Combination therapy drug treatment for HIV becoming available from 1996[6] onwards but was initially unaffordable in Africa. The Treatment Action Campaign (TAC) was launched on 10 December 1998, Human Rights Day[7], "by a small group of political activists". Using a combination of "negotiation, litigation, and mobilization", TAC was instrumental in getting substantial reductions in the drug prices for ARVs and pathology costs needed for on-going patient testing. TAC then turned its attention to the delivery of public sector health in South Africa. Heywood quotes Prof Leslie London: "The TAC, … has shifted the debate firmly to one of fundamental human rights and utilized the human rights machinery established by the same government to force its hand on the ARV[b] issue."

It was only in 2003 that the South African Government approved a plan to provide ARVs in the public health system and these began to be rolled out from 2004. South Africa is now judged to have the largest antiretroviral treatment programme in the world. In 2007 the South African Cabinet endorsed the HIV & AIDS and STI National Strategic Plan for South Africa, for the period 2007-2011. This was hailed for the broad consensus finally reached between Government and civil society on a comprehensive approach to HIV/AIDS. The document reflects the sentiments originally expressed in the ANC Health Plan of 1994[5] of the need for a multi-sectoral approach.

2. Modelling of the Epidemic

Figure 1 above is taken from the latest version of a series of models produced under the guidance of Prof Rob Dorrington and the Centre for Actuarial Research (CaRE)[c] at UCT, together with the AIDS Committee of the Actuarial Society of South Africa (ASSA)[d]. These models have been critical in developing estimates of the future costs of the epidemic in South Africa and the need for treatment. Tracing the development of the models gives insights into how these models are now structured.

Dorrington describes[8] the early model developed by Peter Doyle of Metropolitan. "This program modelled a hypothetical population by essentially dividing the population into four groups depending on the ease with which individuals were expected to contract and transmit the HIV." The model was proprietary and the ASSA AIDS Committee preferred to have a program which could be altered, leading to the first in a series of models, **ASSA500**.[e]

A concern at the time was that[8] "by and large demographers in this country were ignoring the impact of AIDS in their models". This "led to the conclusion that it might be useful to produce a combined AIDS and demographic model for the country as a whole." The resulting **ASSA600** model was calibrated to replicate "as far as possible the empirical observations. Such an exercise is by its nature perhaps inevitably a little more art than science but briefly the aim was to set, where possible, the assumptions to be consistent with empirical studies and where this was not possible to set the assumptions by trial-and-error (within bounds of reasonableness) so that the output from the model reproduced the observations of the epidemic." This and subsequent models have been calibrated to emerging population, mortality and fertility data, the annual antenatal clinic surveys of the Department of Health and to other surveys and research.

The **ASSA2000** model[f] was a model of the impact of HIV/AIDS on the South African population by population group at provincial level. Dorrington found that[9] "modelling the epidemic at the level of the population group and provinces improves our understanding of the dynamics of the epidemic as well as our estimates of its future trajectory". The model was released in June 2001 and subsequently modified. It was later superseded and users are cautioned by ASSA "that the ASSA2000 version is now considered to have overstated the extent of the South African epidemic. This is partly because the ... model does not allow for the effects of HIV prevention and treatment programmes ..." .

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[b] ARVs are antiretroviral medicines. HAART is highly-active antiretroviral therapy.
[c] CaRE: http://www.commerce.uct.ac.za/care/
[d] ASSA AIDS Committee: http://www.actuarialsociety.org.za/Resource-Centre/Aids-Model-269.aspx
[e] All old models available at: http://www.actuarialsociety.org.za/Older-Models-291.aspx
[f] ASSA2000 model: http://www.actuarialsociety.org.za/Resource-Centre/Aids-Model/Models/Older-Models/ASSA2000-286.aspx

A derivative model, the **ASSA2000 Orphan Model**[10], allowed estimates of the future number of maternal, paternal and "double orphans" to be made. A useful technical note by Leigh Johnson[11] provides an introduction to the mathematics used in these models. At that time, the issue of orphanhood in the epidemic had barely received attention and the models were instrumental in highlighting the magnitude of the problem. The authors said[10] "South Africa can expect to see an alarming growth in the number of orphaned children over the next 15 years. ...South Africa's capacity to provide care for these orphaned children will ... determine the long-term social stability of the country".

Other variations on the basic model were developed. A significant development was the **ASSA2000 Interventions Model** which pioneered the modelling of interventions, including antiretroviral treatment. The underlying ASSA2000 model was then substantially revised to include the very useful prevention and treatment approaches in the main model. The **ASSA2002** model, released in July 2004, was replaced with **ASSA2003** in November 2005 and this is the current model in use. These models have a similar architecture and continue to be calibrated against emerging data on the population and the epidemic.

The **ASSA2003 model** allows behavioural change and changes in HIV transmission as a result of the following interventions[12]:

- improved treatment for sexually transmitted diseases (STDs);
- information and education campaigns (IEC) and social marketing;
- voluntary counselling and testing (VCT);
- mother-to-child transmission prevention (MTCTP); and
- antiretroviral treatment (ART).

Significantly, the model allows for determining the numbers at various stages of HIV infection[12]: "In the absence of antiretroviral treatment, adults are assumed to progress through four stages of disease before dying from AIDS. These four stages correspond to those defined in the WHO Clinical Staging System. The effects of antiretroviral treatment (ART) are modelled by introducing a further two stages, which represent people receiving treatment and people who have started treatment but subsequently discontinued treatment." This is illustrated below.

