Waiting to die:

Staging of HIV positive people at the first HIV test - Region A, Nelson Mandela Metropole (January1991-April 2000)

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A minithesis submitted in partial fulfillment of the requirements for the degree of M.A. Population Studies in the Department of Statistics, University of the Western Cape.

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Title of project

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Abstract

This project suggests that HIV people in Region A (Nelson Mandela Metropole, formerly Port Elizabeth) health district of the Eastern Cape, seek HIV testing when they are already in stages three (late disease) and four (AIDS) of HIV infection.
This was done by:

i) reviewing available literature on the disease progression of HIV-1 subtype C
ii) reviewing clinical staging systems developed for patient care as well as case definitions developed for surveillance purposes (1980-2000)
iii) reviewing the application of these definitions in other African countries (Cote d'Ivoire, Gambia, Uganda and Zambia).

This thesis analysed 27 505 anonymous HIV positive people's case level data from January 1991 to April 2000. The data had been obtained from the AIDS Training Information and Counselling Centre (hereafter ATICC) in the Nelson Mandela Metropole in 2000. This data included the test date, symptoms and follow-up diagnoses. Further, medical symptoms of HIV positive people were staged consistent with the four phases of the World Health Organisation's Clinical Staging System as revised in 1999.

The results of this study support the hypothesis that HIV positive people in Region A health district of the Eastern Cape seek HIV testing when they are already in stage three (late disease) and stage four (AIDS) of HIV infection. The consequences of diagnoses only in the advanced stages of HIV infection will have a devastating impact on case management. Therefore, this paper yields important data for South African policy makers to write health and welfare policies that might improve the quality of life of those terminally infected with HIV. This study seeks also to help encourage much earlier testing.

Declaration

I declare that, Waiting to die: Staging of HIV positive people at the first HIV test - Region A, Nelson Mandela Metropole (January 1991-April 2000), based on case level is my own work; that has not been submitted previously for any degree or any examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by my complete reference.

YNOMA CUPIDO NOVEMBER 2006

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Glossary

Acute HIV: can resemble flu, or other viral syndromes. Typical symptoms include fever, headache, fatigue, and swollen lymph nodes. People may also experience aching muscles and a rash that occurs anywhere on the body and may change locations. These symptoms may last from a few days to 4 weeks, and then subside.

ADI: AIDS defining Illness

AIDS: Acquired Immuno-deficiency Syndrome

Antibodies: a special kind of blood protein produced in lymphoid tissue in response to the presence of an antigen

Asymptomatic HIV infection: characterized by the absence of symptoms associated with HIV, such as fevers, weight loss, oral thrush, or any opportunistic infections (such as with *Pneumocystis carinii pneumonia*, cytomegalovirus, and *Mycobacterium avium*).

ATICC: AIDS Training, Information and Counselling Center

CD: a numerical system for classifying antigens

CDC: Centres for Disease Control

CD4: surface antigen on T-cells that is particularly important for immune resistance to viruses

ETB: Extra pulmonary tuberculosis

DOH: Department of Health

HAART: Highly Active Antiretroviral Therapy

HIV: Human Immuno-deficiency Virus

HSV: Herpes simplex virus

ICD10: International Classification for Diseases 10

NMM: Nelson Mandela Metropole

PGL: Persistent Generalized Lymphadenopathy, lymph nodes are larger than one centimeter in diameter, in two or more other sites other than the groin area for a period of at least three months

Prevalence: the percentage in a group infected at a particular point in time

PTB: Pulmonary tuberculosis

Seroconversion: produce specific antibodies in response to the presence of an antigen (e.g. a virus or a vaccine)

Serology: study of blood and serum the fluid that separates from clotted blood or blood plasma

Seronegative: do not show antibodies for HIV in serum

Seropositive: show antibodies for HIV in serum

Serum: the clear liquid that can be separated from clotted blood

StatsSA: Statistics South Africa

STI: Sexually transmitted infection

TB: Tuberculosis

TLC: total lymphocyte counts

WHO CSS: World Health Organization Clinical Staging System

WRCS: Walter Reed Classification System

Zidovudine: AZT an antiviral drug used in the treatment of AIDS and HIV infection

Chapter 1
Introduction

1.1 Background

In July 2004, a collaborative study by the Medical Research Council, the Actuarial Society of South Africa and the Centre of Actuarial Research at the University of Cape Town, estimated the total HIV prevalence rate (the proportion of people who are infected with HIV), at 11%. This study suggested that in 2004, 5.02 million people in South Africa were living with HIV. Of these, over 4.7 million were in the age group 18 to 64 years, *i.e.* the labour force. Among adults aged 15 to 49 years, 4.5 million are living with HIV. Also, an estimated 2.5 million woman aged 15 to 49 years, were infected with HIV and 1.95 million men in the same age group (Dorrington *et al.* 2004:14).

