

## Rian Malan Spreads Confusion about AIDS Statistics

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### Main article

Rian Malan's articles in Noseweek and The Spectator, arguing that AIDS statistics are grossly exaggerated, have numerous technical errors. One which appears in Noseweek and upon which most of his case with regard to the South African epidemic rests is so serious and obvious that it raises questions about Malan's basic competence as a research journalist – or more disturbingly -- about his motives and integrity.

In the December issue of Noseweek, Rian Malan and the magazine's editor, Martin Welz, assert that the AIDS epidemic in South Africa is greatly exaggerated and that too much money is being spent on it. 'Glad Tidings' extols the editorial headline, 'Good news! Hurrah! Much less illness in the pipeline!' exclaims Welz, celebrating Malan's 'findings'. Well actually, keep the cork on the champagne. Malan's 'research', which contains hardly any verifiable references, is shoddy journalism. It is littered with serious errors, one of them highly misleading, as well as obvious upon reading the source he quotes. Certainly Malan is an entertaining read. But unattributed quotes, unnamed science journals, unnamed experts, misrepresentations, leaving out critical evidence and a plethora of incorrect facts have no place in a thesis that purports to be debunking the current orthodox scientific view.

Unfortunately, there is overwhelming evidence that mortality due to HIV in South Africa is immense; it is probably the largest single cause of premature death in South Africa. Botswana, Zambia, Malawi, Zimbabwe and Tanzania, -- some of the countries referred to in another article by Malan published in the 13-20 December edition of The Spectator -- are also experiencing very large HIV epidemics. The number of AIDS cases in South Africa is demonstrably growing but the situation is not hopeless: we can alleviate the epidemic by substantially increasing prevention and treatment efforts as government has recently

committed to doing. This is not a message of doom as Malan and Welz would have their readers believe; it is a warning coupled with a practical plan of action - treat and prevent.

## **HIV in South Africa**

We know that the HIV epidemic in South Africa is large from a variety of sources including HIV tests of pregnant women attending public antenatal clinics, analysis of death certificates and a survey from a number of communities and companies across the country. None of these surveys, even taken together, can give us a precise estimate of the number of infected, dying or dead people, but they do imply a large epidemic. Here are some examples:

- ❖ The Department of Health annually tests about 16,000 women attending public antenatal clinics. In 2002, 26.5% tested HIV-positive (1). The infection rate has increased consistently and dramatically since the antenatal clinic studies started. As a comparison, in 1995 it was about 11% (2). These studies allow us to estimate with a great deal of confidence the extent of the epidemic in the approximately one million pregnant women attending public antenatal clinics. Immediately, we can see that HIV is rife in a large sub-group of the South African population. Unfortunately, determining the extent of the epidemic in the general population from these surveys is difficult. For one thing pregnant women have clearly had at least one unprotected sexual encounter making them more at risk of HIV than the general population.
- ❖ Researchers from the Medical Research Council (MRC) analysed adult death registration data from 1985 to 1999. They found that death among young people, especially women aged 15 to 44, has increased dramatically during that period and that the only reasonable explanation for this is a steadily worsening HIV epidemic (3).
- ❖ The Human Sciences Research Council (HSRC) tested over 8,000 people from across South African society in 2002. 11.4% tested HIV-positive and the study consequently extrapolates this result to the entire population. As with any undertaking of this complexity, the study is not without flaws. But it gives an unmistakable sense of the size of the epidemic.
- ❖ In a particularly important study, Statistics South Africa analysed a sample of death registration certificates from 1997 to 2001. They found that by 2001, TB had become the illness category with the most recorded deaths followed closely by HIV-disease. But the largest illness category recorded as cause of death for women (undifferentiated by age) was HIV. Furthermore, the proportion of deaths due to TB rose dramatically from 1997 to 2001. Since TB is the most commonly associated opportunistic infection with HIV in South Africa, it is certain that much of the proportion of death attributed to TB was also HIV-related. The same trend was observed for influenza and pneumonia, also common opportunistic infections in people with HIV. In younger age groups the same trend can be seen for various other diseases frequently associated with HIV. For example, in women aged 15 to 29, the proportion of deaths ascribed to intestinal infectious diseases doubles between 1997 and 2001. (from 2.1% to 4.4%). While not all deaths due to TB, influenza, pneumonia and other common opportunistic infection are HIV-related, the substantial increase in their proportionate contribution to death suggests that HIV was probably already the largest single cause of death in South Africa by 2001 (4).

These certificates state what medical practitioners certifying a death are prepared to avow, on record, as the cause of death. Yet many record TB, pneumonia, influenza or some other opportunistic infection as cause of death instead of HIV because patients dying of these illnesses are often not tested for HIV. Also, despite the apparent confidentiality of the certificates, doctors avoid citing HIV to spare the family the stigma and so that funeral insurance and other benefits are paid to the family (5).

It is with regard to this study that Malan makes his most serious error described later in this article.

- ❖ The report shows unambiguously a change in age patterns of death particularly among women, as well as what it calls a 'unique racial topology of mortality' (pg. 22). There is a rising proportion of mortality due to TB and other diseases commonly associated with HIV. Furthermore the period of the survey (1997 - 2001) is early in the AIDS epidemic, so it is a hint of what is to come. Government has just released the Towards Ten Years of Freedom report which shows that delivery of social services has improved (e.g. access to clean water, housing and electricity) (6). These are major factors in vulnerability to poverty related disease. Yet more people are dying younger. How can Malan, or the South African government, explain this?

Many other smaller studies have been done which show alarming HIV infection rates in migrant workers, youth in Carltonville, truck drivers and patients in major hospitals (see appendix one for a sample of these). Studies from the late 1980s and early 1990s by comparison find relatively low infection rates indicating that the HIV epidemic has dramatically worsened over the last decade (7). The hospital studies are particularly interesting because they show the increased burden on the public health-care system of AIDS. Surveys have also been done in banks and at Old Mutual, with prevalence rates ranging from 3 to 5%. Noseweek flippantly suggests that the prevalence found in South African banks should ease our concerns about the extent of the epidemic, but these prevalence rates are disturbingly high for institutions with predominantly middle-class workforces and should give no cause for relief (as a comparison a 3% epidemic is proportionately five times greater than the US epidemic).

The Department of Health, Actuarial Society of South Africa (ASSA) and the HSRC have all separately used the results from some of these surveys to estimate the size of the epidemic. This is a difficult task and involves making a number of assumptions. There is quite a large margin for error. The three institutions calculate different epidemic sizes ranging from 4.8 million to 6.6 million for 2002. Clearly the differences are significant, but they all reach the same critical conclusion: the South African HIV epidemic is massive. Even if the epidemic size was as small as one million (which it certainly isn't), there would still be an enormous amount to be done to mitigate its effects.