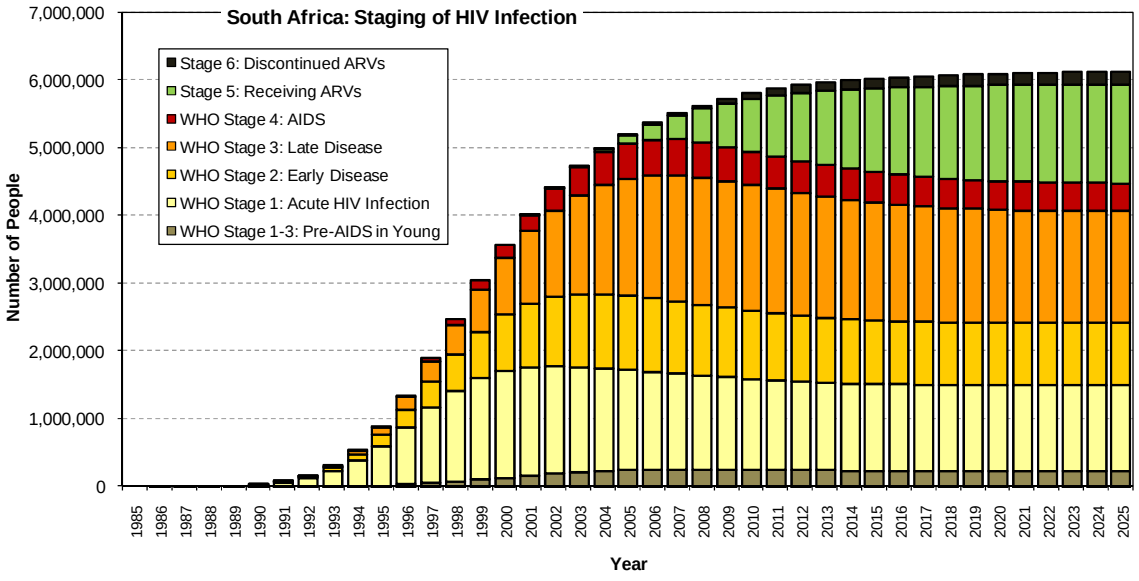

Figure 2: Staging of HIV Infection in South Africa from 1985 to 2025, using the ASSA2003 Model with standard assumptions about treatment and interventions[1]

The rationale for the total number of people with HIV/AIDS levelling off and remaining at about the same level can be seen by referring back to Figure 1. The number of new infections declines and the number of deaths increases until the two are almost in balance.

The **ASSA2003 suite of models**[g] includes several versions[12]:

- **South Africa 'lite' version**: treats the population of the country as one population group;
- **South Africa 'full' version**: separate modelling of each of four population groups (Asian/Indian, black African, Coloured and White);
- **Provincial version**: the application of the full version of the model separately to each of the nine provinces.
- **Urban-rural version**: this allows for situations where there is significant migration between two groups with significantly different prevalence levels.
- The **Orphans model** remains an additional module that can be run with any of the above.

The ASSA2003 and related models have been calibrated by students for some other African countries. The **ASSA Select Model**[h] needs to be used when considering the impact on a defined group drawn from the large population, like an industry or the workforce in a particular company.

Dr Leigh Johnson of UCT completed his PhD thesis in 2008, capping a significant contribution to the modelling of the epidemic with a model on the interaction between HIV and other sexually transmitted infections in South Africa[13]. The impact of the models developed by Prof Rob Dorrington and Dr Leigh Johnson is that we have available excellent estimates of the population and the course of the epidemic for the work to come on costing National Health Insurance.

It was argued in IMSA NHI Policy Brief 1 that all costing work on National Health Insurance should be done using the ASSA2003 provincial model and that the costings be updated when a revision to the model is released. An update is under consideration and the aim is to release it by the end of 2009[i].

The ASSA2003 provincial tables by age and gender from 1985 to 2025, including a summarised and a detailed staging of HIV infection, can be downloaded as a spreadsheet from the IMSA web-site[j].

3. The HIV Epidemic by Province

A significant feature of the epidemic in South Africa has been the very different levels of infection by province. This has long been known through the annual antenatal clinic surveys by the Department of Health. The ASSA2003 provincial model has been used to provide a report and detailed figures of the epidemic for each of the provinces.[14] "The projections show that the prevalence in the country and in most provinces is reaching a plateau, with KwaZulu-Natal the highest (estimated antenatal plateau of around 40%), Western Cape the lowest (estimated antenatal plateau of around 17%) and Northern Cape and Limpopo slightly higher than the Western Cape. The other provinces are expected to level off or peak at an antenatal prevalence of 30-35%."

The two graphs below illustrate the rate of new infections (i.e. incidence) and the rate of total cases (i.e. prevalence) across the provinces, as a percentage of the total population in that province.

This means there is a wide disparity in the need for treatment by province and this argues for a risk-adjusted payment to the provinces which includes HIV/AIDS as a risk factor.

