

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

NATIONAL SURVEY OF HEALTH PERSONNEL,
AMBULATORY AND HOSPITALISED PATIENTS
AND HEALTH FACILITIES, 2002

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A collaborative effort of



Report prepared for the South African Department of Health

Funded by



DEPARTMENT
OF HEALTH

and



ACKNOWLEDGEMENTS

I wish to thank the Cluster Health Information, Evaluation and Research for initiating and guiding this study on *The Impact of HIV/AIDS on the Health Sector*, and, in particular Dr L Makubalo and Ms P Netshidzivhani for their technical contributions to the study. My thanks also go to the members of the Senior Management Team for their valuable inputs into the finalisation of the study report.

This is a complex area in which a lot still remains unknown especially in the area of impact. We hope this study will add to our growing understanding so that the capacity of planners is enhanced.

Many thanks to the Human Sciences Research Council, in collaboration with the Medical Research Council, for conducting the study. Special thanks go to Dr O Shisana for her role as Principal Investigator and to all the members of the research team who dedicated their time and efforts to the study.

Thanks also to the Centers for Disease Control and Prevention for co-funding this study.

I am grateful for the support received from the managers and administrators in all health facilities.

Special thanks to all the patients and health personnel who agreed to participate in this study, without whom the study would not have been possible.



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ABBREVIATIONS

ART	Antiretrovirals
AZT	Zidovudine (ZDV)
CDC	Centers for Disease Control and Prevention
CVr	Coefficient of relative variation
Deff	Design effect
DoH	Department of Health
EIA	Enzyme immunoassays
FWC	Fieldwork co-ordinator
HAART	Highly active antiretroviral therapy
HASA	Hospital Association of South Africa
HIV/AIDS	Acquired human immunodeficiency virus
HSRC	Human Sciences Research Council
ICD-10	International classification of diseases
INH	Isoniazid
MEDUNSA	Medical University of South Africa
MOS	Measure of size
MOU	Maternity obstetric unit
NNRTI	Non-nucleoside reverse transcriptase inhibitors
NRTI	Nucleoside reverse transcriptase inhibitors
NSPH	National School of Public Health
NVP	Nevirapine
PACTG	Paediatric AIDS clinical trials group
PCP	Pneumocystis carinii pneumonia
PHC	Primary Health care
PEP	Post exposure prophylaxis
PHC	Primary health care
PMTCT	Prevention of mother-to-child transmission
PSU	Primary sampling unit
PV+	Positive predictive value
PV-	Negative predictive value
SE	Standard error
Stats SA	Statistics South Africa
STD	Sexually transmitted disease
TAC	Treatment Action Campaign
TB	Tuberculosis
VCT	Voluntary counselling and testing
WHO	World Health Organization

EXECUTIVE SUMMARY

Introduction

South Africa is estimated to have the largest number of people living with HIV/AIDS in the world. The *Nelson Mandela/HSRC study of HIV/AIDS* (2002) reported an estimated HIV prevalence of 4.5 million persons aged two years and older. The epidemic results in high morbidity and mortality. Given the overall impact of HIV/AIDS on South African society, and the need to make policies on the management of those living with the disease, it is important that studies are undertaken to provide data on the impact on the health system. Most people who were infected seven years ago are expected to become ill, and therefore the patient load is expected to increase. Given this scenario, South Africa needs data to assess the impact of HIV/AIDS on the health system to assist decision-makers and programme planners to make policies to ameliorate this impact.

Objectives

The HSRC and the National School of Public Health (NSPH) at the Medical University of South Africa (MEDUNSA) responded to Tender No GES 38/2000-2001 called for by the Department of Health (DoH) to achieve the following specific objectives:

- Determine the current status and projected morbidity and mortality among South African health workers;
- Estimate the number of persons with AIDS using public health services in South Africa and determine the demographic profile of these patients;
- Identify the health services most severely affected by HIV/AIDS, estimate and project important health service indicators such as drug utilisation, bed occupancy and length of stay in hospital;
- Determine the impact of HIV/AIDS on human resources by focusing on training, staff morale, workload, working hours and absenteeism;
- Estimate the total cost of administering preventive therapy to newborns and pregnant women at different levels of the health care system.

Research questions

To achieve these objectives, a series of studies were conducted to generate empirical data that could be used for planning and management of HIV/AIDS. These studies answered the following three broad questions:

- To what extent does HIV/AIDS affect the health system?
- What aspects or sub-systems are most affected?
- How is the impact going to progress over time?

Method

To answer these questions we drew a probability sample of health facilities and patients – specifically, a stratified cluster sample of 222 health facilities representative of the public and private health sector in South Africa was drawn from the national DoH database on health facilities (1996). We designed a sample to obtain a nation-wide representative sample of medical professionals i.e. specialists and doctors, nursing professionals and other nursing staff, other health professionals such as social workers and physiotherapists, non-professional health workers such as ward attendants and cleaners, and adult and

child patients. From these sampling frames, a representative probability sample was obtained of 2 000 patients, as well as a representative probability sample of 2 000 health workers treating patients, at public and private health facilities.

In this report we present results from data collected in all nine provinces.

Data were collected through a series of questionnaires. With respect to HIV testing, we conducted an anonymous linked HIV survey in the Free State, Mpumalanga, Northwest and Kwazulu-Natal. We tested oral fluids for HIV antibodies at three different laboratories. These results were linked with the questionnaire data using bar codes.

Results

We found that the HIV/AIDS epidemic has an impact on the health system through loss of staff due to illness, absenteeism, low staff morale, and also through the increased burden of patient load.

HIV prevalence in health workers

We found that an estimated 15.7 per cent (CI 95%: 12.2–19.9 per cent) of health workers employed in public and private health facilities located in the Free State, Mpumalanga, KwaZulu-Natal and North West, were living with HIV/AIDS in 2002. Among younger health workers, the prevalence is much higher. This group (aged 18–35 years) had an estimated HIV prevalence of 20 per cent (CI 95%: 14.1–27.6 per cent).

This suggests that, in the absence of life-prolonging drugs such as anti-retroviral therapy, the country can expect to lose at least 16 per cent of its health workers to AIDS in the future. The impact is likely to be felt severely because it is younger health workers (18–45 years) who have higher HIV prevalence ratios than older health workers.

Absenteeism among health workers

In the survey, we found 16.2 per cent of the respondents had been treated for stress-related illnesses. Of these, 63.9 per cent had to take sick leave.

Low staff morale

We found that a third of health workers (33.8 per cent) had low morale due to several factors, including stressful working conditions, heavy patient workload, staff shortages and low salaries.

High HIV prevalence among patients served

We also found that 28 per cent (CI 95%: 22.5–34.2 per cent) of patients served in the public and private health sectors in the four provinces surveyed were HIV positive. When the HIV prevalence was examined in hospitals separately from primary care facilities, the figure was much higher at 46.2 per cent (CI 95%: 37.9–54.7 per cent). These AIDS

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patients stayed in hospital longer (mean length of stay: 13.7 days) than the non-AIDS patients (mean length of stay: 8.2 days). Longer stays are associated with higher costs to health services.

Increased patient load

The study results showed that overall there has not been an increase in the mean number of admissions to the medical wards of all patients (AIDS and non-AIDS) reported between 1995 and 2000. However, based largely on medical records, there has been a very large increase in the mean number of HIV/AIDS-related admissions between 1995 and 2000. The study also found that 94.6 per cent of health facilities indicated that over the last five years there has been an increase in patients seeking clinical care for HIV/AIDS-related illness, and 97.1 per cent indicated that the number of admissions for HIV/AIDS clinical care have also increased. We found that 73 per cent of health workers surveyed reported that there was an increase in workload. The heaviest burden fell on professionals (81 per cent). About a third of these health workers indicated the workload increased by 75 per cent of the usual workload in the last year. Interestingly, during this period, the total bed occupancy rates have remained about the same. These results suggest that non-AIDS patients have been 'crowded out' of the health care system to give way to HIV/AIDS patients. This 'crowding out' effect is largely in the public health sector, where the bed occupancy remained in the upper 80s or lower 90s. The private hospitals have not been affected as much, although their bed occupancy rates have remained relatively low, increasing from 49.1 per cent in 1995 to 53.6 per cent in 2000.

We also asked whether health facilities had their own policies for dealing with HIV/AIDS. We found that only 42.4 per cent of all health facilities had their own official HIV/AIDS policy and 13.7 per cent did not even know whether they had an official policy on HIV/AIDS. We also asked if they had seen the government's plan on HIV/AIDS and found that a mere 19.3 per cent of managers of 220 health facilities surveyed had seen the 2000–2005 National HIV/AIDS plan. Some 43 per cent of the public hospital managers had seen it, while only 19 per cent of the primary health care centers and 7.8 per cent of the private sector managers had seen it. As the implementers of the health services component of this plan, it is expected that they have access to this key document. What is encouraging is that 66.5 per cent of health workers had access to the Department of Health's (DoH) guidelines on HIV/AIDS care. However, only 38.8 per cent of managers in the private health sector had access to these guidelines on HIV/AIDS care.

To assess the ability of the health care system to cope with the demand for HIV/AIDS care in South Africa, we measured the per cent of health facilities needing more staff to cope with the patient load and found that nearly 80 per cent of all health care facilities expressed the need for more staff to cope with the demand for HIV/AIDS care. The need was highest in public hospitals, followed closely by primary health care facilities, and least in the private hospitals.

Affected sub-systems of the health care system

The sub-systems of the health care system affected are primary health care, secondary, tertiary and academic state hospitals (grouped as public hospitals), and the private health system. The results are summarised below.

Primary health care system

The primary health care (PHC) system is not immune to the impact of the HIV/AIDS epidemic. The study results revealed that 25.7 per cent (CI 95%: 19.8–32.5 per cent) of the patients served in the four provinces were living with HIV/AIDS. AIDS patients stay longer in district hospitals (mean length of stay: 20.3 days) than non-AIDS patients (mean length of stay: 5.2 days).

Private health sector

The private sector is also affected because 36.6 per cent (CI 95%: 21.3–55.4 per cent) of the patients were HIV positive. However, the private sector seems to have room to absorb the impact because the bed occupancy rate is still low. The high user rates probably prohibit frequent and extended stays in hospitals. Indeed, the private health sector had the shortest length of stay in hospital for both AIDS and non-AIDS patients, 6.3 per cent and six per cent respectively.

Public health sector

The burden on the health care system is felt most in public hospitals, where 46.2 per cent (CI 95%: 37.9–54.7 per cent) of the patients served in the medical and paediatric wards tested positive for HIV. Unlike district hospitals, which keep AIDS patients longer in hospital, public hospitals keep their AIDS patients for shorter periods. Moreover, the non-AIDS patients stay longer in hospital than the AIDS patients, suggesting that some hospitals have a policy of stabilising and then discharging them.

Supply of equipment to treat HIV/AIDS patients

When we assessed the capacity of the health care system to cope with HIV/AIDS patients, we investigated the extent to which health facilities were adequately equipped to provide necessary services. The results showed that the private sector, followed by primary care facilities, were least equipped to provide testing for HIV because 75.5 per cent of the private facilities and 59.2 per cent of the PHC facilities reported never to have HIV test kits in stock. This means that they were more likely to send their patients to be tested elsewhere, suggesting that most patients are unlikely to return to the facility to obtain their results. We found 32.1 per cent of the public hospitals were not equipped with HIV test kits. Rapid testing would increase the uptake of VCT services that are being expanded throughout South Africa.

Most health care facilities stocked syringes and needles, protective clothing and gloves most of the time. However, nearly one in five private sector health facilities did not have protective clothing and gloves to prevent infections or cross-contamination.

Only 65 per cent per cent of all health facilities have an adequate supply of sterilising equipment 75–100 per cent of the time. The shortage was highest in PHC facilities, where 30 per cent never stocked sterilising equipment. The absence of sterilising equipment in a health care facility suggests that patients are at risk of contracting hospital-acquired infection. Low temperature sterilisation is an essential tool for the sterilisation of heat labile clinical and diagnostic equipment such as endoscopes and surgical instruments. Disinfectants and frequent hand washing are among the most simple and applicable ways of reducing hospital-acquired infections. Health workers also indicated that they did not obtain sufficient training in infection control systems. For the health care system to cope adequately with HIV, it is critical that infection control systems be improved.

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Drug supply system

The burden on the public health care system is also felt in the drug supply system. Drugs were available to treat opportunistic infections and not for prolonging life. The only antiretrovirals (ARVs) available (non-nucleoside reverse transcriptase inhibitors [NNRTI] and nucleoside reverse transcriptase inhibitors [NRTI]) were available for prevention of transmission of HIV from mother to child and/or for post-exposure prophylaxis. The private sector was better equipped with ARVs for treating patients.

The health care system is better equipped to treat tuberculosis (TB) patients. All the anti-TB drugs surveyed were generally available at over 80 per cent of all facilities 75–100 per cent of the time.

Antibiotics were generally available to treat most infections related to HIV/AIDS. However, the supply of antiviral agents for treatment of serious viral opportunistic infections such as herpes, and cytomegalovirus (CMV), was generally very low in all facilities, with the private facilities having the highest availability of these agents.

To manage HIV/AIDS effectively in South Africa, we recommend that a national treatment plan be developed and implemented to reduce the burden of HIV/AIDS on the health sector. The elements of such a plan would include:

- Distribution of the national AIDS plan to all public and private health care facilities;
- Training of health workers to manage HIV/AIDS;
- Staffing ratios;
- Availability of suppliers;
- Drug availability;
- Treatment guidelines;
- Funding of these services.

Progression of the impact of HIV/AIDS over time

We projected that South Africa will have 416 580 new AIDS cases in 2003. In all we project that since the beginning of the epidemic in 1990, South Africa will have had 2 064 900 new AIDS cases. Some of these people will have died by now. We projected that in 2003, half of these patients will seek care in the public health sector for HIV/AIDS related illness. The impact of such a large number of people seeking clinical care in the public health facility for one disease is substantial.

For this reason, it is recommended that antiretroviral therapy, coupled with food security, improved nutrition, VCT and home-based care, should be the package provided to people with AIDS who are seeking care. This service would be provided in addition to the standard care usually provided to people with HIV/AIDS.

AIDS mortality

The study found an estimated cumulative overall mortality ratio of 0.185 per 1 000 deaths among health workers. Of the total number of deaths among health workers from 1997–2001, 5.6 per cent were considered to be due to HIV/AIDS-related illness. If another 7.5 per cent of deaths due to TB associated with AIDS are included, according to the registration data, then an estimated 13 per cent of health workers died from HIV/AIDS-

related illness during this period. In this study it was difficult to accurately estimate the number of health workers who died from HIV/AIDS-related illnesses using death notification data because of stigma associated with HIV/AIDS. Despite this difficulty with the registration data, certain patterns emerge from this study. African health workers appear to be more at risk of dying of HIV/AIDS-related illness than health workers in other race groups. Also, nurses and other paramedical personnel appear to have a higher risk of dying of HIV/AIDS than doctors and specialists. It is most likely that, proportionately, Africans are more likely to be nurses than doctors, which may partly be a reflection of disparities in educational attainment that are rooted in the history of the country.

It is recommended that a human resource plan for the South African health sector should consider the attrition of health workers due to AIDS-related mortality. There is a need to train more nurses to compensate for this attrition.

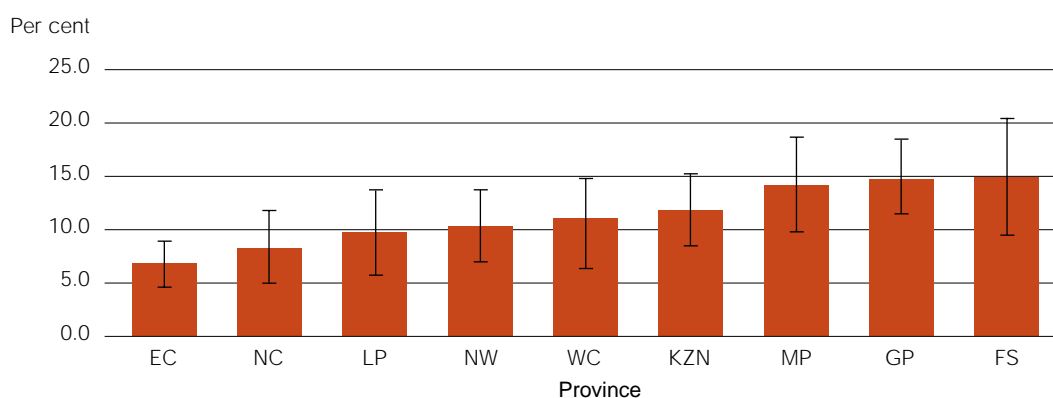
INTRODUCTION

1. HIV prevalence in South Africa

South Africa has the largest number of people living with HIV/AIDS in the world. In a recently publicised study using a linked, anonymous HIV testing of oral fluids in the general population, the Nelson Mandela/HSRC study of HIV/AIDS (2002) reported an estimated HIV prevalence of 11.4 per cent (or 4.5 million people) among persons aged two years and older. The HIV prevalence was higher among females (12.8 per cent) than males (9.5 per cent). Although HIV was found to have generalised in the population leaving no specific racial group or location type unaffected, the prevalence was highest among Africans (12.9 per cent), followed by whites (6.2 per cent), coloureds (6.1 per cent) and Indians (1.6 per cent).

The epidemic has also reached unacceptable levels among youth and older South Africans. The Nelson Mandela/HSRC study found that in 2002, 9.3 per cent of the youth and 7 per cent of persons aged 55 years and older, were living with HIV/AIDS. Those living in informal settlements were disproportionately affected by the virus, with 21.3 per cent living with HIV/AIDS. This prevalence is very high when compared to those who live in formal urban areas (12.1 per cent), tribal authority areas (8.7 per cent), and farms (7.9 per cent). The provinces were also not equally affected (as shown in Figure 1). Free State, Gauteng and Mpumalanga provinces were reported to have the highest HIV prevalence, while Eastern Cape and Northern Cape had the lowest prevalence. However the confidence intervals (CI) overlap, suggesting that the differences are not statistically different.

Figure 1: HIV prevalence by province, South Africa 2002



Source: The Nelson Mandela/HSRC Study of HIV/AIDS: South African National HIV Prevalence, Behavioural Risks and Mass Media Household Survey 2002, HSRC. The lines in the bars are 95% confidence intervals around the prevalence estimates.

2. Impact of HIV/AIDS

The high prevalence of HIV/AIDS (4.5 million citizens older than two years living with HIV/AIDS) has serious implications for South Africa:

- HIV/AIDS causes an enormous burden to society through high morbidity and mortality. Those killed by AIDS are frequently family breadwinners, and the loss of an income earner is exacerbated by the extra costs of caring for those who are ill.

Families are often forced to divert financial resources from basic foods, education and other necessities, to pay for health care. When people die, the cost of funerals is an additional financial burden to families without sufficient resources. Furthermore, premature mortality attributable to AIDS causes children to be orphaned. Thus the epidemic is causing the social disruption of families and society at large.

HIV increases the patient load at health facilities. This burden has been estimated in small studies that involved testing for HIV. A prospective, linked, anonymous cross-sectional study conducted over a four-week period at a tertiary level academic hospital in South Africa (Pillay, 2001), found that 60 per cent of all children admitted were HIV positive. Most of these children were younger than 12 months old. Of these infants, nearly 70 per cent were living with HIV/AIDS. HIV has also been found to be prevalent in adult medical wards at a tertiary hospital in Durban. Colvin et al. (2001) found that of 507 patients, 54 per cent were living with HIV.

- HIV compromises the patient's immunity and thus opportunistic infections proliferate in people living with the virus. Oral thrush and diarrhoea are two of the most important indicators of HIV/AIDS. Other opportunistic infections are pneumonia, pneumocystis carinii and cryptococcal meningitis. The high proportion of patients admitted to hospitals with the HI virus is evidence of the advanced stage of the HIV/AIDS epidemic in South Africa, as people living with HIV/AIDS who suffer from these opportunistic infections make use of the health services in an attempt to get relief.

Tuberculosis is a major opportunistic infection associated with HIV. Annual admissions in a rural South African hospital increased by 81 per cent between 1991 and 1998 – from a total of 6 562 patients to 11 872 – with much of that increase reportedly due to AIDS patients infected with TB. At times the increase in admissions to the TB ward was as high as 360 per cent (Floyd, Reid, Wilkinson & Gilks, 1999). As HIV/AIDS increases the demand for health services in developing countries, HIV negative patients may be crowded out of hospitals by those who are HIV positive. In Thailand, Uganda, Congo, Rwanda, Burundi and Kenya, the percentage of beds occupied by HIV positive patients in 1997 ranged between 39 per cent and 70 per cent (World Bank, 1997). Priority for health care tends to be given to those who are HIV positive and this overcrowding of hospitals due to AIDS needs to be managed.

- Although patients with opportunistic infections have higher rates of hospitalisation and stay longer in hospitals, this need not be the case. In industrialised countries, progress in medical care has reduced the length of stay in hospital for AIDS patients. In a London hospital, the average length of stay decreased from 16 days in 1992, to 11 days in 1997, and similar changes were reported from other hospitals in industrialised countries (Mocroft et al., 1999). Major causes of the decrease in length of stay were the introduction of prophylactic treatment for pneumocystis carinii pneumonia (PCP) in 1989, dual antiretroviral therapy (in approximately 1994), and highly active antiretroviral therapy (HAART) in 1996.

The latter decreased the utilisation of hospital services significantly (Mouton et al., 1997). While there has been a decrease in the length of stay in hospital for AIDS

patients in developed countries, there is no clarity on the frequency of admissions. In some studies, authors report a decrease in the frequency of admissions, while in others an increase is reported. While these reports seem contradictory, such increases and decreases are probably due to a number of factors including medical progress, improved access to treatment, and policies regarding admission or treatment.

There were sharp declines in the mortality of AIDS patients in those developed countries that had introduced HAART between 1994 and 1997. The patients in these countries have obviously benefited from medical progress. In contrast, developing countries continue to experience an increased burden due to HIV/AIDS mortality. In middle-income countries such as Brazil and Thailand, decreases in hospital utilisation have been a direct result of policies that promote outpatient services instead of hospital-based care (Buvé, 1997). In addition, Brazil and Thailand manufacture antiretroviral drugs and have introduced HAART for patients. Hence, there has been a corresponding decrease in rates of opportunistic infections, and subsequently, in health care utilisation. In Brazil, the annual number of AIDS deaths has been halved nearly, and opportunistic infections have decreased by between 60 per cent and 80 per cent (UNAIDS, 2000). This intervention clearly has an impact on hospital admission and discharge rates, on the length of stay in hospital, and on the cost of providing health services.

- In addition to the suffering and loss of human life caused, HIV/AIDS is expected to have a profound effect on the labour market as HIV affects many individuals in their economically productive years. In the 1999 national study of workers in heavy industry in South Africa, the prevalence of HIV was estimated at 8.8 per cent among agricultural workers, but in KwaZulu-Natal the rate was 22 per cent (Rosen et al., 2001). From an employer's perspective, the direct impact of HIV/AIDS may result in increased costs and lower profits due to the loss of labour. Direct costs include increased benefit payments, insurance premiums, recruitment and training, overtime and casual wages. Indirect costs include reduced on-the-job productivity, increased absenteeism, supervisory time management burden, production disruptions, loss of workforce cohesion and experience, and labour disputes.

Given the overall impact of HIV/AIDS on South African society and the need to make policies on the management of those living with the disease, it is critical that studies are undertaken to provide data on the impact of HIV/AIDS on the health system. This has become urgent because, having started in the early 1990s, the epidemic is maturing. More people are expected to become ill and therefore the patient load is expected to increase. For this reason, South Africa needs data to assess the impact of HIV/AIDS on the health system to aid decision makers and programme planners to make policies to mitigate this impact.

3. Objectives of this report

The HSRC and the National School of Public Health (NSPH) at MEDUNSA responded to Tender No GES 38/2000–2001 called for by the DoH to achieve the following specific objectives:

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- Determine the current status and projected morbidity and mortality among South African health workers;
- Estimate the number of persons with AIDS utilising public health services in South Africa and determine the demographic profile of these patients;
- Identify the health services most severely affected by HIV/AIDS, estimate and project important health service indicators such as drug utilisation, bed occupancy and length of stay in hospital;
- Determine the impact of HIV/AIDS on human resources by focusing on training, staff morale, workload, working hours and absenteeism; and
- Estimate the total cost of administering preventive therapy to newborns and pregnant women at different levels of the health care system.

The first two objectives were later extended to include the private sector as well. This report does not include mortality among South African health workers.

From a literature review we know that in depth assessments of the impact on health systems are a useful contribution to understanding the nature of the interaction between HIV/AIDS and health systems (WHO, 2000). However, such assessments are usually complex and expensive to implement. As a result, we proposed to the DoH to conduct a series of studies that would permit rapid assessment and generate empirical data that could be used for planning and management of HIV/AIDS. These studies will answer the following three broad questions:

- To what extent does HIV/AIDS affect the health system?
- What aspects or subsystems are most highly affected?
- How is the impact going to progress over time?

In our response to the tender we indicated that we would not conduct a study of orphanhood and dependants of health workers because of the complexity and time required to do justice to this issue. We also indicated that we planned to conduct a survey in two phases. Phase 1 would take place in Gauteng for the first four objectives outlined above, while Phase 2 would cover the other eight provinces for all objectives. The last objective is a longitudinal study conducted during Phases 1 and 2. Phase 1 is now complete and the results of the analysis of the survey in Gauteng have already been reported to the DoH. The purpose of Phase 1 was to identify any methodological problems or areas for improvement, to inform the main, national survey.

A series of five sub-reports are presented separately in this document. These are:

- HIV/AIDS prevalence amongst South African health workers and patients, 2002 (Study No 1);
- The impact of HIV/AIDS on the South African health workers (Study No 2);
- The impact of HIV/AIDS on health services (Study No 3);
- The total cost of administering prophylaxis therapy to pregnant women and newborns to different levels of health care in a peri-urban setting following the Nevirapine and Zidovudine Protocols (Study No 4: the abstract only is presented here; the work is ongoing and an interim report has been presented to the DoH.); and
- AIDS-attributable mortality amongst South African health workers.

4. Methods

4.1 Sampling frames

A stratified cluster sample of 222 health facilities representative of the public and private health sector in South Africa was drawn from the National DoH's database on health facilities (1996). The sample was designed to obtain a nationwide representative sample of:

- Medical professionals i.e., specialists and doctors;
- Nursing professionals and other nursing staff;
- Other health professionals such as social workers and physiotherapists;
- Non-professional health workers such as ward attendants and cleaners; and
- Adult and child patients.

The target population consisted of two separate sampling frames, that is:

- A list of all public clinics in the country (excluding mobile, satellite, part-time and specialised clinics); and
- A list of all hospitals (public and private) and private clinics with an indication of the number of beds available in each of these health facilities.

From these sampling frames, a representative probability sample of 2 000 patients was obtained as well as a representative probability sample of 2 000 health workers who were in contact with patients undergoing treatment at these health facilities.

4.1.1 Sampling frame of public clinics

A random sample of 1 000 patients, 500 nursing personnel and 111 non-professional health workers was obtained. A nationwide representative sample of 167 clinics was drawn, and at each drawn clinic an average of three nursing personnel, six patients and 0.67 non-professional personnel were drawn at random. Information on the number of employees per occupational category, as well as the number of patients undergoing treatment at the day of our visit, were obtained for the calculation of record weights. (See also Appendix 3 for more information on sample design, drawing and weighting.)

4.1.2 Sampling frame of public and private hospitals

At hospitals, the following numbers of persons were obtained in the sample:

Public hospitals

- 667 patients;
- 333 nurses (all categories);
- 200 medical practitioners;
- 67 other health professionals eg. social workers, psychologists; and
- 222 non-professionals eg. cleaners.

Private hospitals

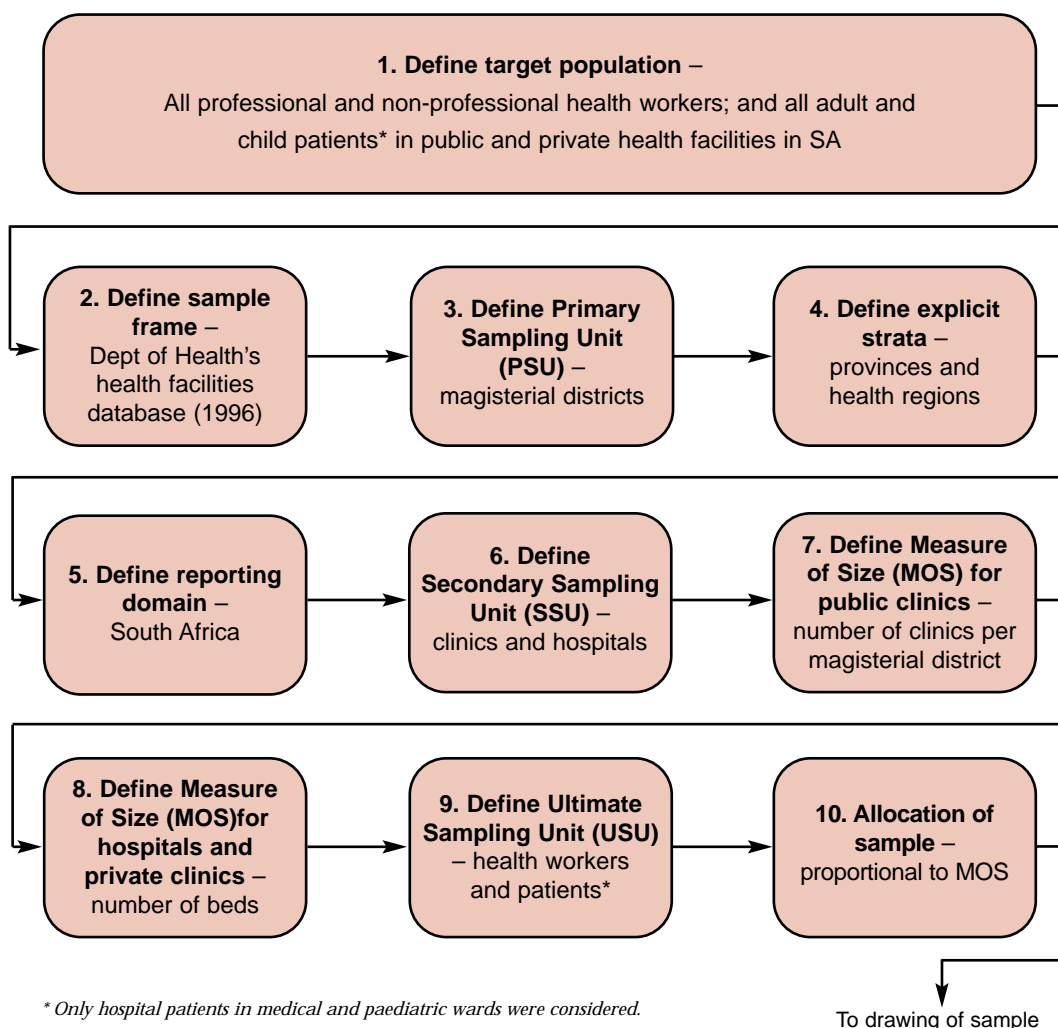
- 333 patients;
- 167 nurses (all categories);
- 100 medical practitioners;
- 33 other health professionals eg. social workers, psychologists; and
- 167 non-professionals eg. cleaners.

Information on the number of employees per occupational category, as well as the number of patients undergoing treatment in medical and paediatric wards at the time of our visit, was obtained for the calculation of record weights. The process of drawing the sample is shown in Figure 2.

4.2 Sample drawing at health facilities

Within each province, the two sampling frames were ordered according to health regions, and within each health region according to magisterial district. Statistics South Africa's (Stats SA) numerical numbering system of magisterial districts was used to obtain a geographical spread of magisterial districts in the systematically drawn sample over the health regions.

Figure 2: Steps in the sample design



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4.2.1 Sample of public clinics

Provinces were considered as the primary stratification variable, and the health regions as the secondary stratification variable. The 167 clinics that were drawn were allocated disproportionately (see Table 1). In other words, proportionately more clinics were allocated to the provinces with the smaller number of clinics and proportionately fewer clinics to the provinces with the greater number of clinics. This was done to obtain sufficient representation of the smaller provinces in the sample so that the results of each province could be reported separately.

Table 1: The provincial allocation of public clinics and interviews

PROVINCE	TOTAL CLINICS	CLINICS IN SAMPLE	INTERVIEWS			TOTAL INTERVIEWS
			Professional health workers	Non-professional health workers	Patients	
	n	n	n	n	n	n
Eastern Cape	781	33	99	22	198	319
Free State	280	15	45	10	90	145
Gauteng	461	22	66	15	132	213
KwaZulu-Natal	420	20	60	13	120	193
Mpumalanga	188	11	33	7	66	106
North West	327	17	51	11	102	164
Northern Cape	221	13	39	9	78	126
Limpopo	330	17	51	11	102	164
Western Cape	379	19	57	13	114	184
TOTAL	3 387	167	501	111	1 002	1 614

The sample number of clinics within each province was allocated approximately proportionately to the number of clinics within the health regions in the province. Magisterial districts were considered as primary sampling units (PSUs) within each health region. Because two clinics were drawn per magisterial district, districts with only one clinic were combined with a geographically adjacent magisterial district.

A measure of size (MOS) (as defined below) was used i.e.:

- If the number of clinics is two or less, and not more than four, then the PSU_MOS = 1;
- If the number of clinics is between five and ten, then the PSU_MOS = 2; and
- If the number of clinics is more than ten, the PSU_MOS = 3.

This definition of the PSU_MOS was used to avoid an imbalance between large (in terms of number of clinics) and small magisterial districts in the sample.

4.2.2 Drawing of the sample

The SAS version 8.2 procedure *'Surveyselect'* was used to draw the samples. This procedure calculated also the final sampling weight of the drawn clinics within each explicit stratum (viz. health region within province). The final sampling weight of a selected clinic is equal to the sampling weight of the relevant PSU (i.e. magisterial district), times the sampling weight of the selected clinic within the PSU.

The sampling weight of a drawn PSU within an explicit stratum was calculated as:

$$\frac{(\text{the sum of the MOS of all PSUs within the stratum})}{(\text{the number of PSUs drawn within the stratum}) \times (\text{the MOS of the drawn PSU})}.$$

The sampling weight of a drawn clinic within a drawn PSU was calculated as:

$$\frac{(\text{the number of clinics within the PSU})}{(\text{the number of clinics drawn})}.$$

4.2.3 Sample of public and private hospitals

Public and private sector hospitals and clinics were separated before the sample was drawn. The number of health facilities allocated to provinces was calculated proportionately to the sum of the MOS, and not proportionately to the number of beds or to the number of facilities. One-third of the sample was drawn from private health facilities and two-thirds from public health facilities. An adjusted MOS, based on the number of beds (hosp_MOS), was developed and used for the allocation of health facilities to the provinces as well as for determining the different sample sizes, i.e.:

- If the number of beds is less than 30, then the hosp_MOS = 1;
- If the number of beds is between 31 and 80, then the hosp_MOS = 2;
- If the number of beds is between 81 and 150, then the hosp_MOS = 3;
- If the number of beds is between 151 and 300, then the hosp_MOS = 4; and
- If number of beds is greater than 300, then the hosp_MOS = 5.

The hosp_MOS was applied to avoid the concentration of health personnel to a few large hospitals, and to expand the sample across hospitals and clinics of all sizes. Tables 2 and 3 show the allocation of public and private hospitals to the provinces as well as the number of interviews per occupational category.

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Table 2: The provincial allocation of public hospitals and interviews

PROVINCE	NO. OF HOSPITALS	NO. IN THE SAMPLE	INTERVIEWS					TOTAL INTERVIEWS
			Doctors	Nursing staff	Prof health workers	Non-prof health workers	Patients	
Eastern Cape	72	6	38	64	13	43	129	287
Free State	35	3	16	26	5	17	52	116
Gauteng	28	3	19	31	6	21	62	139
KwaZulu-Natal	64	6	41	68	14	45	136	304
Mpumalanga	28	2	13	22	4	15	44	98
North West	33	3	17	28	6	19	56	126
NorthernCape	26	2	7	12	2	8	23	52
Limpopo	44	4	26	44	9	29	89	197
Western Cape	47	4	23	38	8	25	76	170
TOTAL	377	33	200	333	67	222	667	1 489

Table 3: The provincial allocation of private hospitals/clinics and interviews

PROVINCE	TOTAL HOSPITALS		INTERVIEWS					TOTAL INTERVIEWS
	HOSPITALS	IN SAMPLE	Doctors	Nursing staff	Prof health workers	Non-prof health workers	Patients	
Eastern Cape	40	3	12	20	4	20	36	92
Free State	19	2	7	12	2	12	24	57
Gauteng	112	8	43	72	14	72	145	346
KwaZulu-Natal	44	3	18	30	6	30	60	144
Mpumalanga	13	1	4	7	1	7	14	33
North West	19	2	6	10	2	10	20	48
Northern Cape	20	2	5	8	2	8	16	39
Limpopo	2	0	0	0	0	0	3	3
Western Cape	16	1	5	8	2	8	15	38
TOTAL	285	22	100	167	33	167	333	800

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The actual determination of the numbers of each of the categories of staff and patients to be interviewed at a drawn hospital is direct and can be described as follows.

The outcome of the public hospital sample in the Eastern Cape (EC) as indicated in Table 4 is used as an example. Six public hospitals were drawn, with hosp_MOS = 4, 2, 5, 5, 3 and 5, with sum (hosp_MOS) = 24. On average three nursing personnel had to be drawn per hosp_MOS value, which implied in total the drawing of 72 (i.e. 3 x 24) nursing personnel in the EC.

According to Table 2 only 64 nurses should be drawn, necessitating the application of a correction factor of $64/72=0.89$ to all sample sizes given for the EC in that table. Table 4 indicates the outcome of the correction process in the EC.

Table 4: The correction of given sample sizes for public hospitals in the Eastern Cape

HOSPITAL	HOSPITAL MOS	NUMBER				NO. OF PATIENTS
		of nurses	of medical practitioners	of other professionals	of non- professionals	
1	4	11	6	2	7	22
2	2	5	3	1	4	11
3	5	13	8	3	9	27
4	5	13	8	3	9	27
5	3	8	5	1	5	16
6	5	14	8	3	9	26
TOTAL	24	64	38	13	43	129

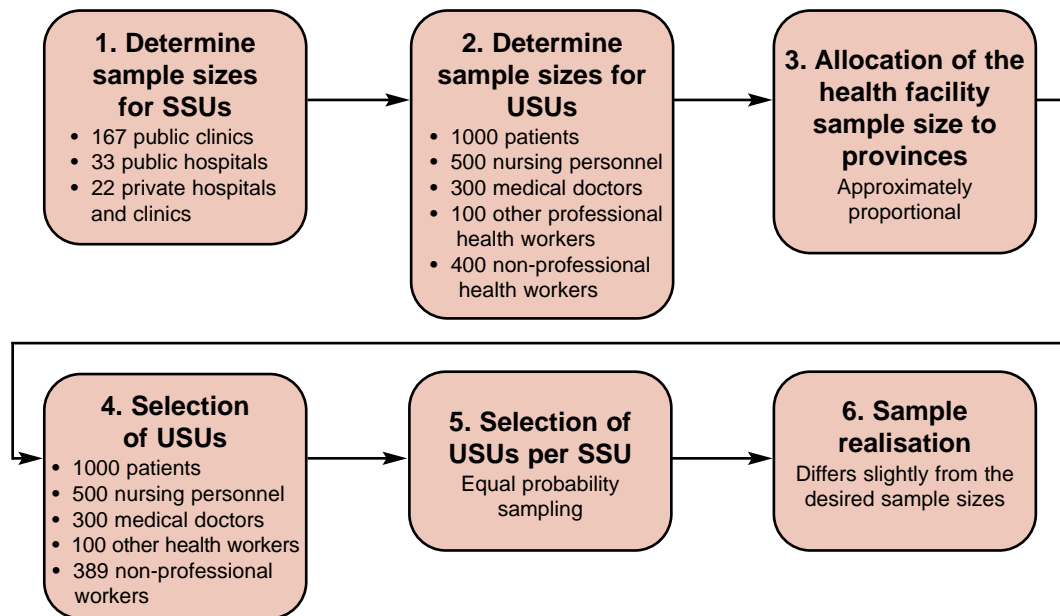
This scaling down or scaling up process was applied to all provinces after the initial sample size had been determined. A similar correction procedure was applied to private hospitals in the sample. The process is summarised in Figure 3.