It is worth noting that the first author of the MRC report discussed above, Rob Dorrington, also leads the ASSA modelling team. The MRC report clearly stated that the ASSA600 model in use at the time of publication was overestimating AIDS deaths. No lack of candour here. Yet Malan somehow manages to paint this as a surreptitious admission of the model's failure and replacement with a new version. In fact the explanation is mundanely benign (though to see this would not suit Malan's breathless purpose) the ASSA model, as with any useful software, is upgraded from time to time. And in any event, the percentage overestimate by ASSA600 does not give credence to Malan's central thesis that the epidemic is grossly exaggerated. What is more, at the time nearly all newspapers quoted the Department of Health estimates -- which were lower than ASSA's. ASSA2000 later replaced ASSA600. When a report on the ASSA2000 model was released in late 2002 its developers stated clearly that they suspected there was still overestimation (about 10%) taking place and that over time this would have to be addressed. So where's the conspiracy? Apparently only in the eye of the beholders, in this case Malan and Welz.

## **HIV in Sub-Saharan Africa**

Our knowledge of the size of the Sub-Saharan HIV epidemic outside of South Africa is very imprecise. This is because of the general lack or collapse of health systems in many of these countries, which makes it difficult to collect hard data about any of the numerous diseases that afflict poor people, including HIV. Consequently, organisations such as UNAIDS have to generate estimates, on the basis of significantly less

data than may be available in a country like South Africa. Nevertheless, numerous surveys indicate that the epidemic is extremely serious in many countries. A few examples are described here.

- ❖ The Lesotho Government has recently conducted a survey of over 2,500 women at six sites. The survey found a median HIV prevalence of 28.5%. HIV prevalence ranged from 17.3% in Mokhotlong (a rural hospital) to 35% in Queen Elizabeth II hospital in Maseru. The 25-39 year age group was the worst affected with prevalence of 39.1% (8).
- ❖ A recently completed general population survey by the Kenyan government backed by the US Centre for Disease Control has found that over 6.7% of Kenyans are HIV-positive, a lower estimate than the UNAIDS one of 9.4% (9).

Similar general population studies in Zambia and Mali also indicate smaller epidemics than the UNAIDS estimates. Once more this should not give us comfort. The revised numbers in Kenya and especially Zambia remain disturbingly large. They confirm that UNAIDS estimates should be treated with caution, but they also confirm that there is much to be done and we are way behind schedule.

Appendix one contains a sample of prevalence studies done in some SADC countries. Undoubtedly, some of them are flawed, but together they provide incontrovertible evidence that the challenge of HIV is substantial in these countries and unless programmes are implemented to mitigate the virus's effects or a cure is found, the epidemic will cause misery and hamper development efforts in these countries for the long-term.

## Malan's Errors

There are several telling technical errors in Malan's articles in *The Spectator* and *Noseweek*. Appendix Two lists the ones we found (10). Here are two particularly important ones:

- ❖ The *Noseweek* article is accompanied by a graph showing different AIDS estimates. The salient feature of the graph is that it purports to show Statistics South Africa's estimates of AIDS deaths at a fraction of the ASSA estimates. The implication is that the estimates by ASSA2000 are way too high and that there is a substantial dispute between the two organisations over the extent of the epidemic.

In the text, Malan explains, 'All deaths caused by HIV or any of its euphemisms were counted as AIDS deaths, and there was evidence for only 40,000 such in 1999.'

There is simply no such implication in the Statistics South Africa report to which Malan refers (11). All the calculations he attributes to the official statistics body are his own and he has made a mess of it.

A direct quote from page 28 of the Statistics South Africa report helps explain his error, '*In cases where HIV or its synonyms (e.g., immunocompromised, immunosuppression, retroviral disease, wasting syndrome) are stated on the certificate, an appropriate code related to HIV is used. . . On the other hand, if HIV or its synonyms are not stated on the certificate, the reported diseases are coded as stated, with no relation to HIV. For example, if a physician certifies the death of a 25-year old urban, educated and employed person as being that of acute tuberculosis, with no mention of HIV, the code for acute tuberculosis is used.*' Similar comments are made elsewhere in the report. Yet Malan takes no notice and only counts deaths in the HIV category. He ignores all the other categories in the Statistics South Africa list, many of which will include HIV-related deaths. His error massively underestimates AIDS-related deaths. In a tiny note under the table,

Malan describes the estimate as derived from Statistics South Africa's report, but the calculation of the derivation is his alone and it is simply wrong.

As the report makes clear, extricating the HIV-related deaths from the other death categories is where 'official statistics stop and research begins.' (pg. 28) Malan has not bothered with such research, which would be a very complex undertaking. From his entertainingly snide comment about 'HIV or any of its euphemisms' and his calculations we can ascertain that he must have at least paged carefully through the report, if not read it entirely. It is therefore very difficult to understand how he could have made this obvious gaffe (12).

- ❖ Malan states that demographers estimate that 450,000 of people on medical schemes are HIV-positive and this is grossly exaggerated because only slightly over 20,000 have registered with their HIV disease management programmes. He argues that hundreds of thousands of people would not rather die than risk the possible stigmatisation associated with making their HIV status known to their medical schemes. But this implication does not follow.
- ❖ It is difficult to determine the source of Malan's numbers. He seems to have calculated them, but at least in this case quite reasonably. The ASSA2000 Interventions Model (13) to which he seems to be referring estimates that 6 to 7% of medical scheme members are infected. Of these, about 10% would have experienced AIDS-defining conditions in 2003 (14). When you consider that (1) many people only join disease management programmes when they experience major morbidity events, (2) some medical schemes do not have disease management programmes, (3) many medical schemes only offer HIV benefits on their more expensive options, (4) it is often unclear even to people who are open about their HIV status why they should join a disease management programme before they become sick(15) and (5) there is an incentive due to stigma to pay for HIV medicines out-of-pocket rather than through medical schemes (16), then the numbers become quite plausible. Make no mistake: we do not know if the medical scheme prevalence estimates are accurate. Much more is known about the prevalence of HIV among South Africa's poor than the middle-classes who have access to medical aid but Malan's analysis is too poor to conclude that current estimates should be ditched just yet.