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[g] ASSA2003 model: http://www.actuarialsociety.org.za/Models-274.aspx
[h] ASSA Select Model: http://www.actuarialsociety.org.za/ASSA-Select-Model-289.aspx
[i] Personal communication, Dr Leigh Johnson, 2 July 2009.
[j] http://www.innovativemedicines.co.za/national_health_insurance_library.html

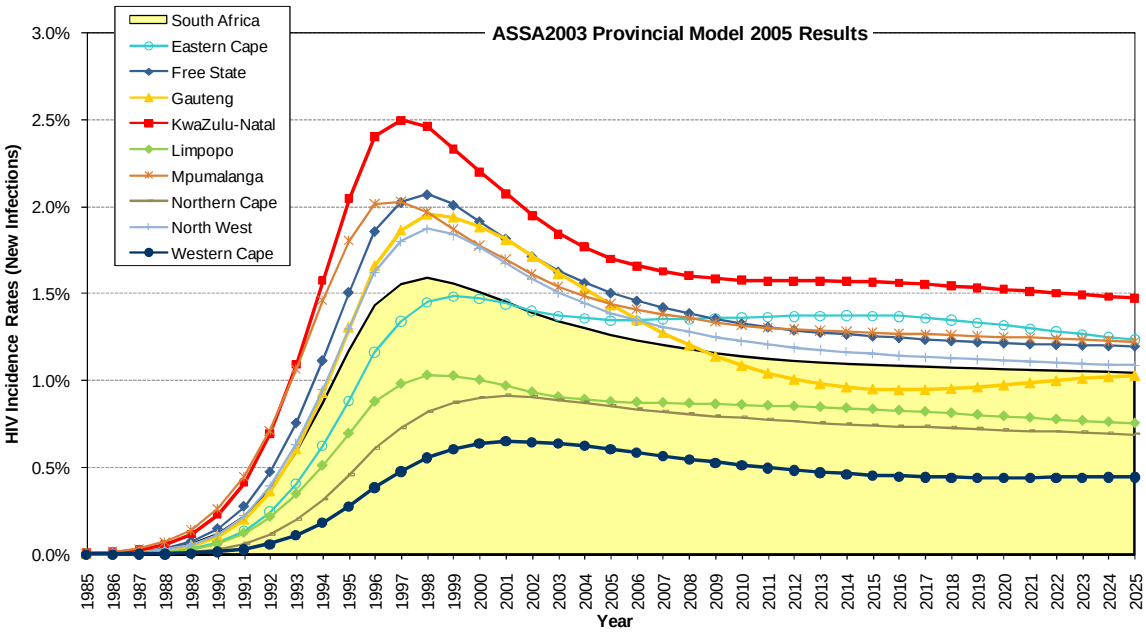

Figure 3: HIV Incidence Rate by Province from 1985 to 2025 using ASSA2003[1]

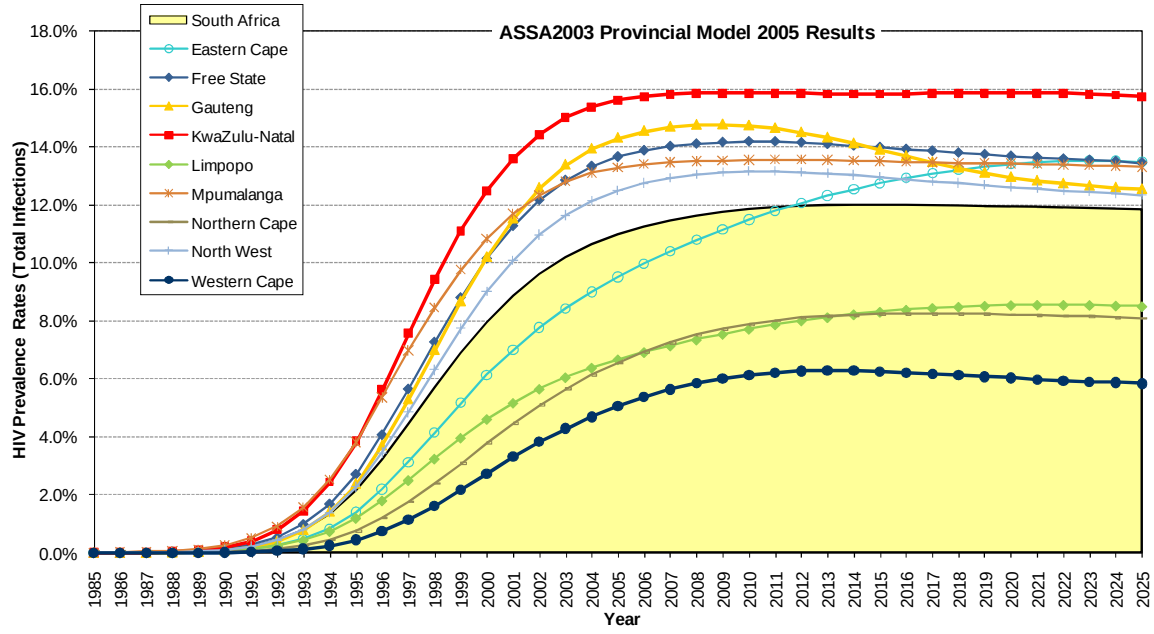

Figure 4: HIV Prevalence Rate by Province from 1985 to 2025 using ASSA2003[1]

4. Prevalence of HIV/AIDS in Medical Schemes

The REF Study 2005[15] provided excellent data on the status of the epidemic in medical schemes in 2005. The study is discussed in more detail in Policy Brief 3 on chronic disease. The graph below shows the age and gender profile for HIV/AIDS in medical schemes, as defined by the Entry and Verification Criteria in use at the time[16]. Essentially, the criteria require for diagnosis that there is documented proof to demonstrate that the patient qualifies for ART in accordance with the National Antiretroviral Treatment Guidelines. A "treated patient" needs to have received any of the following classes of medicines in two of the three preceding months: protease inhibitors (PI); nucleoside and nucleotide reverse transcriptase inhibitors (NRTI); or non-nucleoside reverse transcriptase inhibitors (NNRTI).