Table 5: Public hospital sample for the Eastern Cape

SECTOR	NAME OF HOSPITAL	MAGISTERIAL DISTRICT (MD)	MD NO.	NUMBER OF BEDS	HOSPITAL MOS	HOSPITAL WEIGHT
Public	Dora Nginza Hospital	Port Elizabeth	240	220	4	10.2917
Public	Burgersdorp Hospital	Albert	201	57	2	20.5833
Public	Komani Hospital	Queenstown	215	850	5	8.2333
Public	Madwaleni Hospital	Elliotdale	252	347	5	8.2333
Public	Isilimela Hospital	Port St Johns	266	143	3	13.7222
Public	St Patrick's Hospital	Bizana	250	310	5	8.2333

4.3 Drawing of the sample of health facilities

Figure 3: Steps in the drawing of the sample.



Within each explicit stratum (viz. province by nature of the health facility), the health facilities were ordered according to health region, magisterial district number and type of health facility to make the sample more representative. Health facilities were drawn systematically within each explicit stratum with probability proportional to its hosp_MOS as indicated above.

The SAS version 8.2 procedure 'Surveyselect' was used to draw the samples. This procedure also calculated the sampling weight of the drawn health facility within each explicit stratum. The sampling weight of a drawn health facility within an explicit stratum was calculated as:

$$\frac{(\text{the sum of the MOS of all health facilities within the stratum})}{(\text{the number of health facilities drawn within the stratum})} \times (\text{the MOS of the drawn health facility})$$

4.4 The drawing of the sample of health workers

The drawing of the allocated numbers of health personnel, other personnel and patients in the drawn health facilities, can be explained as follows.

4.4.1 Health workers in clinics

In the case of incorrect information or refusal to participate, a clinic was replaced by another clinic in the same stratum. In clinics, the following broad categories were considered, namely health professionals, non-professional workers whose duties brought them in contact with patients, and patients coming to the clinic at the day of the field work.

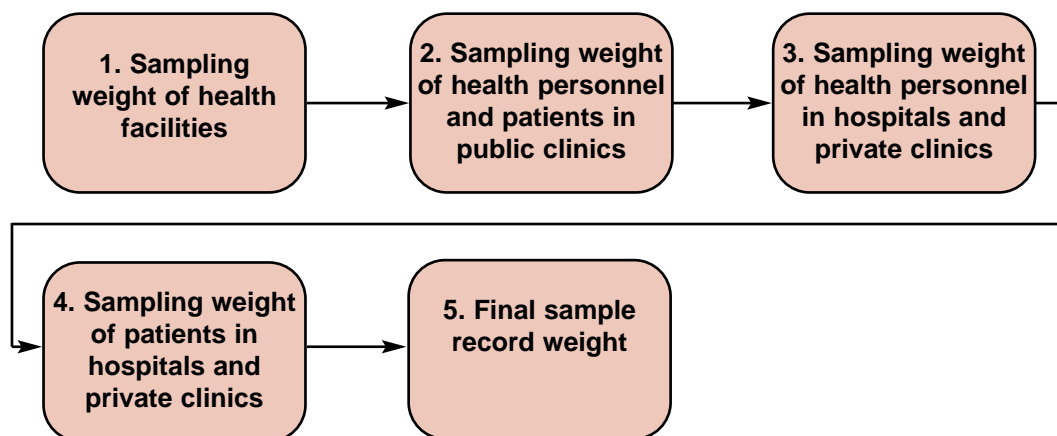
The final sampling weight of any person drawn in the clinic sample is then equal to the sampling weight of the relevant clinic multiplied by the total number of persons in a category at a clinic divided by the number of persons drawn in that category.

4.4.2 Health workers in hospitals

If a hospital refused to co-operate it was replaced by another hospital in the same stratum, although a private hospital could not always be replaced. In hospitals, the following occupational categories were considered: medical practitioners (general practitioners and specialists), nurses (all categories), other health professionals (eg. social workers and psychologists) and non-professional health workers whose duties brought them in contact with patients. Patients were selected from people occupying the medical and paediatric wards of the hospital. If there were no medical and paediatric wards at a drawn hospital, all patients occupying beds at the hospital were considered. No day patients were considered.

The final sampling weight of any person drawn in the hospital sample is then equal to the sampling weight of the relevant hospital multiplied by the total number of persons in a category at a hospital divided by the number of persons drawn in that category. This is illustrated in Figure 4.

Figure 4: Steps in the weighting of the sample



4.5 Development of questionnaires

Existing data sources such as articles, dissertations and news reports were explored to establish a broad background against which the interviews could be planned and structured. Information was collected from members of the management team, health workers and patients, during interviews as well as from focus group discussions, to gain an understanding of the following:

- Hospital/clinic environment;
- Impact of the disease on health personnel; and
- Impact of the disease on patients.

The health facility questionnaire was adapted from that developed by Family Health International.

4.6 Training of data collection staff

Training of fieldworkers for the pilot study was done in August 2001, and for the national study, in April and May 2002. Thirteen fieldwork co-ordinators (FWCs) and 53 fieldworkers were trained during two-day training workshops presented in Pretoria, Cape Town, Kimberley, Durban, Bloemfontein, Umtata and Pietersburg. The workshop included the selection of candidates as fieldworkers. A survey planner and two assistants were appointed to assist with the planning of the survey and the training.

Professional nurses were appointed as fieldworkers and they were trained to conduct face-to-face interviews with health workers and patients at health facilities by means of three separate questionnaires. Where applicable they were also taught how to obtain oral fluid specimens from respondents. The FWCs conducted interviews with the superintendents/managers of health facilities by using the health facility questionnaire. They were also trained to select the respondents to be interviewed (see Appendix 1: Instructions to fieldworkers), and to do administration and quality control.

Fieldwork teams consisting of a FWC and \pm four fieldworkers conducted fieldwork during 23 'tours' over a period of two months across SA. The survey planners developed a travel plan for each tour, contacted the facilities for appointments and made the necessary travel and accommodation arrangements. At least one day was spent at a facility and each tour took from one to three weeks to complete.

4.7 HIV testing

Oral fluid specimens were obtained from participants by means of the OraSure oral fluid collection device. All aspects of specimen collection, transport and storage were done according to the 'Standard Operating Procedures for collecting, storing and transporting oral fluid using the OraSure® HIV-1 Oral Specimen Collection Device' (see Appendices 4 and 5).

For all of the selected health workers in Mpumalanga, KwaZulu-Natal, Free State and North West, the OraSure/Vironostika combination was used so that the same methodology was applied to ensure comparability across provinces. Testing was anonymous, but the

results of the HIV test could be matched to the data through a bar code. By separating the questionnaires from the consent forms, anonymity was ensured. Individual's names and unique identifying information was not collected and therefore could not be linked to an individual's HIV test results. While this ensures the confidentiality of the HIV test, it also means that HIV results cannot be returned to individuals who wish to know their HIV status. However, individuals wanting to know their HIV status could enquire at the health facility whether they can undergo voluntary counselling and testing (VCT), which includes providing new specimens to be tested.

For all of the health workers and patients, the collection of the oral fluid specimen using Orasure was done at the time of the interview. As the test is non-invasive and only requires individuals to stick a pad between their cheek and gum for two to five minutes, the logistics of this procedure was simple. Furthermore, as the Orasure is a specimen collection device, the specimen is sent to the laboratory for analysis and therefore the individual and the interviewer had no way of knowing the tested individual's HIV status, making the acceptability of the test higher.

4.8 Quality control

The principal investigator prepared detailed protocols for Phase 2 of the study. Since the project comprised five objectives, various researchers were allocated responsibilities to develop questionnaires for their respective objectives. Draft questionnaires were brought before a special project committee for assessment and reconstruction. This was intended to ensure the quality of questionnaires.

Final draft questionnaires, study protocols and informed consent forms were subjected to the ethics review processes of the NSPH at MEDUNSA. After this process, the project manager drafted training manuals for field supervisors and fieldworkers.

Training manuals included final questionnaires, maps of field work routes, instructions on access to health care facilities, administrative forms to record daily activities and for other administrative activities, and instruction on safe keeping of completed questionnaires. Information generated from the Gauteng Phase I survey was used to design questionnaires for the national study and to retrain staff accordingly.

Field supervisors did 'over the shoulder' supervision of fieldworkers. At the end of each day, supervisors checked completed questionnaires to detect possible deviations from protocols and to offer corrective support where such deviations were observed. Regular supervision of data collection by fieldworkers is an important quality control measure.

To maintain the accuracy of questionnaires, the project manager regularly evaluated completed questionnaires as they arrived. Regular meetings with field supervisors were held to review issues arising out of completed questionnaires. In this way, quality assurance on data collection was maintained.

The process of data management started as soon as completed questionnaires were satisfactorily assessed. Coding lists were prepared for the pilot survey by researchers. For the main study, specialists were contracted to do this work. The database, set up

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before the study began, was in the SPSS software format. The data-capturing unit of HSRC entered and cleaned the data with the assistance of the project manager and researchers. Statisticians were contracted to set up the data for analysis, including creating categorical variables from continuous variables and creating major variables of the study (such as Bangui indicators). Backups of data were made and stored safely for future use.

The statistical outputs were subjected to random checks by an independent statistical consultant to assess their accuracy. No statistical computation errors were found.

4.9 Data collection

The questionnaires in the study are listed in Table 6.

4.9.1 Pilot study

Individual and focus group interviews with health personnel and patients were conducted at both public and private health facilities in urban and rural areas of Gauteng and North West. Using this knowledge, two questionnaires were compiled, namely:

- A demographic and morbidity questionnaire for adult patients; and
- A demographic and morbidity questionnaire for children.

The questionnaires were pilot-tested during face-to-face interviews with two health workers, eight patients and members of management at three hospitals and one clinic. These health managers were interviewed to determine logistic information about administering the questionnaire, such as access to the facility, patients' files, how best to select patients, records of the patients, ensuring confidentiality, and the organisation of fieldworkers.

Once the questionnaires had been finalised, the adult and child questionnaires were translated from English into seven other languages, namely Northern Sotho, Southern Sotho, Tswana, Zulu, Xhosa, Shangaan and Venda.

4.9.2 Phase 1 study in Gauteng

Retired registered nurses were hired to visit health facilities in order to collect information using five different questionnaires. We developed a fieldworker manual that included the methodology for the selection of health workers and patients at health facilities. The retired nurses were then trained during a one-day workshop to conduct field work at hospitals and clinics.

The methodology was tested in Gauteng, prior to full implementation in the second and national phase. All interviews were confidential and non-compulsory, and respondents had to give their informed written consent before being interviewed.

4.9.3 Phase 2

The second objective of this survey was to estimate the number of persons with AIDS utilising public and private health services in South Africa, and to determine the demographic profile of these patients.

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Table 6: Questionnaires and target groups

QUESTIONNAIRE	TARGET GROUP
1. The impact of HIV/AIDS on health services in South Africa (facility questionnaire)	Public hospitals, private hospitals/clinics
2.1. Demographic and morbidity questionnaire for adults	Adult patients (15–49 years) at health facilities.
2.2. Demographic and morbidity questionnaire for children	Child patients (below 15 years) at health facilities
3.1. Impact of HIV/AIDS on professional health workers in the health sector	Health professionals, i.e., doctors, nurses, other professionals.
3.2. Impact of HIV/AIDS on non-professional health workers in the health sector	Non-professionals who worked with patients such as ward attendants and cleaners.

The first three sections of the adult and child questionnaires are: section 1 – demographic, section 2 – morbidity, and section 3 – behavioural. This instrument primarily collected information on nine variables, each measured through numerous items. The first part of the instrument collected data on facilities, as well as on the biographical details of respondents. A fourth section was addressed to facilities and was intended to yield information on the distribution of AIDS cases in the private and public facilities.

In section 5 of the questionnaire, on health status, we enquired into the symptoms/diseases that had prompted patients to seek medical and health care. Section 6 was intended to determine the presence or absence of major and minor AIDS symptoms according to the Bangui definition. In those few instances where the medical diagnosis of AIDS was stated on the medical record, the symptoms were clearly validated. Medical records were used as the gold standard to predict AIDS, given the symptoms. This was not possible for all cases, because of missing medical diagnoses on patients' records.

Section 7 of the questionnaire captured behavioural variables, because certain behaviours predispose one towards infection with HIV.

4.10 Informed consent process for adults, for health workers and for children

4.10.1 Informed consent for questionnaires

An informed consent form was attached to each questionnaire. All adults were requested to give informed consent and to sign the form in the presence of a witness. For child respondents who were too young to give consent, their parents or guardians were asked to give consent on their behalf. However, child respondents who were old enough to give consent were asked to sign an additional child consent form.

To protect the identity of respondents, the covering sheet of the questionnaire was separated from the rest of the questionnaire because it contained identifying details of respondents. The separated pages were destroyed.

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4.10.2 Informed consent for HIV testing

The procedure described in this section was applied to the four provinces where HIV testing was done. The process entailed describing the purpose of the project to all patients and obtaining the written or verbal (where respondent was illiterate) consent of those who agreed to participate. The nurses requested permission from parents and guardians of children under 15 years to give informed consent for including their children in the survey, and they obtained verbal consent from all children who gave a specimen for HIV testing. Nurses who collected data were trained to ensure that this procedure was done correctly.

To ensure compliance with ethical standards, we took the following measures:

- We did not record names of individuals on the questionnaires or on the oral fluid specimen. Instead we pasted bar codes with the same numbers on the questionnaires, the laboratory results sheet and the oral fluid specimen.
- We ensured that the specimens were sent by courier to the laboratories for HIV testing.
- We linked the HIV test results and the questionnaires electronically, making this a linked anonymous HIV testing survey. Because we designed the study to ensure anonymity, we did not give the participants their results. Patients who wished to know their HIV status could enquire from the health care facilities where they were being served at the time of the survey. They would first go through VCT, which was not available in this survey.

4.11 Approval of the ethics committee at the NSPH

The research proposal, data collection instruments, study protocol, and informed consent forms were brought before the Research and Ethics Review Committee of the NSPH at MEDUNSA. The Committee suggested some changes to documents prior to approval. The changes were then reviewed and approved.

The Research and Ethics Review Committee of the NSPH at MEDUNSA reviewed the study, and project number NSPH/FA/2002/01 was allocated after suggested changes to the protocol and informed consent forms were satisfactorily effected.

4.12 Administration of the HIV test

The HIV test was used in the public and private health care facilities. This HIV test has a shelf life of 22 days.

4.12.1 Collecting oral fluids

The following general steps were followed to collect a specimen:

- A specially treated absorbent pad attached to a plastic stick was used (details are presented in Appendix 3);
- The pad was placed in the person's mouth against the inner cheek for the length of time specified in the manufacturer's instructions. Then the pad was placed into a vial containing a preservative solution.

Due to the test complexity, oral fluid specimens collected for Enzyme immunoassays (EIAs) are sent to a national laboratory for analysis.

4.12.2 Storing oral fluids

Oral fluid specimens can be stored from 4°–37° C for a maximum of 21 days (including the time for shipping and testing). Oral specimens should be refrigerated during shipment. Specimens can be frozen (–20° C) for a limited time (approximately 6 weeks). Once thawed, they can be refrozen once. The test kit insert should be consulted prior to testing for more specific storage information.

Supervisors made sure that all envelopes were sealed and sent to the nearest courier depot before being dispatched twice a week.

4.12.3 Administration

Patients and health personnel were tested using the Oral fluid collection devices in Mpumalanga, KwaZulu-Natal, Free State and North West. Three testing sites participated in determining the HIV status. These are:

- The Department of Virology, University of Natal, Durban;
- Contract Lab Services (CLS), a joint venture unit of the WITS Health Consortium (Pty) Ltd and the National Health Laboratory Service; and
- The Medical University of Southern Africa (MEDUNSA).

The test results were linked electronically to the questionnaires prior to analysis.

5. Strengths and limitations of the study

Each research study has strengths and limitations. This study has the following strengths.

5.1 Strengths

- First, because five per cent of all health facilities were selected on a probability basis and using a stratified approach, the findings can be generalised. With respect to HIV prevalence amongst health workers and patients, the generalisation is limited to four South African provinces and not to the whole country.
- Second, the response rate in the study of the patients is very high, obviating the need to adjust for non-response bias.
- Third, the data allows for comparison of the public and private sectors in key areas of service delivery, identifying the strengths of each sector. Such information is necessary for planning the delivery of health services.

5.2 Limitations

- First, due to insufficient funds, we were not able to draw a sample large enough to allow for the production of provincial estimates, key demographic variables or to conduct HIV prevalence tests in all the five per cent of health care facilities sampled. The small sample size, in some cases, resulted in large confidence intervals around estimates and we were therefore unable to determine whether there were statistically significant differences between estimates even when the differences appeared substantial.
- Second, due to the poor medical record systems in health care facilities, some of the statistics may be subject to recall bias. For key indicators related to health services, most of the estimates were derived from medical records.
- Third, the poor medical record systems found in health facilities accounted for a lack of crucial information. For example, most health facilities did not keep statistics on key indicators such as the number of individual patients seen.
- Finally, because AIDS is not a notifiable disease, most health facilities did not keep statistics on the number of patients diagnosed with AIDS, hence our decision to use projections to estimate the number of patients with AIDS using the health care system.



STUDY No. I

HIV/AIDS PREVALENCE AMONG
SOUTH AFRICAN HEALTH WORKERS
AND AMBULATORY AND
HOSPITALISED PATIENTS



I. TERMS OF REFERENCE

A recent study shows that South Africa has the largest number of people currently living with HIV/AIDS in the world. The *Nelson Mandela/HSRC Study of HIV/AIDS* (2002) reported that an estimated 4.5 million people are infected with HIV/AIDS in the country.

In this study (No 1), we investigated the prevalence of HIV/AIDS amongst South African health workers and patients in 2002 in order to assess the impact on, and inform recommendations for, the health care system.

The objective of this study was to ascertain the HIV/AIDS prevalence ratio amongst health workers and patients in the health care system, and to project morbidity due to AIDS among patients in public health facilities.

In this study we present:

- The demographic profile of patients served in the public and private health sectors;
- Reliability and validity of the study results;
- Findings on HIV prevalence amongst health workers;
- The HIV prevalence amongst ambulatory and hospitalised patients in public and private health care facilities;
- Morbidity among these patients; and
- Projection of the number of AIDS patients to use the health services in the next ten years.

Before presenting the results however, we discuss the issues around HIV testing.

1.1 Literature review on HIV testing

Tests to determine an individual's HIV status may be conducted on a range of body fluids including blood, plasma, urine and oral fluids. A brief review of the literature shows that it is appropriate to use oral fluid as a test substrate for HIV surveillance purposes. There is consensus that oral fluid testing is sensitive and specific enough to use for HIV surveillance purposes, whether among adults or children. Earlier problems with low sensitivity have been corrected by using specialised collection devices that concentrate and stabilise the salivary-associated immunoglobulins (Gallo, 1997). Modified EI and Western Blot assays have improved the sensitivities to between 97 per cent and 100 per cent, and specificities to between 98 per cent and 100 per cent, depending on the study. For example, the Oral Fluid Vironostika HIV-1 Microelisa System (Organon Teknika, Durham, NC) and the Orasure HIV-1 Western Blot Kit (Epitope Ince, Beaverton, OR) have provided the correct result of triggered appropriate follow-up testing in 3 569 (>99 per cent) of 3 570 cases (Gallo, 1997).

A study in the USA that evaluated a system using oral mucosal transudate for HIV-1 antibody screening followed with a confirmatory test to determine the accuracy of the HIV-1 antibody testing system, found that oral fluid testing is a highly accurate alternative to serum testing (Gallo, 1997).

A study to validate a method for oral fluid testing for HIV infection in children older than 12 months found that from 331 specimens, specificity and sensitivity of oral fluid testing compared with results on sera were both 100 per cent (297 of 297; 95 per cent CI 98.8 to 100 per cent) and 34 of 34 (95 per cent CI 89.7 to 100 per cent), respectively (Tess, 1996). The author concluded that:

salivary testing provides an accurate and acceptable non-invasive method for assessing the HIV infection status of children born to infected mothers by using IgG antibody capture enzyme-linked immunosorbent assay alone with a strategy of duplicate retesting of reactive specimens.

In South Africa, investigators from the University of Pretoria compared tests of whole blood and saliva for HIV antibodies (anti-HIV) using a rapid test strip capillary flow immunoassay, and correlated the test strip results with blood specimen results obtained from routine diagnostic anti-HIV assays (Weber, 2000). Only two salivary test strip results tested false-negative, both from marasmic and severely dehydrated babies, while the other results were all in concordance. The authors concluded that:

anti-HIV test strip methodology for whole blood and salivary specimens is rapid, reliable and easy to perform and interpret. Saliva specimens can be readily collected from any individual, and there is a reduction in hazard risk. Anti-HIV saliva testing using the test strip methodology is recommended for South Africa, particularly in high-risk situations such as the paediatric and forensic medicine settings.

There are a number of obvious advantages to collecting specimens for HIV testing by using a non-invasive specimen collection procedure, for example, there is greater safety and increased patient compliance. A recent study that aimed to evaluate youth preferences for rapid and innovative human immunodeficiency virus antibody tests found that an oral collection device with a rapid saliva test was the most highly preferred test method (Peralta, 2001).

There are ways of estimating AIDS cases without laboratory evidence. The method is described below.

1.2 Clinical AIDS case definitions

The Bangui case definition belongs to a group of instruments called clinical case definitions, used to measure AIDS in the absence of laboratory evidence. According to these definitions, a person is considered likely to have AIDS if he/she presents with certain clinical signs or conditions. Currently there are 29 such disease/signs (http://www.continuummagazine.org/what_is_AIDS_hiv.htm). The CDC in Atlanta initiated the use of these definitions for the purpose of surveillance of AIDS worldwide.

The literature reviewed reveals that the case definitions are useable in diagnosing AIDS, especially where HIV testing is a standard procedure. Weniger et al. (1992) used the revised Caracas/PAHO case definition among patients in a Brazilian hospital, 110 of whom were HIV positive, and 135 HIV negative. Using the serological results as a standard, they found the major and minor symptoms to be highly predictive of AIDS.

There are currently six clinical case definitions used in different countries and settings. The first three definitions are used in countries with sophisticated laboratory facilities, while the last three are used where laboratory facilities are limited (PAHO/WHO, 2001). These are:

- CDC 1987;
- CDC/CD4;

- European;
- WHO surveillance (Bangui/WHO/Clinical);
- Expanded WHO surveillance (formerly Abidjan);
- Caracas/PAHO; and Revised Caracas/PAHO.

Each of the case definitions is described in more detail in Appendix 2.

Having examined all definitions for AIDS cases, we chose to use the WHO Bangui definition to measure the prevalence of AIDS in the absence of an HIV test. The World Health Organisation (WHO) designed this definition for surveillance purposes in Africa where diagnostic resources are limited. Simplicity of symptoms used allows for easy definition. In addition, it has been used successfully in Africa since 1980. (See Appendix 2 for more details on AIDS case definitions.)

1.3 Method

A detailed account of methodology in both the pilot study and national survey is provided in the Introduction (see pages 5–18) and in Appendix 3. Important issues of consent and ethics are also outlined in the Introduction.

2. RESULTS

2.1 Demographic profile of patients

Table 7 presents findings on the demographic characteristics of the sample selected. This information is useful in understanding the patient population served by the public and private health care system.

In this part of the study, we surveyed 1 949 patients in all provinces. Of these, 86.9 per cent were in the public health sector and the remainder in the private health sector. Our sample consisted largely of females, youth and adults of reproductive age. Most of the patients were African, followed by coloureds. The majority spoke Nguni languages, followed by those speaking seSotho languages. The majority came from villages. They owned their dwelling as opposed to renting, and were more likely to have attained high school or more education. The respondents were more likely to be religious than not. They also were more likely to be unmarried (single, widows or separated) than not, and were more likely to live alone.

The public health sector has a significantly different patient profile from that of the private health sector. The public sector has a higher proportion of females, while the reverse is true for the private health sector. Public sector patients were also more likely to be youths (15–24 years), while the private sector patients were likely to be older (25 years or older). The patients using the public health sector were more likely to be unemployed, unmarried and live alone, while those using the private sector were more likely to be employed, married and live with someone.

The public sector served few whites – they tended to be seen in the private health sector – while Africans and coloureds were more likely to be served by the public health sector.

Although there were significant differences between the two health sectors in the demographic characteristics of patients they serve, there were no significant differences in the patients' educational levels, religiosity, housing situation and home language.

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Table 7: Characteristics of patients of health facilities by sector of facility (public or private), South Africa, 2002, weighted data

		TOTAL	PUBLIC	PRIVATE	STRUCTURAL TEST public vs private
	n=	1949	1694	255	
Gender					p<0.001
Male	693	32.0	31.4	54.1	
Female	1256	68.0	68.6	45.9	
Age					p=0.243
Child (0 to 14 years old)	415	22.1	22.3	15.6	
Adult (15 to 49 years old)	1534	77.9	77.7	84.4	
Age					p=0.001
0 to 14 years old	415	22.1	22.3	15.6	
15 to 29 years old	731	41.4	41.9	23.9	
29 years old and more	803	36.5	35.8	60.5	
Province of facility					p=0.016
Eastern Cape	346	24.9	25.2	13.2	
Free State	173	7.9	8.0	4.2	
Gauteng	372	14.9	13.3	65.5	
KwaZulu-Natal	265	16.6	16.9	7.1	
Mpumalanga	109	3.0	3.0	2.8	
Northern Province (Limpopo)	188	8.5	8.7	0.0	
North West	165	8.5	8.6	4.4	
Northern Cape	128	2.9	2.9	2.8	
Western Cape	203	12.9	13.3	0.0	
Province where respondents live					p<0.001
Eastern Cape	363	25.3	25.6	16.9	
Free State	164	7.7	7.8	4.4	
Gauteng	340	14.4	13.3	51.4	
KwaZulu-Natal	270	16.4	16.7	6.9	
Mpumalanga	112	3.1	3.1	5.7	
Northern Province (Limpopo)	199	8.8	8.9	4.7	

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		TOTAL	PUBLIC	PRIVATE	STRUCTURAL TEST public vs private
North West	173	8.5	8.6	6.7	
Northern Cape	124	2.7	2.7	2.6	
Western Cape	204	12.9	13.3	0.5	
Race					p=0.001
African	1536	80.7	80.8	77.9	
Indian	34	1.7	1.6	4.4	
Coloured	305	15.8	16.1	8.0	
White	74	1.8	1.6	9.7	
Home language					p=0.862
Afrikaans	332	14.9	14.9	13.7	
English 84	4.2	4.1	7.2		
Nguni languages	835	49.7	49.8	44.7	
Sotho languages	590	25.5	25.4	28.2	
Other languages	108	5.8	5.7	6.1	
Type of place where living					p=0.006
Village	992	52.0	52.8	26.0	
Town	724	35.2	34.7	52.2	
City	233	12.8	12.5	21.8	
Owned or rented dwelling					p=0.097
Own	1576	76.3	76.3	78.5	
Rent	317	19.5	19.5	20.9	
Other	56	4.2	4.3	0.6	
Education level					p=0.862
Less than high school	871	41.1	41.1	40.0	
High school or more	1078	58.9	58.9	60.0	
Attendance at religious services					p=0.189
Regularly (Once a week)	1067	58.4	58.7	50.3	
Often (Once or twice a month)	443	19.2	19.1	21.8	
Seldom / Never	439	22.4	22.2	27.9	



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	TOTAL	PUBLIC	PRIVATE	STRUCTURAL TEST public vs private
Employment *				p<0.001
Employed	498	29.0	27.9	63.6
Unemployed – looking for job	498	36.7	37.2	22.4
Unemployed – not looking for job	538	34.3	34.9	14.0
Marital status *				p=0.032
Married (civil and/ or traditional)	412	22.1	21.6	38.6
Others	1122	77.9	78.4	61.4
Couple situation *				p=0.001
Living with spouse/ sexual partner	603	33.3	32.7	51.4
Living alone	931	66.7	67.3	48.6
Marital status *				p=0.036
Married – more than one wife	26	1.0	1.0	2.0
Married – one wife	386	21.1	20.6	36.7
Not married	1122	77.9	78.	4 61.4

On all patient population (n=1949)

** On adult patient population (n=1534)*

2.2 Reliability and validity of study results

In this section we present:

- Response rates;
- Validity of HIV prevalence estimates;
- Validity of questionnaires; and
- Validity of HIV testing.

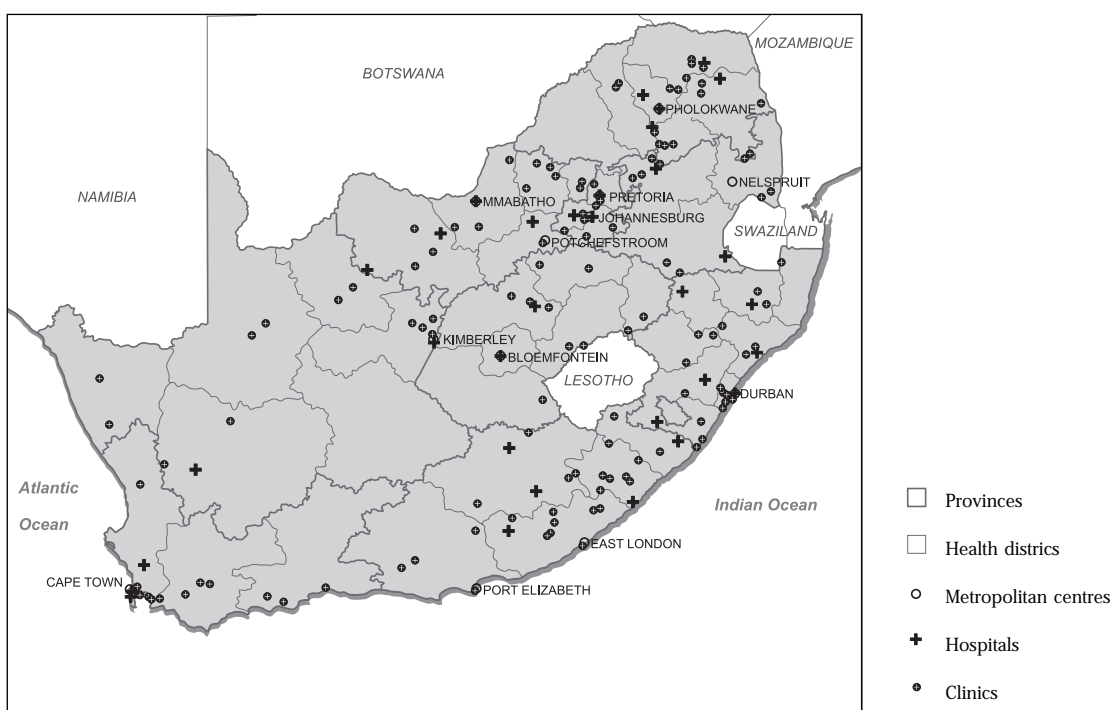
2.2.1 Response rates

Amongst the 222 health facilities that were selected, those that refused to participate were substituted by other equivalent health facilities. The different response rates on various items are indicated in the respective sections of the report.

Figure 5 shows the location of most of the health facilities.

The geographic coordinates for three health facilities (i.e. St Augustine hospital, Hibiscus hospital and Groblersdal hospital) could not be obtained from the DoH's health facility database.

Figure 5: Realised sample of selected health facilities, South Africa 2002



2.2.2 Validity of HIV prevalence estimates

The estimates of HIV prevalence take into consideration the full complexity of the sample by using the Stata procedure *Svymean*, and include the standard errors (SE), the CI 95% and the coefficient of relative variation (CVr). The HIV prevalence is a ratio. A ratio estimate is a biased estimate. As a rule of thumb the Kish guideline of CVr of <20 per cent is used as a reference threshold to determine the validity of prevalence estimates (Kish, 1965). An estimate is not precise if the confidence interval is too wide. Consequently, if a CVr value is relatively 'large', then the estimate has low reliability.

Based on this method, which is considered the most rigorous, the estimates of HIV prevalence among health workers should be considered valid for public sector health workers and less so for private sector health workers. This is because of the small sample size in that group. For professional health workers, male and from 36 to 45 years old, the imprecision of estimates are of substantive importance and are at the statistical borderline. For this reason, the results on these latter subgroups should be treated with caution, and this is why CVrs were also supplied to the reader. Finally, very high CVrs in some subgroups (health workers in the private sector of 46 years and older and of race groups other than African) clearly indicate that the survey was not able to produce valid estimations of prevalence due to small sample sizes.

The CVrs should not be examined in isolation of the design effect (Deff). We calculated Deff, that is, the loss of effectiveness when using cluster sampling instead of employing random sampling procedure. Deff is generally used to determine the desired sample size or CIs necessary to estimate reliability of the population parameters. If a study is well designed the Deffs usually range between 1 and 3, but they can be much higher (Schackman, 2001). The smaller the value, the more reliable the sample estimate will be. In this study the design effects for HIV prevalence among health workers and patients (adults and children) are listed in Tables 8 and 9. Due to insufficient funds, we could not sample health workers and patients in large numbers to test them for HIV status and hence some of the findings cannot be relied upon. These are the estimates of HIV prevalence in the private sector patient population, amongst coloured, Indian and white patient population groups, amongst male patients, patients in the North West, as well as amongst children.

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Table 8: HIV prevalence and response rates among health workers by socio-demographic and health facilities' characteristics, coefficient of variation and the design effect

	COUNT	n	RESPONSE RATE	HIV PREVALENCE (%)	SE	CI 95%	CVr	Deft	Deff
Total	721	595	82.5%	15.7	1.915	(12.24,19.88)	0.12	1.28	1.65
Sector of facility									
Public	625	512	81.9%	16.3	2.072	(12.55,20.84)	0.13	1.45	2.12
Type of facility									
Primary health care facility/clinic	305	264	86.6%	17.5	2.736	(12.72,23.7)	0.16	3.49	12.18
Public Hospitals	320	248	77.5%	15.9	2.432	(11.2,21.96)	0.15	2.08	4.34
Province of facility									
Free State	172	142	82.6%	9.6	1.389	(7.061,12.91)	0.14	2.08	4.31
KwaZulu-Natal	284	231	81.3%	17.1	3.055	(11.69,24.26)	0.18	2.86	8.20
Mpumalanga	109	79	72.5%	19.6	3.571	(12.99,28.58)	0.18	8.84	78.12
North West	156	143	91.7%	19.7	2.692	(14.61,25.93)	0.14	3.11	9.65
Occupation status									
Professional	440	349	79.3%	13.7	3.215	(8.467,21.46)	0.23	2.66	7.07
Non-professional	281	246	87.5%	20.3	3.494	(14.2,28.14)	0.17	3.56	12.69
Gender									
Male	120	97	80.8%	18.9	4.77	(11.05,30.48)	0.25	8.07	65.12
Female	601	498	82.9%	15.3	2.132	(11.51,20.04)	0.14	1.51	2.29
Age									
18 to 35 years old	254	203	79.9%	20.0	3.378	(14.09,27.63)	0.17	3.28	10.76
36 to 45 years old	263	221	84.0%	16.6	3.634	(10.53,25.13)	0.22	3.74	14.01
Race group									
African	577	473	82.0%	21.1	2.287	(16.91,26.01)	0.11	1.59	2.54

Abbreviations in this table and others in this report:
Count = Total size of the sample,
n = number of tested respondents in the sample,
SE = standard error of the prevalence ratio,
CI 95 = confidence interval (95%),
CVr = coefficient of variation of prevalence ratio,
Deft = design factor (square root of Deff), and
Deff = Design effect.

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Table 9: HIV prevalence and response rates among patients (adults and children) of health facilities, by socio-demographic and health facilities' characteristics, coefficient of variation and the design effect

	COUNT	n	RESPONSE RATE	HIV PREVALENCE (%)	SE	CI 95%	CVr	Deft	Deff
Total	712	634	89.0%	28.0	2.933	(22.56,34.21)	0.10	1.63	2.66
Sector of facility									
Public	652	581	89.1%	27.9	2.975	(22.37,34.19)	0.11	1.66	2.75
Type of facility									
PHC facility/clinic	375	355	94.7%	25.7	3.198	(19.82,32.51)	0.12	1.95	3.80
Public hospital	277	226	81.6%	46.2	4.262	(37.93,54.73)	0.09	5.00	24.99
Province of facility									
Free State	173	166	96.0%	37.8	3.837	(30.52,45.68)	0.10	3.36	11.31
KwaZulu-Natal	265	225	84.9%	23.7	4.642	(15.74,34.15)	0.20	3.65	13.33
Mpumalanga	109	86	78.9%	29.4	4.633	(21.12,39.41)	0.16	7.39	54.63
North West	165	157	95.2%	26.3	6.853	(14.96,41.86)	0.26	7.12	50.69
Gender									
Male	245	213	86.9%	21.7	4.826	(13.56,32.8)	0.22	4.77	22.76
Female	467	421	90.1%	30.9	3.033	(25.19,37.23)	0.10	1.84	3.37
Age									
Youths (15–24)	189	181	95.8%	25.6	4.596	(17.5,35.73)	0.18	4.04	16.30
Adults (25–49)	390	368	94.4%	36.2	4.56	(27.71,45.69)	0.13	2.99	8.95
Race									
African	659	591	89.7%	28.9	3.059	(23.19,35.33)	0.11	1.72	2.94

The detailed results are presented below.

2.2.3 Validity of questionnaires

Validity of a questionnaire refers to the extent to which it measures what it intends to measure, i.e. variables and items on the questionnaire accurately measure information on exposures, outcomes of interest, demographic, behavioural variables etc. A valid questionnaire is free of bias.

To ensure validity of the questionnaire, we integrated information carefully from various sources from previously tested questions. We used Stats SA variables on demographics and standard behavioural variables from Family Health International, an organisation with extensive international experience in HIV/AIDS surveys. In both instances we made the necessary adaptations for the purposes of our study.

2.2.4 Validity of HIV testing

The validity of HIV testing is described in Appendix 5.

The results presented below are based on data collected from health personnel employed in the public and private sectors in clinics and hospitals located in the Free State, KwaZulu-Natal, Mpumalanga and North West provinces. Table 10 presents the overall HIV prevalence among 595 health workers, of whom 512 were working in the public sector and only 83 in the private sector. The figures for the private sector are based on numbers that are too small to give meaningful statistics; hence only the overall figure is reported. The rest of the private sector details are included in the statistics for all health workers and are not reported separately.

Table 10: HIV prevalence among health workers employed in health facilities located in four provinces, 2002

	n	% HIV+ ALL WORKERS	n	% HIV+ IN THE PUBLIC SECTOR
Total	595	15.7	512	16.3
SE		1.915		2.072
CI 95%		(12.2, 19.9)		(12.5, 20.8)

Table 11 shows HIV prevalence among health workers by type of health facility. The results show that an estimated 16.3 per cent of all public sector health workers in the four provinces were HIV positive. This figure is not significantly different between those working in primary health care facilities and those in state hospitals.

Table 12 shows HIV prevalence ratios amongst health workers categorised by professional status. The prevalence appears to be higher among non-professionals than professionals. However, the differences are not large enough to reach statistical significance.