Malan argues that he does not accept these arguments because surely middle-class South Africans should know their status (which incidentally only addresses one of the arguments above). He says, 'Even if you accept against all odds that only 25% are aware of their condition, 112,500 people should have come forth to join the HIV management programmes.' Well, 'against all the odds', 25% is actually a pretty good guess. The HSRC study, referred to earlier, extrapolated that 18% of HIV-negative people and 23% of HIV-positive people know their status. Class is a limited predictor: 30% of HIV-positive people with high-school education or more knew their status. Again, the HSRC estimate is just an approximation and we cannot be sure it is correct, but it is the best we have to go on, irrespective of Rian Malan's whims to the contrary.

Curious about Malan's figures, I contacted Aid for AIDS, the biggest HIV disease management scheme in the country. I was informed that two thirds of people who join the programme already need to start treatment (17). Furthermore the number of people enrolled in their programme has dramatically increased in the last few months. They have 20,000 current members, which comes to substantially more than the 10% of estimated AIDS cases among the HIV-positive population belonging to the associated medical schemes. However, not all 20,000 require treatment yet (although at least two thirds do) and one of their schemes is believed to have a higher prevalence than average. When all things are considered, the estimate of the ASSA2000 Interventions Model is plausible given currently available information (18).

## **Uncertainty About the Size of the Epidemic**

It is worth noting what is obvious to anyone with an interest in the epidemic: we do not know, never have known and probably never will know the exact number of people infected with HIV in any developing country hard-hit by the epidemic. UNAIDS's annually published computer-modelled epidemiological data must be treated with caution. After all they are only estimates as the team of experts who assemble them make clear. Some, maybe many, of their calculations have overestimated the epidemic, but as their website explains (19), 'The HIV/AIDS epidemic is constantly yielding new information and understandings. As the epidemic evolves and our knowledge improves, we commit to update and share what we have learned.' A similar explanatory note is made about their estimates in the widely circulated AIDS epidemic update (20). In any case, estimates made by the Department of Health and ASSA have for many years been considered more definitive for the South African epidemic than the UNAIDS ones.

There are some consultants with little knowledge or experience in epidemiology making wild forecasts about the size of the epidemic, but this is no cause for the smugness or complacency expressed by Malan and Noseweek. Because some estimates are poorly derived, does not mean that all are.

### **Politicisation of AIDS**

Malan states that HIV is quite possibly the most politicised disease in history. However, he then draws the wrong conclusion. He warns us of the 'lobbyists seeking to commandeer a disproportionate amount of pitifully limited health resources to fight a condition ... whose rate of occurrence appears to have been hugely overestimated skewing political, financial and humanitarian agendas.' He also questions spending '\$300 dollars a year keeping an individual alive with AIDS drugs' when 'that individual's friends and neighbours are dying in much larger numbers of starvation or politically less interesting, but equally fatal, diseases that could be cured for a few cents if medicines were made available, which often aren't.'

However, it is precisely because of the politicisation of the HIV epidemic that there is a growing awareness globally of the inequities in health-care between rich and poor countries that go far beyond AIDS. There have been concrete results of this raised awareness. The Global Fund to Fight AIDS, TB and Malaria was established in 2001 as a result of the efforts of AIDS activists. The fund means that finally, there is the real prospect of substantial money being invested into alleviating TB and malaria, probably the infectious diseases responsible for the most number of deaths in the developing world after HIV (and frequently associated with HIV), as well as the opportunity to develop health-care infrastructures in poor countries. Malan refers to the Department of Health's Operational Plan for Comprehensive HIV and AIDS Care, Management and Treatment for South Africa (released on 19 November 2003). He should have noticed that much of the funding for the programme will be invested in making lasting improvements to South Africa's health-care system (such as increasing the numbers of doctors and nurses) that will benefit the management of many diseases other than AIDS. Indeed, a primary reason to address the HIV epidemic appropriately in South Africa is that the increased morbidity associated with HIV is crowding out other diseases in the public health system (21). There is no guarantee that the Global Fund or the government's operational plan (and similar programmes in other African countries in various states of progress, including Botswana, Kenya, Nigeria, Namibia and Cameroun) will be successful, but they are arguably generating the most encouraging attempts yet to improve health-care in Sub-Saharan Africa.

At his most disingenuous, Malan states 'spending on AIDS research exceeded spending on TB by a crushing factor of 90 to one. As for pneumonia, cancer, dysentery or diabetes, let them take aspirin or grub in the bush for medicinal herbs.' His sarcasm aside, this real problem he refers to has nothing to do with under- or overestimating HIV prevalence in Africa. Pharmaceutical companies have spent large amounts of money researching new HIV drugs because there are very profitable markets for them in the US and Europe. There are not lucrative markets for treating TB and malaria in these countries. The failure of drug companies to develop enough medicines for high-mortality diseases in developing countries is because the current research and development incentive system does not encourage

developing medicines for the poor. This is something that AIDS activists have consistently highlighted, which is why the global pharmaceutical industry is under unprecedented pressure (22). Furthermore, it is partly through the efforts of AIDS activists that drugs such as cotrimoxazole, an antibiotic for preventing and treating pneumonia, and fluconazole, an effective anti-fungal, are now much more widely available to patients in the public health sector.

But the critical rebuttal to Malan's point is that the South African government has had a policy of treating patients in the public sector with 'pneumonia, cancer, dysentery or diabetes' as well as most other common diseases. Until the publication of the operational plan in November 2003, it had no such policy for HIV. Unfortunately, the massive growth in AIDS patients in the public sector coupled with a long period of stagnation in per capita public health expenditure (23) has resulted in patients with all diseases being crowded out of the system. Treating HIV offers an opportunity to reverse this by reducing the numbers of patients with AIDS-related opportunistic infections, and by drawing renewed capital investment into the health system.

Incidentally, Malan's proclivity for making the mistake he accuses demographers of is interesting. How does he know that more people are dying of starvation than AIDS in Africa? Could he please name the fatal disease of the next door neighbour that costs only a few cents to treat? The ignorance of these statements betrays how little he knows about health-care and epidemiology.

Malan claims he has travelled Africa extensively in recent years trying in vain to find evidence for a large HIV epidemic. For nurses, doctors, community workers and activists throughout South Africa, the dreadful rise in AIDS morbidity and mortality over the last few years and the consequent strain on our health-care system and community life in general is something we encounter on a daily basis and it is glaringly obvious.

Ultimately though, we should ask Malan does it really matter whether one in eight South Africans or one in twelve is HIV-positive, or whether it is 15 million or 30 million Africans when governments are still so far short of meeting the demands of the epidemic.