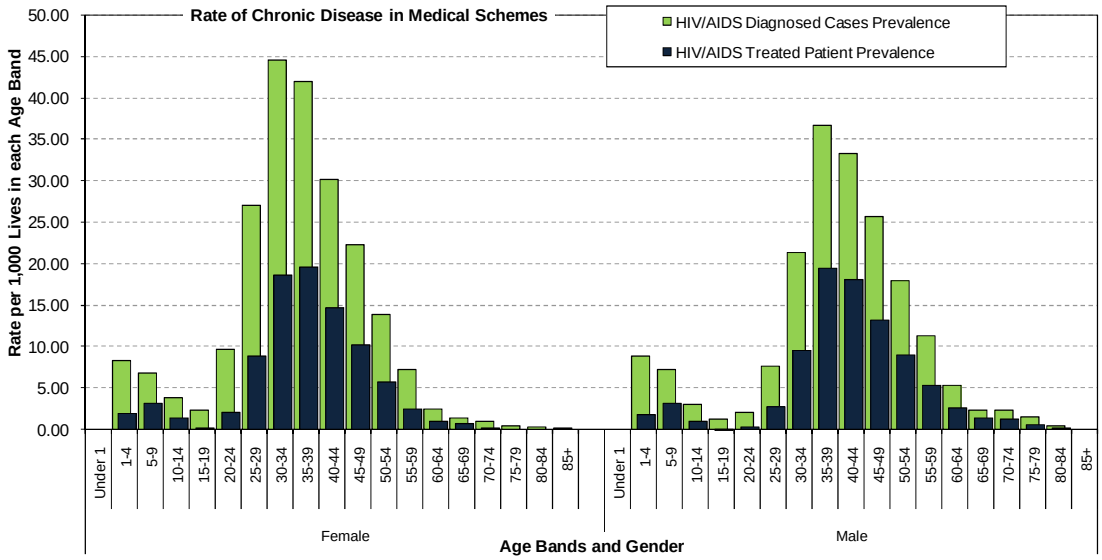

Figure 5: Rate of HIV/AIDS on Antiretroviral Medicines in Medical Schemes in 2005

These "diagnosed" and "treated patient" prevalences are not directly comparable to the ASSA2003 expected prevalence as the medical scheme experience is only those who have been tested and have been found to be eligible for ARVs. The medical scheme prevalence though has extended the understanding of the age range of people needing treatment. The ASSA model may be underestimating those needing treatment at the oldest ages as it assumes that sexual activity ceases at age 59[k]. This may be changed in future versions of the model.

In order to determine the expected future prevalence in medical schemes, it was agreed with Dr Leigh Johnson that the progression in the epidemic should be applied to the medical scheme base figures. This has been done since 2004 and the same rate of progression was then applied to the improved figures from the REF Study 2005[15].

There is some evidence of the extent of private sector provision of ARVs by considering the numbers covered on disease management programmes[17] and using the Risk Equalisation Fund figures.

A difficult estimate to make is the extent of HIV/AIDS in future medical schemes or a phased NHI. The issue is that the additional medical scheme members and beneficiaries are being taken from a pool with higher levels of HIV. As a crude first estimate some sort of linear relationship from the medical scheme "treated patient" prevalence rate to the population "Stage 5: Receiving ARVs" prevalence rate is needed by age and gender. However this ignores the complexity that it would probably be easier to access ART as a member of a medical scheme than through the public sector[l].

[k] Personal communication, Leigh Johnson, October 2005.
[l] Personal communication, Dr Leigh Johnson, 2 July 2009.

This means that a greater number of people from WHO Stage 3 may move to Stage 5 and be on treatment in a mandatory system. The private sector has also typically placed people on ART earlier as clinical evidence emerged about the optimum time to begin treatment. The public sector guidelines have at times lagged best practice from the Southern African HIV Clinicians Society[m]. In addition, being on ART impacts on survival time and the ability to infect others. Much more work is needed on this issue to develop a reasonable estimate of the HIV epidemic at various stages of a phased NHI.

5. Estimates of the Cost of Treatment in the Public Sector

The ASSA models have played a major role determining the cost of treatment of HIV/AIDS in the public sector. The first version of the intervention model was used as the basis for a highly-influential piece of research by Nathan Geffen, Prof Nicoli Natrass and Chris Raubenheimer. The authors combined[18] "detailed information about the costs of implementing these interventions with demographic projections of their impact. Information about prices, wages and other cost components" was gathered and included.

The research produced significant results[18]: "HAART[n] is expensive, but the net costs to government are significantly lower than the direct costs of providing HAART. This is because people on HAART experience fewer opportunistic infections (OIs) – thereby saving the government the costs of treating those OIs. We estimate these 'hospital costs averted', provide a brief discussion of the savings associated with fewer orphans, and then conclude with a calculation of the cost of prevention and treatment programmes as a percentage of GNP."

This work played a major role in the assessment by the Department of Health and the National Treasury[19] of the cost-effectiveness of treatment and the eventual decision by Cabinet in 2003 to roll-out ARVs in the public sector.

It would be valuable for the development of a National Health Insurance system for the costs of HIV to be estimated again, using more recent prices. To this end, spreadsheets have been extracted from the latest version of the ASSA2003 model by staging of the epidemic and have been made available on the IMSA web-site[o]. These can be used to model the epidemic for the whole country.