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Table 11: HIV prevalence among health workers employed in health facilities located in four provinces by type of facility, 2002

	n	% HIV+	p
Type of facility			0.60
PHC facility/clinic	264	17.5	
SE		2.736	
CI 95%		(12.7, 23.7)	
State academic/state	248	15.9	
SE		2.432	
CI 95%		(11.2, 21.9)	
Public sector (combined)	512	16.3	
SE		2.072	
CI 95%		(12.5, 20.8)	

Table 12: HIV prevalence amongst health workers employed in health facilities located in four provinces by professional status, 2002

	n	% HIV+ ALL HEALTH WORKERS	p	n	% HIV+ PUBLIC SECTOR	p
Professional status			0.28			0.40
Professional	349	13.7		303	14.4	
SE		3.215			3.71	
CI 95%		(8.4, 21.4)			(8.5, 23.5)	
Non-Professional	246	20.3		209	20.3	
SE		3.494			3.761	
CI 95%		(14.2, 28.1)			(13.8, 28.8)	

Table 13 shows HIV prevalence among health workers by various demographic characteristics. When the prevalence ratios are examined by the sex and age of health workers, the observed differences are not statistically significant. When the prevalence ratios are examined by race of all health workers, major differences were observed. African health workers had a much higher HIV prevalence than all other race groups. Caution needs to be taken in interpreting these results because the figures amongst all other race groups are too small to yield meaningful results.

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Table 13: HIV prevalence amongst health workers employed in four provinces by demographic characteristics, 2002

	n	% HIV+ ALL HEALTH WORKERS	p	n	% HIV+ PUBLIC SECTOR	p
Sex of health worker			0.49			0.85
Male	97	18.9		76	17.2	
SE		4.77			4.801	
CI 95%		(11, 30.5)			(9.5, 29.1)	
Female	498	15.3		436	16.2	
SE		2.132			2.233	
CI 95%		(11.5, 20)			(12.2, 21.1)	
Age			0.48			0.33
18–35	203	20.0		168	22.4	
SE		3.378			3.683	
CI 95%		(14.1, 27.6)			(15.9, 30.6)	
36–45	221	16.6		193	15.2	
SE		3.634			3.782	
CI 95%		(10.5, 25.1)			(9, 24.3)	
46 years old or more	171	10.0		151	11.1	
SE		5.282			6.016	
CI 95%		(3.3, 26.4)			(3.6, 29.7)	
Race group						
African	473	21.1		419	20.9	
		2.287			2.477	
		(16.9, 26)			(16.4, 26.3)	
Education level			0.60			0.63
Matric and below	285	17.3		240	18.0	
SE		3.075			3.295	
CI 95%		(12, 24.3)			(12.4, 25.5)	
Above matric	310	14.6		272	15.1	
SE		3.189			3.639	
CI 95%		(9.3, 22.1)			(9.2, 23.9)	

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	n	% HIV+ ALL HEALTH WORKERS	p	n	% HIV+ PUBLIC SECTOR	p
Marital status			0.008			0.001
Married (civil and/or traditional)	301	11.8		252	11.5	
SE		2.229			2.484	
CI 95%		(8.1, 17.1)			(7.3, 17.4)	
Not married	294	20.0		260	21.5	
SE		2.861			2.784	
CI 95%		(14.9, 26.3)			(16.4, 27.5)	

Table 13 shows that amongst health workers education is not significantly related to HIV prevalence, but marital status was strongly related to HIV status. Health workers who were unmarried were more likely to be HIV positive than those who were married.

Several demographic variables were included in a logistic regression model to examine their relationship to HIV status, after controlling for other variables. We found the following results: race was significantly related to HIV status – health workers who were Africans were more likely than workers of other combined race groups to be HIV positive (OR=6.6, $p<0.001$). Age was also related to HIV status – we found that unmarried health workers were more likely to be HIV positive than married health workers (OR=1.7, $p<0.01$).

2.5 HIV prevalence amongst patients attending public and private health facilities

Another key objective was to estimate the HIV prevalence among patients and the number of persons with HIV/AIDS utilising public health services in South Africa and to determine the demographic profile of these patients.

The results below, based on testing oral fluids of 634 patients for HIV antibodies, show that the overall HIV prevalence in public and private health care facilities located in four South African provinces and measured in PHC, clinics and hospitals, was 28 per cent (CI 95% was 22.5, 34.2 per cent).

Table 14 presents findings of HIV prevalence amongst patients by type of health care facility. The results show that the burden of HIV is highest in the public health facilities, followed by private hospitals and least on primary health care facilities. Primary health care patients are ambulatory, while hospital patients are admitted to either paediatric wards or medical wards of public or private facilities.

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Table 14: HIV prevalence amongst ambulatory and in-patients hospitalised in public and private health facilities in four provinces, 2002

	n	% HIV+ ALL PATIENTS (222)	p
Total	634	28.0	
SE		2.933	
CI 95%		(22.5, 34.2)	
Type of facility			<0.0001
PHC facility/clinic	355	25.7	
SE		3.198	
CI 95%		(19.8, 32.5)	
Private hospital	53	36.6	
SE		8.8	
CI 95%		(21.3, 55.1)	
State academic/state	226	46.2	
SE		4.262	
CI 95%		(37.9, 54.7)	

The results were further analysed by province where these patients were served. While Table 15 shows that the burden of HIV/AIDS was highest in the Free State, followed by Mpumalanga, then North West and KwaZulu-Natal, these differences are not statistically significant. The table also presents the same results for patients in the public health sector, excluding the private sector. The results are similar to those for all patients.

Table 16 presents HIV prevalence amongst patients by sex and age, which includes public and private sector patients served in the four provinces. The results show that male patients were more likely than female patients to be HIV positive, although the differences were not large enough to reach statistical significance. This finding holds for all patients.

The results also show that there is a positive relationship between age and HIV status among the ambulatory and inpatients. The HIV prevalence among patients increased with age. Those aged 2 to 14 years have the lowest prevalence, followed by the youth aged 15 to 24 years, and then those aged 25 to 49 years. This relationship is statistically significant.

Due to small numbers, the prevalence ratios for races other than African are not reliable, and hence are not reported. For Africans, the rates are more likely to reflect the true value.

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Table 15: HIV prevalence amongst patients attending public and private health facilities by provinces, 2002

	% HIV+ ALL PATIENTS		p	% HIV+ PUBLIC SECTOR		p
Province of facility			0.18			0.22
Free State	166	37.8		153	37.4	
SE		3.837			3.893	
CI 95%		(30.5, 45.7)			(30, 45.4)	
KwaZulu-Natal	225	23.7		211	23.9	
SE		4.642			4.688	
CI 95%		(15.7, 34.1)			(15.8, 34.4)	
Mpumalanga	86	29.4		73	29.0	
SE		4.633			4.745	
CI 95%		(21.1, 39.4)			(20.5, 39.2)	
North West	157	26.3		144	26.1	
SE		6.853			6.972	
CI 95%		(14.9, 41.9)			(14.7, 42.1)	

Table 16: Prevalence of HIV amongst ambulatory and hospitalised patients in four provinces by sex, age and race, 2002

	n	% HIV+ ALL PATIENTS	p	n	% HIV+ PUBLIC SECTOR	p
Total	634	28.0		581	27.9	
Gender			0.09			0.09
Male	213	21.7		179	21.2	
SE		4.826			4.948	
CI 95%		(13.5, 32.8)			(12.9, 32.7)	
Female	421	30.9		402	30.9	
SE		3.033			3.054	
CI 95%		(25.2, 37.2)			(25.1, 37.3)	
Age			0.047			0.050
0–14	85	11.3		82	11.3	
SE		6.593			6.61	
CI 95%		(3.2, 32.5)			(3.2, 32.6)	

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	n	% HIV+	p	n	% HIV+	p
		ALL PATIENTS			PUBLIC SECTOR	
15–24	181	25.6		172	25.6	
SE		4.596			4.617	
CI 95%		(17.5, 35.7)			(17.5, 35.8)	
25–49	368	36.2		327	36.1	
SE		4.56			4.672	
CI 95%		(27.7, 45.7)			(27.4, 45.8)	
Race						
African	591	28.9		545	28.7	
SE		3.059			3.098	
CI 95%		(23.2, 35.3)			(22.9, 35.3)	

Table 17 presents HIV prevalence among ambulatory and hospitalised patients by marital status. Unmarried patients were more likely than married patients to be HIV positive. However the relationship was not statistically significant.

Table 17: HIV prevalence among ambulatory and hospitalised patients in four provinces by marital status, 2002

	n	% HIV+	p	n	% HIV+	p
		ALL PATIENTS			PUBLIC SECTOR	
Marital status			0.15			0.14
Married (civil and/ or traditional)	143	25.8		118	25.3	
SE		4.755			4.912	
CI 95%		(17.4, 36.4)			(16.7, 36.3)	
Not married	406	33.4		381	33.4	
SE		3.474			3.511	
CI 95%		(26.9, 40.6)			(26.8, 40.7)	

2.6 Discussion of HIV prevalence amongst health workers

The observed HIV prevalence of 15.7 per cent amongst health workers aged 18 years and older is very high. This is not surprising because the HIV prevalence amongst South Africans of reproductive age (15–49 years), was found to be 15.6 per cent (Shisana et al.,

2002). As members of that community, these health workers will reflect the level of HIV prevalence in that community.

However, such high HIV prevalence amongst health workers has serious implications for the health system. Health workers who are HIV positive should be placed in work situations where they are less likely to contract TB, given that TB is a common opportunistic infection in people living with HIV/AIDS. A vigorous VCT service targeted at health workers is necessary to afford them the opportunity to know their HIV status and then to be reassigned to work with non-TB patients.

HIV-infected health workers are less likely to transmit HIV to their patients. In international literature there are extremely few cases of infected health workers who have transmitted HIV to their patients. These cases are that of a Florida dentist who infected six patients, and a French orthopaedic surgeon who infected one patient (Bartlett, 1997).

Some governments, such as in Australia, have developed policies to prevent nosocomial infection from health workers to patients by requiring that all public health workers who perform exposure-prone procedures know their blood-borne virus status, including HIV, and that such health workers do not perform exposure-prone procedures. (See: <http://www.health.nsw.gov.au/fcsd/rmc/cib/circulars/1999/cir99-88.pdf>). Exposure-prone procedures as defined in the guidelines refer to a sub-set of invasive procedures that involve the possibility of the skin of health care workers (usually a finger or thumb) coming into contact with sharp surgical instruments and needles or sharp tissues (such as teeth). Procedures that do not have these features are considered less risky. Compliance with infection control is required as a means to prevent infection from health worker to patients.

The United Kingdom has established an advisory committee to inform the government on how to manage health workers who have blood borne diseases, including those living with HIV/AIDS. The committee has published a paper for comment that includes the following key principles:

- Keeping confidentiality of the HIV status of health workers;
- Criteria for notifying a patient of the risk of having been exposed to HIV from a health worker, recognising that the risk of transmission is low; and
- Care of the health care worker.

(See: <http://www.scotland.gov.uk/library5/health/ahhc-05.asp#b8>)

Given the low risk of transmission from health worker to patients, Bartlett (1997) recommends that the focus should not be on the health worker, except if there is proof that the health workers have transmitted HIV to a patient. The focus should rather be on strengthening infection control measures. The infection control measures in South African PHC facilities seem to be inadequate. We will see later in this report that nearly a third of these facilities do not stock sterilising equipment; and 20 per cent of private sector health facilities, 10.7 per cent of PHC facilities and 4.9 per cent of public hospitals, reported never to stock protective clothing and gloves. Furthermore, we will also see that nearly 17 per cent of health workers in the private health sector do not stock disinfectants (Jik), and only 35.7 per cent of health workers have had training in universal precautions against infection. The extent to which the lack of infection control contributes to HIV infections from health worker to patient, or more likely from patient to patient, in South

Africa is unknown and needs to be investigated. We recommend that the South African Ministry of Health establishes a committee to advise it on the development of policy guidelines for health facilities on the management of health workers who are HIV positive, and also to ensure training in universal precautions against infection.

2.7 Discussion of HIV prevalence among patients

In this study we found the prevalence of HIV among patients treated in health care facilities to be 28 per cent; the percentage among PHC centers, including district hospitals, was 25.7 per cent; and the figure was much higher in the public hospitals where 46.2 per cent of patients were HIV positive. In other parts of the world, studies have shown that between 39–70 per cent of beds in several hospitals in Thailand, Uganda, Congo, Rwanda, Burundi and Nairobi were occupied by persons who were HIV positive (World Bank, 1997). This information is used as evidence that there is a possible 'crowding out' of HIV negative people by HIV positive patients.

The results obtained in this study suggest that the burden of care for PHC facilities as well as public hospitals is substantial.

Table 18 presents the distribution of patients who experienced major signs and symptoms of HIV/AIDS. The small sample size, particularly when looking at sub-groups, makes the significance of differences between groups difficult to determine.

The finding that almost half of the patients admitted to hospital are HIV-infected demonstrates the massive increase in the burden placed on health care facilities. When one considers that there has not been a significant increase in the number of public sector hospital beds provided over the last decade, the implications of this study are that almost half the number of hospital beds are now available to patients not infected with HIV.

The prevalence of HIV found among patients is compatible with other recent reports. In a study of hospitalised patients in a Durban academic hospital in 1998, 54 per cent of adult admissions (Colvin et al., 2001) and 60 per cent of paediatric admissions (Pillay, 2001) were HIV positive.

It is interesting to contrast the age distribution of hospitalised cases with the age distribution found in community-based HIV prevalence studies. In the latter, the peak prevalence is in the 20 to 29 year age group, whereas the age group with the highest prevalence among hospitalised patients is older. This is in keeping with the estimated nine-year latency period between infection and HIV-related disease. In other words, if the peak HIV prevalence is among 20 to 29 year olds, then we would expect HIV-related disease to peak about nine years later.

The finding that the lowest HIV prevalence was among those attending PHC clinics is not surprising as this population is not as sick as hospitalised patients, who, by definition, are sicker. As AIDS is a terminal disease in the absence of antiretrovirals, it is to be expected that HIV prevalence will be higher among hospitalised patients than among ambulatory patients.

3. ESTIMATING AIDS CASES IN HEALTH FACILITIES

3.1 Morbidity of patients attributable to AIDS

AIDS morbidity among patients in health facilities was estimated through the use of a questionnaire developed following major and minor signs of AIDS as defined in the Bangui AIDS case definition. This questionnaire was administered to adults and children. For children below the age of 15, mothers/guardians or persons who accompanied them to health centres on the day of the survey gave responses on their behalf. It is common knowledge that ascertaining diseases or exposures through questionnaires is inevitably subject to errors. This means that the likelihood of misclassification of disease or exposure status is highly likely. The Bangui scale was used with this in mind, and hence it was validated against the HIV test as a reference.

Caution must be exercised in interpreting the results because some of the patients who are HIV positive are asymptomatic and some of those who have relevant major signs and minor symptoms may also not be HIV positive. We attempted to develop an AIDS case definition for surveillance purposes by selecting patients who are HIV positive and also have two major signs and one minor sign of AIDS based on the Bangui case definition.

3.1.1 Measuring HIV/AIDS status using the Bangui case definition

To measure the presence or absence of AIDS within the sample of patients, we created two indicator variables, namely AIDS presence and AIDS absence from a combination of major and minor signs as defined in the Bangui case definition. This case definition is described in paragraph 1.2 of this study and in Appendix 2.

*Table 18: Distribution of signs and symptoms of AIDS, South Africa, 2002**

	n**	TOTAL %	PHC FACILITY/ CLINIC %	PRIVATE HOSPITAL %	STATE ACADEMIC / STATE %
Do you have genital warts?					
Yes	19	1.6	1.4	1.1	1.8
No	1 203	98.4	98.6	98.9	98.2
In the last 3 months, have you had diarrhoea that lasted for more than three days?					
Yes	188	15.1	11.3	8.7	22.6
No	1 053	84.9	88.7	91.3	77.4
In the last 3 months did you have fever for more than one month?					
Yes	234	18.9	13.4	15.2	28.3
No	1 006	81.1	86.6	84.8	71.7

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	n*	TOTAL %	PHC FACILITY/ CLINIC %	PRIVATE HOSPITAL %	STATE ACADEMIC / STATE %
Have you had white sores in your mouth over the last three months?					
Yes	98	7.9	4.4	5.5	13.9
No	1 139	92.1	95.6	94.5	86.1
Have you had sores on your skin over the last three months?					
Yes	98	7.9	7.7	6.5	8.5
No	1 142	92.1	92.3	93.5	91.5
Do you have swollen lymph nodes in your neck, under your arms or in the groin?					
Yes	81	6.5	6.0	2.2	8.3
No	1 157	93.5	94.0	97.8	91.7
Have you been treated for pneumonia more than once during the last year?					
Yes	75	6.0	3.0	8.7	10.3
No	1 168	94.0	97.0	91.3	89.7
Do you have difficulty swallowing solid foods, compared to liquids?					
Yes	98	7.9	4.3	8.7	13.4
No	1 146	92.1	95.7	91.3	86.6
Do you have recurrent headaches throughout the day and night?					
Yes	376	31.2	29.0	38.9	33.1
No	829	68.8	71.0	61.1	66.9
Have you had shingles over the last 12 months?					
Yes	35	2.8	2.4	0.0	4.0
No	1 207	97.2	97.6	100.0	96.0
Have you had a persistent cough for one month or more?					
Yes	151	14.4	10.7	8.5	22.6
No	900	85.6	89.3	91.5	77.4

* On adult patient population that answer to the question

We then used these variables to classify diseased and non-diseased persons and determine prevalence. This AIDS prevalence is given in Table 19 below.

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Table 19: Prevalence of AIDS according to the Bangui scale for all adults and children in weighted and unweighted samples

UNWEIGHTED SAMPLE	PREVALENCE IN %	CI 95%	WEIGHTED SAMPLE	PREVALENCE IN %	CI 95%
All respondents	16.2	14, 2	All respondents	9.1	9, 9.3
Adults	16.0	13, 2	Adults	9.0	9, 9.2
Children	18.0	26, 10	Children	11.0	11,11.4
Total = 634			Total n= 153 325		

The Bangui case definition yielded reasonable prevalence (16.3 per cent) for both unweighted and weighted combined samples, and 16 per cent for weighted and unweighted adult only samples. All four sample sizes were big as seen from the precision of all four estimates.

The observed prevalence for both weighted and unweighted children's samples is numerically high, but that of the unweighted sample is not precise due to a small sample size. Estimates for the weighted sample were more precise because weighting the data tends to inflate the sample size.

3.1.2 Assessing the validity of the Bangui scale

Since we used the Bangui scale for screening purposes, it became necessary to contrast the computed statistics with the HIV test. For this purpose we computed sensitivity, specificity and predictive values of the test.

These terms are described briefly below:

- *Sensitivity*. The ability of the test to identify correctly those who have the disease; and
- *Specificity*. The ability of the test to identify correctly those who do not have the disease (Szklo & Nieto, 2000).

For diagnostic purposes we enquired further into the probability that a patient who tested positive to the Bangui test, actually has the disease (positive predictive value of the test (PPV+). To answer this question we calculated the proportion of patients who tested positive and truly have the disease, and the proportion of respondents who tested negative and are truly free of the disease (negative predictive value of the test).

We did this for all respondents combined, and for adults and children separately:

- *Positive predictive value* (PV+): The proportion of true positives among individuals who test positive; and
- *Negative predictive value* (PV-): The proportion of true negatives among individuals who test negative

Sensitivity, specificity and predictive values as used here are indices of validity of the Bangui test. Since this is the very first use of the test, it became necessary to test its validity rigorously. This we did by computing the indices of validity namely, sensitivity and specificity and predictive values. These estimates are given in Tables 20–26.

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Table 20: Using a Bangui case definition and HIV test for all respondents (adults and children based on unweighted data)

HIV TEST RESULT	BANGUI SCALE AIDS PRESENT	BANGUI SCALE AIDS ABSENT	TOTAL
Positive	64 (10.1%)	158 (24.9%)	222 (35.0%)
Negative	39 (6.2%)	373 (58.8%)	412 (65.0 %)
Total	103 (16.3%)	531 (83.7%)	634 (100%)

Prevalence: $103/634 = 16.2$ per cent.

Sensitivity = $64/103 = 62$ per cent, (CI 50, 74). The wider confidence intervals indicate reduced the precision of this statistic.

Specificity = $373/531 = 70$ per cent (CI 65,74), a relatively narrow confidence interval indicated a more precise estimate. However in both estimates, the test missed 38 per cent and 30 per cent cases.

PV+ = $64/222 = 29$ per cent

PV- = $373/412 = 91$ per cent.

Table 21: Using a Bangui case definition and HIV test results for the combined sample (adults and children based on weighted data)

HIV TEST RESULT	BANGUI SCALE AIDS PRESENT	BANGUI SCALE AIDS ABSENT	TOTAL
Positive	6 922 (4.5%)	360 359 (23.5%)	42 957 (28.0%)
Negative	7 085 (4.6%)	103 283 (67.4%)	110 368 (72.0%)
Total	14 007 (9.1%)	139 318 (90.9%)	153 325 (100%)

Prevalence: $14\ 007/153\ 325 = 9.1$ per cent.

Sensitivity = $6922/14007 = 49$ per cent (CI 95% 48,50)

Specificity = $103283/139318 = 74$ per cent (CI 95% 74, 74.3)

PV+ = $6922/42957 = 16$ per cent

PV- = $103283 / 110368 = 94$ per cent.

The Bangui test performed better with an unweighted sample. With the weighted sample, it missed approximately 50 per cent of cases and about 26 per cent of non-cases.

However, the estimates are more precise as seen from their narrow confidence intervals.

Similarly, predictive values for the unweighted sample are better when compared with those of the weighted sample (29 per cent vs 16 per cent).

Predictive values are normally interpreted within the context of prevalence and specificity, rather than sensitivity. The moderately high prevalence of 16.3 per cent and 9.1 per cent for unweighted and weighted samples respectively, and specificity of 70 per cent and 74 per cent for unweighted and weighted samples respectively, show that predictive values

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are acceptable. Hence, the Bangui scale has been used productively and efficiently within this facility-based population.

We also tested the validity of the Bangui scale separately for adults and for children in both weighted and unweighted samples. Table 22 provides these results.

Table 22: Sensitivity, specificity, and predictive values of the adult sample, unweighted

HIV TEST RESULT	BANGUI SCALE AIDS PRESENT	BANGUI SCALE AIDS ABSENT	TOTAL
Positive	61 (11.1%)	154 (28.1%)	215 (39.2%)
Negative	27 (4.9%)	307 (55.9%)	334 (60.8%)
Total	88 (16%)	461 (84%)	549 (100%)

Prevalence: $88/549 = 16.3$ per cent (CI 95% 13, 19)

Sensitivity: $61/88 = 69.3$ per cent (CI 95% 58, 81)

Specificity: $307/461 = 67$ per cent (CI 95% 62, 72)

PV+: $61/215 = 28$ per cent

PV-: $307/334 = 92$ per cent.

For unweighted adult data, the Bangui scale had better sensitivity, specificity and positive predictive values, although the former two statistics had lower precision as seen from the wider confidence intervals (58.81 and 62.72).

Table 23: Sensitivity, specificity and predictive values of the adult sample, weighted

HIV TEST RESULT	BANGUI SCALE AIDS PRESENT	BANGUI SCALE AIDS ABSENT	TOTAL
Positive	6 584 (5.2%)	33 239 (26.5%)	39 823 (31.7%)
Negative	4 510 (3.6%)	81 210 (64.7%)	85 720 (68.3%)
Total	11 094	114 449 (91.2%)	125 543 (100%)

Prevalence: $11094/125543 = 9$ per cent (CI 95% 9, 9.7)

Sensitivity: $6584/11094 = 59.3$ per cent (CI 95% 58,60)

Specificity: $81210/114449 = 71$ per cent (CI 95% 71, 71.3)

PV+: $6584/39823 = 17$ per cent

PV-: $81210/85720 = 95$ per cent

Similarly within the sub-sample of adults, the Bangui scale was better able to identify accurately diseased people within the unweighted than the weighted sample (69.3 per cent vs 59.3 per cent).

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Table 24: Sensitivity, specificity, predictive values for children's sample, unweighted

HIV TEST RESULT	BANGUI SCALE AIDS PRESENT	BANGUI SCALE AIDS ABSENT	TOTAL
Positive	3 (3.5%)	4 (4.7%)	7 (8.3%)
Negative	12 (14.1%)	66 (77.6%)	78 (91.7%)
Total	15 (17.6%)	70 (82.4%)	85 (100%)

Prevalence: $15/85 = 18$ per cent (CI 95% 10, 26)

Sensitivity: $3/15 = 20$ per cent (CI 95% 0, 65)

Specificity: $66/70 = 94$ per cent (CI 95% 88,100)

PV+: $3/7 = 45$ per cent

PV-: $66/78 = 85$ per cent

The sensitivity of 20 per cent is very low. This may be due to the inherent weaknesses of the Bangui scale as explained earlier. Specificity of 94 per cent is good, which means the scale was better able to accurately classify non-cases. The positive predictive value of 45 per cent is acceptable if one considers 18 per cent prevalence and a specificity of 94 per cent.

Table 25: Sensitivity, specificity and predictive values of children's sample, weighted

HIV TEST RESULT	BANGUI SCALE AIDS PRESENT	BANGUI SCALE AIDS ABSENT	TOTAL
Positive	338 (1.2%)	2 796 (10.1%)	3 134 (11.3%)
Negative	2 575 (9.3%)	22 072 (79.4%)	24 647 (88.7%)
Total	2 913 (10.5%)	24 868 (89.5%)	27 781 (100%)

Prevalence: $2913/27781 = 11$ per cent (CI 95% 11.6, 12)

Sensitivity: $338/2913 = 12$ per cent (CI 95% 9, 16)

Specificity: $22072/24868 = 90$ per cent (CI 95% 89, 91)

PV+: $338/3134 = 11$ per cent

PV- : $22072/24647 = 90$ per cent.

Looking at the estimates, clearly the Bangui scale was not predictive when used with the weighted sample.

3.1.3 Discussion of the Bangui case definition results

The Bangui case definition is evidently not very useful when used for children in both weighted and unweighted samples. The low sensitivity and low positive predictive value meant it was not able to identify accurately diseased individuals.

In the case of adults, the definition was generally better able to identify accurately diseased individuals, particularly with unweighted data.

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Notably sensitivity and specificity as used in this study, are partly computed from information obtained from questionnaires. Normally such information has inherent biases. With the sensitive nature of the information, we cannot exclude the possibility of errors that might have lead to misclassification by disease status.

To validate the Bangui scale further, we computed and compared AIDS prevalence by province from the Bangui and HIV tests. Results are given below in Table 26.

Table 26: A comparison of prevalence by province determined through HIV test and Bangui scale

		HIV TEST RESULTS		BANGUI SCALE	
		Positive	Negative	AIDS present	AIDS absent
Unweighted data					
Total	%	35.0	65.0	16.2	83.8
	n	222	412	103	531
Free State	%	41.0	59.0	13.3	86.7
	n	68	98	22	144
KwaZulu-Natal	%	32.9	67.1	22.7	77.3
	n	74	151	51	174
Mpumalanga	%	36.0	64.0	19.8	80.2
	n	31	55	17	69
North West	%	31.2	68.8	8.3	91.7
	n	49	108	13	144
Structural test		p=0.254		p=0.001	
Weighted data					
Total	%	28.0	72.0	9.1	90.9
	n	42 957	110 368	14 006	139 318
Free State	%	37.8	62.2	7.0	93.0
	n	13 391	22 034	2 495	32 930
KwaZulu-Natal	%	23.7	76.3	10.4	89.6
	n	16 779	53 901	7 372	63 307
Mpumalanga	%	29.4	70.6	18.7	81.3
	n	3 602	8 630	2 284	9 948
North West	%	26.3	73.7	5.3	94.7
	n	9 185	25 803	1 855	33 133
Structural test		p=0.187		p=0.348	

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When comparing 'HIV test prevalence' and 'Bangui scale indicator prevalence' on the tested population, we see that the Bangui indicator is less likely to identify cases (Table 27). As a consequence, HIV prevalence is much higher for every province in the case of the HIV test than in case of the Bangui indicator. This is expected because not all people who test positive have AIDS.

Table 27: AIDS prevalence by characteristics of respondents, unweighted

	n	BANGUI SCALE			n	HIV TEST		
		% AIDS present	% AIDS absent	p		Positive %	Negative %	p
Total		16.2	83.8			35	65	
n	634	103	531		634	222	412	
Gender				0.439				0.09
Male	213	17.8	82.2		213	30.5	69.5	
Female	421	15.4	84.6		421	37.3	62.7	
Age				0.707				0.0001
(0–14)	85	17.6	82.4		85	8.2	91.8	
(15–49)	549	16	84		549	39.2	60.8	
Age				0.435				0.0001
0–14	85	17.6	82.4		85	8.2	91.8	
15–24	181	13.3	86.7		181	29.8	70.2	
25–49	368	17.4	82.6		368	43.8	56.3	
Race				0.074				0.004
African	591	17.3	82.7		591	36.5	63.5	
Indian	12	0	100		12	0	100	
Coloured	14	7.1	92.9		14	35.7	64.3	
White	17	0	100		17	5.9	94.1	

3.1.4 Comparison of other prevalence indicators

Table 26 indicates that the Bangui scale underestimated the overall HIV prevalence by 18.8 per cent (35 per cent–16.2 per cent). When comparisons are made according to gender, the Bangui scale yielded insignificant results for males and females ($p=0.44$), while the HIV test yielded significant results ($p=0.09$). This is also applicable to comparisons by different age groups.

A notable underestimation of HIV by the Bangui scale is evident with the prevalence of white respondents. The Bangui test yielded 0 per cent prevalence while in reality it is 5.9 per cent for this racial group.

We find similar results for weighted data as shown in Table 28 below.

Table 28: HIV prevalence by characteristics of respondents, weighted

	n	BANGUI SCALE			n	HIV TEST		
		% AIDS present	% AIDS absent	p		Positive %	Negative %	p
Total	153325	9.1	90.9			28.0	72.0	
n		14007	139318		153325	42957	110368	
Gender				0.702				0.09
Male	47767	9.8	90.2		47767	21.7	78.3	
Female	105558	8.8	91.2		105558	30.9	69.1	
Age				0.659				0.045
(0 to 14)	27780	10.5	89.5		27781	11.3	88.7	
(15 to 49)	125544	8.8	91.2		125544	31.7	68.3	
Age				0.542				0.047
0 to 14	27780	10.5	89.5		27781	11.3	88.7	
15 to 24	53012	6.9	93.1		53012	25.6	74.4	
25 to 49	72532	10.3	89.7		72532	36.2	63.8	
Race				0.679				0.61
African	140569	9.9	90.1		140569	28.9	71.1	
Indian	4578	0.0	100.0		4578	0.0	100.0	
Coloured	4195	2.0	98.0		4194	40.5	59.5	
White	3983	0.0	100.0		3983	16.6	83.4	

Table 28 confirms the tendency of the Bangui scale to underestimate HIV prevalence. In this instance it is underestimated by 18.9 per cent.

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

We further tested the validity of the Bangui case definition by computing and comparing prevalence by province and by type of facility, for both weighted and unweighted samples. The results are given in Table 29 below.

Table 29: HIV prevalence by facilities' characteristics, unweighted

	n	BANGUI SCALE			n	HIV TEST		
		% AIDS present	% AIDS absent	p		Positive %	Negative %	p
n		103	531			222	412	
Total	634	16.2	83.8		634	35	65	
Type of facility				<0.0001				<0.0001
PHC facility/ Clinic	355	8.5	91.5		355	25.9	74.1	
Private Hospital	53	7.5	92.5		53	37.7	62.3	
State Academic/ state	226	30.5	69.5		226	48.7	51.3	
Province of facility				0.001				0.25
Free State	166	13.3	86.7		166	41	59	
KwaZulu-Natal	225	22.7	77.3		225	32.9	67.1	
Mpumalanga	86	19.8	80.2		86	36	64	
North West	157	8.3	91.7		157	31.2	68.8	

In both weighted and unweighted samples the Bangui scale yielded lower prevalence than the HIV test. The 18.8 per cent (35.0–16.2 per cent) underestimation is consistent with the other results. This is clear demonstration of the fact that the Bangui scale measures AIDS while the HIV test measures the serostatus of the patients.

A possibility of underestimating AIDS cases exists because the Bangui scale is interview-based. All interviews are inevitably susceptible to information bias. In this study, bias would arise from the following circumstances.

First, fear of being diagnosed with AIDS (particularly those who know the symptoms) might make respondents deny the presence of such symptoms, leading to incorrect diagnosis. Second, parents and guardians reported on behalf of their children. It is likely that some details would be inaccurate. Third, children who report on their symptoms may over- or under-exaggerate the presence of symptoms.

In the paragraphs below we estimate the number of AIDS cases using modelling. In addition, we model the number of AIDS cases that will be seen in public health facilities.

Table 30: HIV prevalence by facilities' characteristics (weighted)

	n	BANGUI SCALE			n	HIV TEST		
		% AIDS present	% AIDS absent	p		Positive %	Negative %	p
		14007	139317			42958	110367	
Total	153324	9.1	90.9		153325	28	72	
Type of facility				<0.0001				0.0001
PHC facility/ Clinic	134755	6.6	93.4		134756	25.7	74.3	
Private hospital	2087	6.7	93.3		2087	36.6	63.4	
State Academic/ state	16482	30	70		16482	46.2	53.8	
Province of facility				0.332				0.18
Free State	35425	7	93		35425	37.8	62.2	
KwaZulu-Natal	70679	10.4	89.6		70680	23.7	76.3	
Mpumalanga	12232	18.7	81.3		12232	29.4	70.6	
North West	34988	5.3	94.7		34988	26.3	73.7	

3.2 Modeling AIDS cases

A key objective of this study was to project the AIDS patient load on health facilities. To achieve this for public health facilities requires calculation of the following set of figures:

- Projection of annual AIDS cases; and
- Proportion of AIDS cases likely to be seen in public health facilities.

The Epidemic Projection Package (EPP) and Spectrum model package was used for estimating the annual number of new AIDS cases during the time period 1990–2020. A detailed description of the applied equations and assumptions in EPP and Spectrum can be found in the UNAIDS manual (2002).

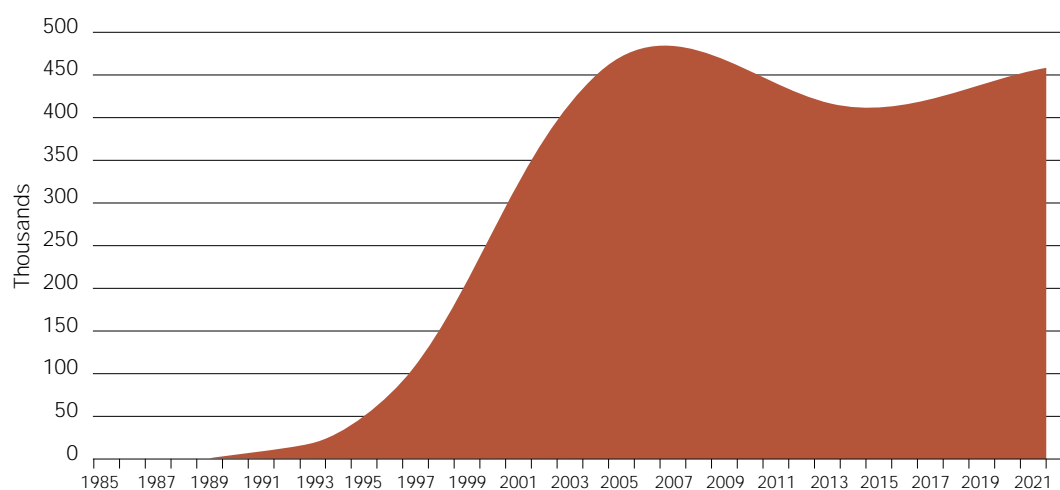
EPP is a methodology for estimating prevalence from surveillance data developed by the UNAIDS Reference Group on Estimates, Models and Projections (UNAIDS, 2002). The EPP model aims to find the best fitting curve that describes the evolution of adult HIV prevalence over time. The Spectrum model package, developed by the Futures Group in 1999, combines the epidemiological calculations of HIV/AIDS (AIM Version 4) with demographic calculations, to translate the prevalence estimate from EPP into estimates of the number of people infected, new AIDS cases, and AIDS deaths. Spectrum contains a demographic projection model (DemProj) that projects the population by age and sex on the basis of fertility, mortality and migration.

Demographic variables required by the model are derived from the United Nations Population Division database, the 2000 Revision. The national HIV prevalence surveys among pregnant women from 1990–2001, and the first national, population-based HIV survey in 2002, served as the prime data sets to prepare the epidemiological input values (Shisana et al., 2002). A crucial parameter in the model is the progression from HIV infection to AIDS and AIDS deaths. For adults, the median time from infection to AIDS is assumed to be eight years and from AIDS to death, one year. For children who are infected perinatally, about half experience a rapid progression from infection to death (approximately 50 per cent die within two years) and the other half experience a much slower progression. Other important default values used in the model determine the perinatal transmission rate, fertility reduction due to HIV infection, and patterns for the age distribution of HIV infection and the ratio of female to male prevalence. Some of these patterns were modified to create a scenario customised for South Africa.

3.3 Results

The projections of new AIDS cases are shown in Figure 6 and Table 31. A 30 per cent increase in new AIDS cases is estimated from the year 2002 to 2007, when the number of new AIDS cases is projected to peak at 486 120. In order to calculate the number of patients with AIDS who are eventually seen in the public health care sector, we used the October 1999 household survey data reported by Stats SA. The analysis showed that 51.5 per cent of all persons seeking care are served by the public health care sector. Applying this figure to patients with AIDS seems reasonable. Therefore, we assume that at least half of the projected AIDS cases will seek treatment in public health sector facilities.

Figure 6: Projected new AIDS cases



STUDY No. I

Table 31: Projected annual new AIDS cases (thousands), 1990-2020

YEAR	NEW CASES	YEAR	NEW CASES
1990	1.85	2006	483.24
1991	4.13	2007	486.12
1992	8.32	2008	481.29
1993	15.69	2009	471.24
1994	28.11	2010	458.86
1995	47.77	2011	446.72
1996	76.74	2012	436.99
1997	115.56	2013	430.02
1998	162.88	2014	427.12
1999	216.04	2015	426.42
2000	271.50	2016	428.79
2001	325.45	2017	432.67
2002	374.30	2018	437.93
2003	416.58	2019	444.26
2004	448.66	2020	450.59
2005	471.03		

4. CONCLUSIONS

The EPP/Spectrum model projects a 30 per cent increase in the prevalence of AIDS in the general population for the period 2002–2007. This increase is expected to lead to a 40–45 per cent increase within health care facilities as more people seek treatment, testing and counselling.

This projection is supported in the current findings reported in Study No. 3. An escalation in the number of patients admitted for HIV-related diseases in 35 of 54 hospitals which provided figures, increased mean length of stay in hospitals for AIDS patients, and increased demands for more staff to cope with increasing patient load as expressed in 80 per cent of facilities, are evidence in support of projected increases.

Further supporting evidence is given in Study No. 2 in terms of human resource issues of increasing workload, lowered job morale, frequent absenteeism, frequent requests for sick leave, and heightened stress levels.

If the health care system (particularly the public sector) fails to cope with current prevalence of 28 per cent in facilities, we can expect the situation to deteriorate in the face of 40–45 per cent projection. Devoting more resources to health care, particularly in the public health sector, must become top priority for policy makers.



STUDY No. 2

THE IMPACT OF HIV/AIDS ON HEALTH
WORKERS EMPLOYED IN THE HEALTH
SECTOR



I. AIM AND OVERVIEW

From an employer's perspective, the direct impact of HIV/AIDS can increase costs and lower profits due to loss of labour and a reduction in productivity and quality of service. However, employees are also affected by the prevalence of the disease, especially health workers who have to take care of increased numbers of HIV/AIDS patients amidst staff shortages, absenteeism, increased risk of infection and the challenges arising from the fact that AIDS without treatment is fatal.

On the one hand health workers themselves may be infected with the disease. They may experience discomfort as well as fear that their status will become known. This may lead to increased absenteeism, lower productivity and lack of motivation.

The impact of these factors on health workers may have major implications on health care in our country. Besides the impact on the supply of human resources for health, the quality of health care may also be affected.