It would be an easy task to write an article in a similar vein to Malan's which argues the opposite viewpoint - that there is a conspiracy to underestimate HIV prevalence throughout Africa by epidemiologists. It could be backed up with arguments and seroprevalence studies that on the face of it seem compelling to people without detailed knowledge of AIDS epidemiology and who have not had the time to consult the reports the article refers to. But it would be as misleading as Malan's thesis. No respectable epidemiologist, among whom I include the MRC and Actuarial Society of South Africa (ASSA) researchers whom Malan attacks, has claimed perfect exactitude about South African HIV prevalence estimates. What can be said, is that they are the best available estimates given current knowledge and that with time and more research they will become more accurate.

### **Malan's Lack of Credibility**

By this stage one has to begin to ask whether Malan wishes to re-brand himself as the whistle-blower on exaggerated epidemiological estimates. Were he simply to argue that we cannot be sure precisely of the size of the epidemic and that AIDS statistics must be treated with caution, I would agree. But his arguments go far further than this. Malan, who seems to have no objection to having become a hit among AIDS denialists (24), flirts too suspiciously with pseudo-science. In a Rolling Stone article (22 November 2001), he devotes many paragraphs to questioning the efficacy of HIV tests and consequently South Africa's antenatal clinic results (Studies of various ELISA tests in Sub-Saharan Africa suggest a median specificity of 98.5%, adequate for the purposes of demography.)

In a recent letter to the Cape Times (17 October 2003), he called for a presidential commission to investigate AIDS statistics. What would the commission achieve? The ASSA and Department of Health

researchers, whose models are the most widely cited for South Africa are fully cognisant that more studies are needed to generate more confident results. What reasonable conclusion other than this could a commission reach?

We definitely do need more surveys of HIV prevalence and further mortality studies throughout Sub-Saharan Africa, including South Africa. This will help improve estimates and help governments better plan programmes to mitigate the epidemic's effects. But we already have more than enough evidence that the epidemic is costly in human lives and misery - and that in many countries it is getting worse. Only comprehensive treatment and prevention programmes can change this.



## **Appendix One**

### **HIV Seroprevalence in some SADC Countries**

Thank you to Annie Parsons for compiling this list of references and to Claire Kelly for editing it. The list is not comprehensive. For example many of the antenatal surveys conducted are not included. Only studies which directly measured HIV prevalence in a particular group were considered for inclusion. The descriptions underneath each reference are directly quoted, though some descriptions have been lightly edited to maintain simplicity. Notice how articles examining data from the late 1980s and early 1990s generally find low prevalence rates, while as time goes by prevalence rates increase steeply.

It is probable that some of these studies are flawed. Others seem ethically dubious. Nevertheless, examined together they provide incontrovertible evidence of the seriousness of HIV epidemics in many SADC countries.

Readers are encouraged to consult the original articles to assess them.

### **ANGOLA**

#### **Assessment of the Epidemiological Situation, 2002**

<http://www.plusnews.org/AIDS/angola.asp>

Study conducted in Luanda and Cabinda. In Luanda, HIV infection rates among antenatal women attendees tested increased from 0.3% in 1986 to 0.7% in 1992 and 3.4% in 1999; by 2001, HIV prevalence had increased to 8.6%. Outside the major urban area, in Cabinda, HIV prevalence increased from 6.8% in 1992 to 7.4% in 1994 and then 8.5% in 1996. In 1995, 0.5% of antenatal women tested in Namibe province were HIV positive.

### **BOTSWANA**

#### **HIV seroprevalence among pregnant women in Botswana, 1999, SAfAIDS News. 1997 Sep;5(3):9.**

Statistical data on HIV prevalence among antenatal clinic attenders in Botswana from 1992-96. Overall, it is noted that serious increases in infection levels are apparent over the period in all sites. The highest level, at over 43%, is recorded in Kweneng and Francistown; and the lowest, just below 22%, is documented in the Southern site.

Tuberculosis and HIV infection in the Kweneng district, Botswana, 1993, Tidsskr Nor Laegeforen. 1993 Nov 30;113(29):3568-71. Anonymous survey that included 214 cases. 45 of 214 patients (21%) were HIV positive. The HIV seropositivity reached 29% in the age group 15-49 years. 25% of the females (average age 34 years) and 18% of the males (average age 39 years) were HIV positive. 18 (40%) of the 45 HIV positive patients had AIDS.

### **LESOTHO**

#### **Sexually transmitted infections and HIV in a rural community in the Lesotho highlands, 2000, Sex Transm Infect. 2000 Feb;76(1):39-42**

Total of 29 villages were randomly selected and a systematic sample of houses within villages was obtained in a community residing in remote, rural Lesotho. Chlamydia was diagnosed in 28.4% of adults, gonorrhoea in 5.9%, syphilis in 11.3%, and HIV infection in 6.3%.

**Human immunodeficiency virus seroprevalence in an occupational cohort in a South African community, 1995, Arch Intern Med. 1995 Aug 7-21;155(15):1601-4**

HIV seroprevalence among a cohort of workers at the Katse Dam construction site in Bokong, Lesotho. Unlinked, anonymous HIV testing of 486 persons revealed a seroprevalence of 5.3% (26/486; 95% confidence interval, 3.3% to 7.3%). These data contrasted with a 0.8% seroprevalence in a similar age group in nearby villages that surrounded the construction project.

**Ministry of Health and Social Welfare Lesotho, Report of the Sentinel HIV/Syphilis Survey 2003, 7 August 2003, unpublished.**

An anonymous unlinked survey of 2666 women at six sentinel sites showed a median HIV prevalence of 28.5%. HIV prevalence ranged from 17.3% in Mokhotlong (a rural hospital in the mountains) to 35% in Queen Elizabeth II hospital in Maseru. The 25-39 year age group was the worst affected with prevalence of 39.1%.

(It is also noteworthy that a 2001 Demographic Survey in Lesotho found that 2% of children between 0 to 14 had both parents deceased. This was considered an underestimate as the survey did not include children not living in households. Under five mortality also showed an increase from 82/1000 live births in 1995 to 113/1000 live births in 1999.)

## **MOZAMBIQUE**

**Syphilis and HIV infection among displaced pregnant women in rural Mozambique, 1994, Int STD AIDS. 1994 Mar-Apr;5(2):117-23**

1728 consecutive antenatal attendees of 14 rural clinics in Zambezia were interviewed, examined, and tested for HIV and syphilis antibodies. The seroprevalence of syphilis and HIV were 12.2% and 2.9%, respectively.

**HIV-1 and HIV-2 antibodies in pregnant women in the City of Maputo, Mozambique. A comparative study between 1982/1983 and 1990, 1993, Scand J Infect Dis. 1993;25(6):685-8**

Researchers used previous serum samples collected for a study of maternal morbidity in Mozambique in 1982/83, including the city of Maputo and new samples collected in 1988 and 1990 in the same city. None of the 432 serum samples collected in 1982/83 was positive for antibodies to HIV. HIV-1 and HIV-2 seroprevalences in 1988 were 0.4% (2/500) and 0.6% (3/500), respectively, and in 1990 0.6% (12/2014) and 0.2% (4/2014), respectively.