The user guide to the ASSA2003 model explains the expected diseases at various points in the staging[12]: "The first two stages are largely asymptomatic. Symptoms occur more frequently in stage 3, and include weight loss and oral infections. People in stage 4 experience a range of more severe conditions, such as pneumonia, extrapulmonary TB and wasting syndrome. These conditions are referred to collectively as AIDS." "In the absence of treatment, individuals are assumed to progress through each of the four WHO stages sequentially, before dying from AIDS. Individuals who initiate ART are assumed to do so at the time that they experience their first AIDS-defining illness, and move into stage 5 on initiating ART. People may die from AIDS while receiving ART or may discontinue treatment before dying from AIDS."

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[m] http://www.sahivsoc.org/

[n] From notes from Aid for AIDS: HAART is Highly Active Antiretroviral Therapy and usually consists of a combination of three ART drugs (2 NRTI + NNRTI or PI). It lowers the viral load, often to below the detection level. HAART may be sustained for years if taken correctly and is associated with weight gain and general well being. There is less risk of "opportunistic" illnesses while on HAART and it dramatically slows the progression to AIDS.

[o] http://www.innovativemedicines.co.za/national_health_insurance_library.html

6. Disease Management in the Private Sector

Dr Leon Regensberg, the Senior Medical Advisor of Aid for AIDS[p], has long shown that the major cost driver in managing HIV/AIDS is hospitalisation for AIDS-related conditions. Antiretroviral therapy is effective and reduces the need for hospitalisation. Aid for AIDS is the longest running disease management programme in the private sector and is described in a case study in the South African Health Review of 2007 [20].

Aid for AIDS has found from experience that "Treatment costs are high at entry into the programme because hospitalisation typically coincides with diagnosis or registration." "Treatment costs have been shown to stabilise once a patient has enrolled and been stabilised on HAART." This is shown below in terms of time from registration on the confidential disease management programme.

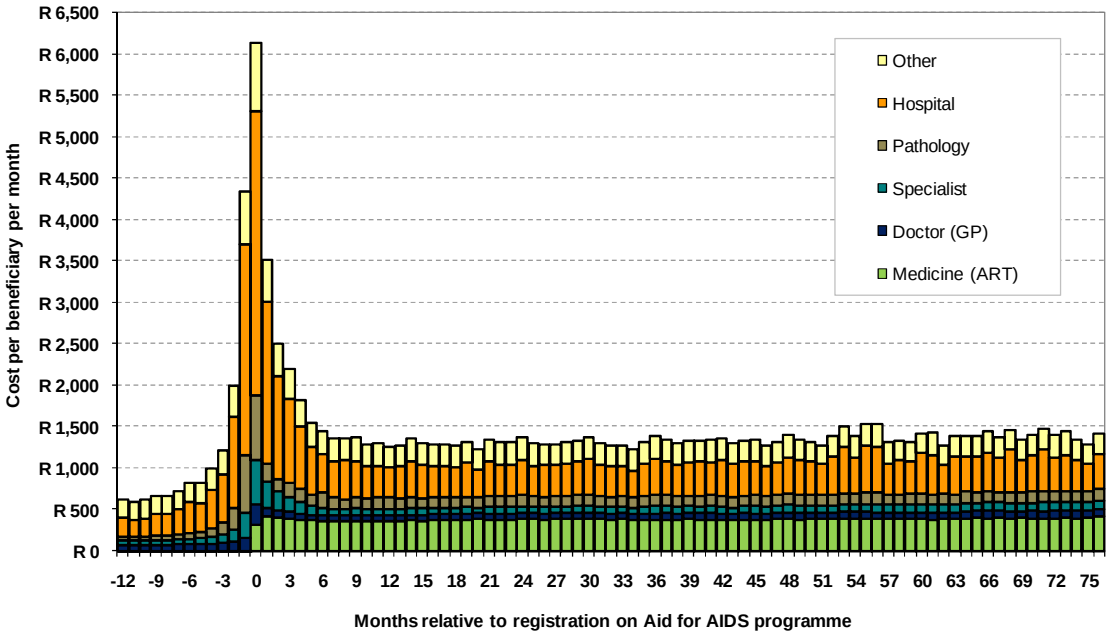

Figure 6: Components of treatment Costs relative to Enrolment on Aid for AIDS Disease Management Programme, January 2007 [Source: Michael Hislop, Aid for Aids]

Aid for AIDS researchers[q] "have always suspected that there is a degree of 'coincidence' in the cost spike at AfA entry. In other words, patients enrol on AfA as a consequence of admission most likely either because they are diagnosed HIV+ for the first time or know about their status but only finally decide to do something about it after the admission experience". Patients in a later stage of disease, in terms of a CD4 count, "have a significantly higher spike and higher average post registration treatment costs than patients who enter at an early stage". Significant hospital costs might therefore be avoided through earlier diagnosis and registration on disease management programmes. A commitment to destigmatising the disease remains essential.

[p] Aid for AIDS is the largest disease management company for HIV/AIDS in the private sector in South Africa. It participates in international programmes providing services in the public sector and also provides HIV/AIDS disease management in Botswana, Namibia, Swaziland, Lesotho and Zambia. See http://www.aidforaids.co.za

[q] Personal communication, Michael Hislop, Aid-for-AIDS, 2 July 2009.

Disease management programmes to manage HIV/AIDS benefits were already found to have become standard by 2003[21]. A survey[22] found that these programmes could potentially be accessed on a confidential basis by 90% of medical scheme beneficiaries before treatment became mandatory in medical schemes. By mid-2006 it was found[17] that there were seventeen companies offering HIV/AIDS disease management, covering 55,900 patients. A further 11,600 were treated on community treatment programmes so that the total number of individuals receiving HAART in the private sector was estimated to be at least 67,600. Roughly 181 000 people had started HAART in the public health sector by June 2006. No attempt was made to estimate the number of individuals paying for their own treatment and not belonging to disease management programmes, community treatment programmes or public sector programmes.