It is against this background that this study on the impact of HIV/AIDS on health workers was commissioned by the National DoH as part of a broader study examining the impact of the disease on different aspects of the South African health sector.

The aim of this study (No.2) is to determine the impact of HIV/AIDS on health workers by looking at the influence that the prevalence of the disease, and the stigma attached to it, may have on their work as care givers. To determine the impact in more detail, the study will focus on the influence of the disease on the professional duties of health workers and the challenges that face them in caring for HIV/AIDS patients. Particular attention will be given to aspects such as workload, working hours, staff morale, job satisfaction and support from management.

In this study, we discuss the following:

- The demographic composition of survey participants in terms of occupation, race, gender, age, education and years of work experience;
- Health workers' comments on the impact of HIV/AIDS on their professional duties;
- The influence that the stigma related to the disease has on health workers and their work environment;
- Challenges that HIV/AIDS poses to health workers in caring for those living with HIV/AIDS and their families;
- Work environment, such as workload, working hours, job satisfaction, staff morale and the prevalence of stress related illnesses;
- The support that is provided by management to health workers due to the prevalence of HIV/AIDS in their work environment;
- Summary of the results;
- Final conclusions and recommendations regarding the impact of HIV/AIDS on health workers in the South African health sector.

2. METHOD

This study was divided into two phases. In Phase 1, a preliminary investigation was done to obtain an overview of the health environment, test the questionnaire and guide the research team in planning the survey that was to be conducted among health workers employed in the public and private health sector in South Africa.

The planning and drawing of a national sample of health facilities representative of the public and private health sector in SA was completed in Phase 2, before the survey of health facilities was planned and executed. The methodology for sampling was outlined in detail in the Introduction to this report and is also discussed in Appendix 3.

Unweighted data was used to describe the biographical profile of respondents, but weighted data was applied in terms of the findings of the study.

2.1 Phase 1: Situation analysis and survey in Gauteng province

The health environment in hospitals and clinics was explored to obtain a broad background against which the survey could be planned and interpreted. Interviews were conducted with members of management as well as with groups of health workers to gain an understanding of:

- The work environment;
- Availability and formats of information on staff profiles, work hours, absenteeism, staff turnover and HIV/AIDS policies/procedures;
- Impact of the disease on health workers.

With the knowledge gained from our visits to health facilities, a draft questionnaire was developed to establish the impact of aspects such as work load, job satisfaction, staff morale, caring for HIV/AIDS patients, stigma and fear of contagion on health workers. A shortened questionnaire was compiled for non-professional health workers. The questionnaire was tested and finalised during face-to-face interviews with health workers at a few health facilities in Gauteng and North West provinces.

Professional nurses collected information from health professionals and non-professional health workers by means of face-to-face interviews. Health professionals included general practitioners and specialists, nurses (all nursing categories) and other health professionals such as social workers and psychologists. Non-professional health workers who came into contact with patients, such as cleaners, ward attendants and HIV/AIDS advisors, were also interviewed. A structured questionnaire consisting of closed and open-ended questions was used to collect data. Fieldworkers received training on the methodology and the interview process during one-day training sessions.

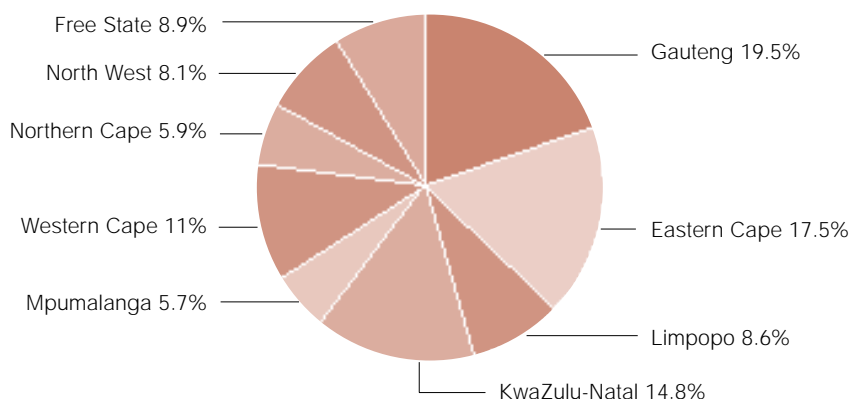
Table 32 shows that 1 922 interviews were conducted with health workers, while Figure 7 indicates the distribution of interviews over the nine provinces. It should be noted that most of the medical practitioners interviewed were employed in the public health sector. Only a few medical practitioners in the private health sector were interviewed, as most of them were self-employed.

STUDY No. 2

Table 32: Total number of interviews of health workers by province and occupational category

PROVINCE	MEDICAL PRACTITIONERS		NURSES		OTHER HEALTH PROFESSIONALS		NON-PROFESSIONAL HEALTH WORKERS		TOTAL	
	n	%	n	%	n	%	n	%	n	%
Eastern Cape	34	10.1	158	47	14	4.2	130	38.7	336	100
Free State	16	9.3	79	45.9	7	4.1	70	40.7	172	100
Gauteng	21	5.6	190	50.8	20	5.3	143	38.2	374	100
KwaZulu-Natal	29	10.2	141	49.6	9	3.2	105	37	284	100
Mpumalanga	13	11.9	52	47.7	1	0.9	43	39.4	109	100
North West	13	8.3	73	46.8	7	4.5	63	40.4	156	100
Northern Cape	10	8.8	51	44.7	4	3.5	49	43	114	100
Limpopo	13	7.8	86	51.8	10	6	57	34.3	166	100
Western Cape	28	13.3	94	44.5	14	6.6	75	35.5	211	100
Total	177	9.2	924	48.1	86	4.5	735	38.2	1922	100

Figure 7: Provincial distribution of interviews in the sample



2.2 Scope of the survey

A nationally representative sample was drawn of public and private health facilities in South Africa. The sample was designed to obtain a representative sample of medical professionals, nurses, other health professionals and non-professional health workers. Sampling weights were applied to the sample of health facilities and health workers. Results would therefore be representative of all health workers employed at public clinics and public and private hospitals in the country.

3. PROFILE OF SURVEY PARTICIPANTS

This section provides an overview of the health workers that were interviewed. It starts with an occupational profile and includes the racial and gender composition of respondents. This is followed by a profile on age and educational levels, while the section concludes with a profile on work experience in the health sector.

A total of 1 922 health workers participated in the study. The majority of respondents were African and female. They were mostly employed as nurses or non-professional health workers.

Figure 8 shows the distribution of respondents over occupational categories, while Table 33 provides a race and gender profile of respondents.

Figure 8: Occupational distribution of health workers

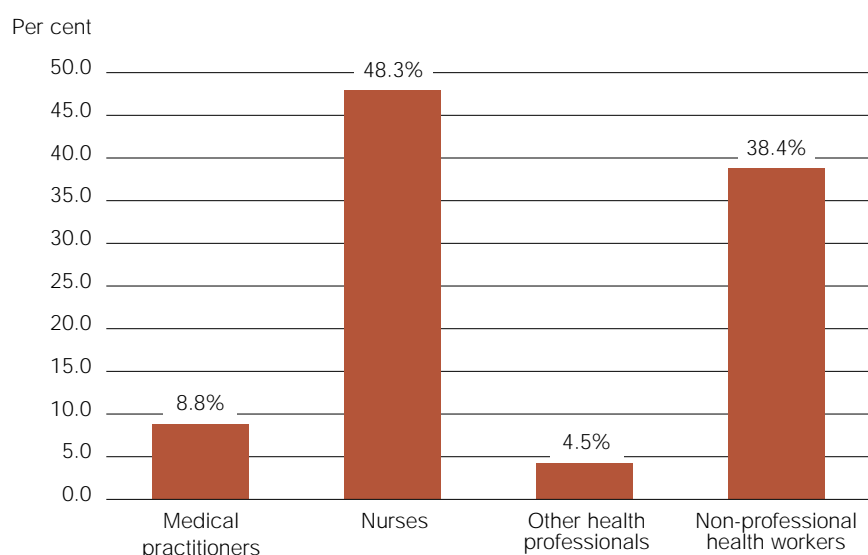


Table 33: Race and gender distribution of South African health workers, 2002

OCCUPATIONAL CATEGORY	AFRICAN		COLOURED		INDIAN		WHITE		OTHER		TOTAL %
	M	F	M	F	M	F	M	F	M	F	
	%	%	%	%	%	%	%	%	%	%	
Medical practitioners	18	9.6	1.8	0.6	7.2	5.4	29.9	16.8	9	1.8	100
Nurses	6.3	65	0.4	13.8	0.1	2.5	0.1	11.2		0.5	100
Other health professionals	17.4	40.7	1.2	9.3	2.3	4.7	1.2	22.1		1.2	100
Non-professional health workers	10	71.7	2	13.4	0.1	1	0.5	1		0.3	100

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The average age of health workers in the sample is 41 years. Table 34 shows differences in the age profiles of health workers. Most medical practitioners (71.6 per cent) and other health professionals (58.9 per cent) were younger than 40 years, in comparison to less than half of nurses (48.7 per cent) and non-professional health workers (43.5 per cent).

Table 34: Age distribution of South African health workers, 2002

AGE GROUP	MEDICAL PRACTITIONERS	NURSES	OTHER HEALTH PROFESSIONALS	NON- PROFESSIONAL HEALTH WORKERS	TOTAL PER AGE GROUP
		%	%	%	%
25 yrs and younger	13.6	3.1	9.4	4.1	4.7
26–30 yrs	29	9.8	16.5	8.4	11.3
31–35 yrs	15.9	14.7	16.5	12.9	14.2
36–40 yrs	13.1	21.1	16.5	18.1	19
41–45 yrs	6.3	21	18.8	18.1	18.4
46–50 yrs	8.5	14.9	14.1	21.1	16.6
51–55 yrs	4.5	8.4	7.1	9.5	8.4
56–60 yrs	3.4	4.9	1.2	5.9	5
61+yrs	5.7	2.3		1.8	2.3
Total	100	100	100	100	100

The educational profile of health workers indicates that only a small percentage of the nurses interviewed (13.5 per cent) had obtained degrees in comparison to the majority of the other professional groups (see Table 35). It should, however, be noted that this figure represents nurses in all categories i.e., registered and enrolled nurses as well as nursing auxiliaries. Most of the nurses had at least obtained a diploma or occupational certificate. In contrast to nurses, the non-professional category is mostly low-skilled workers. More than a third of this category did not proceed further than Grade 9.

Health workers in the sample had, on average, 13.5 years work experience in the sector. The majority (73 per cent) of nursing staff had at least 11 years experience in the health sector in comparison to only 39 per cent of medical practitioners (see Figure 9). These percentages correspond with the age profile of the different occupational categories.

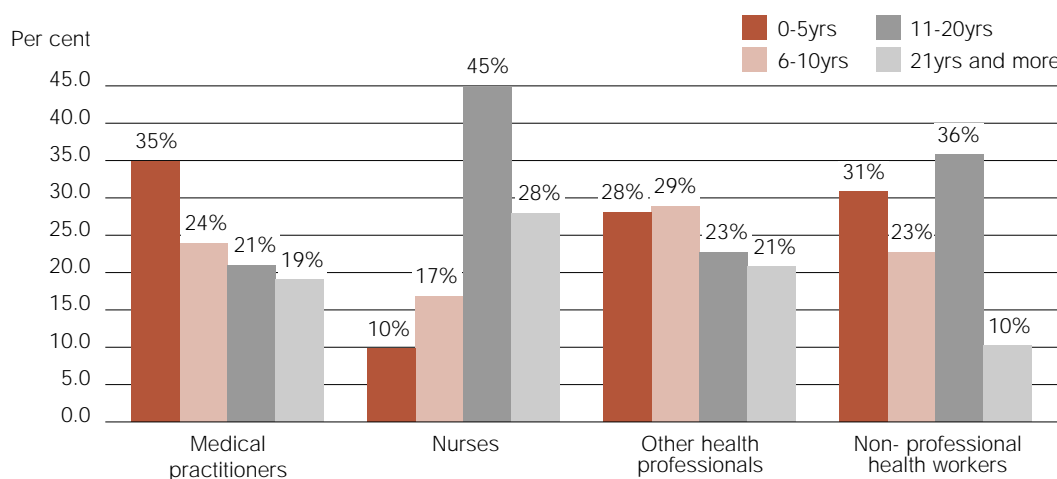
Although most of the non-professional health workers were appointed as cleaners who could have applied their skills outside the health sector, nearly half of them had worked in the health sector for at least 11 years.

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Table 35: Educational profile of South African health workers, 2002

LEVEL OF HIGHEST QUALIFICATION	MEDICAL PRACTITIONERS	NURSES	OTHER HEALTH PROFESSIONALS	NON-PROFESSIONAL HEALTH WORKERS	TOTAL
	%	%	%	%	%
No qualifications	0	0	0	5.6	2.1
Grade 1–Grade 9	0	0	0	30.7	11.9
Grade 10–Grade 11	0	10.2	0	41.2	20.7
Grade 12	0	10.9	7	17.7	12.2
Diploma/occupational certificate		65.4	29.1	4.7	34.5
First degree and higher	100	13.5	64	0	18.6
Total	100	100	100	100	100

Figure 9: Health workers: occupational category by years of work experience



4. HIV/AIDS AND CONDUCT OF PROFESSIONAL DUTIES

HIV/AIDS is not a notifiable disease. It is therefore not necessary for patients to make their HIV status known to health workers, or for health workers to notify their patients of their HIV status. In fact, due to the stigma attached to the disease, many patients visiting clinics or lying in hospitals, as well as many health workers, are unaware of their HIV status. If they know that they are HIV positive, they usually do not want to make this known to other people.

During the Gauteng survey it was established that professional health workers have access to the medical files of patients in the public health sector. However, it was difficult to determine a patient's HIV status from these files.¹ In the other eight provinces the situation might be different, although professional health workers generally reported that they were not officially informed about the HIV status of patients.

Nurses in private hospitals did not have access to patients' medical files. Normally the medical practitioner responsible for the patient keeps these files. Even medical practitioners may be unaware of a patient's status. Unless informed by a medical practitioner or the patient, most professional health workers did not know the status of their patients. Many nurses in public and private health facilities were, however, of the opinion that they could determine a patient's status by looking at presenting symptoms.

Non-professional health workers were normally not familiar with the status of patients unless informed by the patient or other staff members.

It is against this background that health workers were asked if patients suffering from HIV/AIDS affect how they perform their duties as health care givers. Table 36 shows that 43.9 per cent of health workers felt that the prevalence of HIV/AIDS impacted on their work. Nearly half (48.9 per cent) of professional and 30.8 per cent of non-professional health workers reported that they had experienced this effect.

Table 36: Does the fact that many patients may suffer from HIV/AIDS affect you in performing your duties?

OCCUPATIONAL CATEGORY	YES %	NO %	TOTAL %
Professionals	48.9	51.1	100
CI 95%	(41.1, 56.8)	(43.2, 58.9)	
Non-professionals	30.8	69.2	100
CI 95%	(23.3, 39.6)	(60.4, 76.7)	
Total sample	43.9	56.1	100
CI 95%	(36.4, 51.7)	(48.3, 63.6)	

Respondents who replied in the affirmative were also asked to explain how HIV/AIDS impacted on their performance. Their responses showed that HIV/AIDS had a physical and mental impact on them, which was caused by operational matters in their work

¹ During the Gauteng survey, fieldworkers (professional nurses) could obtain the HIV status of only a small number of patients visiting public clinics and hospitals from their medical files.

environment as well as taking care of patients. Health workers frequently indicated that they experienced stress, fear, frustration and depression due to their contact with patients living with AIDS and the limitations of their work environment.

In terms of their exposure to HIV/AIDS, ambivalent feelings were reported by respondents. On the one hand they were scared to become infected as they were not certain about the status of the majority of their patients. Some respondents mentioned deliberate attempts by patients (spitting and biting) to infect health workers.

Respondents expressed annoyance that they could not do much to prevent the spread of the disease, especially in view of the fact that HIV/AIDS is still incurable. In fact, a number of health workers felt that they could not contribute towards preventing further infection because they were not allowed to inform the partners or caretakers (eg. young children that took care of sick parents and families of patients living with AIDS) about their loved ones' status. They also could not advise any patient presenting with HIV/AIDS-related symptoms on how to sustain quality of life, or limit further spreading of the virus, unless the patient disclosed his/her status to them. At the same time, clinics and hospitals were experiencing an increase in the number of patients living with AIDS. In many instances, facilities were overcrowded with a limited number of staff nursing patients. This situation evoked feelings of helplessness and despondency.

On the other hand, health workers expressed sympathy and empathy towards patients because of their physical and mental suffering. Many patients were very ill and did not respond to treatment. Some were depressed because of their condition and the irreversibility of the disease, while others did not receive physical or emotional support from their families or friends.

The prevalence of the disease also had an effect on the productivity and workload of health workers. Health workers felt that it takes more time to care for patients since HIV/AIDS has become more prevalent. Nowadays they had to take continuous precautions against possible infection while performing their duties, such as wearing protective clothing, as they were not aware of patients' status and had to regard everyone as HIV positive.

Many complained that the gloves available were uncomfortable or not the correct size and that this affected their working speed. In fact, some health workers stated that ill-fitting gloves could increase the possibility of injuries.

Furthermore, they pointed out that HIV/AIDS patients were usually very ill when they were admitted to hospital and needed a lot of attention and care. They also felt that AIDS patients took more time to recover in comparison to non-AIDS patients. In Study No 3 we will see that the length of stay in hospital for an AIDS patient admitted to district hospitals is much longer than that of a non-AIDS patient. This had an impact on health workers' workload and time.

The families of HIV/AIDS patients required emotional support and guidance as well as information and advice on legal and financial matters pertaining to the death of a spouse/father/mother. Due to a lack of other sources of support, nurses felt obliged to assist family members in this respect, sometimes after hours.

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Health workers reported that the quality of health care was affected by the prevalence of the disease. In many facilities, a substantial number of patients were treated for HIV/AIDS-related conditions. The time that they had to spend caring for these patients was one of the reasons that prevented health workers from providing holistic care to patients. They said they did not even have enough time to address the physical and emotional needs of HIV/AIDS patients, let alone the health needs of other patients.

Finally, health care givers felt that patients suffering from non-HIV diseases were being neglected at health facilities because of the sheer volume of infected patients needing treatment. The elderly and children were affected especially. Respondents indicated that children and people with treatable conditions were being denied services because of a lack of available beds in facilities and the workload of caregivers.

Taking care of HIV/AIDS patients was emotionally and physically demanding to health workers, especially nurses and medical practitioners. The secrecy surrounding the disease, the needs of those living with HIV/AIDS, and the lack of support all impact on health workers' stress levels, workload and performance.

4.1 The effect of stigma on health workers

Before the possible impact of stigma could be established, interviewers had to determine whether respondents believed that any stigma existed. Health workers were therefore asked if there was stigma attached to the disease in a) their work environment and b) the community in which they lived.

Table 37 shows that half (50.5 per cent) of health professionals were of the opinion that stigma existed at work, while considerably more (81.5 per cent – see Table 38) believed that this was also the case in their neighbourhoods. The same trend was noticeable from the responses of non-professionals, although only a small percentage (22.7 per cent) mentioned a stigma at work (see Tables 37 and 38).

Table 37: Do you think that there is stigma attached to HIV/AIDS in your hospital/health centre/clinic?

OCCUPATIONAL CATEGORY	YES %	NO %	TOTAL %
Professionals	50.5	49.5	100
CI 95%	(44.3, 56.6)	(43.3, 55.5)	
Non-professionals	22.7	77.3	100
CI 95%	(13.9, 34.8)	(65.2, 86.1)	
Total	42.7	57.2	100
CI 95%	(36.7, 49)	(50.9, 63.2)	

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*Table 38: Do you think that there is stigma attached to HIV/AIDS in your community? **

OCCUPATIONAL CATEGORY	YES %	NO %	TOTAL %
Professionals	81.5	18.5	100
CI 95%	(74.5, 86.9)	(13.1, 25.5)	
Non-professionals	68.6	31.4	100
CI 95%	(61.9, 74.6)	(25.4, 38.1)	
Total	77.9	22.1	100
CI 95%	(73.3, 82)	(18, 26.7)	

**Results exclude Gauteng province*

Both groups identified the behaviour of staff, as well as the secrecy surrounding the disease, as the most important indicators that HIV/AIDS was stigmatised. Respondents frequently made the following remarks to underline their opinion that stigma existed at work:

- HIV/AIDS patients were treated differently from patients who were not infected with AIDS.
- Members of staff were reluctant to provide proper care for HIV/AIDS patients because they were concerned that they might become infected.
- Members of staff used a different manner of speech when they talked about the disease and patients living with HIV/AIDS.
- Ongoing gossiping took place regarding patients living with HIV/AIDS, or patients who showed symptoms associated with HIV/AIDS, such as weight loss and TB.
- Rejection, condemnation or isolation of patients with AIDS, their friends or family members often occurred.

The stigma had a physical and emotional impact on health workers. Because members of the community feared isolation and rejection, they hid their status and only reported for health care when they were very ill and could not take care of themselves anymore. Fear of rejection by the community and a lack of resources, such as money and alternative types of care, forced families to 'dump' their infected relatives at health care facilities. Most of these patients were at a stage where they needed continuous attention. This situation caused overcrowded facilities and an increase in work for staff members.

Health workers generally regarded themselves as healers, yet no healing was possible for most of their patients. In fact, due to the stigma, many people reported at health facilities at a stage when it was too late to do much for them. Many health workers indicated that this made them feel sad.

Many people denied the existence of the disease, or hid their positive status from health workers, due to the stigma. They were reluctant to go for testing, as many people did not want to know the results. If they agreed to be tested and the results were positive, they

sometimes discarded their medical records. The fear that others would know their status made them visit a new hospital or clinic each time they fell ill. In many cases, this meant that diagnostic procedures had to be repeated. This further affected the workload of health workers and increased health sector expenditure.

4.2 Health care challenges posed by the prevalence of HIV/AIDS

The majority (69.4 per cent; CI 64.4–74.1 per cent) of professionals pointed out that they faced various challenges in caring for patients because HIV/AIDS is not a notifiable condition. These challenges were not purely health related, but included cultural, social and economic factors related to health issues (see Table 39).

Table 39: Challenges experienced by health professionals related to HIV/AIDS (in order of priority)*

CHALLENGES
1. Impact of secrecy eg.:
• Cannot inform partner/families of infected patient
• Patients' rights versus rights of partner, family, health worker
• Cannot keep proper statistics
• Cannot counsel/educate effectively
• Abuse of the health system by patients (repeated tests at different health facilities)
• Had to take safety precautions with every patient – impact on time/productivity
2. Stigma – patients came to hospital only when they were very ill
3. Possibility of infection
4. Education of people eg. use of condoms
5. Socio economic conditions of patients – no money for proper diet, funerals
6. People denied the existence of HIV/AIDS or hid their positive status
7. Emotionally draining for health workers – mainly took care of the dying
8. Lack of resources eg. hospices, support for families
9. Increased rate of infection meant increased patient load
10. Deliberate attempts by those living with HIV/AIDS to infect other people
11. Lack of medicine eg. nevirapine to protect babies and vitamins to increase quality of life of the infected

* Priority has been determined by adding all the values that a particular factor received in order to obtain a total on each factor. The overall priority of each factor was then determined by ranking the totals of the different factors from most frequently mentioned to less frequently mentioned.

Challenges caused by the fact that HIV/AIDS is not a notifiable condition (see Table 39, secrecy) were mentioned frequently. In addition to what has been raised earlier, health workers also indicated that, due to the secrecy surrounding the disease, it was not possible to keep reliable statistics for future planning in the health sector. They were also faced with the dilemma of balancing the patients' rights with the rights of the non-infected who were taking care of patients and their next of kin, eg. the right of the patient to keep his status secret against the right of the non-infected partner/child/member of family that nursed or had sexual relations with the patient.

Health workers also mentioned that the success of education/guidance/counselling programmes was determined by several factors over which they did not have control. For example, large-scale poverty and the rejection of those with HIV by their relatives and friends limited the likelihood of their survival despite the fact that they had received counselling and information on aspects such as a healthy diet. Furthermore, they indicated that denial of the existence of HIV/AIDS by influential South Africans made many people doubt the existence of the disease, which made the task of educators and counsellors harder.

Health workers also doubted whether counselling/education was effective because of the impact of secrecy. They felt that AIDS patients, their partners and families, should receive information and guidance. However, in many cases, patients hid their positive status from relatives, which meant that health workers could not advise family members on how to take care of them and how to protect themselves against possible infection.

Another challenge faced by health workers was the lack of supplementary support in terms of care, such as facilities (hospices) and volunteers (eg. home care givers) to assist those with HIV/AIDS and their families. The lack of these resources meant that more HIV/AIDS patients frequented existing health facilities. This had a negative impact on the workload and emotional wellbeing of caregivers. Nurses sometimes experienced depression as a result of the high number of patient deaths.

A lack of ARVs to prevent the transmission of the disease as well as to strengthen the immune system of patients was also mentioned.

Young medical practitioners complained about the lack of variety of medical conditions that they dealt with during their hospital year, saying that they dealt primarily with HIV/AIDS-related diseases.

The second part of this question dealt with suggestions from respondents on how to overcome the challenges that they mentioned. Firstly, the majority of health workers indicated that HIV/AIDS should become a notifiable disease (see Table 40). They also felt that more education was needed to increase awareness and limit the further spread of HIV/AIDS. Health workers were also in favour of free medical care and medication to assist those living with HIV/AIDS to maintain optimum health for as long as possible, as well as to reduce new infection eg. prevention of HIV from mother-to-child transmission. Furthermore, respondents said there was a need for more trained counsellors and counselling services to try and change patients' reluctance to be tested. They also said testing should become compulsory.

STUDY No. 2

Table 40: Suggestions made by health workers surveyed to overcome the challenges in patient care due to HIV/AIDS (in order of priority)

SUGGESTIONS
1. Make HIV/AIDS notifiable
2. Provide more education on HIV/AIDS, health and sex
3. Free medication and health care to persons living with HIV/AIDS
4. More trained counsellors and counselling services
5. Testing for HIV/AIDS should become compulsory
6. Protective clothing should be worn continuously i.e. not only when working with patients living with AIDS
7. National computerised patient information system to avoid abuse of the health system
8. Separate specialised health facilities for HIV/AIDS patients
9. More support from government in all aspects relating to the disease

Some of these suggestions point to the health workers being the source of stigma. More education is needed to change the attitudes of the health workers.

4.3 General issues related to working environment

Health workers were also questioned on work-related issues that could be affected by the prevalence of HIV/AIDS without reference being made to the disease. Such information included details of their workloads and hours spent at work during the past year. To obtain a better understanding of these aspects, health workers were also asked to explain their opinions in greater detail. This section will focus on health workers' opinions on workload, job satisfaction, staff morale, and absenteeism due to stress and stress-related illnesses.

4.3.1 Workload

When health workers were asked to comment on possible changes to their workload during the past year, most (73 per cent) of those in hospitals and public clinics said that they had experienced an increased workload (see Table 41). Nearly 81 per cent of health professionals indicated a heavier workload, in comparison to 54 per cent of non-professional health workers.

Respondents who indicated an increase were also asked to specify the extent to which their workload has increased. Half of them reported workload increases of at least 75 per cent over the past year (see Table 42), which they attributed mainly to staff shortages, patient increases and more patients with HIV and related diseases. Changes to health structures to make provision for a system of comprehensive health care also resulted in extra work for many health workers.

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Table 41: Changes to the workload of health workers during the past year, South Africa, 2002

OCCUPATIONAL CATEGORY	INCREASE %	DECREASE %	REMAINED THE SAME %	DON'T KNOW %	NOT APPLICABLE*	TOTAL %
Professionals	80.9	2.6	10.2	1,2	5	100
CI 95%	(74.7, 85.9)	(1.3, 5.1)	(7.4, 13.9)	(0.5, 3)	(3.6, 7)	
Non-professionals	54.1	5.2	37.3	1.3	2.1	100
CI 95%	(45.5, 62.5)	(2, 12.7)	(30.4, 44.7)	(0.4, 4.7)	(1.1, 4.1)	
Total	73.4	3.4	17.8	1.2	4.2	100
CI 95%	(68.7, 77.6)	(1.9, 6)	(14.9, 21.1)	(0.6, 2.5)	(3.1, 5.7)	

* Health workers who occupied their current position for less than one year

*Table 42: Extent of work increase of over the past year, South African health workers, 2002**

OCCUPATIONAL CATEGORY	INCREASED BY 25% %	INCREASED BY 50% %	INCREASED BY 75% %	DOUBLED %	TOTAL %
Professionals	18.8	32.9	27.3	20.9	100
CI 95%	(14.9, 23.5)	(27, 39.3)	(23.4, 31.6)	(15.8, 27.2)	
Non-professionals	16.1	27.5	28.9	27.6	100
CI 95%	(11.5, 22)	(21.7, 34.1)	(21.9, 36.9)	(18.1, 39.6)	
Total	18.3	31.8	27.7	22.3	100
CI 95%	(15, 22.1)	(26.5, 37.5)	(24.4, 31.2)	(17, 28.7)	

* Only answered by those that experienced an increase

Health professionals were asked to comment on how the extra work affected their performance, and reported that they experienced increased stress, physical exhaustion and dissatisfaction while performing their duties because of staff shortages and an increase in patients. Professional health workers believed that the quality of their work was negatively affected by their daily workload. Nurses at public clinics commented that, although the emphasis should be on holistic care, they could barely find time to attend to the physical health of patients. As a result, they spent longer hours at work. Additional responsibilities, such as administrative work, were usually dealt with after hours. Some 37.4 per cent of health professionals indicated that they often or regularly worked longer than the official working hours (see Table 43).

While some felt that an increased workload provided additional experience, others believed that it was responsible for increased absenteeism. Absenteeism aggravated the workload of the remaining staff, especially as many facilities already experienced chronic staff shortages.

STUDY No. 2

Table 43: Do you work longer than the official hours without extra remuneration?

OCCUPATIONAL CATEGORY	REGULARLY %	OFTEN %	SELDOM %	NEVER %	TOTAL %
Professionals	22	15.4	24.8	37.8	100
CI 95%	(17.6, 27.1)	(11.7, 19.9)	(20.4, 29.9)	(32.6, 43.3)	
Non-professionals	13.9	5.7	19.8	60.6	100
CI 95%	(7.7, 23.8)	(3, 10.5)	(13.9, 27.3)	(46.3, 73.3)	

The crowded health institutions often meant patients took out their frustration on health workers for having had to wait a long time before being attended to, or finding that medicine was not always available. Shortages of important resources such as medication was also related to overloaded facilities.

Health professionals experienced stress and exhaustion as a result of the shortage of personnel and an increase in patient numbers. Their stress levels were exacerbated by the fact that, because of overwork, they believed that they were not offering an adequate standard of care; they had to deal with grumpy patients.

4.3.2 Job satisfaction

Despite the challenges health workers encountered in their work environment, Table 44 shows that most (83.7 per cent) still enjoyed their work and experienced job satisfaction as health care givers. However, approximately a fifth (19.6 per cent) of professionals said that they were unhappy in their current positions.

Table 44: Do you enjoy your work and experience job satisfaction/fulfilment?

OCCUPATIONAL CATEGORY	YES %	NO %	TOTAL %
Professionals	80.4	19.6	100
CI 95%	(75.6, 84.5)	(15.5, 24.4)	
Non-professionals	92.1	7.9	100
CI 95%	(83.1, 96.5)	(3.5, 16.9)	
Total	83.7	16.3	100
CI 95%	(78.2, 88)	(12, 21.8)	

Job stimulation and opportunities for development were mentioned as factors contributing to job satisfaction, while overwork, inadequate remuneration, staff shortages and stressful working conditions were cited as reasons for not enjoying work.

4.3.3 Staff morale

Health workers were asked to give their general impression of the morale of the staff in their health facilities. Table 45 shows that only 38 per cent of professionals believed that staff had high morale in comparison to 63 per cent of non-professional health workers. A further 21.8 per cent of professionals and 20.1 per cent of non-professionals were uncertain, as they felt that the atmosphere at work varied from day to day.

Table 45: Health workers' perceptions of staff morale

OCCUPATIONAL CATEGORY	HIGH MORALE %	LOW MORALE %	UNCERTAIN* %	TOTAL %
Professionals	38	40.2	21.8	100
CI 95%	(32.7, 43.6)	(32.8, 48.1)	(17.9, 26.3)	
Non-professionals	63	17	20.1	100
CI 95%	(53.9, 71.2)	(12.3, 22.8)	(15.6, 25.4)	
Total	44.9	33.8	21.3	100
CI 95%	(40.6, 49.2)	(28.4, 39.6)	(17.7, 25.4)	

**Morale varied from day to day.*

Good working relationships, team spirit, open communication channels between staff and managers and the absence of discrimination, were perceived as factors that contributed towards high morale. High morale was also associated with low staff turnover and absenteeism, as well as adequate remuneration.

Low morale was associated with autocratic decision-making; a lack of managerial support in terms of incentives, opportunities for promotion and counselling services; heavy workloads; low salaries and staff shortages (see Table 46).

Table 46: Reasons specified for high or low staff morale (in order of priority)

HIGH MORALE	LOW MORALE
1. Good working conditions eg. open communication channels, positive team spirit	1. Stressful working conditions eg. autocratic management style, poor conditions of service
2. High standard of health care	2. Heavy workload
3. Opportunities for development existed	3. Low salaries
4. Low absenteeism	4. Staff shortages
5. Adequate remuneration	5. No counselling services provided for health workers
6. Low staff turnover	6. Unhappy/stressed/frustrated colleagues Quality of health care – no time for proper care

STUDY No. 2

4.3.4 Stress-related illnesses

Nearly a fifth (16.2 per cent) of health workers said that they had been treated for stress or stress-related conditions during the past year (see Table 47). Besides treatment, the majority (63.9 per cent) of these people also had to take sick leave before they could continue with their work (see Table 48).

Table 47: Have you been treated for stress or stress-related illnesses during the past year?*

OCCUPATIONAL CATEGORY	YES %	NO %	TOTAL %
Professionals	17.3	82.7	100
CI 95%	(14.5, 20.5)	(79.5, 85.5)	
Non-professionals	13.4	86.6	100
CI 95%	(61.9, 74.6)	(80.9, 90.8)	
Total	16.2	83.8	100
CI 95%	(13.7, 19)	(81, 86.3)	

**During interviews no reference was made to any specific medical condition. The decision of whether an illness was stress-related or not, was made by the respondent.*

*Table 48: Did you have to take sick leave due to such illnesses during the past year? **

OCCUPATIONAL CATEGORY	YES %	NO %	TOTAL %
Professionals	64.5	35.5	100
CI 95%	(54.8, 73.1)	(26.9, 45.2)	
Non-professionals	62	38	100
CI 95%	(43.9, 77.2)	(22.8, 56.1)	
Total	63.9	36.1	100
CI 95%	(56, 71.1)	(28.9, 44)	

**Only people that were treated for stress-related illnesses.*

5. SUPPORT AND EMPOWERMENT FROM MANAGEMENT

Caring for people with HIV/AIDS involves physical risk (eg. possibility of infection) and emotional challenges (eg. stressful working conditions). Thus, health care givers should be empowered to provide proper health care while safeguarding themselves against possible infection. The focus of this section is on the actions taken by management to assist health workers to work amid the HIV/AIDS epidemic. We will discuss health workers' responses to the availability of guidelines relating to HIV/AIDS, training and information, protective clothing and precautionary measures.

5.1 HIV/AIDS workplace policies

Table 49 shows that more than half of the respondents were aware of the existence of a HIV/AIDS workplace policy at their workplace. Almost a third of the professionals, and four in ten non-professional health workers, did not know if such a policy existed.

Table 49: Does your health institution have a HIV/AIDS workplace policy that you are aware of?

OCCUPATIONAL CATEGORY	YES %	NO %	DON'T KNOW %	TOTAL %
Professionals	56.5	13.2	30.4	100
CI 95%	(49.3, 63.4)	(10.6, 16.3)	(24.9, 36.5)	
Non-professionals	47.2	9.7	43.2	100
CI 95%	(37.6, 56.9)	(5.3, 16.9)	(32.8, 54.2)	
Total	54	12.2	33.8	100
CI 95%	(49.1, 58.8)	(9.9, 15)	(29.6, 38.3)	

5.2 Training and information

The number of health workers that received training or information on various aspects relating to HIV/AIDS is set out in Table 50. Approximately a third of the health workers who responded to the question received training on at least one of the following subjects:

- Transmission of the disease (33.2 per cent);
- How to deal with, and care for, those living with HIV/AIDS (31.5 per cent); and
- Universal precautions against possible infection (35.7 per cent).

The remainder received only information on these topics. Information was defined as verbal or written knowledge, while training included information and practical work. Information is transformed into reality through demonstration and practice, and the interaction between the trainer and trainees serves to increase understanding. Trainees' level of understanding can also be evaluated during training. The lack of training means that the majority of health workers were therefore only armed with theoretical knowledge regarding HIV/AIDS.

STUDY 2

In contrast to professionals, most non-professional health workers had low skills levels, and more than a third had not proceeded further than Grade 9. If they do not receive training on aspects of HIV/AIDS such as precautions, they might not be able to protect themselves properly or prevent infection spreading from one patient to another.

Table 50: Training/information received regarding aspects of HIV/AIDS

OCCUPATIONAL CATEGORY	TRAINING %	INFORMATION %	TOTAL %
Transmission of HIV*			
Professionals	36.9	63.1	100
CI 95%	(28.7, 46)	(54, 71.3)	
Non-professionals	23	77	100
CI 95%	(11.5, 40.7)	(59.3, 88.5)	
Total	33.2	66.8	100
CI 95%	(29.2, 37.5)	(62.5, 70.8)	
Dealing with and caring for HIV/AIDS patients**			
Professionals	34.3	65.7	100
CI 95%	(26.6, 42.9)	(57.1, 73.4)	
Non-professionals	23.6	76.4	100
CI 95%	(12, 41)	(59, 88)	
Total	31.5	68.5	100
CI 95%	(27.2, 36.1)	(63.9, 72.8)	
Universal precautions against infection***			
Professionals	40	60	100
CI 95%	(33, 47.4)	(52.6, 67)	
Non-professionals	22.6	77.4	100
CI 95%	(11.4, 39.8)	(60.2, 88.6)	
Total	35.7	64.3	100
CI 95%	(31.8, 39.8)	(60.2, 68.2)	

*Non-response: 12.2%

**Non-response: 18.2%

***Non-response: 11.4%

5.3 Protective clothing

Gloves and masks were always available to the majority of health workers (gloves: 86.8 per cent, masks: 62.5 per cent: masks) when they needed them (see Table 51). However, many professionals complained about the quality and sizes of gloves. Gowns and goggles were less frequently available in health facilities, with 55.9 per cent of health workers reporting that gowns were always available and only 19.4 per cent saying goggles were available.