**HIV seroprevalence among military blood donors in Manica Province, Mozambique, 2001, Int J STD AIDS. 2001 Apr;12(4):225-8**

Retrospective analysis of laboratory records for voluntary blood donors at a rural hospital from January 1997 through December 1999. Of the 797 blood donors during this period, 110 (13.8%) were military personnel of whom 39.1% were HIV positive (35.0% in 1997, 33.3% in 1998 and 48.7% in 1999). Among the 687 nonmilitary donors 15.3% were HIV positive ( $P < 0.0001$  vs military). Syphilis and HIV infection among prisoners in Maputo, Mozambique, 1995, Int J STD AIDS. 1995 Jan-Feb;6(1):42-6

Cross-sectional study was conducted to determine the prevalence of and risk factors for sexually transmitted diseases (STDs) among the 2340 prisoners at Machava, Mutatele, and Hanhane prisons, and Cadeia civil jail between September 1990 and February 1991. 0.6% of men and no woman had antibodies to HIV.

## **NAMIBIA**

### **HIV in Namibia, 1997, SAfAIDS News. 1997 Sep;5(3):8**

HIV prevalence among antenatal clinic attenders. 1854 samples from 10 sites. Results showed that the rate of infected antenatal clinic attenders at the national level had risen to 15.4% from 8.4% in 1994 and 4.2% in 1992. In the Windhoek site, prevalence rose from 4.2% to 16% from 1992 to 1996, and in Swakopmund site from 2.9% to 17.4% over the same period. Age-specific prevalence showed a marked increase in infection at all ages. It has been estimated that 108,325 Namibians aged 15-44 years are infected.

### **Orofacial manifestations and seroprevalence of HIV infection in Namibian dental patients, 1997, Oral Dis. 1997 May;3 Suppl 1:S51-3**

Anonymous study of HIV-I sero-reactivity in dental patients in a Government clinic in Namibia, 29 (7%) out of 405 patients (10 female and 19 male) were confirmed as HIV-infected.

## **SOUTH AFRICA**

### **The impact of migration on HIV-1 transmission in South Africa: a study of migrant and nonmigrant men and their partners, 2003, Sex Transm Dis. 2003 Feb;30(2):149-56**

Cross-sectional study of 196 migrant men and 130 of their rural partners, as well as 64 non-migrant men and 98 rural women whose partners are non-migrant. 25.9% of migrant men and 12.7% of nonmigrant men were infected with HIV (  $P = 0.029$ ; odds ratio = 2.4; 95% CI = 1.1-5.3).

### **HIV infection among youth in a South African mining town is associated with herpes simplex virus-2 seropositivity and sexual behaviour, 2001, AIDS. 2001 May 4;15(7):885-98**

A community-based, cross-sectional study was conducted on a random sample of men ( $n = 723$ ) and women ( $n = 784$ ) living in a township in the Carletonville district of South Africa. Among men and women the prevalence of HIV infection was 9.4 and 34.4%, respectively, and of positive HSV-2 serology was 17.0 and 53.3%, respectively. Among 24-year-old women the prevalence of HIV was 66.7% [95% confidence interval (CI), 54.6--77.3%].

### **Prevalence of HIV and HIV-related diseases in the adult medical wards of a tertiary hospital in Durban, South Africa, 2001, Int J STD AIDS. 2001 Jun;12(6):386-9**

Consecutive admissions were recruited and a single ELISA assay was used to determine HIV infection. Of 507 patients, 54% were infected with HIV of which 84% had AIDS. HIV-infected patients were significantly younger (34.9 years) than uninfected patients (47.1 years) and had significantly higher risks for oral/oesophageal candidiasis (risk ratio [RR] 18.6), generalized lymphadenopathy (RR 7.1), unexplained fever (RR 7.0), chronic diarrhoea (RR 6.2) and pulmonary tuberculosis (RR 3.1). Pulmonary tuberculosis was present in 56% of HIV cases. Mortality was 22% for HIV cases and 9% ( $P=0.016$ ) for others.

**HIV infection and in-hospital mortality at an academic hospital in South Africa, 2000, Arch Dis Child. 2000 Sep;83(3):227-30**

Hospital discharge summaries from January 1992 to the end of 1996 were reviewed. There were 20 733 admissions in the five year period; 7985 (39%) were tested for HIV. In tested admissions above 15 months of age, 4.9% were HIV infected in 1992, increasing to 35% in 1996. Under 15 months of age, 9% of tested admissions were positive in 1992, increasing to 46% in 1996. The proportion of all hospital deaths occurring in children considered HIV infected (ELISA testing together with clinical features if 15 months or younger) increased from 6.7% in 1992 to 46.1% in 1996 ( $p < 0.001$ ). In-hospital mortality for all children increased by 21% from 4.3% in 1992 to 5.2% in 1996. Mortality rates declined in uninfected children from 5.4% in 1992 to 4.5% in 1996 (chi(2) trend 3.3;  $p = 0.06$ ).

**Paediatric HIV infection in a rural South African district hospital, 2000, J Trop Pediatr. 2000 Apr;46(2):107-10**

Paediatric HIV infection in 281 consecutive children admitted to Hlabisa hospital in rural South Africa between October 1996 and January 1997. In all, 72 (26 per cent) children were HIV infected.

**HIV infection among women admitted to the gynaecology service of a district hospital in South Africa, 1999, Int J STD AIDS. 1999 Nov;10(11):735-7**

Disease-specific prevalence of HIV infection among 196 gynecologic patients admitted to Hlabisa hospital, South Africa, in 1997. High prevalence of HIV infection and showing a significant association with abortion and its complications

Also see the thirteen antenatal surveys since 1990 published by the Department of Health which demonstrate a consistent rise in HIV infections among pregnant women. Summary Report National HIV and Syphilis Antenatal Sero-Prevalence Survey In South Africa, 1990 through 2002.

**ZAMBIA**

**Studying dynamics of the HIV epidemic: population-based data compared with sentinel surveillance in Zambia, 1998, AIDS. 1998 Jul 9;12(10):1227-34**

Survey of antenatal clinic (ANC) attenders in urban Lusaka and rural Mposhi district in 1995-96. In Lusaka, the adjusted overall HIV prevalence among ANC attenders was 24.4%. The rural estimates were 12.5%.