Aid for AIDS has, since inception in 1998, made clinical guidance on the management and treatment of HIV/AIDS freely available. The clinical guidelines are currently in their seventh edition[r]. Aid for AIDS would be an excellent source for costs of treatment according to the stage of HIV infection.

A concern expressed by Aid for AIDS[20] is that disease management programmes "do not offer integrated programmes traversing the areas of TB, STIs and HIV and AIDS, and therefore the overall health care needs of individuals are not managed holistically".

7. Minimum Benefits for HIV, AIDS and TB.

The changing benefits provided for HIV/AIDS as part of Prescribed Minimum Benefits (PMBs) in medical schemes are a mirror image of the changing benefits provided in the public sector for the disease. It is one of the clearest examples where the public and private sectors provide the same defined minimum package of care. While the private sector disease management companies and AIDS activists argued strongly for all medical schemes to include treatment for HIV[22], it was not until benefits were provided in the public sector that they became mandatory for medical schemes as well. From 1 January 2005 medical schemes have been required to provide the following package of minimum benefits for HIV/AIDS:

- HIV voluntary counselling and testing;
- Co-trimoxazole as preventive therapy;
- Screening and preventive therapy for TB;
- Diagnosis and treatment of STIs;
- Pain management in palliative care;
- Treatment of opportunistic infections;
- Prevention of mother-to-child transmission of HIV;
- Post-exposure prophylaxis following occupational exposure or sexual assault; and
- Medical management and medication, including the provision of antiretroviral therapy and ongoing monitoring for medicine effectiveness and safety, to the extent provided for in the national guidelines applicable in the public sector.

Dr Leon Regensberg made a substantial submission on the minimum package for HIV/AIDS for the 2008 review of Prescribed Minimum Benefits[23]. He said: "While the existing prescribed minimum benefits for HIV/AIDS provide scope for reasonable cover, there are a number of practical problems that have been identified which may prejudice both schemes and members. In particular, with the exception of antiretroviral therapy, the existing regulations do not stipulate or make provision for clear treatment guidelines, clinical protocols or exclusions. This is particularly important in respect of treatment for opportunistic infections."

[r] Aid for AIDS clinical guidelines: http://www.aidforaids.co.za/ex_MEDSCHEME_VS07/MedschemeHealthRisk/HealthRiskManagement/AidForAids/ClinicalPublications.aspx

He provided evidence of practical problems and proposed solutions for a number of concerns in the clinical management of HIV/AIDS. These included recommendations on Hepatitis B screening, diagnosis and treatment of sexually transmitted infections, screening and preventive therapy for TB and improvements to the payment of voluntary counselling and testing for HIV. He argued that: "No waiting periods or exclusions should apply to HIV under any circumstances. [These are] in neither the scheme's nor the beneficiary's interest both from a financial and clinical perspective. For example, any exclusion on pregnancy should not extend to MTCTP."

8. The Interaction between HIV and Other Diseases

The epidemics of HIV and tuberculosis (TB) are interlinked[24,25]. The ANC Health Plan of 1994[5] said: "Tuberculosis is by far the most frequently occurring notifiable disease. The annual case load increased by 4% between 1987 and 1988. In 1988 the prevalence rate was 489 per 100,000 population, with the Western Cape having the highest rates in the country. The incidence in 1990 was 229 per 100,000." By 2006, the Department of Health found[25] that the incidence of TB had increased to 720 per 100,000.

The WHO[26] said: "Globally, 700 000 people living with HIV had TB in 2006. ... Sub-Saharan Africa accounts for 85% of the people with both TB and HIV, with a disproportionately heavy burden in some countries. South Africa ... has 0.7% of the world's population but accounts for 28% of the world's people with both HIV and TB and 33% of the cases in sub-Saharan Africa."

The National Strategic Plan for HIV/AIDS says[24]: "In southern Africa, between 50% and 80% of TB patients are HIV positive. Whilst a primary risk factor for TB infection is overcrowding, the development of TB disease is significantly more likely where there is co-infection with HIV as a product of immunosuppression".

A recent review of the history and treatment of TB in the Lancet warns[27] "Tuberculosis is at least as old as recorded human history ... Regrettably, there are currently more cases of tuberculosis in the world than at any previous time in history." "When WHO declared tuberculosis a global emergency in 1993, the initial response from the international community was sluggish and inadequate. A resurgence of the disease, the emergence of multidrug-resistant [MDR-TB] and extensively drug-resistant [XDR-TB] strains, and the detrimental effect of the concurrent tuberculosis and HIV/AIDS epidemics on national control programmes in sub-Saharan Africa have all occurred despite the availability of effective combination treatment regimens. On the positive side, funding agencies and donor governments are at long last taking a serious interest in investing in tuberculosis research priorities defined by the Stop TB Partnership."

The SAHR 2007 describes the delivery of TB treatment in South Africa[20]: "Whilst the public health sector is predominant in the provision of TB care across the country, there are private providers of TB treatment. These providers can be classified into three main groups:

- Employer-based private providers (e.g. the mining industry TB services provided either in-house or contracted out to managed health care companies);
- Private for-profit providers; and
- Private not-for-profit providers (e.g. the NGOs providing community-based TB treatment).