Table 51: Availability of protective clothing

OCCUPATIONAL CATEGORY	ALWAYS %	MOST OF THE TIME %	SOMETIMES %	RARELY %	NEVER AVAILABLE %
Gloves					
Professionals	87.5	6.9	4.6	0.8	0.2
CI 95%	(84.4, 90.1)	(5.2, 9.1)	(3.2, 6.5)	(0.3, 1.7)	(0.1, 0.7)
Non-professionals	85	1.6	6.5	4.6	2.3
CI 95%	(61.3, 95.3)	(0.7, 3.5)	(2.2, 17.9)	(0.9, 21.4)	(0.8, 6.5)
Total	86.8	5.4	5.1	1.8	0.8
CI 95%	(80, 91.6)	(4.2, 6.8)	(3, 8.5)	(0.6, 5.7)	(0.3, 2)
Gowns					
Professionals	57.1	6.9	10.5	4.8	20.6
CI 95%	(51.4, 62.6)	(4.1, 11.4)	(7, 15.5)	(2.6, 8.9)	(15.9, 26.4)
Non-professionals	52.7	3.1	1.7	3.2	39.3
CI 95%	(32.3, 72.2)	(1.4, 6.8)	(0.7, 4)	(1.2, 8.3)	(19.2, 63.8)
Total	55.9	5.9	8.2	4.4	25.6
CI 95%	(47.2, 64.3)	(3.6, 9.5)	(5.8, 11.4)	(3, 6.5)	(20, 32)
Goggles					
Professionals	23.2	2	3.7	5.3	65.7
CI 95%	(15.2, 33.8)	(0.9, 4.4)	(2.1, 6.4)	(3, 9.3)	(55.9, 74.4)
Non-professionals	8.8	0.1	1.8	1.6	87.7
CI 95%	(3.6, 19.9)	(0, 0.4)	(0.3, 10.9)	(0.6, 4.7)	(75, 94.4)
Total	19.4	1.5	3.2	4.3	71.5
CI 95%	(12.7, 28.4)	(0.8, 3.1)	(1.8, 5.6)	(2.6, 7)	(62.8, 78.9)

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OCCUPATIONAL CATEGORY	ALWAYS %	MOST OF THE TIME %	SOMETIMES %	RARELY %	NEVER AVAILABLE %
Masks					
Professionals	68.2	3.8	8.4	2.6	16.9
CI 95%	(58.1, 76.8)	(2.7, 5.4)	(6.2, 11.4)	(1.5, 4.6)	(10.5, 26.1)
Non-professionals	47.1	2.2	1.8	4.3	44.6
CI 95%	(25.4, 69.9)	(0.9, 5.3)	(0.8, 4)	(1.5, 11.8)	(22.2, 69.5)
Total	62.5	3.4	6.7	3.1	24.3
CI 95%	(49.7, 73.8)	(2.6, 4.5)	(5, 8.8)	(2.1, 4.4)	(15.2, 36.5)

5.4 Staff precautionary measures against possible infection

Table 52 shows that most (78.8 per cent) health workers reported that the necessary medication or treatment was always available to them at work in case of an injury. Nearly a fifth (18.8 per cent) of non-professional health workers and 10 per cent of professionals did not know if medication was available.

Table 52: Availability of medication/treatment in case of injury

OCCUPATIONAL CATEGORY	ALWAYS %	MOST OF THE TIME %	SOMETIMES %	RARELY %	NOT AVAILABLE %	DON'T KNOW %	NOT APPLICABLE*
Professionals	80.6	1	1.3	0	5.7	10	1.2
CI 95%	(74.3, 85.7)	(0.5, 1.9)	(0.7, 2.6)	0	(3.6, 9.1)	(7.2, 13.8)	(0.4, 4.1)
Non-professionals	74.1	0.3	0.1	0.2	3.5	18.8	2.9
CI 95%	(64.8, 81.6)	(0.1, 0.8)	(0, 0.3)	(0.1, 0.6)	(1.9, 6.5)	(13.6, 25.6)	(0.8, 9.7)
Total	78.8	0.8	1	0	5.1	12.5	1.7
CI 95%	(72.2, 84.2)	(0.4, 1.5)	(0.5, 1.8)	(0, 0.2)	(3.4, 7.6)	(9.2, 16.8)	(0.7, 4)

**No physical contact with patients*

5.5 Support in case of trauma

Nearly a quarter (23.6 per cent) of caregivers said no official support was available to them from professionals such as psychologists or social workers in case of trauma relating to their work. A further 30.5 per cent did not even know if there was any form of official support on offer (see Table 53). Some professionals mentioned that, although these services were available, they had to use their own medical aid funds to pay for them.

Table 53: Does your employer offer any form of official support or counselling to staff members?

OCCUPATIONAL CATEGORY	YES %	NO %	DON'T KNOW %	TOTAL %
Professionals	49.7	24.9	25.4	100
CI 95%	(42.2, 57.2)	(19.5, 31.2)	(19.7, 32.1)	
Non-professionals	36.3	20.2	43.5	100
CI 95%	(28, 45.5)	(14.9, 26.8)	(35.5, 51.8)	
Total	46	23.6	30.5	100
CI 95%	(40.7, 51.3)	(18.9, 29)	(26.1, 35.3)	

6. SUMMARY AND CONCLUSIONS

A total of 1 922 medical practitioners, nurses and other health professionals and non-professional health workers, representative of all health staff employed at public clinics and public and private hospitals in South Africa, were interviewed to determine the impact of HIV/AIDS on human resources in the health sector. Most respondents were female, African and employed as nurses or non-professional health workers. More than half of them were older than 40 years with at least 11 years of experience in the health sector.

Nearly half the respondents reported that HIV/AIDS had a physical and mental impact on them and their work activities. They were physically exhausted, stressed and experienced fear, frustration, depression and helplessness because:

- HIV/AIDS is not a notifiable disease;
- They feared infection;
- The disease was spreading but their ability to prevent it was limited;
- Patients living with AIDS and frequenting health facilities were increasing and facilities were overcrowded;
- HIV/AIDS patients required a high level of attention and care;
- Those living with HIV/AIDS were not well supported by their next of kin;
- The quality of health care had dropped and no comprehensive care was possible;
- There was a drop in productivity; and
- There was a lack of health services for people with non-HIV conditions.

The stigma relating to HIV/AIDS meant those living with HIV/AIDS feared rejection so they tended to report at health facilities only when they were very ill and little could be done for them. The same fear caused many patients to discard their medical records on discharge from health facilities and to visit a different health facility each time when they got sick, which meant that they had to be diagnosed all over again.

Health workers reported various work-related challenges as a result of secrecy, the rate of infection and social, cultural and economic factors related to the disease. Secrecy seemed to impact severely on their work, especially in terms of counselling and educating people, keeping statistics, and caring for those living with HIV/AIDS as well as those not infected. The fact that they did not know their patients' status also impacted on their productivity and time. The lack of medication, care facilities for those living with HIV/AIDS and community support, increased their workload. Fear of infection was a constant worry.

Health workers' responses to questions that dealt with general issues in their work environment, confirmed and supported their feedback on the impact of the disease. Nearly three quarters of health workers indicated an increase in their workload during the past year. A fifth of these said that their workload had doubled, while nearly 40 per cent of health professionals indicated that they often had to put in extra hours to complete their work. They attributed this extra workload mainly to staff shortages, increased numbers of patients and increases in patients seeking care for HIV and related diseases. Health staff found it difficult to cope, and this resulted in increased absenteeism and dissatisfied patients.

A third of respondents reported that morale was low, and linked this mainly to stressful working conditions, high workload, inadequate remuneration, staff shortages and a lack

of counselling services for staff. The lack of management support was demonstrated by the fact that less than half of health workers indicated that counselling services were available to staff at health facilities. In some cases, services were available but had to be paid for.

The majority of respondents received only information and not training on essential aspects relating to health care and HIV/AIDS. A lack of communication between management and staff seemed to exist in some health facilities, as a third of the respondents did not know if their health facilities had a workplace policy on HIV/AIDS. However, the majority of health workers indicated that medication/treatment in case of injury, as well as protective clothing such as gloves, gowns and masks, were always available at health facilities.

The stressful working conditions that were reported by health workers were underlined by the fact that nearly a fifth of health workers were treated for stress or stress-related conditions during the past year. Due to the seriousness of their condition most of these people were compelled to take sick leave before they could resume their duties. Nevertheless, the majority of health workers still enjoyed their work and experienced job satisfaction.

The outcome of the study revealed that the impact of HIV/AIDS on health workers could not be isolated from the broader human resources challenges that the health system is currently experiencing. Health planners are confronted by the challenges of how to mitigate the impact of infectious diseases such as HIV/AIDS, and how to transform the health system in SA into a 'unified system capable of delivering quality health care to all SA citizens efficiently and in a caring environment' (Department of Health, 1997). In the process, planners have to juggle with the after-effects of the previous health dispensation that were characterised by racial separation and inequalities in the supply, distribution and application of resources.

There are shortages of health professionals such as medical practitioners and professional nurses, and many health facilities have vacant positions for health professionals. Professional health skills are maldistributed across provinces and regions and the situation has been worsened by the outflow of skills to other countries. Rural areas are badly affected and in many cases nurses in public clinics have to perform duties normally conducted by medical practitioners.

The majority of South Africans lack the funds to belong to a medical aid scheme and depend on government-subsidised health care. High unemployment, increases in medical costs and illnesses such as HIV/AIDS, have resulted in an increase in the number of patients depending on the public health sector. This puts pressure on public health expenditure and the ability of the state to provide proper healthcare to all its citizens. It is against this background that the conclusions in this study should be viewed and interpreted.

The following broad points emerged in this study:

- Taking care of HIV/AIDS patients is emotionally and physically taxing to health workers, especially nurses and medical practitioners and it impacts on their stress levels, workload and performance;

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- Health workers have to provide healthcare to an increasing number of patients, some living with HIV/AIDS;
- The needs of those living with HIV/AIDS are such that health workers have to spend a lot of time caring for them;
- The fact that HIV/AIDS is not a notifiable disease and is stigmatised impacts on the duties of health workers;
- Nurses are usually not informed about patients' HIV status;
- The lack of volunteers and specialised facilities such as hospices to take care of HIV/AIDS patients, add to the workload of staff in clinics and hospitals;
- Health workers deal with the death of patients daily and cannot do much (due to the seriousness of patients' conditions as well as their own workload) to ease the discomfort of patients;
- Staff shortages and a lack of resources, such as medication and other equipment, has aggravated the impact of HIV/AIDS on health workers;
- The majority of health workers received information but not training on healthcare aspects relating to HIV/AIDS;
- Despite the demanding work environment, the majority of health workers experience job satisfaction;
- HIV/AIDS patients frequent health facilities in increasing numbers and many of them require continuous physical and mental care;
- Patients with treatable non-HIV conditions are affected by the prevalence of HIV/AIDS because they cannot be accommodated in overcrowded facilities;
- The lack of a national patient information system leads to the abuse of the health system by patients who seek treatment from different health facilities to avoid disclosing their HIV status;
- Many health facilities do not provide counselling or other forms of official support to health workers in cases of work-related trauma.

Further increases in the number of HIV/AIDS patients is likely to result in an increase in burnout and stress-related diseases among health workers unless health authorities decrease their workloads and address the limitations in their work environment. More staff are likely to leave the health professions and the country. The quality of healthcare will be adversely affected and the spread of HIV will continue. The availability of government-subsidised health services to patients with non-HIV related conditions will also decrease.

7. RECOMMENDATIONS

On the basis of the findings in this study, it is recommended that::

- Recruiting and training more volunteers and home caregivers to attend to the needs of HIV/AIDS patients in the community will ease the burden on health workers as well as on institutionalised healthcare. It will also ensure that people living with HIV/AIDS are not isolated and that proper care is provided to them. Better quality health services should be provided for people living with HIV/AIDS. Community volunteers should be asked to assist with aspects of healthcare that do not necessarily require specialised health skills, such as home visits to the chronically ill, education and awareness as well as administration.
- Shortages of staff, equipment and health facilities should be addressed to decrease the burden on the current workforce and to ensure that proper health care is available to all South Africans, whether or not they are infected with HIV.
- Stress management programmes and proper counselling services should be introduced in health facilities to enable health workers to cope with stressful working conditions.
- Opportunities for regular and open communication between management and health workers should be created to enable health workers to raise the problems and frustration that they experience.



STUDY No. 3

THE IMPACT OF HIV/AIDS ON
HEALTH SERVICES



I. OVERVIEW

In order to assess the impact of HIV/AIDS on the health sector we need to understand the ability of the health care system to cope with the epidemic. This means that the health services must equip health workers to care adequately for an increasing number of HIV/AIDS patients by giving them the necessary resources to manage patients. These include the right skills, policies, clinical guidelines, sufficient beds to accommodate patients and adequate supplies and drugs. The epidemic is likely to have an impact on all of these factors.

The background to the study is discussed in the Introduction to this report.

The objective of this study is to identify which health services are most severely affected by HIV/AIDS and to identify important health service indicators.

2. METHOD

More information on the method used in this study is provided in detail in the Introduction and Appendix 3 of the report. Information specific to this part of the study is presented below.

2.1 Sampling

The results of sampling on a probability basis yielded the following allocations of health facilities between the public and private sectors in each province (Table 54).

Table 54: Sample of health facilities

PROVINCE	TOTAL CLINICS	CLINICS IN SAMPLE	TOTAL PUBLIC HOSPITALS	PUBLIC HOSPITALS IN SAMPLE	TOTAL PRIVATE HOSPITALS	PRIVATE HOSPITALS IN SAMPLE
Eastern Cape	781	33	72	6	40	3
Free State	280	15	35	3	19	2
Gauteng	461	22	28	3	112	8
KwaZulu-Natal	420	20	64	6	44	3
Mpumalanga	188	11	28	2	13	1
North West	327	17	33	3	19	2
Northern Cape	221	13	26	2	20	2
Limpopo	330	17	44	4	2	0
Western Cape	379	19	47	4	16	1
TOTAL	3 387	167	377	33	285	22

2.2 Data collection

Information was collected by means of a questionnaire administered by registered nurses during visits to health facilities. A fieldworker manual was compiled and used to train fieldworkers during a one-day workshop. The questionnaire titled 'The impact of HIV/AIDS on health services in South Africa' was answered by the chief administrator or manager of the health facility. The list of health facilities included in this study is attached as Appendix 6.

During Phase 2 of the study, we tested the feasibility of gathering the required information through telephonic contact with hospitals and mailed questionnaires. In addition to mailing questionnaires it was necessary to follow up with both telephone calls and personal visits to the health facility because the chief administrators or managers of health facilities took a long time to complete the questionnaire. Although this was an expensive process, it proved crucial in increasing response rates, as will be seen below.

2.3 Questionnaire items

The questionnaire used was adapted with permission from Family Health International, which designed the original questionnaire. In order to identify important health service indicators we used the health facility questionnaire, which included the following items:

1. Type of health service provided
2. Average number of visits made by patients
3. Hospital bed occupancy rates
4. Management of HIV/AIDS services
5. HIV/AIDS care
6. TB treatment
7. Treatment for sexually transmitted disease
8. Drug availability
9. Laboratory supplies.

The results presented in this study exclude treatment of sexually transmitted disease.

3. RESULTS

3.1 Validity of the findings

3.1.1 Response rates

Out of 222 health facilities sampled, 220 participated in the study. However, not all chief administrators or managers of health care facilities answered every single question. For this reason, we indicated the number of facilities included in the denominator, where appropriate.

3.1.2 Validity of key indicators

Self-reports of critical information to measure the impact of HIV/AIDS on the health services may be biased. This may be largely due to recall bias, lack of institutional memory where there is a high turnover, or there might be social desirability bias. For this reason we enquired whether the figures provided on the key indicators were estimated or calculated from medical records. The results show that the majority of figures were obtained from medical records except for paediatric AIDS cases (see Table 55). While we accept that even medical records may be incomplete, we also consider the data more reliable because they were prepared before we asked the questions and hence could not have been influenced by our research.

Table 55: Validity of key indicators

INDICATORS	ESTIMATES (%)	CALCULATED FROM RECORDS (%)
1. Total number of admissions in the medical ward(s)	14.7	85.3
2. Number of admissions in the medical ward with HIV/AIDS-related illnesses	31.8	68.2
3. Number of admissions in the medical ward with TB	12.5	87.5
4. Total number of admissions in the paediatric ward	12	88.5
5. Number of admissions in the paediatric wards with HIV/AIDS-related illness	50	50
6. Total bed occupancy rate	14.7	85.7
7. Total number of admissions	9.4	90.6

3.1.3 Ownership of health institutions

Table 56 presents the distribution of health facilities by ownership. The majority of health facilities included in the study were located in townships, towns and traditional/farming areas, while a few were situated in cities.

STUDY 3

Table 56: Type of health facility by ownership (n)

TYPE OF HEALTH FACILITY	PROVINCE	LOCAL AUTHORITY	PRIVATE (PROFIT-DRIVEN)	EMPLOYER PROVIDED (EG. MINES OR INDUSTRIES)	TOTAL
1 Academic health service complex (Level 4)	2	0	0	0	2
2 Provincial tertiary hospital (Level 3)	5	0	0	0	5
3 Regional hospital (Level 2)	8	0	0	0	8
4 District hospital (Level 1)	17	0	0	0	17
5 Specialized hospital	1	0	0	0	1
6 Private hospital	2	0	15	1	18
7 Community health centre	32	23	0	0	55
8 Public clinic	59	50	1	0	110
9 Private clinic	0	1	0	0	1
10 Mine hospital	0	0	0	1	1
11 Mental hospital	1	0	1	0	2
Total	127	74	17	2	220

More than half of all health facilities sampled (58 per cent) are provincially owned. The majority are public clinics (59 per cent) and community health centres (32 per cent). Local authorities own the next highest per cent of health facilities. Most of these are public clinics and community health centres.

3.2 Admissions

A total of 54 hospitals participated in the study. Not all have medical wards. The results reported in this section are based on 38 hospitals with medical wards. Overall, the means of the total number of admissions in the medical wards of South Africa in the three years of the study, computed individually (1995, 1997 & 2000), showed no significant change. However, the private hospitals showed an increase in the mean number of admissions in their medical wards. The public and district hospitals on the other hand showed no change. This is different in the case of HIV/AIDS admissions shown in Figure 10.

Figure 11 shows that there has been an increase in the number of HIV/AIDS related admissions in the medical wards. This is evident at district level, public hospital level and private hospital level. The total of all three levels shows a step ladder increase in the admissions of patients with HIV/AIDS related illnesses.

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Figure 10: Mean annual number of admissions by type of facility, South African medical wards 1995 to 2000

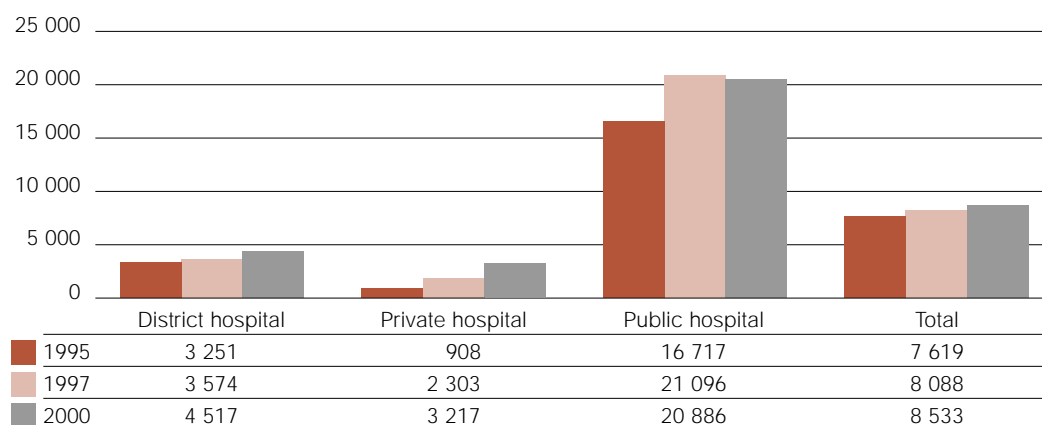
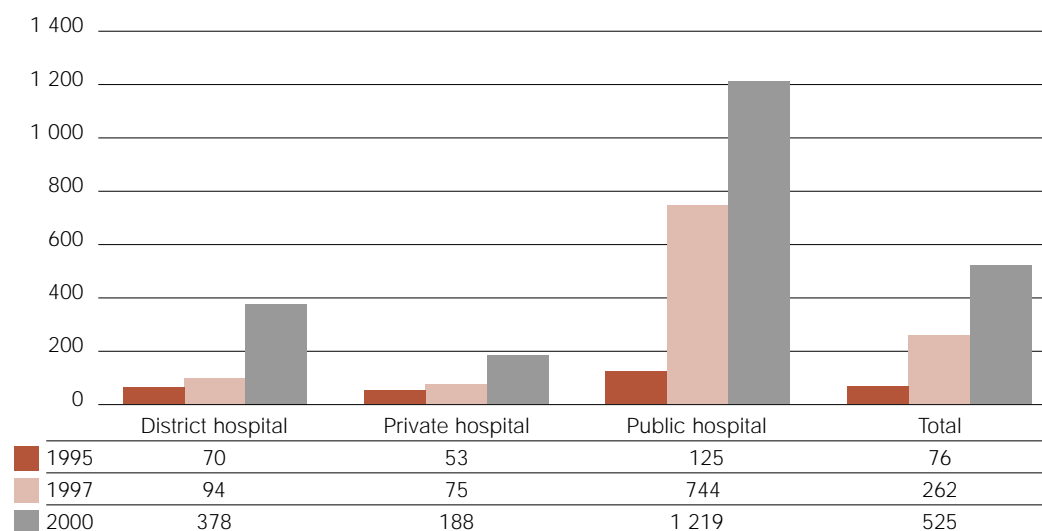


Figure 11: Mean total number of HIV/AIDS-related admissions by type of facility, South African medical wards 1995 to 2000



Most health facilities with medical wards in 1995 did not report information on admission of patients with HIV/AIDS-related illness. In that year, only seven reported this statistic. By 1997, the number reporting had increased to 11. A further increase was seen in 2000, where 16 hospitals reported. The results show that there has been an increase in the mean number of patients admitted for HIV/AIDS-related illness, especially in public hospitals. The actual numbers seem to have been small, but are showing a clear upward trend.

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It is important to note that while there was virtually no increase in the mean admission number of all patients to medical wards, when the results were examined separately for patients admitted for HIV/AIDS-related illness, there was a large increase, which suggests that the AIDS patients 'crowded out' the non-AIDS patients.

As a means to evaluate the impact of HIV/AIDS on the health services, we examined admission of cases of one of the opportunistic infections that is widely considered to be common, that is TB. The statistics are based on 14 hospitals reporting in 1995, 15 in 1997 and 20 in 2000. In Figure 12, we present the mean number of admissions to medical wards for TB. During the first two years of the study, the number of admissions with TB in South African medical wards did not change. During the last year of the study the numbers increased across the board. The private health facilities had a 400 per cent increase in the mean number of TB admissions in the year 2000.

Figure 12: Mean total number of admissions with TB by type of facility, South African medical wards, 1995 to 2000

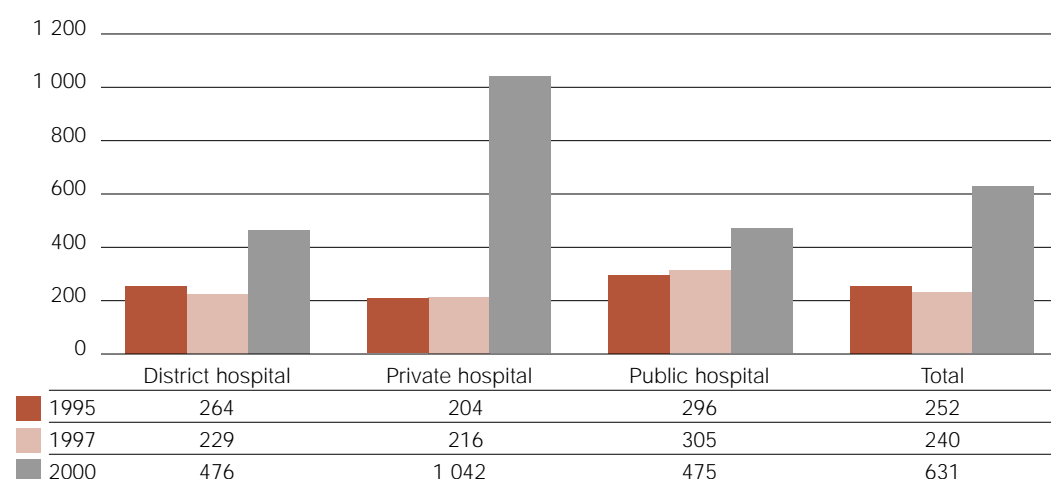


Figure 13 shows the mean number of admissions to paediatric wards for the years 1995, 1997 and 2000. The district and public paediatric ward admissions show the same trend as the medical wards admissions. There is no significant increase or decrease in the mean number of admissions during the five years studied. The private hospitals show a slight increase in the paediatric admissions.

Figure 13 also shows that the public hospitals carry the heaviest load of these admissions with the private sector carrying the least load.

Most paediatric wards do not yet report HIV/AIDS-related admission data. In 1995 the number reporting was four, increasing to six in 1997 and to ten in 2000. The mean number of HIV/AIDS paediatric admissions (as shown in Figure 14) is on the increase, despite the stable levels of mean number of total admissions to paediatric wards. This

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Figure 13: Mean total number of admissions by type of facility, South African paediatric wards 1995 to 2000

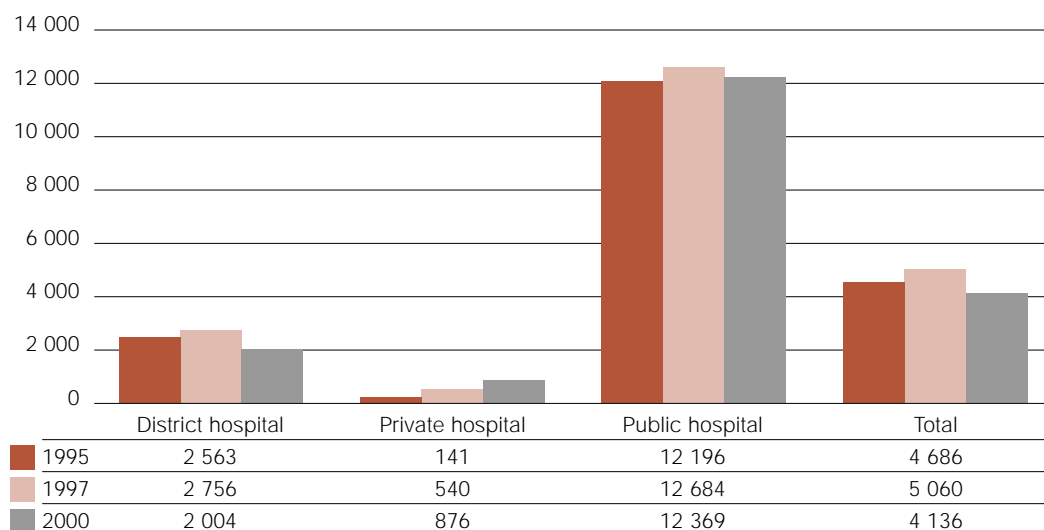
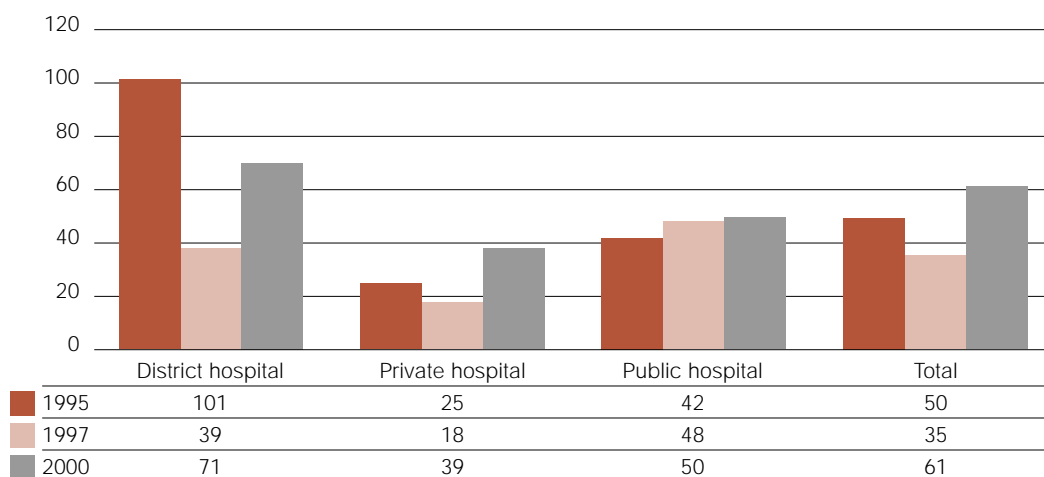


Figure 14: Mean total number of HIV/AIDS-related admissions by type of facility, South African paediatric wards 1995 to 2000



again shows that even though there is an observed general stability in the number of paediatric patients admitted, there is an increase in HIV/AIDS patient load, which is presumably accompanied by a decrease in the admission of the HIV/AIDS negative babies.

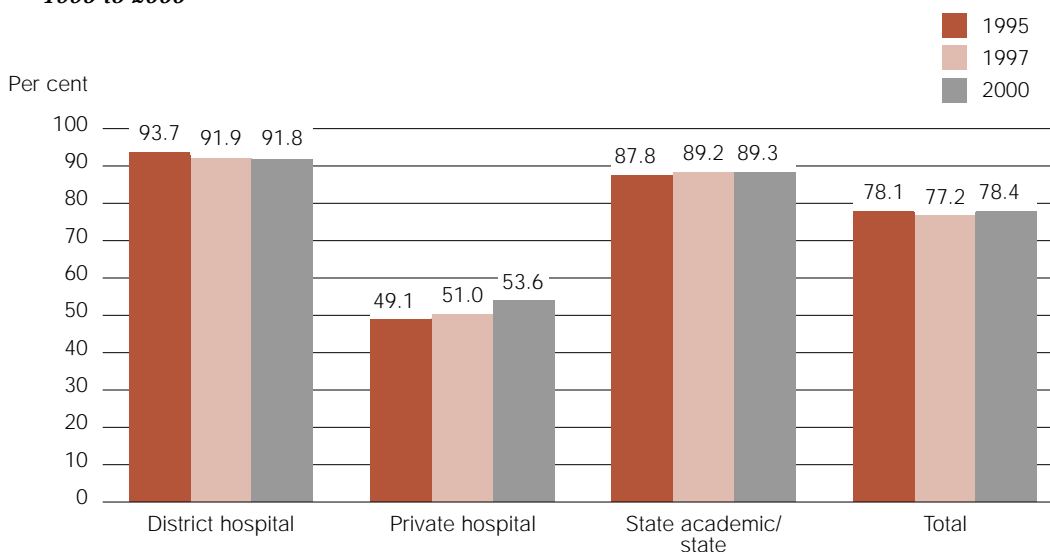
3.3 Bed occupancy

Bed occupancy rate is a measure used to assess the actual use of an inpatient facility for a given time period. It is expressed as a percentage, usually over a one year period. It is usually calculated as an annual average bed occupancy rate, based on the inpatient days of care (the sum of all daily inpatients for the given year) and bed days available (calculated as the maximum number of inpatient days of care that would have been provided if all beds were occupied during the given year). The formula normally used for calculating bed occupancy rate is

$$\text{Bed occupancy rate} = \frac{\text{no. of inpatient days of care}}{\text{bed days available}} \times 100$$

This statistic is useful for planning purposes. In this study, we asked health workers to indicate the bed occupancy rate (percentage) for 1995, 1997 and 2000. We then calculated the mean bed occupancy rate for each category of health service. The results are shown in Figure 15.

Figure 15: Mean bed occupancy rates by type of facility, South African medical wards 1995 to 2000

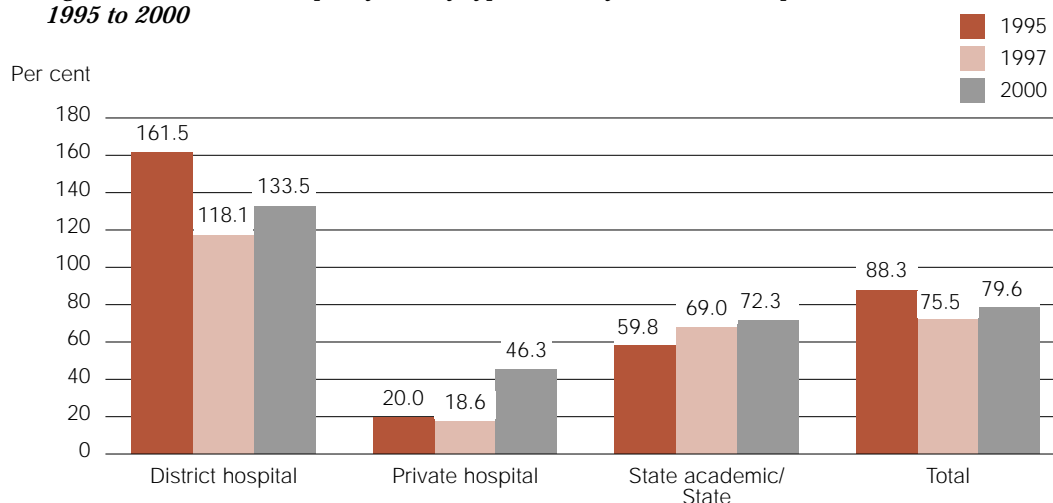


The statistics in 1995 are based on 25 hospitals that had medical wards, 30 hospitals in 1997 and 38 hospitals in 2000. The mean bed occupancy rates at the medical wards of the primary health facilities (district hospitals) was over 90 per cent and the rate for the public hospitals was almost 90 per cent. The private health facilities reported bed occupancies to be just above 50 per cent. There has not been a significant change in bed occupancy rates over the last five years, yet we have seen an increase in admissions of HIV/AIDS patients as well as TB patients.

In Figure 16 we examined bed occupancy rates for paediatric health facilities. In 1995, 17 hospitals with paediatric wards reported the bed occupancy rates, 21 in 1997 and 30 in 2000.

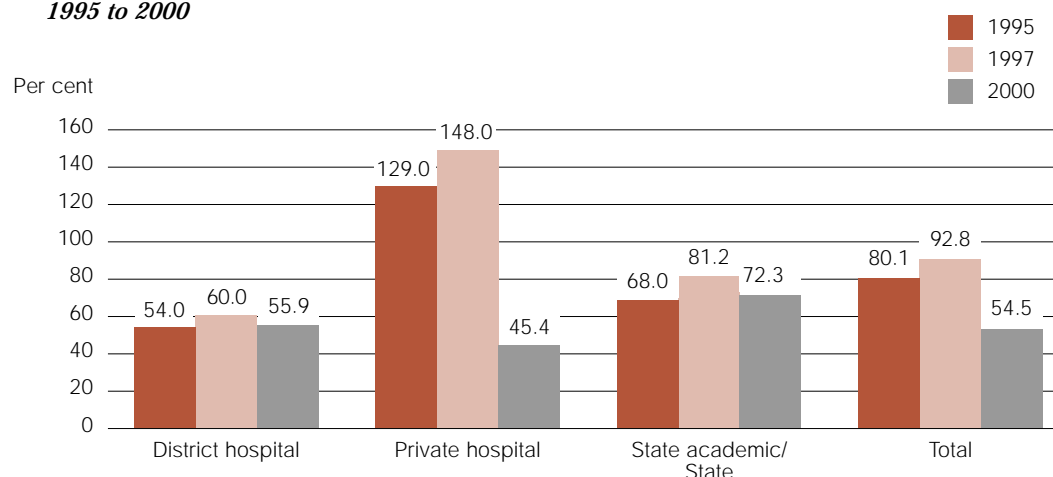
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Figure 16: Mean bed occupancy rate by type of facility, South African paediatric wards 1995 to 2000



The paediatric wards at the primary health facilities (i.e. district hospitals) are overcrowded. During 1995, the bed occupancy rate was highest in district hospitals. This subsequently decreased in 1997, only to increase again in 2000. The public hospitals still had capacity to admit paediatric patients needing hospitalisation, while the private sector was under-utilised. When all hospitals are considered, there has been an overall decline in utilisation of paediatric beds.

Figure 17: Mean bed occupancy rate by type of facility, other South African paediatric wards 1995 to 2000

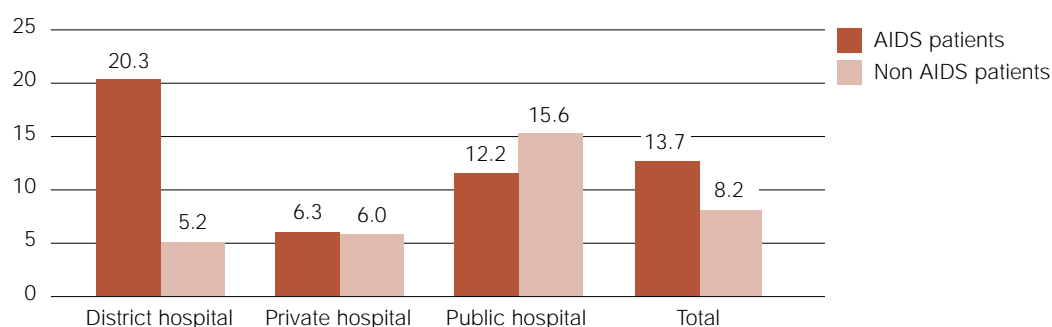


The health facilities with no paediatric and/or medical wards showed a slightly different pattern. Based on five hospitals reporting this statistic in 1995, five in 1997 and 12 in 2000, we found that district hospitals had the lowest mean bed occupancy rates, followed by the public hospitals. The private sector hospitals, on the other hand, were overcrowded with mean bed occupancy rates in 1995 and 1997 exceeding 100 per cent. However, this statistic dropped substantially in 2000. This may reflect a reporting bias in 2000.

3.4 Length of stay

Length of stay is usually defined as the number of days of care for inpatient hospitalisations for residents of a given geographic area. One of the acceptable methods of computation of length of stay is to subtract the patient's discharge date from the admission date. In this study we computed the mean length of stay. We asked the chief hospital administrators the following questions: How long (number of days) do HIV/AIDS patients stay in hospital on average? How long (number of days) do patients who are not infected with HIV stay in hospital on average? The results are presented in Figure 18.

Figure 18: Mean length of stay in hospital (in days) by AIDS status and type of South African hospital, 2002



To assess the impact of HIV/AIDS on the health services, we compared the length of stay in hospital for AIDS patients and non-AIDS patients (Figure 18). We found that AIDS patients were more likely than non-AIDS patients to stay longer in district hospitals (PHC facility), with an average stay of 20 days. The results also showed that AIDS patients served in district hospitals were hospitalised for much longer than those institutionalised in the private or public hospitals (secondary, tertiary or academic hospitals). The public hospitals seem not to keep AIDS patients long, instead their length of stay is less than that of non-AIDS patients. The private sector had a similar period of length of stay in hospital between AIDS and non-AIDS patients.

3.5 Coping with the demands of HIV/AIDS

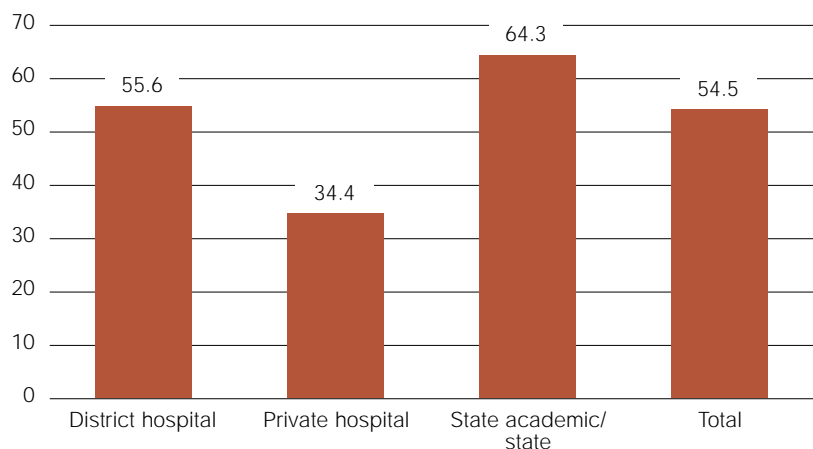
To assess the ability of the health care system to cope with the demand for HIV/AIDS care in South Africa, we measured the percentage of health facilities needing more staff to cope with the patient load. We observed that nearly 80 per cent of all health care facilities expressed the need for more staff to cope with the demand for HIV/AIDS care (Figure 18). The need was highest in public hospitals, followed closely by primary health care facilities and least in the private hospitals.

We assessed whether health facilities had staff assigned to provide HIV/AIDS care activities and found that more than half had done so. These results are reported in Figure 19. However, the results varied by type of health facilities. Public hospitals were most

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likely to report to have assigned staff to provide HIV/AIDS care. More than half of the primary health care facilities reported to have assigned staff to provide this service. The private hospitals reported to have allocated the least number of staff to perform this function.