**AIDS in a Zambian district, 1992, Ned Tijdschr Geneeskd. 1992 Dec 5;136(49):2432-5**

In 1990, among pregnant women .1% tested positive for HIV antibodies in Amsterdam compared to 24.5% in Lusaka, Zambia. During 1990 and 1991 data were collected from 231 patients fulfilling the WHO clinical criteria for the diagnosis of AIDS in 3 hospitals of Sesheke, a rural Zambian district. 46.3% of the group was male and 53.7% was female, and the mean age of women was significantly lower than that of men (25.2 vs. 31.1 years,  $p < 0.001$ ). A total of 185 patients could be tested for HIV-1 antibodies using ELISA-Welcozyme and HIVCECK-Du Pont. There were 141 (81.6%) positive results, 19 (10.3%) negative results, and in 15 (8.1%) cases the outcome was not clear. Seroprevalence figures for HIV-1 in the same period were 16% for blood donors and 41% for patients attending the clinic for sexually transmitted diseases.

**HIV-1 seroprevalence in Zambian patients with acute diarrhea: a community-based study, 1999, J Acquir Immune Defic Syndr Hum Retrovirol. 1999 Feb 1;20(2):160-3**

A study of HIV-1 seroprevalence among Zambian patients presenting to George Health Center, a community-based health center northwest of center Lusaka, with acute diarrhea during March-April 1994. 256 patients with diarrhea and 140 apparently healthy controls participated in the study. Overall, 81 of the 256 (32%) patients with diarrhea were HIV-1-seropositive. Excluding results from infants under age 18 months who may have had maternal anti-HIV-1 antibodies, 64 of 172 (37%) patients with diarrhea were HIV-seropositive. Among children aged 18 months to 5 years, 14 of 63 (22%) were HIV-1-seropositive compared with 8 of 62 (13%) without diarrhea. 49 of 95 adults with acute diarrhea were HIV-1-seropositive compared with 10 of 44 healthy adult controls.

**Human immunodeficiency virus type-1 infection in Zambian children with tuberculosis: changing seroprevalence and evaluation of a thioacetazone-free regimen, 1994, Tuber Lung Dis. 1994 Apr;75(2):110-5**

A prospective cross-sectional study of all consecutive newly diagnosed cases of TB in children from 1 month-15 years of age seen at the University Teaching Hospital (UTH) in Lusaka, Zambia between 1 October 1991 and 31 May 1992. 120 children with a clinical diagnosis of tuberculosis and 167 controls were enrolled in the study. The overall HIV type-1 seroprevalence rate in children with tuberculosis was 55.8% (67/120) compared to 9.6% (16/167) amongst the control group ( $P < 0.0001$ : odds ratio = 11.50; 95% CI = 5.99-22.7). All the 16 patients who died did so within 60 days of discharge from hospital; all of them were seropositive for HIV. There were no deaths among the HIV-negative group. Despite the exclusion of thioacetazone from the treatment regimen, cutaneous reactions occurring within 8 weeks of commencing treatment were observed in 7 of the 65 (11%) patients, 2 of whom developed fatal Stevens-Johnson syndrome. All 7 patients were seropositive for HIV-1.

**ZIMBABWE**

**HIV infection and HIV-1 clades among pregnant women in Harare, Zimbabwe, 1997, Cent Afr J Med. 1997 Jul;43(7):188-92**

Official figures indicate that at least 1 million of Zimbabwe's 11 million population are infected with HIV, while the most recent survey results indicate that about 24% of apparently healthy women in the country are HIV seropositive. 60 (29.1%) of 206 pregnant women attending Edith Opperman and Budiro clinics in Harare who were screened for infection with HIV were found to be HIV-1 seropositive.

**Trends in HIV-1 and HIV-2 prevalence and risk factors in pregnant women in Harare, Zimbabwe, 1996, Cent Afr J Med. 1996 Jan;42(1):14-21**

May 1994-June 1995, 1168 pregnant women attending their first prenatal care visit at Harare Maternity Hospital and three Harare-based maternity clinics had blood taken to test for HIV-1 and HIV-2. 30.4% tested positive for HIV-1 (compared to 18% for a similar group in 1990). The HIV-1 prevalence ranged from 23.6% at the lowest density clinic to 33.2% at the referral maternal clinic of the hospital. 7.6% tested positive for HIV-2.

**Age and religion selection biases in HIV-1 prevalence data from antenatal clinics in Manicaland, Zimbabwe, 1995, Cent Afr J Med. 1995 Nov;41(11):339-46**

(HIV) seroprevalence surveys conducted among pregnant women in rural Zimbabwe (antenatal clinics in Honde Valley and Rusitu Valley, Manicaland), 1993-94. HIV prevalence rates of 24.3% and 14.0%, respectively.

**HIV-prevalence in Mutoko, Zimbabwe. A study among pregnant women and patients with sexually transmitted diseases, 1994, Tidsskr Nor Laegeforen. 1994 Apr 10;114(9):1050-2**

In Mutoko district a study was carried out to determine the HIV-prevalence among pregnant women and patients with sexually transmitted diseases. The results show that 25% of the pregnant women were HIV-positive. Of the patients with sexually transmitted diseases, 50% were found to be HIV-positive.

**Seroprevalence of HIV infection amongst antenatal women in greater Harare, Zimbabwe, 1991, Cent Afr J Med. 1991 Oct;37(10):322-5**

In May-October 1990, microbiologists perform AIDS serodiagnostic tests on blood samples from 1008 pregnant women attending the maternity clinic at Harare Hospital, the Edith Opperman Clinic, or the Glenview Clinic in Greater Harare in Zimbabwe. The overall HIV seroprevalence stood at 18%.

**HIV seroprevalence and its associations with the other reproductive tract infections in asymptomatic women in Harare, Zimbabwe, 2001, Int J STD AIDS. 2001 Aug;12(8):524-31**

Harare, Zimbabwe. In a cross-sectional study, 393 informed consenting women aged 15--49 years, attending 2 primary healthcare clinics, were interviewed and screened for HIV and RTIs. HIV seroprevalence was 29.3%. Seropositivity was significantly associated with bacterial vaginosis, syphilis, gonorrhoea and/or Chlamydia trachomatis infection, warts and genital ulcers.

**A rural HIV epidemic in Zimbabwe? Findings from a population-based survey, 2001, Int J STD AIDS. 2001 Mar;12(3):189-96**

Study using population-based data to describe the socio-demographic, behavioural and biomedical correlates of HIV infection and aid identification of effective HIV control strategies in 689 adults in rural Zimbabwe. HIV seroprevalence was 23.3% and was higher in females, divorcees, widows, working men, estate residents, and respondents reporting histories of STD symptoms. Female HIV seroprevalence rises sharply at ages 16-25.