The Department of Health found "There are marked provincial variations in the treatment outcomes [for TB] ... The best performing province [in 2005], the Western Cape, achieved a cure rate of 71.9% .... The KwaZulu-Natal province, which appears to be experiencing significantly more challenges than the other provinces, reported a cure rate of 45.2%.

The SAHR 2007 found that[20] "Public-private partnerships involving some of the private providers are an important component of TB care". Problems of co-ordination remain and many medical scheme members still receive treatment in the public sector for TB. Medical schemes should be engaged in the provision of TB treatment in order to ensure proper co-ordination of treatment for the patient.

A new WHO report[28] says that multidrug-resistant tuberculosis (MDR-TB)[s] has been recorded "at the highest rates ever". The report is based on information collected between 2002 and 2006 on 90 000 TB patients in 81 countries. It found that extensively drug-resistant tuberculosis (XDR-TB), a virtually untreatable form of the respiratory disease, has been recorded in 45 countries.

The WHO report found a link between HIV infection and MDR-TB: surveys in Ukraine found nearly twice the level of MDR-TB among TB patients living with HIV compared with TB patients without HIV. The report provides valuable epidemiological information which might be used to estimate the likely cases in South Africa as the HIV epidemic develops. For example, "thirty six countries reported data on age and sex of cases by any resistance and MDR-TB".

The interaction between HIV and other sexually-transmitted infections (STI) has been modelled by Dr Leigh Johnson[13]. He identified "a number of forms of STI treatment that could achieve significant reductions in HIV incidence over the next decade". Further research is needed to determine the costs of treatment and the cost-effectiveness of the treatment.

Dr Leon Regensberg provides evidence that[23] "some 5% of people living with HIV in Sub-Saharan Africa are co-infected with Hepatitis B. Certain first-line antiretroviral therapy options (Tenofovir and lamivudine) can successfully suppress both infections."

As the epidemic progresses and people with HIV live longer, so the issue of co-morbidities with other chronic diseases becomes more of a concern.

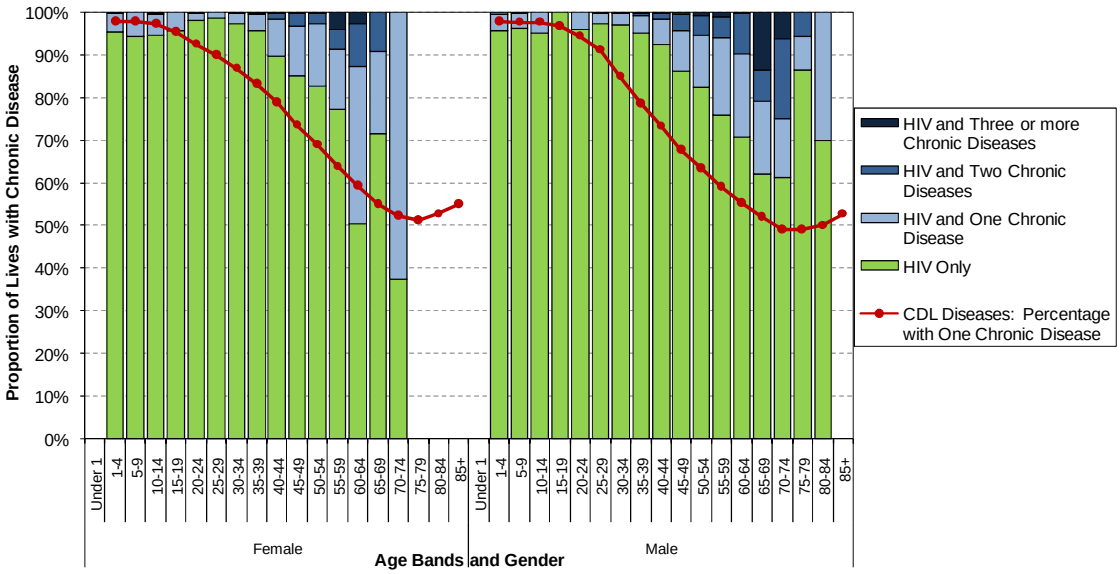

Figure 7: Proportion of Multiple Disease and HIV by Age and Gender in Medical Schemes

[s] One in three people in the world is infected with dormant TB bacteria (Mycobacterium tuberculosis). Only when the bacteria become active do people become ill with TB. Bacteria become active as a result of anything that can reduce immunity, such as HIV, advancing age, or some medical conditions. TB can usually be treated with a course of four standard, or first-line, anti-TB drugs. If these drugs are misused or mismanaged, multidrug-resistant TB (MDR-TB) can develop. MDR-TB takes longer to treat with second-line drugs, which are more expensive and have more side-effects. Extensively drug-resistant tuberculosis (XDR-TB) can develop when these second-line drugs are also misused or mismanaged and therefore also become ineffective. Because XDR-TB is resistant to first- and second-line drugs, treatment options are seriously limited. It is therefore vital that TB control is managed properly. Source: WHO: http://www.who.int/topics/tuberculosis/en/

Using data from the REF Study 2005[15], it was found that of those on treatment for HIV, 24.4% are on treatment for one or more of the other chronic CDL diseases. This is lower than the multiple disease rate found in people who are not on treatment for HIV. For those on treatment for any of the CDL diseases (but excluding HIV), 38.0% are receiving treatment for more than one disease.

There is however a strong effect by age and overall numbers always need to be treated with caution as the HIV population is generally younger. Figure 7 shows that even by age and gender, there seems to be less multiple chronic disease in those being treated for HIV. These early findings need to be discussed with administrators and clinicians in more detail and more research is needed on how this overlap might progress over time and with an expansion of health insurance to a larger proportion of the population.