Figure 19: Percentage of health facilities with staff assigned to provide HIV/AIDS care, South Africa 2002



3.6 Change in HIV/AIDS patient load

An increase in the number of patients seeking care for HIV/AIDS-related illness is an indication of the burden of HIV/AIDS on the health care system. We asked chief administrators whether the number of patients seeking clinical care for HIV/AIDS-related illness has increased over the last five years. Table 57 presents the results based on 204 facilities that responded to the question. In both the public and private sectors, the administrators indicated that there has been an increase of patients seeking clinical care for HIV/AIDS-related illness. It is important to note that this measure is based on the perceptions of administrators and not medical records. However, it is supported by findings from medical records reported above.

Table 57: Compared to five years ago, has the number of patients seeking clinical care for HIV/AIDS related illnesses increased?

FIVE-YEAR CHANGE	PHC CLINIC (%)	PRIVATE HOSPITAL (%)	STATE ACADEMIC/ STATE (%)	TOTAL (%)
n	171	17	16	204
Increased	94.5	91.6	100	94.6
Remained more or less the same	4.3	0	0	3.8
Decreased	1.2	8.4	0	1.6

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Table 58 presents the results of different types of health care facilities, based on the chief administrator's comparison of the numbers. The results based on 158 health facilities show that the overwhelming majority of chief administrators believe that the numbers of admissions for HIV/AIDS clinical care have increased. The increase in the number of patients seeking care exerts pressure on the health care system, which seems to have responded to the demand through increased admissions of patients seeking care for HIV/AIDS related illness.

Table 58: Compared to five years ago has the number of admissions for HIV/AIDS clinical care increased?

FIVE YEAR CHANGE	PHC CLINIC (%)	PRIVATE HOSPITAL (%)	STATE ACADEMIC/ STATE (%)	TOTAL (%)
n	128	16	14	158
Increased	96.7	100	100	97.1
Remained more or less the same	3.3	0	0	2.9
Decreased	0	0	0	0

3.7 Common presenting signs and symptoms of HIV/AIDS

We asked chief administrators to indicate the most frequent signs and symptoms that most HIV/AIDS patients present with in their health facilities. This information was collected with the assistance of staff directly involved in HIV/AIDS care. We report the most frequently reported signs and symptoms. As shown in Table 59, diarrhoea/stomach disorder/gastro/vomiting is the most common symptom HIV positive people present with. This is followed by oral thrush, weight loss and coughing respectively.

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Table 59: Common signs and symptoms of most people with HIV/AIDS, weighted

SIGNS AND SYMPTOMS	n	%
Diarrhoea/stomach disorder/gastro/vomiting	983	26.6
Oral thrush/stomatitis	614	16.6
Weight loss/wasting/emaciation/cachexia	484	13.1
Coughing (chest problems)/respiratory conditions/bronchitis	360	9.7
TB associated with HIV/AIDS	285	7.7
Skin rashes/scabies/ring worms/skin lesions/dermotol	227	6.1
Herpes zoster	108	2.9
Shingles	86	2.3
Pneumonia	79	2.1
Dehydration	61	1.7
Infection/frequent infection/immunity is compromised	48	1.3
Persistent wounds/sores	44	1.2
Poor appetite	41	1.1
Anaemia	31	0.8
Lymphadenopathy	26	0.7
Abscesses/boils	25	0.7
General body aches/legs/arms/swelling/oedema	23	0.6
Genital ulcers	22	0.6
Candida/(vagina)	20	0.5
Pneumocystic carinii/infection of lungs	20	0.5
Can't tell as don't know HIV status	20	0.5
Fever	19	0.
Depression/malaise/feeling of unease/mild sickness	13	0.4
Bedsore	13	0.4
Lethargy/dullness/sluggishness/slow/tiredness/lack of	13	0.4
Pulmonary related diseases/lung diseases	13	0.4
STD (not resolving)	11	0.3
Flu/urti I/colds/laryngitis/repeated colds/tonsillitis	12	0.3
Total	3 702	100

3.8 Services provided to HIV/AIDS patients

In investigating the services provided to HIV/AIDS patients, we asked if the basic services are provided. The results are presented in Table 60.

Table 60: Percentage of health facilities providing specified services to patients seeking care for HIV/AIDS in South Africa, 2002

	NO. OF FACILITIES	PHC CLINIC	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Voluntary HIV counselling, testing	210	75.1	58.1	81.8	74.3
Clinical management of opportunistic infections	213	95.8	75.4	100	94.6
Health education	216	99.7	84.7	100	98.7
Home-based care	204	50.6	13.6	30.1	47.4
Nutrition supplementation	208	65	30.2	77.3	63.1
Condom supply and education	215	99.4	74.2	100	97.9
Follow-up monitor adherence to TB treatment	210	94.5	43.4	45.8	89.5

The public health sector facilities provide most of the basic services. Home-based care is offered by the least number of facilities, with the lowest percentage in the private health sector. Condom supply and follow up of TB treatment by the private health sector were poor.

3.9 Services provided to patients with TB

Because TB is an important opportunistic infection, we assessed whether the health facilities were providing specific basic services to patients who suffer from this disease. Again, as with the HIV/AIDS patients, most health facilities are providing these essential services. Home-based care seems to be a neglected service, particularly in the private health sector. Since health facilities are seeing an increase in HIV/AIDS patients, TB services could be improved, allowing the facilities to focus on the very ill. Only a third of private hospitals reported supplying TB patients with nutrition supplements. State hospitals and primary health facilities, on the other hand, have a better level of nutrition supplementation provision (see table 61).

Table 61: Services offered to TB patients

SERVICES	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Voluntary HIV counselling and testing	74.6	54.7	80	73.5
Clinical management of opportunistic infections	95.5	81.5	93.8	94.6
Health education	99.4	83.3	93.3	98.2
Home-based care	53.9	18	26	50.6
Nutrition supplementation	64.2	32.9	72.4	62.5

3.10 Supply of equipment to treat HIV/AIDS patients

To assess the capacity of the health care system to cope with HIV/AIDS patients, we investigated the extent to which health facilities were adequately equipped to provide necessary services. The specific question asked was, 'Was your health facility stocked with the following during last year?' The results are shown in Table 62. We found that the private sector was least equipped to provide testing for HIV because three quarters of the facilities reported never to have HIV test kits in stock. This means that they were more likely to send their patients to be tested elsewhere. About half of the public hospitals were equipped with HIV test kits 75 per cent to 100 per cent of the time. The PHC facilities are not adequately equipped to provide HIV testing to their patients. This also means that they are likely to send blood specimens to other laboratories for testing, meaning that most patients are unlikely to return to the facility to obtain their results. Rapid testing would increase uptake of VCT services that are being expanded throughout South Africa.

VCT is high in all the facilities compared to the number of facilities that carry HIV test kits. VCT is the process by which an individual undergoes counselling to enable him or her to make an informed choice about being tested for HIV. It is an important and cost-effective HIV prevention measure that is severely compromised by the low number of health care facilities that carry test kits in the survey. Each health care facility in South Africa that carries out VCT must be equipped with rapid and simple HIV test kits that have proven specificity and sensitivity.

Most of the health care facilities stocked syringes and needles, protective clothing and gloves most of the time. However, nearly one in five private sector health facilities did not have protective clothing and gloves to prevent infections or cross-contamination.

Only 65 per cent per cent of all health facilities have adequate supply of sterilising equipment 75 to 100 per cent of the time. The survey showed that 30 per cent of primary health care facilities never stocked sterilising equipment, and 6.2 per cent never stocked

disinfectants, while 16.8 per cent of private health care facilities never stocked the specific disinfectant (Jik). They may be using other disinfectants. If that is not the case this finding indicates that patients are at risk of contracting nosocomial (hospital-acquired) infection. Nosocomial infections are a problem worldwide, especially in developing countries where most health care facilities have inadequate or no infection control systems in place. In many developing countries, the uncontrolled use of antibiotics has led to the emergence of resistant bacterial strains; this has further emphasised the need for good infection control programmes. Low temperature sterilisation is an essential tool for the sterilisation of heat labile clinical and diagnostic equipment such as endoscopes and surgical instruments. Several new methods of low temperature sterilisation have been developed and will need to be investigated and provided to all health facilities in South Africa. Disinfectants and frequent hand washing are among the most simple and applicable ways of reducing nosocomial infections.

3.11 Medical supplies and laboratory monitoring

In several developing countries, including South Africa, there is inadequate laboratory infrastructure, insufficient technical skill and insufficient funds to buy laboratory equipment and reagents used for diagnosis and monitoring patients to be initiated on or already on drug therapy. According to the WHO Guide to ART in Resource Constraint Settings, the use of laboratory investigation is divided into four categories. The minimum requirement before initiating drug therapy includes an HIV antibody test, haemoglobin and/or haematocrit levels. Recommended tests include a white blood cell count and differential liver function test (serum ALT or AST to monitor for co-existing hepatitis or drug-related hepatotoxicity), kidney function (serum creatinine/urea), glucose and a pregnancy test for women. Desirable investigations include expanded liver function test (amylase, bilirubin and lipids) and a CD4 test. Viral load testing is considered optional due to major cost implications.

This survey showed that several health care facilities had VCT programmes but do not carry HIV test kits. It will be important to ensure that any health care facility that performs VCT also has HIV test kits and is able to perform a rapid and confirmatory HIV test. If the VCT programme does not refer people to other facilities for testing, this will ensure a high compliance with testing. As ARVs become more readily available, a minimum laboratory monitoring package (at least per WHO recommendation) will be needed to monitor disease progression and the effects of drug therapy.

Transmission of HIV from patient to health worker, from health worker to patient, and from patient to another patient, can occur in health care settings. Needle punctures or similar percutaneous injuries inflicted by contaminated sharp instruments account for most cases of occupational HIV infection among health care personnel. Transmission from an infected health care worker to a patient is possible when an infected clinician is injured by a sharp object which then recontacts a patient's tissue. Transmission between patients is usually attributable to breaches in infection-control practices such as reuse of contaminated equipment or injection of contaminated material due to improper disinfection procedures.

During the 20 years of the HIV epidemic, there have been many reports of HIV transmission through negligence in the health care system. The first such large report

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

Table 62: Availability of supplies necessary to manage HIV/AIDS by type of health care facility, South Africa 2002

	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
HIV test kits				
100%–75% of times	34	24.5	50.7	34.1
74%–50% of times	3.3	0	0	3
49%–25% of times	2	0	6	2
Less than 25% of times	1.6	0	11.2	1.9
Never	59.2	75.5	32.1	59
Syringes & needles				
100%–75% of times	95.5	100	94.4	95.8
74%–50% of times	3.4	0	5.6	3.3
49%–25% of times	0.5	0	0	0.5
Less than 25% of times	0.5	0	0	0.5
Never				
Protective clothing & gloves				
100%–75% of times	81.5	71.1	89.4	81.1
74%–50% of times	10.7	0	4.9	9.7
49%–25% of times	4.4	9	0	4.6
Less than 25% of times	1.8	0	5.6	1.8
Never	1.6	19.9	0	2.9
Sterilising equipment				
100%–75% of times	63.2	74.6	88.7	65.1
74%–50% of times	2	17.6	5.6	3.2
49%–25% of times	3.2	0	0	2.8
Less than 25% of times	1.4	0	0	1.3
Never	30.2	7.8	5.6	27.6

came from Russia in 1988; subsequent investigations found that injections and other hospital procedures had spread HIV from an index patient to over 250 other children in several hospitals (Dehne et al., 2000; Bobkov et al., 1994 & Sauhat et al., 1992). Less than a year later, doctors in Romania uncovered a much larger outbreak in which medical procedures in orphanages and hospitals had infected over 1 000 Romanian children (Hersh et al., 1993; Patrascu et al., 1993; Apetrei et al., 1997, & De Coul et al., 2000). In Libya in 1998, medical procedures at one hospital spread HIV from one child to more than 390 others (Quadri et al., 2000 & Yerly et al., 2001). Perhaps the largest reported iatrogenic HIV outbreak occurred in China, where unsterile procedures during plasma donations spread HIV to possibly hundreds of thousands of rural Chinese plasma sellers (Rosenthal, 2000).

Many smaller outbreaks have been reported but not thoroughly investigated in Africa, (Mann et al., 1986; Prazuc et al., 1993 & Hitimana et al., 1993), so the extent of any of these outbreaks is unknown. In a hemodialysis unit in Colombia, HIV transmission to at least nine cases was attributed to inadequate disinfection and reuse of contaminated access needles. Many factors are known or suspected to affect the infection risk in specific cases, including the route of transmission, the inoculum of infectious virus and the host's immune response to the exposure (Mandell et al., 2000).

Blood of all persons must be regarded as infectious because it is not possible to know who might be carrying a blood-borne pathogen. Standard universal precautions have been developed by CDC and were designed to prevent direct contact with blood, bloody fluids and other fluids such as amniotic fluid, semen, vaginal fluid, cerebrospinal fluid, serous transudates/exudates and inflammatory exudates, that are likely to be associated with blood-borne pathogen transmission. Barrier precautions included the use of gloves for procedures imparting a risk of contact with body fluids, masks and protective eyewear when splash or splatter was anticipated, and the use of gowns or other protective garments when clothing was likely to be soiled.

The results of this survey provide evidence that patients and health workers in South Africa are at risk of nosocomial HIV transmission due to inadequate implementation of universal precautions and the lack of a reliable infection control programme that emphasises the use of disinfectants, aseptic techniques and the use of sterile medical supplies and equipment for all patients.

Much more attention needs to be paid to all aspects of infection control systems in health care settings from hospitals to clinics to dental clinics to informal providers. For example, a minimum infection control package must be developed for health care facilities in South Africa with a monitoring mechanism to ensure compliance. Procedures must be considered for reporting and investigating iatrogenic infections. Many other policy and program initiatives are required to ensure the security of health care workers and patients in health care settings where as many as half of all patients are carrying deadly blood-borne pathogens. In the United States, for example, many states enacted legislation requiring that universal precautions be implemented as a condition for funding.

3.12 Drug availability

Antiretroviral drugs (ARVs) and the drugs used in the management of opportunistic infections are the mainstays of HIV/AIDS pharmacotherapy. Analgesics, sedatives and vitamins are also commonly used in the HIV/AIDS population. ARVs used appropriately in combination, most often triple therapy or more, have been documented and accepted as the standard of care for treating HIV. These drugs are known to reduce the viral load, increase CD4 cell count, decrease mortality (reduce opportunistic infections) and increase the quality of life. The availability of these drugs has been strongly marred by high costs. (See Appendix 7 for details on drug availability).

South Africa has focused so far on the management of opportunistic infections, but various strategies must be exploited to make ARVs available. The overall availability of protein inhibitors (PIs) is extremely low, at 4.3 per cent of the total number of facilities (190) that were surveyed. The total availability of NNRTI and NRTI increased to about 21 per cent and 20 per cent respectively, most probably due to the use of agents from these two classes for prevention of mother-to-child-transmission or starter packs given to rape victims or for post-exposure prophylaxis (PEP). Although the number of facilities that carry ARVs was generally low, the private facilities had the highest percentage of availability of ARVs, and PHC facilities had the lowest.

Tuberculosis and PCP remain some of the most common opportunistic infections seen in developing countries, including South Africa. All the anti-TB drugs surveyed were generally available at over 80 per cent of all the facilities 75–100 per cent of the times.

Sulfonamides, (co-trimoxazole) which is the drug of choice for PCP, was also readily available at 82 per cent of the PHC facilities and 100 per cent of the private and state/academic facilities 75–100 per cent of the times. The other antibiotics used for treating other infections were generally available in over 70 per cent of the facilities 75–100 per cent of the time, except cephalosporins. Although cephalosporins are more expensive than penicillins, they have been commonly used in several infections that show increasing resistance to penicillins. The cephalosporins were available in 27.1 per cent of the PHC facilities, compared to 78.2 and 77.3 per cent of the private and public hospitals respectively, 75–100 per cent of the time.

The common antifungals were generally available in high proportions except fluconazole, which is the drug of choice for the treating of difficult fungal infections (oropharyngeal candidiasis and cryptococcal meningitis) in patients with HIV/AIDS. Fluconazole was available at 20.9 per cent of PHC, 78.2 per cent of private facilities and 69.9 per cent of state/academic facilities 75–100 per cent of the times. The availability of antiviral agents for serious viral opportunistic infections such as herpes, and cytomegalovirus (CMV), was generally very low in all facilities, with the private facilities having the highest availability comparatively. The opioid analgesics, which are used to control moderate to severe pain, and sedatives, are comparatively more available in the private and state/academic facilities 75–100 per cent of the time.

Proper pharmacologic management of HIV/AIDS will require appropriate pharmacoeconomics and formulary management and a revision of the Essential Drugs programme.

3.13 Discussion

3.13.1 Drug availability

Problems in ensuring availability, affordability, therapeutic access and quality of medicines, are universal and pose the greatest challenge to low income countries. Most countries like South Africa are faced with difficult therapeutic and economic decisions about access to medicines, and more specifically, HIV/AIDS medicines. To provide ARVs adequately and appropriately, the healthcare infrastructure must be such that it can manage drug selection, supplies, storage and distribution, avoid stock-outs, spoilage and unauthorised use and diversion. The infrastructure must also provide reliable laboratory services to diagnose HIV, common opportunistic infections, determine eligibility for ARV, and monitor the effectiveness and safety of drugs.

The World Health Organisation (2001) has outlined measures on minimum requirements for the use of ARVs in resource limited countries as follows:

- Assured access to VCT and institution of follow up counselling services for ART to ensure continued psychosocial support and to enhance adherence to treatment;
- Capacity to recognise and appropriately manage common HIV-related illnesses and opportunistic infections;
- Reliable laboratory monitoring services including routine haematological and biochemical tests for the detection of drug toxicity as well as access to facilities for monitoring the immunologic and virologic parameters of HIV infection;
- Assurance of an adequate supply of quality drugs, including drugs for the treatment of opportunistic infections and other HIV related illnesses;
- Identification of sufficient resources to pay for treatments on a long-term basis;
- Information and training on safe and effective use of antiretroviral drugs for health professionals in a position to prescribe ART; and
- Establishment of reliable regulatory mechanisms against misuse and misappropriation of antiretroviral drugs.

The potential for extending life with ARVs in developing countries has been demonstrated in Brazil. Universal access to AIDS treatment led to a 54 per cent reduction in AIDS deaths between 1995 and 1999. Treatment provision resulted in an overall cost saving for the government of about US \$472 million between 1997–1999 due to hospitalisation of about 146 000 people having been avoided (National AIDS Policy MOH, Brazil 2001). The use of ARVs is the best way of preventing opportunistic infections for patients who qualify to be on ARVs. Several ARVs have been registered for use in South Africa by the Medicines Control Council as shown in Table 63.

To date some generic drugs have also been registered in South Africa but not yet distributed due to patent rights and intellectual property rights disputes. The approach to ensuring long term affordability and sustained access is through improved supply that is consistent and reliable. Formulary management, directly observed or supervised use, supported by programs that will promote adherence and rational use, effective monitoring of antiretroviral treatment, (CD4 count, viral load measurement resistance testing), and pharmacovigilance, have been suggested. These should be linked to focused training of health professionals in the correct use of antiretroviral treatments and supported by

Table 63: ARVs Registered in South Africa

CLASS	GENERIC NAME	BRAND NAME	YEAR OF REGISTRATION
NRTI	Zidovudine	Retrovir	1989
NRTI	Didanosine	Videx	1992
NRTI	Zalcitabine	Hivid	1994
NRTI	Stavudine	Zerit	1998
NRTI	Lamivudine	Epivir	
PI	Siquanavir	Invirase Fortovase	1997
PI	Ritonavir	Norvir	1997
PI	Indanavir	Crixivan	1996
NNRTI	Nevirapine	Viramune	1998
PI	Nelfenavir	Viracept	1999
NRTI	ZDV/AZT	Combivir	1998
NNRTI	Efavirenz	Stocrin	
PI	Ritonavir/lopinavir	Kaletra	2002

1. *NRTI = Nucleoside Reverse Transcriptase Inhibitor*

2. *NNRTI = Non-nucleoside Reverse Transcriptase Inhibitor*

3. *PI = Protease Inhibitor*

availability of regularly updated clinical guidelines. There are currently several guidelines existing in South Africa that may differ on when to start therapy, choices of ARVs, when to switch therapy, etc. There is a need to harmonise these guidelines to ensure homogeneity and continuity in the management of HIV/AIDS patients nationwide. Due to the complexity, complications and dynamic nature of HIV/AIDS management, the Essential Drug Programme will play a pivotal role in updating the list frequently based on current science, develop a formulary management approach that is not only based on the cheapest drug prices but based on rational pharmacoeconomic approaches, and also develop treatment guidelines based on the harmonised guidelines.

3.13.2 HIV/AIDS policy

HIV/AIDS policy provides critical information on key principles guiding health workers in managing HIV/AIDS, whether in preventing new infections, caring for them or mitigating its impact. For this reason, it is important that health workers know about official AIDS policies and guidelines and be trained to translate them into action.

3.13.3 Needle stick injuries

We asked managers if facilities had standard procedures for needle stick injuries (Table 63). Ninety per cent of the primary health facilities said they do. All academic health facilities and all private hospitals said they had standard procedures. Generally, almost all health workers are aware of the protocol. There is a low percentage of primary health workers who are not aware of the protocol.

STUDY No. 3

Table 64: Percentage of health facilities that have policies relating to prophylactic treatment in case of accidental occupational exposure and the percentage that are aware of the policy, South Africa 2002

	PHC FACILITY/ CLINIC	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Health facility-std procedures needle stick injuries?				
Number of facilities	178	19	16	213
Yes	89.9	100	100	91
No	10.1	0	0	9
Health workers aware of protocol needle stick injuries?				
Number of facilities	158	18	16	192
Yes	97.6	100	100	97.9
No	2.4	0	0	2.1

3.13.4 Broad AIDS policy

The National Department of Health issued policies and guidelines on HIV/AIDS to be adhered to by all health facilities in the country. Table 65 shows that only 19 per cent of the management at 220 health facilities in the study said they had seen the 2000-2005 National HIV/AIDS Plan, with the private health facilities having the lowest number.

A low percentage of both the public and the private health facilities had an official policy. Only 55 per cent of the private hospitals had started with HIV/AIDS care and 48 per cent of them did not have an official HIV/AIDS policy.

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

Table 65: The extent of access of health workers to policies necessary to manage HIV/AIDS, South Africa, 2002

	PHC FACILITY/ CLINIC	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Total number of facilities	182	20	18	220
Have you seen the 2000–2005 National HIV/AIDS Plan?				
Yes	19	7.8	43	19.3
No	81	92.2	57	80.7
Guidelines on HIV/AIDS care issued by Dept of Health				
Yes	68.5	38.8	69.6	66.5
No	31.5	61.2	30.4	33.5
Does facility have an official HIV/AIDS policy?				
Yes	41.7	43.1	55.2	42.4
No	44.1	48.3	34.3	43.9
Don't know	14.3	8.6	10.5	13.7
Has facility started with HIV/AIDS activities?				
Yes	80.4	55.2	70.2	78.3
No	16.7	39.9	11.1	18
No response	2.9	4.9	18.7	3.7



STUDY No. 4

THE TOTAL COST OF
ADMINISTERING PROPHYLAXIS
THERAPY TO PREGNANT WOMEN AND
NEWBORNS TO DIFFERENT LEVELS
OF HEALTH CARE IN A PERI-URBAN
SETTING FOLLOWING THE
NEVIRAPINE AND ZIDOVUDINE
PROTOCOLS



STUDY ABSTRACT

1. Objective

The objective of this study is to cost the administration of chemoprophylaxis Azidothymidine (AZT) and Nevirapine (NVP) to newborns and pregnant women at different levels of health care.¹

2. Design and setting

This is a prospective study conducted at the Michael Mapongwane hospital and the Gugulethu Maternity Obstetric Unit, respectively. The latter clinic is part of the National Department of Health's National Pilot Programme for the Prevention of Mother-to-Child Transmission of HIV (PMTCT), following the Nevirapine (NVP) Protocol. The former facility follows the AZT protocol. The babies born are followed for 18 months from birth. Cost and utilisation data were collected from August 2001. The target sample size is 500 HIV positive women on NVP, 500 HIV positive women on AZT, and 500 HIV negative women. Uptake or enrolment into the study has been slow for various reasons.

Women who attend antenatal care at these clinics are counselled about HIV/AIDS and informed about voluntary participation in the PMTCT pilot programme. Consent is sought from women who elect to participate in the costing exercise.

The cost of providing antenatal care and administration of the AZT or Nevirapine PMTCT protocol is presented for women who are HIV positive. The cost of provision of antenatal care without administration of the AZT or Nevirapine PMTCT protocol for HIV negative women is also presented. The study examines the estimated programme cost of the intervention (from the perspective of the health system) associated with administering preventative therapy, including voluntary counselling (HIV+/HIV-), testing (HIV+/HIV-), drugs, formulae feeding, HIV rapid and confirmatory test, personnel time for administering the intervention, and feeding counselling for those who test seropositive. The UNAIDS spreadsheet for costing PMTCT was adapted for use in the Western Cape. In this phase infrastructural set-up costs are excluded. These will be included in the next interim report.

3. Findings

Phase 1 of this study shows that most women at these two sites are of a low economic status, shack dwellers, single parents and unemployed.

The average cost of providing chemoprophylaxis to an HIV positive woman on the AZT protocol is R848, compared to R657 for an HIV negative woman.

The average cost of providing chemoprophylaxis for an HIV positive woman on the NVP protocol is R399, compared to R351 for an HIV negative woman. However, there will be probable additional cost differentiation in Phase 2 of this study, which requires follow-up of the babies for 18 months.

¹ The study is ongoing and only an abstract is presented here. An interim report has been presented to the Department of Health, and will be published in due course. The authors acknowledge the useful comments of Dr Hilary Southall, and David Collins of Management Sciences for Health, and Dr Cathrine Sozi of the UNAIDS; the authors take responsibility for the contents of the report.

4. Conclusions

The costing exercise reveals several challenges in the provision of chemoprophylaxis to pregnant women and their newborns. The first phase of the study shows about an 18% increase in the costs of providing chemoprophylaxis to HIV positive women, compared to HIV negative women. Phase 2 of the study, which requires follow-up of the baby, is pending.



STUDY No. 5

AIDS-ATTRIBUTABLE MORTALITY
AMONGST SOUTH AFRICAN
HEALTH WORKERS



I. INTRODUCTION

Literature on HIV/AIDS morbidity or mortality amongst health workers is very scarce. To date, few studies have been conducted to estimate the proportion of health workers who have AIDS or have died of AIDS. The CDC reported that up until December 2002, 5.1 per cent of all reported AIDS cases in the USA for whom occupational information was available (23 951 of 469 850), had worked in the health sector. They also reported that 73 per cent of those health workers with AIDS had already died of the disease (www.cdc.gov/ncidod/hip/BLOOD/hivpersonnel.htm, last accessed 27 January 2003).

In Malawi researchers reported that in 1999 two per cent of health workers died of AIDS (60 deaths out of 2 979). For female health workers, the highest death rate was among those aged 25–34 years. The cause of death was reported to be TB in 47 per cent of cases, chronic illness in 45 per cent, and acute illness in the remainder. Chronic illness was thought to be due to AIDS, with TB being the common cause of death (Harries, Hargreaves, Gausi et al. 2002). The study did not measure AIDS mortality directly.

In a hospital study of deaths of female nurses in Zambia, Buve et al. (1994) estimated that the mortality rate was two in every 1 000 between 1980 and 1985, increasing to 7.4 in 1986–1988 and 26.7 in 1989–1991, but with few deaths (1, 2 and 7 respectively).

Several researchers and organisations have tried to use the limited data available to raise the issue of the impact of HIV/AIDS on the supply and demand of health workers. These works have alluded to HIV/AIDS as a major contributor to the morbidity and mortality of health workers and, therefore, the need to plan the development of human resources in the health sector (Tawfik & Kinoti 2003; USAID, Academy for Educational Development and Support for Analysis and Research in Africa 2003; Martinez & Martineau 2002; UK Parliament, Select Committee on International Development, 2003).

Health workers may acquire HIV through heterosexual transmission and/or nosocomial infection. Heterosexual sex is considered the dominant mode of HIV transmission in South Africa. Concerns have been raised regarding the transmission of nosocomial HIV amongst health workers. Another study from South Africa which evaluated occupational exposure to HIV/AIDS found that 13 per cent of health care workers reported exposure to medical sharps leading to injuries with HIV-positive patients (Gounden & Moodley 2000). The chances of nosocomial infection are high where health worker training in infection control is inadequate and equipment is reused, coupled with inadequate sterilization.

There is evidence that the disposal of medical waste in South Africa is not safe. Medical sharps (i.e., syringes, needles and blades that are capable of causing penetrating injuries, thus exposing persons to HIV and hepatitis) are disposed of in a manner that raises questions about the possibility that HIV infection in South Africa may be transmitted nosocomially. In a study conducted by the Management Sciences for Health (2001), in 1999 one in five clinics across the Eastern Cape province disposed of the sharps locally within premises – between seven days and three months may elapse before the medical waste containing sharps is collected from the clinic premises for incineration. During this time, medical waste may be contained in plastic refusal and disposal bags, which increases the risk of infection to health workers. Infected health workers may also transmit HIV to their partners.

2. STUDY OBJECTIVES

One of the objectives of the tender awarded to MEDUNSA and the HSRC was to determine the current status and projected morbidity, mortality and orphanhood among South African health workers and their dependants. As stated elsewhere in this report, we indicated in our response to the tender that we would not conduct a study of orphanhood and dependants of health workers given the complexity and time required to do justice to this issue and the resources available for the survey.

In order to meet the objective of determining the current and projected morbidity attributable to AIDS among South African health workers, a questionnaire was developed and pilot-tested in Gauteng. The aim was to compare the data obtained from the questionnaire with information on known AIDS cases among health workers admitted to hospitals. However, the pilot and Phase I of the study did not yield useful information about AIDS cases among health personnel since none of the patients treated at any of the sampled health facilities indicated that they were health workers. It was therefore not possible to use this method in the final phase of the study in the other eight provinces. Instead it was decided to test oral fluid samples of health workers for HIV antibodies.

To answer the question of AIDS-attributable mortality among health workers, the researchers proposed to the DoH that they analyse mortality data using death notification data from the Department of Home Affairs, which is processed by Statistics South Africa. The plan was based on an understanding that the DoH would assist in securing this data, which was only made available to us at the end of January 2003.

The objective of this study (No. 5) was to estimate the proportion of health workers who died of AIDS by using death notification data from Stats SA, and to provide the demographic profile of the deceased health workers.

3. METHOD

3.1 Database

Mortality data was obtained from Stats SA. The following description of their methods is summarised from a full description provided by Stats SA. The source documents are printed images of death notification forms collected from 1997 to 2001. The cause of death classification is based on the 10th revision of the International Classification of Diseases (ICD-10) using multiple causes of death. Statistics South Africa drew a 15 per cent probability sample of microfilm rolls for each year from 1997 to 2001 for analysis (see Table 66). The cutoff date for registering deaths occurring in 2001 was April 2002. All the data were recorded on 1 872 microfilm rolls. There were less microfilm rolls for 2001 than for 2000, which raised questions about the completeness of the death records. The 15 per cent sample of rolls yielded 279 681 death notification forms – this corresponds to 12 per cent of all death notification forms (i.e., 2.4 million deaths occurring between 1997 and 2001 inclusive).

Table 66: Number of universe, sample rolls and sampling fraction, January 1997 to April 2002

YEAR OF REGISTRATION	NUMBER OF ROLLS IN THE UNIVERSE	NUMBER OF ROLLS IN THE SAMPLE	SAMPLING FRACTION (%)
Jan–Dec 1997	290	44	15
Jan–Dec 1998	341	51	15
Jan–Dec 1999	374	56	15
Jan–Dec 2000	345	52	15
Jan–Dec 2001	382	57	15
Jan–Apr 2002	140	21	15
Total	1 872	281	15

Source: Statistics South Africa, 2002

The process entailed scanning information on the microfilms and then printing it in a format similar to the original death notification form (see Appendix 8). The information on the forms was keyed into the computer by experienced clerical staff.

3.2 Cause of death classification

In this study the definition of HIV-related cause of death was based on the classification made by Statistics South Africa. Specifically, ‘in cases where HIV or its synonyms (eg., immunocompromised, immunosuppression, retroviral disease, wasting syndrome) are stated on the certificate, an appropriate code related to HIV was used. ICD-10 has different codes for different HIV-related illnesses. 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.’¹ The definition of HIV included the following codes:

1 From e-mail correspondence sent by Stats SA on 22 November 2002: Final appendices cause of death.

- B20 Human immunodeficiency virus (HIV) disease resulting in infectious and parasitic diseases;
- B21 Human immunodeficiency virus (HIV) disease resulting in malignant neoplasms;
- B22 Human immunodeficiency virus (HIV) disease resulting in other specified diseases;
- B23 Human immunodeficiency virus (HIV) disease resulting in other conditions;
- B24 Unspecified human immunodeficiency virus (HIV) disease.

Because of the stigma associated with AIDS, it is likely that health workers may not enter AIDS as a cause of illness in medical records, nor as a cause of death on death records. This is not surprising – in a probability sample of nearly 10 000 people in South African households, 41.1 per cent indicated that health workers should not write AIDS on the medical records and 38.5 per cent said they should not write AIDS on the death notification form (Shisana, Simbayi, et al. 2002). It is thus likely that the recorded number of people who died of AIDS will be lower than expected.

Multiple cause of death was used as in the Statistics South Africa database. This is defined in ICD-10 as: All morbid conditions, diseases and injuries entered on the death certificate. These include those involved in the morbid chain of events leading to the death, which are classified as either the underlying, intermediate or any intervening cause, and those conditions that contributed to death but were not related to the disease or condition causing death. A second definition of HIV-related cause of death was TB, but only that which was indicated as related to HIV/AIDS. The specific codes for TB Associated with Aids are listed below:

- A15 Respiratory tuberculosis bacteriologically and histologically confirmed;
- A16 Respiratory tuberculosis not confirmed bacteriologically or histologically;
- A17 Tuberculosis of nervous system;
- A18 Tuberculosis of other organs;
- A19 Miliary tuberculosis;
- J65 pneumoconiosis associated with tuberculosis.

4. RESULTS

In the following section we present three categories of mortality:

- overall mortality of health workers due to all causes;
- mortality due to HIV/AIDS-related diseases, and mortality due to TB associated with AIDS among health workers;
- cause-specific mortality (due to HIV/AIDS) among health workers.

Due to small numbers, these categories of mortality are based on the aggregated data for the period 1997 to 2001. Note that since the absolute distribution of the sub-groups examined is not uniform, the percentages presented in the following tables were computed as row percentages so as to control for differences in the size of the sub-groups, hence the row percentages in each of the tables do not add up to 100%.

4.1 Overview of registered mortality among health workers

The sample produced a cumulative overall mortality ratio of 0.185 per 1 000 deaths among health workers. The cumulative overall mortality ratio was derived from the number of deaths among health workers during the period 1997 to 2001 (518), divided by the total number of deaths (279 581) during the period. Of the total number of deaths among health workers during the period, 5.6 per cent (29) were due to HIV/AIDS-related illness. If another 7.5 per cent (39) deaths due to TB associated with AIDS are added, then according to the registration data, 13 per cent of deaths among health workers were due to HIV/AIDS-related illness during the period.

4.2 Mortality of health workers due to HIV/AIDS related illness by background characteristics

Table 67: Mortality attributable to AIDS by age, South African health workers, 1997–2001

AGE	NUMBER IN GENERAL POPULATION THAT HAVE DIED OF AIDS	AIDS AS A % OF ALL DEATHS	TOTAL NO. OF HEALTH WORKERS WHO DIED OF AIDS	AIDS AS A % OF ALL DEATHS AMONG HEALTH WORKERS
0–4	2 315	11.9		
5–9	116	0.6		
10–15	44	0.2		
15–19	307	1.6		
20–24	1 643	8.5	1	33.3
25–29	3 381	17.4	3	14.3
30–34	3 719	19.1	6	13.0
35–39	3 041	15.7	4	8.0
40–44	1 970	10.1	8	15.4
45–49	1 313	6.8	3	7.1
50–54	698	3.6	1	2.5
55–59	356	1.8	1	2.9
60+	519	2.7	2	0.9
Total	19 422	100.0	29	–

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Table 67 shows mortality of health workers due to AIDS as a percentage of the sample of deaths due to HIV/AIDS. The results show that 0.1 percent of all deaths attributable to AIDS in the general population were people who worked as health workers (29/19 422). However, if the analysis is confined to the working age group in the general population (i.e. persons aged 15–64), the proportion of deaths attributable to AIDS contributed by health workers during the period is about nine per cent.

Table 68 presents the percentage of health workers who died from HIV/AIDS-related illness classified by race. The majority of health workers who died from HIV/AIDS-related illness were Africans. This is in line with the pattern of prevalence by race in the general population. Whites and coloureds appeared in equal proportion.

Table 68: Percentage of health workers who died from HIV/AIDS-related disease by race, South Africa 1997–2001

RACE	FREQUENCY	PERCENT
African	22	10.89
White	2	1.18
Coloured	2	9.09
Unspecified	2	1.82
Total	28	

Table 69 shows the distribution of registered deaths of health workers by marital status. The table appears to suggest that of all the marital status categories, widowed health workers are less likely to die of HIV/AIDS-related disease compared to single, married or divorced health workers.

Table 69: Percentage of health workers who died from HIV/AIDS-related disease by marital status, South Africa 1997–2001

MARITAL STATUS	FREQUENCY	PERCENT
Single	9	6.87
Married+living together	10	5.05
Widowed	2	1.94
Divorced	2	5.88
Unspecified	5	17.24
Total	28	

Table 70 presents the distribution of health workers dying of HIV/AIDS-related illnesses by education of the deceased. The table appears to suggest that dying of an HIV/AIDS-related illness is negatively associated with the level of education among health workers.

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Table 70: Distribution of deaths of health workers due to HIV/AIDS-related illness by education of the deceased, South Africa 1997–2001

EDUCATIONAL LEVEL	FREQUENCY	PERCENT
None	3	15.79
Less than matric	11	8.21
Matric	9	7.83
University/Technikon	3	2.61
Unspecified	5	3.42
Total	28	

Table 71 shows the occupation of the health workers who died from HIV/AIDS-related illness. The table suggests that nurses, aides, attendants and orderlies are more likely to die of HIV/AIDS-related illness than doctors and specialists.

Table 71: Distribution of deaths of health workers due to HIV/AIDS-related illness by occupation, South Africa 1997–2001

	FREQUENCY	PERCENT
Doctors and specialists	1	1.11
Professional nursing staff	9	6.04
Associate professional nursing staff	16	6.81
Aides, attendants and orderly	2	5.56
Total	28	

Table 72 suggests that health workers with HIV/AIDS-related illness are more likely to die in hospital than in their homes or elsewhere.

Table 72: Distribution of deaths of health workers due to HIV/AIDS-related illness by place of death, South Africa 1997–2002

LOCATION	FREQUENCY	PERCENT
Hospital	18	8.82
Non-hospital	10	4.18
Unspecified	4	5.97
Total	28	

4.3 Mortality of health workers due to TB associated with HIV/AIDS

Due to under-reporting of AIDS deaths, it is prudent to examine mortality due to other closely related causes of deaths. Tuberculosis is an opportunistic infection associated with HIV/AIDS. For this reason, we examined mortality due to TB associated with AIDS.

Table 73 shows mortality of health workers due to TB associated with HIV/AIDS as a percentage of the sample of deaths due to TB associated with AIDS. The results show that 0.1 per cent of all deaths attributable to TB associated with HIV/AIDS in the general population were people who worked as health workers (39/29 245). The proportion of deaths attributable to TB associated with HIV/AIDS in the working age group in the general population contributed by health workers during the period is about 11 per cent.