**HIV seroconversion among factory workers in Harare: who is getting newly infected?, 1997, Cent Afr J Med. 1997 May;43(5):135-9**

40 factories in Harare, Zimbabwe. Cohort established among factory workers with the objectives of estimating HIV incidence, seroprevalence, correlates of infection and subsequently evaluating the impact of prevention interventions. Of 2,992 subjects enrolled there were 129 seroconversions during 1993 to 1996 follow up, yielding a 2.96 per 100 person year (PY) seroconversion incidence (95% CI = 2.47 to 3.52).

**Risk factors for prevalent and incident HIV infection in a cohort of volunteer blood donors in Harare, Zimbabwe: implications for blood safety, 1997, AIDS. 1997 Sep;11 Suppl 1:S97-102**

Secondary analysis of data from a longitudinal cohort study of voluntary blood donors in Harare, Zimbabwe. Residual risk of HIV contamination of blood due to laboratory false-negatives and donations made during the window period. The HIV prevalence rate among the 1515 blood donors enrolled in the study during 1993-95 was 8.8% (2.1 per 100 person-years). HIV seroprevalence was highest among first-time donors, those 21-45 years of age, married persons, those with more than 1 sexual partner in the preceding year, and those who had paid for sex in the past year. Among the 1142 initially HIV-

negative donors who had at least 1 6-month follow-up test, there were 40 seroconversions (2.1 per 100 person-years).

**Serostatus surveillance testing of HIV-I infection among Zimbabwean psychiatric inpatients, in Zimbabwe, 1996, Cent Afr J Med. 1996 Sep;42(9):254-7**

Blood samples from 87 male and 56 female patients consecutively admitted to Harare Central Hospital's Psychiatric Unit were tested with ELISA and Western blot for infection with HIV. The subjects were 17-70 years old of mean age 32.5 years with a mean 4.21 years of psychiatric illness. 23.8% were infected with HIV and HIV infection was significantly related to high education attainment and being unemployed.

## Appendix Two

### Errors in Rian Malan's Articles in Noseweek and The Spectator

*Thank you to Leigh Johnson for pointing some of these out to me. However, any errors that might appear in the descriptions below remain mine. Thank you to Lindsey Martin for assisting me with this.*

### Errors in Article by Rian Malan in Noseweek December 2003/ January 2004: Apocalypse When

These are listed in order of seriousness.

- ❖ The article is accompanied by a graph showing different AIDS estimates. The salient feature of the graph is that it shows what seems to be Statistics South Africa's estimates of AIDS deaths at a fraction of the ASSA estimates. The implication is that the estimates by the actuaries' computer model, ASSA2000, are way too high and that there is a substantial dispute between the two organisations over the extent of the epidemic.

In the text, Malan explains, 'All deaths caused by HIV or any of its euphemisms were counted as AIDS deaths, and there was evidence for only 40,000 such in 1999.'

There is no such implication in the Statistics South Africa report to which Malan refers (25). All the calculations he describes as derivations from the official statistics body are his own and he has incorrectly calculated them.

A direct quote from page 28 of the Statistics South Africa report helps explain this error, 'In cases where HIV or its synonyms (e.g., immunocompromised, immunosuppression, retroviral disease, wasting syndrome) are stated on the certificate, an appropriate code related to HIV is used. On the other hand, if HIV or its synonyms are not stated on the certificate, the reported diseases are coded as stated, with no relation to HIV. For example, if a physician certifies the death of a 25-year old urban, educated and employed person as being that of acute tuberculosis, with no mention of HIV, the code for acute tuberculosis is used.'

Similar comments are made elsewhere in the report. Yet Malan only counts deaths in the HIV category. He ignores the HIV-related deaths in the TB, pneumonia and influenza and ill-defined categories, as well as all the other categories in the Statistics South Africa list, many of which probably contain some HIV-related deaths. His error massively underestimates AIDS-related deaths.

There is another problem with Malan's calculation. The report is based on a 12% sample of death certificates that Statistics South has on record. The report also states the absolute size of each sample. Using these facts, Malan has taken the proportion of deaths in the HIV illness category and calculated what 100% of HIV deaths would equal. However, this is invalid because Statistics South Africa does not have all deaths that occurred in South Africa on record. A small but significant number of adult deaths and a large number of child deaths are not reported. Furthermore, the report explains that it is possible that a microfiche of deaths for 2001 might have been missing. All these factors render any calculation of gross numbers of deaths inaccurate, without further research.

- ❖ Malan states that the ASSA600 model assumes nearly 3% annual reduction in non-AIDS mortality in order to manipulate it to produce high levels of AIDS mortality, but the MRC Report (26) was very clear that (a) 2.5-3% improvement was only applied at young adult ages (p.30) and (b) the



ASSA600 model was producing too few non-AIDS deaths & too many AIDS deaths (p.30) and therefore that improvement in mortality was probably too great (p.6). At any rate, even assuming no improvement in non-AIDS mortality, the model calculates that AIDS accounted for 17% of all deaths over age 15 in 1999/2000, and about 39% of deaths of persons between the ages 15-49 in 1999/2000. (see bold print on p.6). It was this estimate that was widely publicised in the media, not the estimate that was based on improvements in mortality.

- ❖ Malan cannot claim that choosing four funeral parlours from Johannesburg's Yellow Pages constitutes a representative sample. The sample size is small and it may be biased towards more affluent funeral parlours that service communities in which HIV prevalence is low.
- ❖ Malan claims that most medical scheme members probably know their HIV status; but the HSRC Report found that only 23% of HIV+ Africans knew their HIV status and 28% of HIV+ people of other race groups knew. 30% of HIV-positive people with high-school education or more knew their status. He also claims that people would join disease management programmes the moment they know their HIV status, but Aid for AIDS data shows that most people only join when they experience major morbidity events. The ASSA2000 Interventions Model calculates that currently less than 10% of people with HIV are at such an advanced stage of disease that they require HAART. (See the main text of this article for a more detailed explanation.)
- ❖ Malan quotes a paper by Devon Brewer and others ('Cry beloved Paradigm'; International Journal of STD and AIDS; 2003; Vol. 14: 144 - 147) in which they arrive at an estimate of per sex-contact probability of transmission of 0.34, based on a study conducted by Bertran Auvert and colleagues (AIDS; 2001; Vol. 15: 883 - 898).- Incidentally, it is not clear how this estimate was arrived at. This is presumably the '300x higher' that Malan is quoting, since most empirical studies estimate per-contact transmission probabilities to be roughly 0.001. However, the estimate of 0.34 is an empirically-derived estimate, not a model-derived estimate, so Malan is misinterpreting the Brewer study when he states that models assume HIV transmission probabilities that are too high. Most mathematical models actually assume transmission probabilities to be close to 0.001 per sex contact, in the absence of other STDs.
- ❖ ASSA2000 has not been retired as he claims-though the ASSA modellers are working on a new version that is likely to produce lower estimates than before.
- ❖ UNAIDS no longer uses Epimodel, as stated by Malan -they use the Spectrum & EPP models.
- ❖ Malan states 'But small things have a geometric impact in the AIDS models'. Rather opinionated. The ASSA model when run properly (i.e. calibrated, in contrast to how some of its detractors have run it) is reasonably insensitive to changes in its assumptions (as it should be).
- ❖ The MRC Mortality Report was up-front about the fact the ASSA600 model was probably over-estimating the extent of AIDS mortality (see p.30). Malan implies an unusually quiet admission.