The graph below from the data used for the REF Study 2005 provides information on the multiple Chronic Disease List (CDL) diseases that co-exist with HIV in medical schemes.

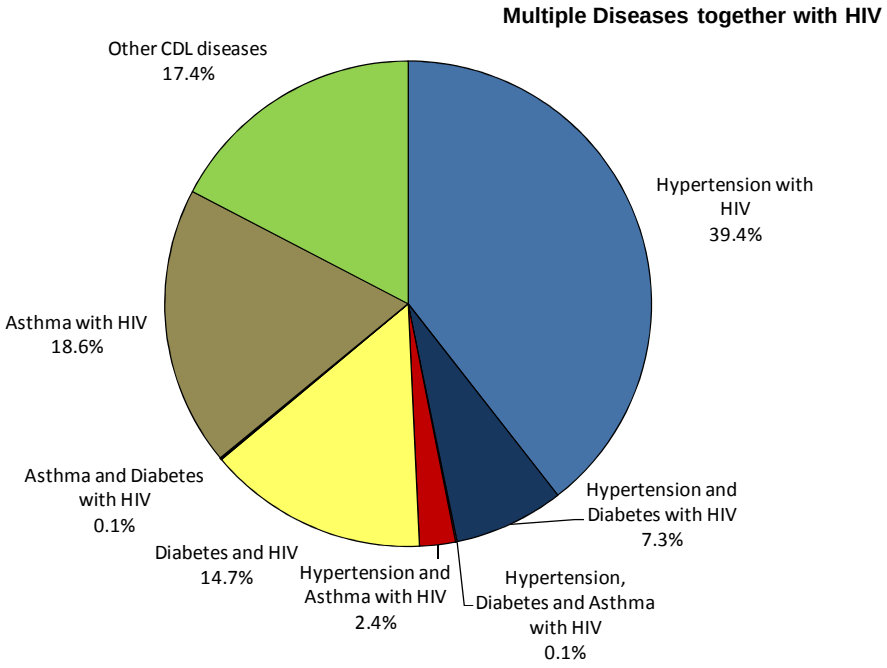

Figure 8: Multiple Chronic Conditions occurring together with HIV/AIDS in Medical Schemes in 2005

It seems that HIV may also have a reverse impact on the experience of chronic disease in those that are not HIV positive. Steyn and Schneider argue[29] that the "most striking feature of the AIDS pandemic in South Africa is the tremendous increase in the mortality of young adults (citing Dorrington). As a consequence, the older and poorer people not only have to care for their adult children who suffer from AIDS, but also for their grandchildren who are orphaned when their parents die. Although not yet formally evaluated, the impact this has on the quality of chronic diseases care for the elderly must be extensive. They are emotionally drained as a result of the changing family structure and through the premature loss of their children, who traditionally would have cared for them in their old age (citing Adjetaye-Sorsey). The impact that the AIDS epidemic has on chronic diseases and chronic diseases care in older persons must surely aggravate the position of the poor."

9. The Impact of HIV, TB and Related Diseases on a Future NHI

This Policy Brief shows that much is known about the future trajectory of the HIV/AIDS epidemic from the modelling work by Prof Rob Dorrington and Dr Leigh Johnson and their colleagues at UCT. The earlier study of costs in the public sector is quoted which should form the basis for a future costing for NHI but needs updated figures. Dr Leon Regensberg and Michael Hislop at Aid for AIDS have excellent data in a variety of settings and countries. Sources of data for estimating the impact of TB are suggested and the new Johnson model of the impact of the interaction between HIV and sexually-transmitted infections is available.

Units in South Africa that may be able to assist in a definitive updated costing of the impact of all aspects of the epidemic are:

- Centre for Actuarial Research (CaRE), University of Cape Town: http://www.commerce.uct.ac.za/Research_Units/CARE/
- Aid for Aids: http://www.aidforaids.co.za/
- HIV Prevention Research Unit: http://www.mrc.ac.za/hiv/hiv.htm
- TB Epidemiology and Intervention Research Unit: http://www.mrc.ac.za/operationaltb/index.htm
- The Centre for Social Science (CSSR), University of Cape Town: http://www.cssr.uct.ac.za/
- Health Economics and HIV/AIDS Research Division (HEARD), University of KwaZulu-Natal: http://www.heard.org.za/
- Centre for the Study of AIDS, University of Pretoria: http://www.csa.za.org/
- The Centre for Health Policy (CHP), University of the Witwatersrand: http://web.wits.ac.za/Academic/Centres/CHP/Research/HIV/HIVAIDS.htm
- Reproductive Health and HIV Research Unit (RHRU), University of the Witwatersrand: http://www.rhru.co.za/default.asp
- The KwaZulu-Natal Research Institute for Tuberculosis and HIV: a new unit to be housed in the Nelson Mandela School of Medicine in Durban.

In all, there are substantial resources and experienced people available to assist in producing estimates of the impact of HIV and related diseases on a future NHI. This work needs to be commissioned, however the future NHI may be structured.

Produced for IMSA by
Professor Heather McLeod
4 July 2009

Resources on the IMSA Web-site

The following are available on the NHI section of the IMSA web-site: www.imsa.org.za

- The slides and tables used in this policy brief [PowerPoint slides].
- Tables by age and gender of the population in each province, with tables giving the WHO staging of HIV infection and the numbers needing and discontinuing antiretroviral treatment. Tables are available from 1985 (which pre-dates the epidemic) to 2025. [Excel spreadsheets.]

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