Table 73: Mortality attributable to TB associated with AIDS by age among South African health workers, 1997–2001

AGE	NO. IN GENERAL POPULATION WHO HAVE DIED OF TB	% OF ALL DEATHS FROM TB	TOTAL NO. OF HEALTH WORKERS WHO DIED OF TB	PERCENTAGE OF ALL DEATHS OF HEALTH WORKERS ATTRIBUTABLE TO TB
0–4	721	2.5		
5–9	170	0.6		
10–15	101	0.3		
15–19	453	1.5		
20–24	1 827	6.2		
25–29	3 761	12.9	6	28.6
30–34	4 498	15.4	9	19.6
35–39	4 124	14.1	8	16.0
40–44	3 256	11.1	3	5.8
45–49	2 690	9.2	4	9.5
50–54	1 974	6.7	4	10.0
55–59	1 558	5.3	3	8.8
60+	4 112	14.1	2	0.9
Total	29 245	100.0	39	28.6

Similar to the pattern in HIV/AIDS-related illness (see Table 72), Table 74 shows that health workers who die from TB associated with HIV/AIDS are more likely to die in health institutions than elsewhere.

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Table 74: Percentage of health workers who died from TB associated with HIV/AIDS by place of death, South Africa 1997–2001

LOCATION	FREQUENCY	PERCENT
Hospital	19	9.31
Non-hospital	10	4.18
Unspecified	8	3.35
Total	37	

In contrast with the pattern of HIV/AIDS-related illness described above, Table 75 appears to suggest that health workers without education are less likely to die of TB associated with HIV/AIDS than health workers who have some form of education, with the exception of health workers with a tertiary education.

Table 75: Percentage of health workers who died from TB associated with HIV/AIDS by education of the deceased, South Africa 1997–2001

	FREQUENCY	PERCENT
None	1	5.26
Less than Matric	8	6.96
Matric	10	8.70
University/technikon	2	1.74
Unspecified	16	10.96
Total	37	

With regard health workers dying of TB associated with HIV/AIDS by occupation, race and marital status, Tables 76–78 show a similar pattern to that of health workers dying of HIV/AIDS-related illness by occupation, race and marital status described in Tables 68, 71 and 69.

Table 76: Percentage of health workers who died from TB associated with HIV/AIDS

OCCUPATION	FREQUENCY	PERCENT
Doctors and specialists	4	4.44
Professional nursing staff	13	8.72
Associate professional nursing staff	16	6.81
Aids, attendants and orderlies	4	11.11
Total	37	

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Table 77: Percentage of health workers who died from TB associated with HIV/AIDS by race, South Africa 1997–2001

RACE	FREQUENCY	PERCENT
African	22	10.89
White	1	0.59
Coloured	1	4.55
Unspecified	13	11.82
Total	37	

Table 78: Percentage of health workers who died from TB associated with HIV/AIDS by marital status, South Africa 1997–2001

MARITAL STATUS	FREQUENCY	PERCENT
Single	18	13.74
Married + living together	10	5.05
Widowed	2	1.94
Divorced	2	5.88
Unspecified	5	17.24
Total	37	

5. DISCUSSION AND CONCLUSIONS

It is difficult to estimate accurately the proportion of health workers who died from HIV/AIDS-related illnesses using death notification data. Families and doctors fear that the insurance industry may not pay out benefits if the deceased did not declare their HIV status when the insurance policy was purchased. Anecdotal evidence also suggests that some of the African burial societies refuse to bury someone who died of HIV/AIDS-related illness. This is because AIDS is stigmatised. All these factors may contribute to underreporting of mortality due to AIDS.

As research has indicated, 'Projections based on different stages of the epidemic suggest that a country with a stable 15 per cent prevalence can expect that each year between 1.6 and 3.3 per cent of its healthcare providers will die from AIDS' (Tawfik & Kinoti 2003). Earlier we reported that in a random probability sample of health workers in four provinces, in the public and private sectors, working in primary, secondary or tertiary hospitals, an estimated 15.7 per cent tested positive for HIV antibodies. This figure is similar to the 15 per cent found amongst South Africans aged 15–49 years in another recent study (Shisana, Simbayi et al. 2002). This study estimated that 13 per cent of health workers died from HIV/AIDS-related illness during 1997–2001. If the projections suggested by Tawfik and Kinoti (2003) are applied to the results from this study, the estimated 13 per cent deaths of health workers over a five-year period is within the cumulative mortality range of eight to 16 per cent derived from the projections.

Despite the difficulty of establishing the accurate number of health workers dying of HIV/AIDS-related illness from registration data, certain patterns emerge from this study, despite the small numbers, as follows. African health workers appear to be more at risk of dying of HIV/AIDS-related illness than other health workers in other race groups. This may be related to educational attainment impacting on knowledge about HIV/AIDS (Africans generally have lower educational attainment than other race groups). Also, nurses and other para-medical personnel appear to have a higher risk of dying of HIV/AIDS than doctors and specialists. It is most likely that proportionately Africans are more likely to be nurses than doctors, which may partly be a reflection of disparities in educational attainment that have their roots in the history of the country.



SUMMARY AND RECOMMENDATIONS



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The four studies presented in this report were meant to answer the following three broad questions:

- To what extent does HIV/AIDS affect the health system?
- What aspects or sub-systems are most highly affected?
- How is the impact going to progress over time?

This section presents our conclusions and recommendations.

1. Impact of HIV/AIDS on the Health System

The HIV/AIDS epidemic will have an impact on the health system through loss of staff due to illness, absenteeism, low staff morale, and also through the increased burden of patient load. The impact is discussed below.

1.1 HIV prevalence in health workers

We found that an estimated 15.7 per cent (CI 95%: 12.2–19.9 per cent) of health workers employed in the public and private health facilities located in the Free State, Mpumalanga, KwaZulu-Natal and North West, were living with HIV/AIDS in 2002. This figure reflects the national HIV prevalence among persons aged 15–49 years, which was 15.6 per cent in 2002 (Shisana et al., 2002). The implication is that South African health workers are equally at risk of HIV infection as the general population. Among younger health workers, the risk is much higher. This group (aged 18–35 years) had an estimated HIV prevalence of 20 per cent (CI 95%: 14.1–27.6 per cent).

This means that, in the absence of anti-retroviral therapy, the country can expect, in the future, to lose at least 16 per cent of its health workers to AIDS. The impact is likely to be felt severely because younger health workers (18–45 years) have higher HIV prevalence ratios than older health workers.

1.2 Absenteeism among health workers

Being sick because of the disease and also serving patients who are ill from an HIV/AIDS-related disease, is likely to increase the stress of health workers. In the survey, we found 16.2 per cent had been treated for stress-related illnesses. Of the 16.2 per cent who were treated, 63.9 per cent had to take sick leave.

1.3 Low staff morale

We found that a third of health workers (33.8 per cent) had low morale due to several factors including stressful working conditions, heavy patient workload, staff shortages and low salaries.

1.4 High HIV prevalence in patients served

We also found that 28 per cent (CI 95%: 22.5–34.2 per cent) of patients served in the public and private health sectors in the four provinces surveyed were HIV positive. These HIV/AIDS patients stayed in hospital longer (mean length of stay: 13.7 days) than the non-HIV/AIDS patients (mean length of stay: 8.2 days). Longer stays are associated with higher costs to health services, putting pressure on funds to provide service to patients.

1.5 Increased patient load

The study results showed that overall there has not been an increase in the mean number of admissions to the medical wards of all patients (AIDS and non-AIDS) reported in 1995, 1997 and 2000. However, based largely on medical records, there has been a very large increase in the mean number of HIV/AIDS-related admissions between 1995 and 2000. The study also found that 94.6 per cent of health facilities indicated that over the last five years there has been an increase in patients seeking clinical care for HIV/AIDS-related illness and 97.1 per cent indicated that the number of admissions for HIV/AIDS clinical care have also increased. We also triangulated by analysing the findings from the health worker survey, which differed slightly from the information obtained from chief administrative officers. We found that 73 per cent of health workers surveyed reported that there was an increase in workload. The heaviest burden fell on professionals (81 per cent). About a third of these health workers indicated the workload increased by 75 per cent of the usual workload in the last year. Interestingly, during this period, the total bed occupancy rates have remained about the same. These results suggest that non-AIDS patients have been 'crowded out' of the health care system to give way to HIV/AIDS patients. This 'crowding out' effect is largely in the public health sector, where the bed occupancy rate remained in the upper 80s or lower 90s. The private hospitals have not been affected as much, although their bed occupancy rates have remained relatively low, increasing from 49.1 per cent in 1995 to 53.6 per cent in 2000.

Given the large increase in HIV/AIDS patients seeking clinical care, we examined whether the health facilities have staff specifically assigned to deal with HIV/AIDS care activities. We found that more than half (54.5 per cent) of health facilities have already assigned staff to deal with this disease. Despite the allocation of staff to manage HIV/AIDS patients, 80 per cent of all managers of health facilities surveyed, expressed the need for more staff to cope with the demand for HIV/AIDS care.

The services to be provided were VCT, clinical management of opportunistic infections, health education, nutrition supplementation, condom supply and education and follow-up to monitor adherence to TB treatment. Less than half of the facilities provided home-based care, and those that did were largely in primary care facilities and in about a third of public hospitals.

We also asked whether health facilities had admission policies for patients presenting with AIDS. Some of the facility managers said they had no admission policies. Others had a policy to treat AIDS patients like all other patients. Others have an open policy of admitting all patients to any other ward, depending on the availability of beds. This depended on whether they have AIDS-related symptoms. Still others had a policy to treat AIDS patients at home, particularly when they were considered to be terminally ill. This inconsistency is not surprising because only 42.4 per cent of all health facilities had their own official HIV/AIDS policy and 13.7 per cent did not even know whether they had an official policy on HIV/AIDS.

We were surprised to find that a mere 19.3 per cent of managers of 220 health facilities surveyed had seen the *2000–2005 National HIV/AIDS Plan*. Some 43 per cent of the public hospital managers had seen it, while only 19 per cent of the PHC centres have

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seen it. Even more surprising was the finding that only 7.8 per cent of private health sector managers had seen this plan. These are the implementers of the health services component of this plan and hence should have had access to this key document. What is encouraging is that 66.5 per cent of health workers had access to the Department of Health's *Guidelines on HIV/AIDS Care*. However, only 38.8 per cent of managers in the private health sector had access to these guidelines.

The absence of uniform admission policies for patients presenting with HIV/AIDS-related illness is likely to impact on the health care system's ability to cope with the increased demand for AIDS care. We observed the 'crowding out effect' in public hospitals and district hospitals, which is probably due to lack of a clear policy on how to manage patients with HIV/AIDS disease. *We recommended that a home-based care policy be adopted as a standard for managing patients presenting with HIV/AIDS-related illness, noting that some are already providing this service. However, families would need to be supported and equipped to manage these patients, so that this policy should not result in dumping of patients on already poor families. The support should include food parcels for families of people living with HIV/AIDS, and provision of disinfectants to prevent infection while handling patients' blood.*

Due to the low percentage of health facilities that have access to the *2000–2005 National HIV/AIDS Plan*, *it is recommended that the Department of Health ensures that each health manager has a copy of the plan. The same is recommended for the Department of Health's Guidelines on HIV/AIDS Care.*

Hospitals that have reduced the length of stay in developed and middle income countries provide antiretroviral therapy for people living with HIV/AIDS. As stated earlier, in a London hospital, the average length of stay of AIDS patients decreased from 16 days in 1992 to 11 days in 1997, and similar changes were reported from other hospitals in industrialised countries (Mocroft et al., 1999). Major causes for the decrease in length of stay are the introduction of (a) prophylactic treatment for PCP in 1989, (b) dual antiretroviral therapy in approximately 1994, and (c) highly effective antiretroviral therapy (HAART) in 1996. South Africa could reduce the burden of HIV/AIDS on public hospitals and district hospitals through the provision of HAART. *We recommended that the public sector provide ARVs for people living with HIV/AIDS whose health status indicates this.*

2 Affected sub-systems of the health care system

The sub-systems of the health care system affected are the primary health care, secondary, tertiary and academic state hospitals (grouped as public hospitals) and the private health system. The results are summarised below.

2.1 Primary health care system

The PHC system is not immune to the impact of the HIV/AIDS epidemic. The study results revealed that 25.7 per cent (CI 95%: 19.8–32.5 per cent) of the patients served in the four provinces were living with HIV/AIDS. The AIDS patients stay longer in district hospitals (mean length of stay: 20.3 days) than non-AIDS patients (mean length of stay: 5.2 days). The cost of PHC services is likely to increase substantially.

2.2 Private health sector

The private sector is also affected because 36.6 per cent (CI 95%: 21.3–55.4 per cent) of the patients were HIV positive. However, the private sector seems to have room to absorb the impact because the bed occupancy rate is still low. The high user rates probably prohibit frequent and extended stays in hospitals. Indeed the private health sector had the shortest length of stay in hospital for both AIDS and non-AIDS patients, 6.3 per cent and 6 per cent respectively.

2.3 Public health sector

The burden on the health care system is felt most in public hospitals, where 46.2 per cent (CI 95%: 37.9–54.7 per cent) of the patients served in the medical and paediatric wards tested positive for HIV. Unlike district hospitals, which keep AIDS patients longer, public hospitals keep their AIDS patients for shorter times. Moreover, the non-AIDS patients stay longer in hospital than the AIDS patients, suggesting that some hospitals have a policy for stabilising and then discharging them.

2.4 Supply of equipment to treat HIV/AIDS patients

When we assessed the capacity of the health care system to cope with HIV/AIDS patients, we investigated the extent to which health facilities were adequately equipped to provide necessary services. The results showed that the private sector followed by primary care facilities were least equipped to provide testing for HIV because 75.5 per cent of the private facilities and 59.2 per cent of the PHC facilities reported never to have HIV test kits in stock. This means that they were more likely to send their patients to be tested elsewhere suggesting that most patients are unlikely to return to the facility to obtain their results. We found 32.1 per cent of the public hospitals not to be equipped with HIV test kits. Rapid testing would increase uptake of VCT services that are being expanded throughout South Africa.

Most health care facilities stocked syringes and needles, protective clothing and gloves most of the time. However, nearly one in five private sector health facilities did not have protective clothing and gloves to prevent infections or cross-contamination.

Only 65 per cent per cent of all health facilities have adequate supply of sterilising equipment 75–100 per cent of the time. The survey showed that 30 per cent of PHC facilities never stocked sterilising equipment. This may not be the disinfectant of choice. The absence of sterilising equipment in a health care facility indicates that patients are at risk of contracting (hospital-acquired) nosocomial infection. Nosocomial infections are a problem worldwide, especially in developing countries where most health care facilities have inadequate, or lack any, infection control systems in place. Low temperature sterilisation is an essential tool for the sterilisation of heat labile clinical and diagnostic equipment such as endoscopes and surgical instruments. Disinfectants and frequent hand washing are among the most simple and applicable ways of reducing nosocomial infections. Health workers also indicated that they did not obtain sufficient training in infection control systems. *For the health care system to cope adequately with HIV, it is critical that infection control systems be significantly improved.*

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2.5 Drug supply system

The burden on the public health care system is also felt in the drug supply system. Drugs were available to treat opportunistic infections and not for prolonging life. The only ARV's available (NNRTI and NRTI) were for prevention of transmission of HIV from mother to child and/or for post-exposure prophylaxis. The private sector was better equipped with ARVs for treating patients.

The health care system is better equipped to treat TB patients. All the anti-TB drugs surveyed were generally available at over 80 per cent of all the facilities 75–100 per cent of the time.

Antibiotics were generally available to treat most infections related to HIV/AIDS. However, the supply of antiviral agents for treatment of serious viral opportunistic infections such as herpes, and cytomegalovirus (CMV), was generally very low in all facilities, with the private facilities having the highest availability of these agents.

Proper medical management of HIV/AIDS requires that the government revise the Essential Drugs List and treatment guidelines to include the drugs shown to be unavailable.

To manage HIV/AIDS effectively in South Africa, we recommend that a national treatment plan be developed and implemented to reduce the burden of HIV/AIDS on the health sector. The elements of such a plan would include:

- *Distribution of the National AIDS plan to all public and private health care facilities;*
- *Training of health workers to manage HIV/AIDS;*
- *Staffing ratios;*
- *Availability of supplies;*
- *Drug availability including ARVs;*
- *Treatment guidelines;*
- *Funding of these services; and*
- *Mortality of health workers.*

3. Progression of the impact of HIV/AIDS over time

Elsewhere in this report we projected that South Africa will have 416 580 new AIDS cases in 2003. In all, we projected that since the beginning of the epidemic in 1990, South Africa will have had 2 064 900 new AIDS cases. Some of these people will have died by now. We projected that in 2003, half of these patients will seek care in the public health sector for HIV/AIDS related illness. The impact of such a large number of people seeking clinical care in the public health facility for one disease is substantial.

For this reason, it is *recommended that antiretroviral therapy, nutrition supplementation coupled with food security, and home-based care, should be the package provided to people with AIDS who are seeking care.* This service would be provided in addition to the standard care described earlier.

Mortality of health workers due to AIDS

We earlier reported that in a probability random sample of health workers in the public and private sectors – working in primary, secondary or tertiary hospitals – an estimated 15.7 per cent tested positive for HIV antibodies. This figure is similar to the 15 per cent estimated amongst South Africans generally aged 15–49 years in a national household survey undertaken in 2002 (Shisana, Simbayi et al. 2002). 'Projections based on different stages of the epidemic suggest that a country with a stable 15 per cent prevalence can expect that each year between 1.6 and 3.3 per cent of its healthcare providers will die from AIDS' (Tawfik & Kinot 2003). This implies that a cumulative five-year mortality rate of health workers would be between 8 and 16 per cent. The study estimated that 5.6 per cent of health workers who died between 1997 and 2001 were due to HIV/AIDS-related illness. If another 7.5 per cent of deaths due to TB associated with AIDS are included, then, according to the registration data, an estimated 13 per cent of health workers died from HIV/AIDS-related illness during this period. If the guideline used by Tawfik and Kinoti (2003) is applied, then South African health workers are probably dying at the rate that is within the expected range.

Based on the findings of this study, *it is recommended that a human resource plan for the South African health sector should consider the attrition of health workers due to AIDS-related mortality, and more nurses should be trained to compensate for this.* This is particularly so in view of the tendency of international agencies to aggressively recruit South African nurses.



APPENDICES AND REFERENCES



APPENDIX I

Instructions to fieldworkers

General remarks

- The contents of the questionnaires and the replies of respondents are strictly confidential. Under no circumstances may the fieldworker supply any information in respect of the contents of the questionnaire or the replies of respondents to anyone else.
- fieldworkers must get the informed consent of respondents (health workers, patients) before starting with the interview. The respondent must also give his/her permission to be interviewed by signing the consent form. If a person does not want to participate, report it to the Fieldwork Co-ordinator (FWC). The FWC will provide you with a replacement (another person) to interview instead.
- It is very important to complete the section on interview details at the beginning of the questionnaire. Every completed questionnaire must be signed by the fieldworker and the date on which the questionnaire was completed should be filled in.
- The whole questionnaire must be checked carefully after every interview to ensure that no question or page has been omitted. A good idea is to initial every page as proof that this check has been carried out.
- Fieldworkers must write in a clear and readable handwriting and all questionnaires should be completed in English, irrespective of the language in which the questions are asked.
- No payment will be made for questionnaires that are incomplete or not completed in accordance with the instructions of this manual or the instructions in the questionnaire.
- Each fieldworker will be expected to conduct at least one interview per questionnaire during the training, in the presence of a researcher, before a start is made with the fieldwork.
- Fieldworkers will operate in teams under the guidance of a FWC. The FWC will select the respondents and provide the Fieldworkers with detail on the interviews that they will have to conduct. If Fieldworkers experience any problems, they should discuss it with the FWC. If the FWC cannot solve the problem, he/she must contact the project manager.

The questionnaires must reflect the respondent's answers and opinions and questionnaires that were influenced by the fieldworker or outsiders will be destroyed without payment.

The FWC as well as members of the project team will conduct quality control.

Selection of respondents

Respondents will be selected by the FWC. After the selection of respondents the FWC will indicate to each fieldworker which respondents should be interviewed. *Only respondents indicated by the FWC should be interviewed.*

Health workers at hospitals

1. Obtain a service roster of health workers¹ who will be on duty for the days that the fieldwork team will visit the hospital. The list should be categorised per occupational category.
2. Number the staff members per occupational category.
3. Use your *Interview Profile* to get the number of interviews to be conducted per health facility. The number of interviews is indicated per occupational category, namely medical *doctors/specialists, nurses, other professionals and non-professional (support) staff*.
4. Draw a systematic sample for each occupational category as follows (use a calculator): for example, if the name list of staff members shows that there are 100 doctors/specialists in the facility, divide the total number of doctors by the number of interviews needed e.g. $100 \text{ doctors} / 8 \text{ (number of interviews needed)} = 12.5$. Interval = 13 (i.e. 12.5 rounded to nearest integer)
5. Use the random number table to obtain a random starting point between 1 and 13 e.g. 5.
Select number 5 and select every 13th person thereafter i.e.
 $5 + 13 = 18$;
 $18 + 13 = 31$,
 $31 + 13 = 44$, etcetera.
In this case doctors number 5, 18, 31, 44 etc. will be interviewed.
6. Repeat this process for every occupational category.

NB. If a respondent is not available e.g. attending a conference, leave, sick leave, he/she should *be replaced randomly by another person in the same occupational category*. For example, if number 18 is not available, a replacement is needed for that doctor. To do this, obtain *a random number between 0 and 100* (total number of doctors). If this number has not been selected yet, e.g. 38, use that doctor as the replacement. If the number has already been selected, e.g. 18, draw another random number (using your random table).

Health workers at clinics

1. Obtain a service roster of health workers² who will be on duty for the day that the fieldwork team will visit the clinic. The list should be categorised per occupational category.
2. Number the staff members per occupational category. If there are more than three nurses per clinic, follow the same process as for hospitals and systematically draw three. If there are three or less than three nurses, interview all of them.
3. Non-professional staff – if there are more than three non-professional staff at a clinic, follow the same process as for hospitals and systematically draw three. If there are three or less than three non-professionals, interview all of them.

Patients at hospitals

1. Get the total number of patients that has to be interviewed from the Interview Profile e.g. 12 patients.
2. Obtain a list of all patients who are in the medical and paediatric wards of the hospital from the superintendent/sisters in charge of the wards.

¹ Doctors, nurses and other professionals eg. social workers, psychologists, occupational therapists.
Non-professional staff e.g. cleaners, porters, caregivers (ward hostesses) who are in contact with patients undergoing treatment in hospitals.

² Nursing staff i.e. professional nurses, student nurses, nursing assistants, enrolled nurses, staff nurses.

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3. Combine the two lists into one and number the patients. Draw a systematic sample of 12 patients as follows (use a calculator): for example, if the patient list shows that there are 36 patients in the medical and paediatric wards of the hospital, divide the total number of patients by the number of interviews needed e.g. $36 \text{ patients} / 12 \text{ (number of interviews needed)} = 3$. Interval = 3
Use the Random number table to obtain a random starting point between 1 and 3 e.g. 2.

Select number 2 and select every third person thereafter i.e:

$$2 + 3 = 5;$$

$$5 + 3 = 8,$$

$$8 + 3 = 11, \text{ etcetera.}$$

In this case patients' number 2, 5, 8, 11 etc. will be interviewed.

NB: If a patient refuses to be interviewed, the patient should be replaced by another randomly selected patient in the same ward. For example, if number 8 is not available, a replacement is needed for that patient. To do this, obtain a random number between 0 and 36 (total number of patients) on your random table. If this number has not been selected yet e.g. 4; use that patient as the replacement. If the number has already been selected, draw another random number. If there are only 12 or less than 12 patients in the hospital, interview all of them.

Patients in clinics

1. According to the Interview Profile, 6 patients should be interviewed per clinic.
2. Draw a systematic sample as follows:
Upon arrival at the clinic (early in the morning), an estimate of the number of patients that normally visits the clinic on a specific day e.g. Wednesday, should be obtained from the person in charge. For example, at a certain clinic they normally expect 50 patients on Wednesdays.
Calculate the interval as $50/6 = 8$ (8,33 rounded to nearest integer)
This means every eighth patient who arrives at the clinic should be interviewed.
3. Interview the first patient who arrives at the clinic, and then the ninth one (1 + 8); the 17th (9 + 8) and then the 25th (17 + 8) etcetera. Respondents may be adult or children patients.

NB: Patients should be interviewed before they consult the clinic sister.

The interview

General

1. The success of fieldwork is largely dependent on the fieldworker's approach and the co-operation he/she obtains from the respondent.
2. The fieldworker must always state his/ her case clearly and convincingly. She has to gain the confidence of the person to whom she is speaking, so that the respondent will answer freely and honestly, with the assurance that it will not be to the respondent's disadvantage. Fieldworkers must at all times be professional but friendly and spontaneous.

3. Most people will cooperate if the aim of the investigation has been explained clearly and if the fieldworker does not try to mislead the respondent for example, by saying that the interview will last only a few minutes, whereas in reality interviews will take ± 45 minutes.
4. Fieldworkers should try to conduct interviews in privacy, with only the respondent present.
5. Face-to-face interviews will be conducted by means of four separate questionnaires namely:
 - Demographic and Morbidity Questionnaire for Children;
 - Demographic and Morbidity Questionnaire for Adults;
 - The impact of HIV/AIDS on professionals in the health sector; and
 - The impact of HIV/AIDS on non-professional (support) health workers.
6. Questionnaires should be completed in pen, in English and in a clear and readable handwriting.

Introduce yourself

1. Say who you are and that you are helping the Human Sciences Research Council (HSRC) with research.
2. Use the information on the consent form of the questionnaire to explain the purpose of the study.
3. Before interviewing a patient, make sure that the person is of the right age (15 years and older = adult questionnaire; younger than 15 years = child questionnaire) so that the correct version of the Demographic and Morbidity questionnaires are used for the interview.

Refusals

If the respondent does not want to participate (refuses to give consent), complete the consent form and tear it off and hand it to the FWC. Write the information on your fieldworker table. Ask the FWC to replace the respondent.

Use a new consent form with the questionnaire to interview the replacement.

Completing the questionnaires

The content of the various questionnaires were discussed with you. You also participated in mock interviews to prepare yourself for the interviews with health workers and patients.

Please refer back to the notes that you took during the training session if your experience problems with the content of questionnaires. Otherwise consult your FWC.

Overview of interviews form

Fieldworkers should complete a copy of the form on the following page to provide a daily overview of the interviews that they conducted. At the end of each day the completed form and questionnaires should be returned to the FWC for record keeping and quality control.

APPENDIX I

Name of fieldworker

Fieldworker co-ordinator

[illegible]

APPENDIX 2

AIDS case definitions

CDC 1987

Without laboratory evidence

INDICATOR DISEASES

- Candidiasis of the oesophagus, trachea, bronchi, or lungs;
- Cryptococcosis, extra-pulmonary;
- Cryptosporidiosis with diarrhoea persisting >1 month;
- Cytomegalovirus disease of an organ other than liver, spleen, or lymph nodes in a patient >1 month of age;
- Herpes simplex or bronchitis, pneumonitis in a patient >1 month of age;
- Kaposi's sarcoma in a patient <60 years of age;
- Lymphoma of the brain (primary) affecting patient <60;
- Mycobacterium avium complex or M. Kansalis disease, disseminated (site other than/in addition to lungs, skin, cervical or lymph nodes);
- PCP;
- Progressive multifocal leukoencephalopathy;
- Toxoplasmosis of the brain in a patient > 1 month of age;
- In children <13: 2 or more bacterial infections within a two-year period (septicaemia, pneumonia, meningitis, bone, or joint infections) or abscesses of an internal organ, or body cavity excluding otitis media or superficial abscesses.

With laboratory evidence

INDICATOR DISEASES

- Coccidiomycosis, disseminated;
- HIV encephalopathy;
- Histoplasmosis, disseminated;
- Isosporiasis with diarrhoea persisting >1 month;
- Kaposi's sarcoma at any age;
- Lymphoma of the brain (primary) at any age;
- Non-Hodgkin's lymphoma;
- Any mycobacterium disease caused by other than M. tuberculosis, disseminated;
- Disease caused by M. tuberculosis, extra-pulmonary;
- Salmonella (non-typhoid) septicaemia, recurrent;
- HIV wasting syndrome;
- Indicator disease diagnosed presumptively;
- Candidiasis of the oesophagus;
- Cytomegalovirus retinitis with loss of vision;
- Mycobacterium disease disseminated;
- PCP;
- Toxoplasmosis of the brain in a patient >1 month of age;
- In children <13; lymphoid interstitial pneumonia and/or pulmonary lymphoid hyperplasia.

APPENDIX 2

CDC/CD4

The following conditions were added to conditions listed above with laboratory evidence:

- CD4 + T-lymphocyte count $<200 \times 10^6$ litre (or a CD4 % of $<14\%$);
- Pulmonary TB;
- Cervical cancer invasive;
- Recurrent pneumonia (more than one episode within a 12 month period).

European

Same as revised CDC above but without CD4+ T-lymphocyte count

WHO surveillance (Bangui/WHO/clinical)

The World Health Organization formulated the Bangui definition of AIDS in a meeting held in Cote d'Ivoire in 1985. The definition was intended to be used for surveillance purposes in Africa, in consideration of the limited diagnostic resources characteristic of this part of the world.

The definition allows for a diagnosis of AIDS in adults or adolescents (≥ 12 years) and in children (<12 years) in the absence of laboratory evidence.

For surveillance purposes, an adult is said to have AIDS when two major and one minor sign/s are present.

Major signs in adults

- Weight loss more $\geq 10\%$ of body weight
- Chronic diarrhoea >1 month
- Prolonged fever >1 (intermittent or constant)

Minor signs in adults

- Persistent cough >1 month
- Generalised itching skin rash
- Recurrent herpes zoster
- Oro-pharyngeal candidiasis
- Chronic progressive and disseminated herpes simplex infection
- Generalised lymphadenopathy

For surveillance purposes, a child is said to have AIDS when two major and at least two minor signs are present.

Major signs in children

- Weight loss or abnormally slow growth
- Chronic diarrhoea >1 month
- Prolonged fever >1 month

Minor signs

- Generalised lymphadenopathy
- Oro-pharyngeal candidiasis
- Repeated common infections (otitis, pharyngitis, etc.)
- Persistent cough
- Generalised dermatitis
- Confirmed maternal LAV/HTVL-111 infection (PAHO, June 2000)

The Bangui definition has been used extensively for surveillance purposes and generated statistics on prevalence of AIDS in Africa as indicated in Table 79.

Table 79: Number of AIDS cases in Africa according to WHO based on the Bangui definition and cases registered on the basis of positive HIV test results

CASES IN AFRICA (CUMULATIVE SINCE 1980)	REPORTED IN MILLIONS	ESTIMATED UNDERREPORTING IN MILLIONS	ESTIMATED TOTAL IN MILLIONS	ESTIMATED OF CASES IN % THE TOTAL
WHO report July 1994	0.33	2.35	2.68	88%
WHO report January 1995	0.35	2.8	3.15	89%
WHO report November 1997	0.62	9.78	10.4	94%
Cases between July 1996 and November 1997	0.12	4.4	4.5	97.3

Source: Fiala, 2000

Expanded WHO Surveillance (formerly Abidjan)

For purposes of surveillance an adult (>12 yrs of age) is a case of AIDS if HIV test results are positive and one or more of the following conditions are present:

- Ten per cent of body weight loss or cachexia, with diarrhoea or fever or both, intermittent or constant for at least 1 month, not known to be due to a condition unrelated to HIV infection;
- Cryptococcal meningitis;
- Pulmonary and extra-pulmonary TB;
- Kaposi's sarcoma;
- Neurological impairment sufficient to prevent independent daily activities not known to be due to a condition unrelated to HIV infection (eg. trauma or cerebrovascular accident);
- Candidiasis of the oesophagus (which may presumptively be diagnosed based on the presence of oral candidiasis accompanied by dysphagia);
- Clinically diagnosed life-threatening or recurrent episodes of pneumonia, with or without aetiological confirmation;
- Invasive cervical cancer.

APPENDIX 2

Caracas and Revised Caracas/PAHO

A patient is defined as having AIDS when cumulative points assigned to conditions listed in Table 80 are equal to or exceed ten and when an HIV test is positive. Cases in which the total point score exceed the required ten, but HIV serology is pending, are considered to be 'pending cases.' Persons with cancer, immunosuppressive therapies, or those with signs that are attributable to conditions other than HIV infection, are excluded.

Table 80: Revised Caracas/PAHO AIDS definition

SYMPTOMS/DIAGNOSTIC	ASSIGNED POINTS
Kaposi's sarcoma	10
Disseminated/extrapulmonary, non-cavity pulmonary TB	10
Oral candidiasis/hairy leukoplasia	5
Pulmonary TB with cavitations or unspecified	5
Herpes Zoster in a person of 60 or less	5
Central nervous system dysfunction	5
Diarrhoea one month or more	2
Fever at least 38 degrees for at least a month	2
Cachexia or weight loss of > 10%	2
Asthenia of at least a month	2
Persistent dermatitis	2
Anaemia, lymphopenia, and/or thrombocytopenia	2
Persistent cough or any pneumonia and/or thrombocytopenia	2
Lymphadenopathy of at least 1 cm at least two non-inguinal sites	2
Required point score	10 or more

APPENDIX 3

Steps in sample design, drawing of the sample and weighting

Steps in the design of the sample

- Define target population: All professional and non-professional health workers and all adult and child patients in public and private health facilities in SA (Note: In hospitals only patients in medical and paediatric wards).
- Define sampling frame: DoH's health facilities database (1996).
- Define reporting domain: South Africa.
- Define explicit strata: Provinces and health regions within provinces.
- Define Primary Sampling Units (PSU): Magisterial districts in the case of public clinics; none in all other cases.
- Define Secondary Sampling Units (SSU): Clinics and hospitals.
- Define Measure of Size (MOS) for public clinics: Some monotonic function of the number of clinics per magisterial district.
- Define MOS for hospitals and private clinics: Some monotonic function of the number of beds as in DoH's database.
- Define Ultimate Sampling Units (USU): professional and non-professional health workers and patients (in hospitals only patients in medical and paediatric wards).
- Allocation of sample: proportional to MOS.

Steps in drawing the sample

- Determination of sample sizes for SSUs:
 - 167 public clinics
 - 33 public hospitals
 - 22 private hospitals and clinics
- Determination of sample sizes for USUs:
 - 1 000 patients
 - 500 nursing personnel
 - 300 medical doctors
 - 100 other professional health workers
 - 400 non-professional health workers
- These sample numbers were approximately allocated in the ratio 2:1 to public/private health facilities
- Allocation of the above health facility sample sizes to provinces: Approximately proportionally
- Selection of PSUs (public clinics): Two PSUs (i.e. clinics) per drawn magisterial district. Number of magisterial districts drawn per province approximately = allocated number of public clinics divided by 2
- Selection of USUs per SSU: Equal probability sampling
- Sample realisation: Differ a little bit from the above aimed sample sizes

Steps in weighting the sample

- Sampling weight of health facilities: Equal to the reciprocal value of the selection probability. Non-responding health facilities were substituted with a similar health facility – in some cases a non-response correction factor had to be used

APPENDIX 3

- Sampling weight of health personnel and patients in public clinics: Number of health personnel/patients present/visiting the clinic on 'sample day' divided by the number of health personnel/patients interviewed at the clinic
- Sampling weight of health personnel in hospitals and private clinics: Number of health personnel of each category at hospital and private clinic (limiting only to medical and paediatric wards where possible) divided by the number of health personnel of each category interviewed. Average figures were used in non-responding cases
- Sampling weight of patients in hospitals and private clinics: Actual number of patients (in medical and paediatric wards, where possible) divided by the number of patients interviewed.
- The final sample record weight was calculated as the product of the health facility sampling weight and the sampling weight of the appropriate category of health personnel or patient.

Challenges faced in conducting the study

The survey of health workers was conducted in two stages. During the first stage, Gauteng province was surveyed. The other eight provinces were surveyed after the successful completion of the Gauteng survey.

During the situation analysis the research team experienced problems gaining access to health facilities. Organisational information was also not readily available at the health facilities that were visited.

On the other hand, information on the database was incomplete in terms of the requirements of the study and sometimes inaccurate, especially in terms of public clinics. The health sector has been through transformation and rationalisation since the database was updated in 1996. As a result, aspects such as the operational status and/or names of many facilities changed, which made it difficult to link health facilities on the database to facilities that were operational during the planning of the survey. Apart from the names of clinics, no other information such as contact details appeared on the database. As an alternative, the nine provincial health departments as well as local authorities were approached for contact information.

At the same time, these departments were also contacted to obtain permission to access health facilities. This process was complex and time-consuming. For instance, we had to approach various people at higher levels to get permission to access health facilities at the bottom end. Provincial structures were not the same, which meant that every province had to be approached differently. Faulty communication lines, or a lack of telephone or fax facilities, were further obstacles once we received permission to contact health facilities, especially facilities in rural areas.

Due to the lack of information on the database, the lack of information at facilities and the problems that we encountered in terms of gaining access to facilities, the research team decided to conduct the survey in Gauteng before commencing with the survey in the other eight provinces. Based on the experience gained during the first phase (Gauteng survey), the second phase (survey in the other eight provinces) was planned and executed.

A team of people at the HSRC planned the fieldwork. They verified the sample of health facilities with the respective provincial departments of health. They also established the initial contact with facilities, collected some background information on the facility and arranged access on behalf of the fieldwork teams. Approximately a quarter of the health facilities in the sample had to be replaced because of incorrect information. The few facilities that refused to participate were also replaced.

APPENDIX 4

Standard operating procedures for collecting, storing and transporting oral fluid using the OraSure® HIV-1 oral specimen collection device

OraSure® HIV-1 Oral Specimen Collection Device is a device for the collection of oral fluid specimens for detection of antibodies to Human Immunodeficiency Virus Type 1 (HIV-1) and Type 2 (HIV-2).

Name and intended use

OraSure Oral specimen Collection Device is intended for use in the collection of oral fluid specimens by properly trained individuals, for the purpose of testing for the presence of antibodies to Human Immunodeficiency Virus. OraSure specimens are intended to be used *only* with the Oral Fluid Vironostika® Microelisa screening test manufactured by Organon Teknika Corporation.

Restrictions

- The administration of this device is restricted to individuals who have been trained in the use of this device.
- The device is not to be provided to subjects for home use.
- Testing of OraSure oral fluid specimens for HIV antibodies is restricted to testing with the Oral Fluid Vironostika® Microelisa System manufactured by Organon Teknika Corporation.

Summary and explanations of the OraSure HIV-1 collection device

Early experience using oral fluid for HIV testing suggested that there was a problem of specimen instability and assay insensitivity. Saliva is a complex mixture of parotid, submandibular, sublingual and minor salivary gland secretions, mixed with mucin, bacteria, leukocytes, sloughed epithelial cells and gingival crevicular fluid. Gingival crevicular fluid or mucosal transudate is the fluid derived from the passive transport of serum components through the oral mucosa into the mouth. Among the serum components in mucosal transudate are immunoglobulins or antibodies. Antibodies that are specific for the HIV virus can be detected by in vitro tests.

The OraSure device consists of an absorbent cotton fibre pad, impregnated with a proprietary mixture of common salts and gelatine affixed to a nylon stick. The pad creates a hypertonic environment and an increased osmotic pressure whenever it contacts oral mucosal cells. The pad is placed in contact with the gingival mucosa (between the lower gum and cheek) and enhances the flow of mucosal transudate across the mucosal surfaces onto the absorptive cotton fibres of the pad.

Oral fluid contains a number of enzymes (proteases) which degrade oral bacteria and proteins, including antibodies. Specimens collected from the mouth must be preserved to ensure that the antibodies are intact when the specimens arrive at the laboratory for testing. The OraSure device includes preservatives that are effective in protecting antibodies from degradation.