### **Errors in Article by Rian Malan in Spectator 13-20 December 2003: Africa isn't Dying of AIDS**

Some of the errors described above are repeated. The ones below are specific to The Spectator.

- ❖ Malan seems to suggest that an "all-causes death rate" of 3% is not unusual. In fact, this is very high and it definitely does suggest AIDS is playing an important role in mortality of Malawian teachers.

- ❖ In Malan's description of the MRC Mortality report he quotes a 'boffin' who says that further reference to actual death reports 'will be of limited usefulness.' It would be interesting to know who made this unattributed comment. Certainly the MRC and ASSA researchers I have met believe there's a need for much more empirical research on death data. This is made clear in a recommendation of the MRC Report which commented on the 'usefulness of establishing a rapid mortality surveillance system' and suggested that this system should become more formalised.

## References

- 1 Summary Report National HIV and Syphilis Antenatal Sero-Prevalence Survey in South Africa 2002. Published by the Department of Health.
- 2 The Impact of HIV/AIDS on Adult Mortality in South Africa. 2001. Published by the MRC.
- 3 Ibid.
- 4 Causes of death in South Africa 1997-2001: Advance release of recorded causes of death. PO309.2. 2002. Statistics South Africa.
- 5 I consulted three doctors on this issue , two of whom treat large numbers of people with HIV. They also alerted me to various complexities related to the filling in and potential lack of confidentiality of death certificates. One confidentiality problem is that coroners frequently insist on having a copy of the confidential part of the death certificate, with the implication that family of patients with HIV written on their death certificates lose funeral and other benefits. In 2001 (the end point of the Statistics South Africa data), the three doctors hardly ever recorded HIV (or any of its euphemisms) on the death certificate for their deceased AIDS patients. There is also an ongoing problem of bad data collection. The Medical Certificates on Death were amended a few years ago, so that they now have a confidential tear-off, which contains private information, and is numerically linked to the public part of the certificate (needed to get an official death certificate etc). However, the form is complex and time-consuming to complete, and there has not been proper training in its use. Consequently it is not properly filled in.
- 6 <http://www.gov.za/reports/2003/10yrbook.pdf>
- 7 Sex Transm Dis. 2003 Feb;30(2):149-56; Sex Transm Dis. 2002 Jan;29(1):44-9; AIDS. 2001 May 4;15(7):885-98; Int J STD AIDS. 2001 Jun;12(6):386-9; Arch Dis Child. 2000 Sep;83(3):227-30; J Trop Pediatr. 2000 Apr;46(2):107-10; AIDS. 1992 Dec;6(12):1535-9.
- 8 Ministry of Health and Social Welfare Lesotho, Report of the Sentinel HIV/Syphilis Survey 2003, 7 August 2003, unpublished.
- 9 [http://www.unaids.org/en/other/functionalities/ViewDocument.asp?href=http%3a%2f%2fgva-doc-owl%2fWEBcontent%2fDocuments%2fpub%2fMedia%2fPress-Statements01%2fPS\\_Kenyan\\_Report\\_13Jan04\\_en%26%2346%3bpdf](http://www.unaids.org/en/other/functionalities/ViewDocument.asp?href=http%3a%2f%2fgva-doc-owl%2fWEBcontent%2fDocuments%2fpub%2fMedia%2fPress-Statements01%2fPS_Kenyan_Report_13Jan04_en%26%2346%3bpdf)
- 10 Thanks to Leigh Johnson for analysing the technical errors in Malan's articles.
- 11 Causes of death in South Africa 1997-2001: Advance release of recorded causes of death. 2002. Statistics South Africa.
- 12 Malan's calculation is actually more problematic than described here. See appendix two for additional details.
- 13 This is a specialised version of ASSA2000 which examines the impact of antiretroviral therapy and other interventions.
- 14 Actually the ASSA2000 Interventions Model estimates that less than 10% would have AIDS defining illnesses, but for various technical and practical purposes, we can assume 10% here.

15 Thank you to a TAC colleague who alerted me to this point. He lives openly with HIV and is eligible to join Aid for AIDS but has nevertheless not done so and does not intend to do so until he needs antiretrovirals. If you are still healthy there are limited benefits to joining a disease management programme.

16 Antiretroviral medicine prices have fallen dramatically and are now affordable for most middle-class people especially on the black market, the size of which in my direct experience is probably considerable.

17 Aid for AIDS considers a patient ready for treatment if his or her CD4 count is less than 250.

18 Personal Communication with Collean Pead of Aid for AIDS. To see that 20,000 is higher than the estimated number of AIDS sick, take 6% of 2 million (the number of people on schemes aligned to Aid for AIDS) and take 10% of that to get the number of people sick with AIDS.

19 [http://www.unaids.org/Unaid/EN/Resources/Questions\\_Answers.asp](http://www.unaids.org/Unaid/EN/Resources/Questions_Answers.asp)

20 AIDS epidemic update, December 2003, UNAIDS.

21 See the South African Health Review 2003 published by Health Systems Trust for details on this. Also see some of the South African hospital studies in appendix one.

22 See [www.cptech.org](http://www.cptech.org) <<http://www.cptech.org/>> and the TAC website, [www.tac.org.za](http://www.tac.org.za) <<http://www.tac.org.za/>> , for examples of this.

23 This period of stagnation in public health care expenditure has now come to an end hopefully.

24 Malan's articles are given high profile on denialist websites such as [virusmyth.net](http://virusmyth.net) and [aliveandwell.org](http://aliveandwell.org).

25 Causes of death in South Africa 1997-2001: Advance release of recorded causes of death. 2002. Statistics South Africa.

26 The Impact of HIV/AIDS on Adult Mortality in South Africa. 2001. Published by the MRC.