Principle of the procedure

The OraSure device consists of a treated absorbent cotton fibre pad affixed to a nylon stick and a preservative solution in a plastic container. Under the direction of a trained and medically supervised individual (the collector), the specimen is collected by the subject rubbing the pad between his/her lower gum and cheek until moist, and then leaving the pad stationary for a minimum of two minutes (time verified by the collector). The cotton pad contains salts and gelatine, which facilitate the flow of antibodies from the gingival mucosa into the mouth and onto the pad. The subject then promptly places the pad in a vial containing a preservative solution, which stabilises HIV antibodies. The vial is then capped by the collector and transported to a qualified laboratory for testing.

At the laboratory, the specimen is processed for testing with the Oral Fluid Vironostika Microelisa System (Epitome), and where appropriate, with the OraSure HIV-1 Western Blot Kit. The laboratory will measure the volume of the specimen to determine that a minimum volume of specimen was collected. If a *minimum* volume of specimen was not collected, the specimen is unsuitable for testing and a new specimen from the test subject must be obtained.

Material provided with each device

1. One treated cotton fibre collection pad (contains gelatine) on a nylon stick.
2. One specimen vial containing blue preservative solution.

Materials required but not provided

1. Timer capable of timing 2 minutes.
2. If oral fluid specimens are not collected from subjects in a medical setting, the trained collector should be provided with sealable containers to safely handle the specimens; for example, sealable plastic bags of 2 mil thickness.
3. Additional materials may be required to protect the OraSure Specimen Vials from impact, direct sunlight, and temperatures exceeding 37° C during transport; for example, styrofoam containers or insulated coolers and cold packs.

Warnings

1. Studies to determine the performance characteristics of the OraSure device in subjects younger than 18 years of age have not been performed.
2. This device is not intended to collect saliva per se. Failure to carefully follow the collection procedure may cause erroneous results.
3. Testing laboratories will not test a specimen of insufficient volume.

Precautions

1. OraSure specimens should not be exposed to temperatures to exceeding 37° C, or direct sunlight.
2. Avoid contamination of collection device and the specimen vial solution with foreign matter.

APPENDIX 4

3. Do not use the collection pad if the package has been opened.
4. Do not touch the collection pad with fingers before or after specimen collection.
5. Do not use if the collection pad is wet.
6. Do not use device beyond expiry date shown on the device package.

Storage instructions

Store unused OraSure Oral Specimen Collection Device at room temperature (18° C–25° C). Exposure to higher temperatures should be avoided. Protect from prolonged exposure to direct sunlight.

Directions for use

1. Open the OraSure package containing the collection pad and the specimen vial.
2. To open the collection pad package, orient the package so that the pad is 'down' and the 'stick' end is up.
3. With the thumb and index finger of each hand, simultaneously and symmetrically peel apart (down) the two sides of the packaging far enough to allow easy removal of the collection pad.
4. Without touching the contents, present the stick of the device to the test subject and instruct the subject to pull it out of the packaging sleeve.
5. Instruct the subject to place the collection pad inside his/her mouth (pad oriented down) between the lower cheek and gum and gently rub the pad back and forth along the gum line until the pad is moist.
6. Begin timing for two minutes.
7. Instruct the subject to leave the pad stationary against the lower gum for a minimum of two minutes, and a maximum of five minutes.
8. Remove the specimen vial from the package and record test subject identification and date of collection on the specimen vial.
9. Open the vial in an upright position (with the cap up, pointed tip down) by gently rocking the cap back and forth to avoid spilling the contents.
10. Give the opened vial to the test subject, being careful not to spill the contents.
11. At the end of two minutes, instruct the subject to remove the pad from the mouth and insert the pad into the blue liquid in the specimen vial, and push the pad all the way to the bottom of the vial.
12. Instruct the test subject to break the nylon stick of the pad by snapping it against the side of the vial and in the direction away from the test administrator and other personnel (the stick is scored to facilitate breakage.)
13. Take the vial from the test subject and replace the vial cap, ensuring it is tight. The cap will 'snap' into place when secure.

Storage and transportation of OraSure specimens to the testing laboratory

1. Collected specimens must be stored and transported in the OraSure Specimen Vial.
2. Collected specimens should be protected from impact, direct sunlight and temperatures exceeding 37° C.
3. Collected specimens may be stored at 4° C to 37° C for a maximum of 21 days (including the time for shipping and testing).

OraSure HIV-1 specimen test procedure

Refer to the Oral Fluid Vironostika Microelisa System package insert for OraSure specimen processing instructions and testing procedures.

Limitations of the procedure

1. False results (either positive or negative) may occur as a result of interfering substances being collected with the specimen.
2. False negative results (the subject is infected, but OraSure is negative) may occur as a result of the absence of antibodies to HIV in the early phase of the infection, or anti-HIV levels which are below the lower limit of detection of this procedure.
3. False positive results may occur, for example, as a result of non-specific cross-reacting antibodies, and not from an HIV infection.
4. A person who has antibodies to HIV is presumed to be infected with the virus, except that a person who has participated in an HIV vaccine study may develop antibodies to the vaccine and may or may not be infected with HIV. Clinical correlation is indicated with appropriate counselling, medical evaluation, and possibly additional testing to decide whether a diagnosis of HIV infection is accurate.

APPENDIX 5

Standard operating procedures for Vironostika® HIV uni-form II *plus O*

Intended use: For detecting HIV_{1/2} antibodies in plasma or serum samples.

Equipment

- Multichannel pipette 50 to 200ul
- Micropipette 5 to 200ul
- Waterbath or 37°C incubator
- Heating block
- Humid chamber
- Microwell plate washer
- Microwell plate optical density reader
- Automated processor
- Timer.

Consumables

- Distilled water
- Disposable reagent troughs
- Disposable 100ul tips
- Disposable 10ul tips
- Paper towels
- Latex gloves
- Sodium hypochloride – cleaning agent
- Eye shields – protection
- 100ml measuring cylinder.

Procedure

1. Sample collection and storage.
2. Plasma or clotted blood to be collected.
3. To be collected in a 5ml sterile gel or EDTA tubes. Minimum volume of 2ml to be collected. It is recommended that samples be centrifuged at 6000rpm for 20 minutes and stored at 4° C until tested.
4. Storage.
5. Samples may be stored at 4° C for up to 1 week.
6. For longer storage plasma or serum may be removed and stored at -15 to -25° C.
7. Clotted blood or EDTA sample cannot be frozen, haemolysed samples are not suitable for testing

Summary of the test

The Vironostika HIV_{1/2} antibody ELISA test is a one-step sandwich technique. A mixture of HIV antigens coupled to horseradish peroxidase HRP serves as the conjugate with tetramethylbenzidine TMB and peroxide as the substrate. Upon completion of the test, the development of colour suggests the presence of antibody to HIV-1, HIV-2 and or HIV-1

group O, while no low colour development suggests the absence of antibody to HIV-1, HIV-2 and HIV-1 group O.

Specific microelisa wells are coated with a mixture of HIV antigens HIV p24, HIV gp 160, HIV1 ANT70 peptide and HIV env peptide amino acid 592-603. Each microelisa well contains an HRP labelled conjugate sphere of the same HIV antigen mixture. The specimen diluents that are added to the wells first will dissolve the conjugate sphere. Then the test sample or appropriate control containing anti HIV-1 and HIV-2 or HIV-1 group O a solid phase antigen/anti-HIV enzyme labelled antigen complex is formed. Following a wash procedure and incubation with TMB substrate, colour develops which turns yellow when the reaction is stopped with sulphuric acid. If anti HIV-1 and anti HIV-2 group O is present in the sample, an intense colour develops. However, when the sample is free of HIV antibodies, no or low colour forms with the substrate.

Kit contents

1. Antibody coated wells coated with mixture of HIV-1 p24, gp160, ANT70 and HIV- 2 env aa 592-603 stored at 2 to 8° C.
2. Sample diluent containing 0.1g/l gentamicin sulfate and 0.2ml/l cinnamadehyde preservatives.
3. Negative controls – normal human sera free from hepatitis B and HIV.
4. Positive controls – heat inactivated human sera free from hepatitis B but with antibodies to HIV- 1 and HIV- 2.
5. Conjugate horse radish peroxidase.
6. Conjugate diluent to reconstitute conjugate.
7. Substrate dried NADP reconstitutes 15 minutes before use. Can keep at 4° C for up to 4 hours or in aliquots at -20° C for one month.
8. Substrate diluent ready for use Tetramethyl benzidine in citric acid.
9. Amplifier contains freeze dried dehydrogenase and diaphorase in a protein base.
10. Store for up to 4 weeks at 4° C or at -20° C for 1 month.
11. Urea peroxide solution.
12. Phosphate Buffered Saline Wash fluid 25 times concentrate – dilute with distilled water, store at room temperature until expiry date.

Test procedure

1. Bring reagents to room temperature.
2. Remove the required number of test strips from the microwell container, return the rest to 4° C.
3. Reseal the bag with the plates very well – air or liquid must not enter.
4. Add 100ul of sample diluent with a microchannel pipette set at 100ul.
5. Add 3 Negative and 1 HIV-1 positive control and 1 HIV-2 positive to carefully labelled wells – 50ul.
6. Add 50ul of patient plasma or serum labelled wells – marked with permanent markers – careful of carryover.
7. Cover the plate with a lid.
8. Place at 37° C for 60 minutes under humid conditions, set the timer.
9. Wash the plate after the incubation with a ELISA plate washer – usually 6 times with 400ul of wash buffer (prepared as described earlier), turn the plate upside down and dab dry on a piece of paper towel.

APPENDIX 5

10. A multichannel pipette is used to dispense 100ul of substrate into each well; the wells are covered and incubated at room temperature under humid conditions for 30 minutes.
11. 100 ul of stop solution (2M sulphuric acid) is added to stop the reaction.
12. The plate is read within 15 minutes at 450 nm with a microwell plate reader.

Interpretation of result

- Negative control: Mean A450nm should be less than 0.250.
- Positive control: A490nm of the positive control should be 0.400nm above the mean of the negative control.
- If the above two criteria is not met, the test run is not valid.

Calculation of results

- Negative control: Calculate the mean = 0.199.
- Cut off = $0.2 + \text{negative mean}$
= $0.2 + 0.199$
= 0.399
- Reactive (positive sample) > or = 0.399.
- Non reactive (negative samples) < 0.399.
- It is advisable to repeat samples that are = to the cut off values.

Validity of test

A test run is valid if: the positive control mean minus the negative control mean should be >0.400.

Limitations of the procedure

All highly sensitive immunoassay systems have a potential for non-specific reactions, therefore the specificity of repeatably reactive specimens should be verified using appropriate test methods.

Sensitivity and specificity

The kit protocol indicates sensitivity = 100% and specificity of 99.9% to 99.2%.

APPENDIX 6

List of health facilities included in study

Clinics

NAME	PROVINCE	PUBLIC/PRIVATE
Adelaide Municipal Clinic	Eastern Cape	PUBLIC
Aerovil Clinic	Eastern Cape	PUBLIC
Aliwal North MunicipalClinic	Eastern Cape	PUBLIC
Baroda Health Clinic	Eastern Cape	PUBLIC
Baziya Health Centre	Eastern Cape	PUBLIC
Central Clinic	Eastern Cape	PUBLIC
CL Bikitsha Clinic	Eastern Cape	PUBLIC
Cradora Clinic (Lingelihle)	Eastern Cape	PUBLIC
Dikgetlane Clinic	Eastern Cape	PUBLIC
EL Southernwood Clinic	Eastern Cape	PUBLIC
Flagstaff Village Clinic	Eastern Cape	PUBLIC
Fort Beaufort Lulama Kama	Eastern Cape	PUBLIC
Gura Clinic	Eastern Cape	PUBLIC
Hlankomo Clinic	Eastern Cape	PUBLIC
Kwelegha Clinic	Eastern Cape	PUBLIC
KWT – Breidbach Clinic	Eastern Cape	PUBLIC
Laetitia Bam Day Clinic	Eastern Cape	PUBLIC
Lotusville Clinic	Eastern Cape	PUBLIC
Lower Rabula Clinic	Eastern Cape	PUBLIC
Maletswai Clinic Dikathol	Eastern Cape	PUBLIC
Manzimahle Clinic	Eastern Cape	PUBLIC
Mnyolo Clinic	Eastern Cape	PUBLIC
Ngangelizwe Estate Clinic	Eastern Cape	PUBLIC
Ngwenyama Clinic	Eastern Cape	PUBLIC
Ntaba Kandoda Clinic	Eastern Cape	PUBLIC
Ntsimba Clinic	Eastern Cape	PUBLIC
Qasa Clinic	Eastern Cape	PUBLIC
Beatrice Ngwentle	Eastern Cape	PUBLIC
Steytlerville Vuyolwetho	Eastern Cape	PUBLIC
Stutterheim Town Clinic	Eastern Cape	PUBLIC
Tanga Clinic	Eastern Cape	PUBLIC
West End Community Health	Eastern Cape	PUBLIC
Clocolan Clinic	Free State	PUBLIC
Clocolan Clinic Hlohlolwa	Free State	PUBLIC
Ficksburg Clinic Doc Isra	Free State	PUBLIC
Ficksburg Clinic Phomolong	Free State	PUBLIC
Harrismith Clinic	Free State	PUBLIC
Heilbron Clinic Relebohile	Free State	PUBLIC
Qwa-Qwa Clinic Monontsha	Free State	PUBLIC
Qwa-Qwa Clinic Phuthadith	Free State	PUBLIC
Thaba Nchu Clinic Dinaane	Free State	PUBLIC
Thaba Nchu Clinic Gaongal	Free State	PUBLIC
Trompsburg Clinic	Free State	PUBLIC

APPENDIX 6

VanStadensrus Clinic	Free State	PUBLIC
Ventersburg Clinic	Free State	PUBLIC
Viljoenskroon Clinic (Rammulotsi)	Free State	PUBLIC
Welkom PHC Clinic	Free State	PUBLIC
Wesselsbron Clinic (Albert Luthuli)	Free State	PUBLIC
Bluegum Clinic	Gauteng	PUBLIC
Church Street 44 Nigel	Gauteng	PUBLIC
Coronation Clinic	Gauteng	PUBLIC
Daveyton Main Clinic	Gauteng	PUBLIC
Diepkloof Clinic	Gauteng	PUBLIC
Dobsonville Clinic	Gauteng	PUBLIC
Eersterust TB Clinic	Gauteng	PUBLIC
Elsburg Clinic	Gauteng	PUBLIC
Evaton Clinic	Gauteng	PUBLIC
Halfwayhouse Clinic	Gauteng	PUBLIC
Klipspruit West Clinic	Gauteng	PUBLIC
Mamelodi Hospital Clinic	Gauteng	PUBLIC
Modderfontein Clinic	Gauteng	PUBLIC
Orange Farm Extention 7	Gauteng	PUBLIC
Primrose Hill Clinic	Gauteng	PUBLIC
Rodepoort City Council	Gauteng	PUBLIC
Soshanguve Clinic 1	Gauteng	PUBLIC
Thembelihle Fixed Clinic	Gauteng	PUBLIC
Verwoerdburg Town Council	Gauteng	PUBLIC
Wattville Clinic	Gauteng	PUBLIC
Westonaria Clinic	Gauteng	PUBLIC
Zone 7 Clinic	Gauteng	PUBLIC
Bothas Hill	KwaZulu-Natal	PUBLIC
Bruntville	KwaZulu-Natal	PUBLIC
Chesterville	KwaZulu-Natal	PUBLIC
Gcumisa	KwaZulu-Natal	PUBLIC
Groutville	KwaZulu-Natal	PUBLIC
Inhlwathi	KwaZulu-Natal	PUBLIC
Macabuzela	KwaZulu-Natal	PUBLIC
Magabheni	KwaZulu-Natal	PUBLIC
Maphophoma	KwaZulu-Natal	PUBLIC
Marianridge	KwaZulu-Natal	PUBLIC
Mhlumayo	KwaZulu-Natal	PUBLIC
Ncemaneni	KwaZulu-Natal	PUBLIC
Newlands East	KwaZulu-Natal	PUBLIC
Ngubevu	KwaZulu-Natal	PUBLIC
Ntabeni	KwaZulu-Natal	PUBLIC
Nyangwini	KwaZulu-Natal	PUBLIC
Ulundi A	KwaZulu-Natal	PUBLIC
Umbumbulu	KwaZulu-Natal	PUBLIC
Umzinto North	KwaZulu-Natal	PUBLIC
Wembezi	KwaZulu-Natal	PUBLIC
Gemsbokspruit Clinic	Mpumalanga	PUBLIC

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

Goederede Clinic	Mpumalanga	PUBLIC
Jeppiesrust Clinic	Mpumalanga	PUBLIC
Marble Hall Municipal Clinic	Mpumalanga	PUBLIC
Mbangwane Clinic	Mpumalanga	PUBLIC
Motetema Clinic	Mpumalanga	PUBLIC
Perdekop Clinic	Mpumalanga	PUBLIC
Phiva Clinic	Mpumalanga	PUBLIC
Tekwane Clinic	Mpumalanga	PUBLIC
Volkstrust Clinic	Mpumalanga	PUBLIC
Borolelo Municipality Clinic	North West	PUBLIC
Dinokana Clinic	North West	PUBLIC
Hebron Private Clinic	North West	PUBLIC
Huhudi Community Health Clinic	North West	PUBLIC
Lesego Clinic	North West	PUBLIC
Lethlabile Clinic	North West	PUBLIC
Madibogo Clinic	North West	PUBLIC
Mmasebudule Clinic	North West	PUBLIC
Moloroe Clinic	North West	PUBLIC
Monakato Clinic	North West	PUBLIC
Morokweng Clinic	North West	PUBLIC
Moruleng Clinic	North West	PUBLIC
Rapulana Clinic	North West	PUBLIC
Thusanang Special Project	North West	PUBLIC
Tlakgameng Clinic	North West	PUBLIC
Valspan Clinic	North West	PUBLIC
Nieuwoudtville	Northern Cape	PUBLIC
Brandvlei	Northern Cape	PUBLIC
City Clinic	Northern Cape	PUBLIC
Delporthoop Municipal Clinic	Northern Cape	PUBLIC
Garies Clinic + Mobile Clinic	Northern Cape	PUBLIC
Kalksluit Clinic	Northern Cape	PUBLIC
Kathu Municipal Clinic	Northern Cape	PUBLIC
Keimoes Municipal Clinic	Northern Cape	PUBLIC
Louwryville Clinic	Northern Cape	PUBLIC
Nababeep Clinic and Mobile Clinic	Northern Cape	PUBLIC
Norvalspont District Clinic	Northern Cape	PUBLIC
Olifantshoek Clinic	Northern Cape	PUBLIC
Roodepan Clinic (Homevale)	Northern Cape	PUBLIC
Windsorton Clinic	Northern Cape	PUBLIC
Beaconsfield Clinic	Limpopo	PUBLIC
Bergplaas Clinic	Limpopo	PUBLIC
Bolobedu Clinic	Limpopo	PUBLIC
Eisleben Clinic	Limpopo	PUBLIC
Hamutsha Clinic	Limpopo	PUBLIC
Killdare Clinic	Limpopo	PUBLIC
Lebaka Clinic	Limpopo	PUBLIC
Letaba Estate Clinic	Limpopo	PUBLIC
Makgato Clinic	Limpopo	PUBLIC

APPENDIX 6

Mampana Clinic	Limpopo	PUBLIC
Mankuwe Clinic	Limpopo	PUBLIC
Mkhuhlu Clinic	Limpopo	PUBLIC
Mulima Clinic	Limpopo	PUBLIC
Phaahla Clinic	Limpopo	PUBLIC
Phalaborwa PHC Clinic	Limpopo	PUBLIC
Rebone Clinic	Limpopo	PUBLIC
Slypsteen Clinic	Limpopo	PUBLIC
Van der Merwe's Kraal Clinic	Limpopo	PUBLIC
Adriaanse Clinic	Western Cape	PUBLIC
Albertinia	Western Cape	PUBLIC
Conville CHC	Western Cape	PUBLIC
Eastridge CHC	Western Cape	PUBLIC
Genadendal Clinic	Western Cape	PUBLIC
Grabouw CHC	Western Cape	PUBLIC
Grassy Park Civic Centre	Western Cape	PUBLIC
Hager Clinic	Western Cape	PUBLIC
Heideveld CHC	Western Cape	PUBLIC
Klawer Clinic	Western Cape	PUBLIC
Lutzville (Koekenaap)	Western Cape	PUBLIC
Morning Star CHC	Western Cape	PUBLIC
Nyanga CHC	Western Cape	PUBLIC
Oceanview CHC	Western Cape	PUBLIC
Parkwood CHC	Western Cape	PUBLIC
Riversdale CHC	Western Cape	PUBLIC
Rusthof/Gastrow CHC	Western Cape	PUBLIC
South Strand Clinic	Western Cape	PUBLIC
Thembaletu CHC	Western Cape	PUBLIC
Zolani Clinic Ashton	Western Cape	PUBLIC

Hospitals (public and private)/private clinics

NAME	PROVINCE	PUBLIC/PRIVATE
Adelaide Provincial	Eastern Cape	PRIVATE
Burgersdorp Hospital	Eastern Cape	PUBLIC
Dora Nginza Hospital	Eastern Cape	PUBLIC
Komani Hospital	Eastern Cape	PUBLIC
Madwaleni Hospital	Eastern Cape	PUBLIC
New Mercantile Hospital	Eastern Cape	PRIVATE
St Patrick's Hospital	Eastern Cape	PUBLIC
St. Mary's Private Hospital	Eastern Cape	PRIVATE
Zitulele Hospital	Eastern Cape	PUBLIC
3 Military Hospital	Free State	PRIVATE
Ernest Oppenheimer Hospital	Free State	PRIVATE
Sasolburg Hospital	Free State	PUBLIC
Universitas/Nasionaal Hospital	Free State	PUBLIC
Virginia Hospital	Free State	PUBLIC
South Rand Hospital	Gauteng	PUBLIC

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

Actonville Hospital	Gauteng	PRIVATE
Astrid Clinic	Gauteng	PRIVATE
Chris Hani Baragwanath Hospital	Gauteng	PUBLIC
Cullinan Care & Rehabilitation	Gauteng	PRIVATE
Kenridge Hospital	Gauteng	PRIVATE
Knights Chest Hospital	Gauteng	PRIVATE
Medforum Algemeene en Haart	Gauteng	PRIVATE
Pretoria Academic (HF Verwoerd) Hospital	Gauteng	PUBLIC
Randfontein South Chest Hospital	Gauteng	PRIVATE
Tshepo-Themba Hospital	Gauteng	PRIVATE
Catherine Booth	Kwazulu-Natal	PUBLIC
Ceza	Kwazulu-Natal	PUBLIC
Durdoc Clinic Division	Kwazulu-Natal	PRIVATE
Hibiscus Hospital	Kwazulu-Natal	PRIVATE
Hillcrest Hospital	Kwazulu-Natal	PUBLIC
Newcastle	Kwazulu-Natal	PUBLIC
Northdale	Kwazulu-Natal	PUBLIC
St Augustine Hospital	Kwazulu-Natal	PRIVATE
Taylor Bequest Hospital	Kwazulu-Natal	PUBLIC
HA Grove Hospital	Mpumalanga	PRIVATE
Groblersdal Hospital	Mpumalanga	PUBLIC
Piet Retief Hospital	Mpumalanga	PUBLIC
Legae Private Clinic	North West	PRIVATE
Mafikeng (Bophelong General)	North West	PUBLIC
Tshwaragano Community Hospital	North West	PUBLIC
Ventersdorp Community Hospital	North West	PUBLIC
Vryburg Private Hospital	North West	PRIVATE
Alexander Bay Hospital	Northern Cape	PRIVATE
Curomed Hospital	Northern Cape	PRIVATE
Olifantshoek Hospital	Northern Cape	PUBLIC
Voortrekker Hospital	Northern Cape	PUBLIC
Dr Machupe Mphahlele Memorial	Limpopo	PUBLIC
Evuxakeni Hospital	Limpopo	PUBLIC
Pietersburg Private Hospital	Limpopo	PRIVATE
Tshilidzini Hospital	Limpopo	PUBLIC
WF Knobel Hospital	Limpopo	PUBLIC
George Hospital	Western Cape	PUBLIC
GF Jooste Hospital	Western Cape	PUBLIC
Swartland Hospital	Western Cape	PUBLIC
Victoria Hospital Wynberg	Western Cape	PUBLIC

APPENDIX 7

Drug availability

DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Anti-infectives (antibiotics)				
Penicillins				
No of respondents	173	18	16	207
100%–75% of times	84.9	90.7	94.8	85.7
74%–50% of times	11.1	9.3	5.2	10.7
49%–25% of times	1.4	0	0	1.2
Less than 25% of times	1.4	0	0	1.2
Never	1.3	0	0	1.2
Cephalosporins				
No of respondents	90	2	–	92
100%–75% of times	27.3	78.2	77.1	33.4
74%–50% of times	4.9	7.9	4.9	5.1
49%–25% of times	2.1	0	5.6	2.1
Less than 25% of times	2.4	0	12.5	2.7
Never	63.3	14	0	56.7
Sulfonamides (Cotrimaxazole)				
No of respondents	175	18	16	209
100%–75% of times	82.9	100	100	84.7
74%–50% of times	14	0	0	12.5
49%–25% of times	1.3	0	0	1.2
Less than 25% of times	1.8	0	0	1.6
Never	0	0	0	0
Tetracyclines				
No of respondents	162	17	16	195
100%–75% of times	55	57.5	73.4	56
74%–50% of times	9.2	1.8	14.9	9
49%–25% of times	2.8	17.1	0	3.6
Less than 25% of times	7.8	0	0	6.9
Never	25.1	23.7	11.7	24.4

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Macrolides (Erythromycins)				
No of respondents	175	18	16	209
100%–75% of times	83.6	79.9	94.8	83.9
74%–50% of times	11	9.2	5.2	10.7
49%–25% of times	2.7	3.6	0	2.6
Less than 25% of times	2.7	7.2	0	2.9
Never	0	0	0	0
Anti-Infectives (AntiFungal agents)				
Nystatin				
No of respondents	174	18	16	208
100%–75% of times	84	96.4	94.8	85.3
74%–50% of times	9.4	0	0	8.4
49%–25% of times	4	3.6	5.2	4
Less than 25% of times	1.3	0	0	1.1
Never	1.3	0	0	1.2
Miconazole				
No of respondents	160	19	14	193
100%–75% of times	33.7	77.3	63	38.2
74%–50% of times	5.1	0	0	4.5
49%–25% of times	2.8	7	5.9	3.3
Less than 25% of times	3.6	0	0	3.1
Never	54.8	15.6	31.1	50.9
Ketoconazole				
No of respondents	148	15	15	179
100%–75% of times	7.7	58.7	40.3	12.7
74%–50% of times	0.8	0	4.9	0.9
49%–25% of times	0.8	2.4	12.5	1.5
Less than 25% of times	2	0	12.5	2.4
Never	88.6	38.8	29.9	82.5

APPENDIX 7

DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Fluconazole				
No of respondents	153	17	16	186
100%–75% of times	20.9	78.2	69.9	27.3
74%–50% of times	0.5	7.9	6.5	1.3
49%–25% of times	4.2	0	0	3.7
Less than 25% of times	2.6	0	17	3.1
Never	71.9	14	6.5	64.6
Amphotericin B				
No of respondents	148	17	15	180
100%–75% of times	5	59.2	40.7	10.7
74%–50% of times	0.4	0	17.9	1.2
49%–25% of times	1.2	2.2	0	1.2
Less than 25% of times	1	0	22.1	1.9
Never	92.4	38.6	19.3	85
Antifective (Antitubercular agents)				
Isoniazid (INH)				
No of respondents	166	15	15	196
100%–75% of times	81.9	77.9	88.3	82
74%–50% of times	6.4	5.6	0	6.1
49%–25% of times	1.8	0	0	1.7
Less than 25% of times	0	5.1	0	0.3
Never	9.8	11.3	11.7	10
Rifampicin				
No of respondents	168	17	16	201
100%–75% of times	85.7	81.1	89.6	85.6
74%–50% of times	5.8	4.8	10.4	6
49%–25% of times	1.8	0	0	1.6
Less than 25% of times	0.3	4.4	0	0.5
Never	6.3	9.7	0	6.3

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR

DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Ethambutol				
No of respondents	167	17	16	200
100%–75% of times	84.2	81.1	89.5	84.2
74%–50% of times	5.1	4.8	5.2	5.1
49%–25% of times	1.8	0	5.2	1.9
Less than 25% of times	0	4.4	0	0.3
Never	8.8	9.7	0	8.5
Pyrazinamide				
No of respondents	166	17	16	199
100%–75% of times	82.8	81.4	84.4	82.8
74%–50% of times	5.4	4.9	15.6	5.8
49%–25% of times	1.9	0	0	1.7
Less than 25% of times	0.7	0	0	0.6
Never	9.2	13.7	0	9.1
Streptomycin				
No of respondents	172	16	16	204
100%–75% of times	75.9	80.7	76.5	76.2
74%–50% of times	6.8	0	4.6	6.4
49%–25% of times	1.3	0	0	1.1
Less than 25% of times	1.9	15	6.5	2.9
Never	14.1	4.3	12.4	13.5
Antiretroviral agents (HIV)				
NRTI eg. Zidovudine (AZT)				
No of respondents	158	16	16	190
100%–75% of times	14.9	56.9	66.7	20
74%–50% of times	1	2.3	4.6	1.2
49%–25% of times	0.7	0	0	0.7
Less than 25% of times	4.2	0	0	3.7
Never	79.2	40.7	28.8	74.4

APPENDIX 7

DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
NNRTI eg. Nevirapine				
No of respondents	159	17	15	191
100%–75% of times	18.8	49.1	22.6	21
74%–50% of times	0	11.9	0	0.8
49%–25% of times	0	0	0	0
Less than 25% of times	1.6	0	0	1.4
Never	79.6	38.9	77.4	76.7
PI eg. Saquinavir				
No of respondents	153	17	15	185
100%–75% of times	1.2	41	6.2	4.3
74%–50% of times	0.6	4.8	0	0.9
49%–25% of times	0	0	0	0
Less than 25% of times	1.2	9.7	11.7	2.3
Never	97	44.5	82.1	92.6
Analgesics (opoids)				
Codeine phosphate				
No of respondents	164	18	16	198
100%–75% of times	18.4	71.1	77.9	24.8
74%–50% of times	7.4	0	4.5	6.8
49%–25% of times	2.7	12.2	0	3.3
Less than 25% of times	1.7	0	0	1.5
Never	69.8	16.7	17.5	63.7
Morphine				
No of respondents	163	16	17	196
100%–75% of times	9.8	65.5	82.5	16.7
74%–50% of times	0.7	0	0	0.6
49%–25% of times	1.9	3.1	6.5	2.2
Less than 25% of times	1.1	21.2	0	2.4
Never	86.5	10.2	11	78.1

THE IMPACT OF HIV/AIDS ON THE HEALTH SECTOR


DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Pentazocine				
No of respondents	159	16	14	189
100%–75% of times	0.5	38	13.1	3.5
74%–50% of times	0	4.7	0	0.3
49%–25% of times	0.8	2.3	0	0.9
Less than 25% of times	0.8	4.2	6.6	1.3
Never	97.8	50.7	80.3	94
Analgesics (Non-Steroidal anti-inflammatory drugs) (NSAIDS)				
NSAIDS e.g. Aspirin, Indomethacin				
No of respondents	166	18	16	200
100%–75% of times	38.3	58.9	94.8	42.2
74%–50% of times	4.3	8.9	0	4.5
49%–25% of times	1.6	0	5.2	1.6
Less than 25% of times	1.8	0	0	1.6
Never	53.9	32.1	0	50
Antiviral agents				
Acyclovir				
No of respondents	163	17	15	195
100%–75% of times	6.6	58.6	52.7	12
74%–50% of times	1.8	0	0	1.6
49%–25% of times	2.3	0	16.4	2.8
Less than 25% of times	1.7	7.9	5.5	2.3
Never	87.5	33.5	25.3	81.3
Foscarnet				
No of respondents	162	14	14	190
100%–75% of times	0	9.2	0	0.5
74%–50% of times	0	0	0	0
49%–25% of times	0	0	0	0
Less than 25% of times	0	0	0	0
Never	100	90.8	100	99.5

APPENDIX 7

DRUG AVAILABILITY	PHC FACILITY	PRIVATE HOSPITAL	STATE ACADEMIC/ STATE	TOTAL
Ganciclovir				
No of respondents	163	16	14	193
100%–75% of times	0.6	23.2	5.1	2.1
74%–50% of times	0	0	0	0
49%–25% of times	0	0	0	0
Less than 25% of times	0	10.6	5.8	0.9
Never	99.4	66.2	89.1	97
Miscellaneous				
Vitamin A				
No of respondents	165	16	15	196
100%–75% of times	68.5	50.2	76.2	67.7
74%–50% of times	6.7	15.3	0	6.9
49%–25% of times	4.9	8.4	6.8	5.2
Less than 25% of times	3	10.8	0	3.4
Never	16.9	15.3	17	16.8
Sedatives eg. Diazepam				
No of respondents	163	17	15	195
100%–75% of times	47.7	82.7	93.2	52
74%–50% of times	6	0	0	5.4
49%–25% of times	2.1	0	6.8	2.2
Less than 25% of times	6.8	0	0	6.1
Never	37.3	17.3	0	34.4

APPENDIX 8

BI - 1663



REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF HOME AFFAIRS
NOTIFICATION / REGISTER OF DEATH / STILL BIRTH
in terms of the Births and Deaths Registration Act,
1992 (Act No. 51 of 1992)

Space for Bar Code

* Must be completed in black ink (please tick ☒ where applicable) SERIAL No: **A01857265**
* Please refer to instructions FILE No: DATE: **A01857265**

A PARTICULARS OF DECEASED INDIVIDUAL <input type="checkbox"/> / STILLBORN CHILD <input type="checkbox"/>		Date of birth Y Y Y Y M M D D Age at last birthday years Sex If death occurred within 24 hours after birth No. of hours alive
Identity number of deceased Surname Maiden Name (if female) Forenames	Date of death Y Y Y Y M M D D Age at last birthday years Sex If death occurred within 24 hours after birth No. of hours alive	Left hand print of deceased
MARITAL STATUS OF DECEASED Single <input type="checkbox"/> Civil Marriage <input type="checkbox"/> Living as married <input type="checkbox"/> Widowed <input type="checkbox"/> Religious Law Marriage <input type="checkbox"/> Divorced <input type="checkbox"/> Customary Marriage <input type="checkbox"/>		Left hand print of informant
PLACE OF BIRTH (municipal district or country if abroad) _____ PLACE OF DEATH (City / Town / Village) _____ PLACE OF REGISTRATION OF DEATH _____ CITIZENSHIP OF DECEASED _____		
B PARTICULARS OF INFORMANT Identity number _____ Initials and Surname _____ Relationship to deceased Parent <input type="checkbox"/> Spouse <input type="checkbox"/> Child <input type="checkbox"/> Other (specify) _____ Postal address _____ Postal Code _____ District Code _____ Was the next of kin of the deceased a smoker* during the past five years? Yes <input type="checkbox"/> No <input type="checkbox"/> Refuse to answer <input type="checkbox"/> Telephone No. _____ Date _____ Signature _____		
C PARTICULARS OF FUNERAL UNDERTAKER Initials and Surname _____ Designation No. _____ Place of burial / cremation _____ Date _____ Signature _____		Office Stamp of Funeral Undertaker
D CERTIFICATE BY ATTENDING MEDICAL PRACTITIONER / PROFESSIONAL NURSE I, the undersigned, hereby certify that the deceased named in Section A, to the best of my knowledge and belief, died solely and exclusively due to NATURAL CAUSES specified in Section G. <input type="checkbox"/> I, the undersigned, am not in the position to certify that the deceased died exclusively due to natural causes. <input type="checkbox"/>		
INITIALS AND SURNAME SIGNATURE CERTIFICATE BY DISTRICT SURGEON / FORENSIC PATHOLOGIST I, the undersigned, hereby certify that a medico-legal post-mortem examination has been conducted on the body of the person whose particulars are given in Section A and that the body is no longer required for the purpose of the Inquest Act, 1959 (Act No. 58 of 1959) and that the cause of death is: Unnatural <input type="checkbox"/> Under investigation <input type="checkbox"/> Natural (Cause of Death as indicated in Section G) <input type="checkbox"/>		
Initials and Surname Date Y Y Y Y M M D D Place of post-mortem Date signed Y Y Y Y M M D D Signature Date signed Y Y Y Y M M D D Mortuary Reference _____ SAMDOC / SANC Reg. No. _____		
E FOR OFFICIAL USE ONLY Registration of death approved and burial order issued Initials and Surname of Registrar Address Force No. / Designation No. _____ Postal No. _____ Date _____ Signature _____		

* Someone who smokes tobacco on most days

APPENDIX 8

NOTIFICATION / REGISTER OF DEATH / STILL BIRTH INFORMATION FOR MEDICAL AND HEALTH USE ONLY (After completion seal to ensure confidentiality)						BI - 1663 Page 2
SERIAL No: A 01857265					<i>Space for Bar Code</i>	
FILE No:		DATE:				
F DEMOGRAPHIC DETAILS						
Initials and Surname of deceased 						
Identity Number 						
Place of death 1. Hospital (Inpatient <input type="checkbox"/> ER/Outpatient <input type="checkbox"/> DOA <input type="checkbox"/> 2. Nursing Home <input type="checkbox"/> 3. Home <input type="checkbox"/> 4. Other (Specify) <input type="checkbox"/>						
FACILITY NAME (if not institution, give street and number) _____						
Usual residential address of deceased # _____ Suburb 						
Town / Village 						
Name of Plot, Farm, etc. _____ Coastal Estuarine Area 						
Street name and number _____						
Deceased's Education (Specify <input checked="" type="checkbox"/> only highest class completed/achieved)						
None	Gr1	Gr2	Gr3	Gr4	Gr5	Gr6
Gr7	Gr8	Gr9	Gr10	Gr11	Gr12	Univ Tech
Form 1	Form 2	Form 3	Form 4	Form 5	Form 6	CODE
Postal Code: 						
Province: 						
Country: 						
USUAL OCCUPATION OF DECEASED (give type of work done during most of working life. Do not use retired) _____						
TYPE OF BUSINESS/INDUSTRY (e.g. Mining, Farming) refer to instructions _____						
Was the deceased a smoker* five years ago? (<input checked="" type="checkbox"/>) : Yes <input type="checkbox"/> Do not know <input type="checkbox"/> Not applicable (minor) <input type="checkbox"/>						
G MEDICAL CERTIFICATE OF CAUSE OF DEATH						
PART 1. Enter the disease, injuries or complications that caused death, and enter the mode of dying, such as cardiac or respiratory arrest, shock, or heart failure. List only the most important.						
IMMEDIATE CAUSE (Final disease or condition resulting in death) a. _____ Due to (or as a consequence of) _____						
Sequentially list conditions, if any, leading to immediate cause. Enter UNDERLYING CAUSE last (Disease or injury that initiated events resulting in death) b. _____ Due to (or as a consequence of) _____						
c. _____ Due to (or as a consequence of) _____						
d. _____ Due to (or as a consequence of) _____						
PART 2. Other significant conditions contributing to death but not resulting in the underlying cause given in Part 1. _____						
If a female, was the pregnant 42 days prior to death? (<input checked="" type="checkbox"/>) : Yes <input type="checkbox"/> No <input type="checkbox"/>						
If stillborn, please write mass in grams 						
Do you consider the deceased to be: African <input type="checkbox"/> White <input type="checkbox"/> Indian <input type="checkbox"/> Coloured <input type="checkbox"/> Other <input type="checkbox"/> (Specify) _____						
Method of ascertainment of cause of death:						
1. Autopsy <input type="checkbox"/> 2. Opinion of attending medical practitioner <input type="checkbox"/> 3. Opinion of attending medical practitioner on duty <input type="checkbox"/>						
4. Opinion of registered professional nurse <input type="checkbox"/> 5. Interview of family member <input type="checkbox"/>						
6. Other <input type="checkbox"/> (Specify) _____						
# Where someone lived on most days * Someone who smokes tobacco on most days						

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