A following study by the Department of Health (DOH) in collaboration with UNAIDS, estimated that 5.5 million people were living with HIV, in 2005. Among adults 15 to 49 years old, HIV prevalence was 18.78%. In the same age group, 4.9 million were living with HIV, of which 3.12 million were female and 2.19 million males (DOH 2006:17).

Also, in 2005, the Human Science Research Council estimated that HIV prevalence in the population two years and older was 10.8%. HIV prevalence was higher in woman, 3.3% than in men, 8.2%. Among people aged 15 to 49 years HIV prevalence was 16% (Shisana *et al.* 2005:33-34).

Subsequently, the 2006 UNAIDS Report estimated that in 2005, 5.5 million people in South Africa were living with HIV. An estimated 3.1 million, were woman older than 15 years. Also, HIV prevalence in the age group 15-49 years was 18.8%. HIV prevalence among women aged 15 to 24 years was 14.8%, whilst HIV prevalence among men in the same age group were 4.4% (UNAIDS 2006:505-506).

Also in 2006, Statistics South Africa estimated that 5.2 million people were infected with HIV. The estimated total HIV prevalence rate is 10.9%. HIV prevalence among people aged 15 to 49 years is 18.2%. The prevalence rate is (20%) highest among women in the age group 15 to 49 years old. HIV prevalence among adults aged 20 to 64 years is 17.1% (StatsSA 2006:3).

Thus, HIV affects mostly the labour force and people in their reproductive years. Females in their reproductive years are more susceptible to HIV, than males.

However, rates about AIDS and mortality in Sub-Saharan Africa, was based on estimates and projections. These estimates convey information results mainly on prevalence, prevention and the projected demographic impact of HIV/AIDS (Adetunju 1998:17). Prior to 1994, there was no systematic collection of mortality data on a national scale in South Africa. Therefore, mortality estimates were based on fragmented data, and the estimation methods and the quality of the data were largely unclear. Consequently, estimates of mortality due to HIV/AIDS in South Africa vary, and often by a large number (Udjo 2005: 90). Nevertheless, differences in HIV estimates should not distract from the fact that HIV has become South Africa's biggest health problem of the 21st century (Bah 2005:155).

HIV/AIDS impacts on socio-economic and human development in South Africa. AIDS will increase the adult mortality rate for all population groups and reduce life expectancy. It will alter the age and gender structure of the population because females who are more vulnerable to the disease will die more quickly. Moreover, this will impact on population growth as females of childbearing age will die (Mostert *et al*. 1998:97-100, Whiteside 1998:79; Whiteside & Sunter 2000:70-73; Bartos & Piot 2002:209-210; Ziehl 2002:67-71; Dorrington *et al*. 2004: 3). The AIDS pandemic will reduce the average household income and increase medical expenses (Mostert *et al*. 1998:97-100, Whiteside 1998:79; Whiteside & Sunter 2000:70-73; Bartos & Piot 2002:209-210; Ziehl 2002:67-71; Dorrington *et al*. 2004:3; Shisana *et al*. 2005: 111). As workers become ill and children are orphaned, HIV/AIDS will create an increasing economic and social burden for the

government (Mostert *et al*. 1998:97-100, Whiteside 1998:79; Whiteside & Sunter 2000:70-73; Bartos & Piot 2002:209-210; Ziehl 2002:67-71).

However, the governments HAART (highly active antiretroviral therapy) programme as reduced the impact of HIV/AIDS on mortality (Dorrington & Johnson 2006:563).

The impact of AIDS on socio-economic and human development creates a need for "disease surveillance— the ongoing systematic collection, analysis, interpretation, and dissemination of data, concerning particular diseases" (De Cock *et al*. 1991:1185). Epidemiological surveillance of AIDS is an important public health tool because it monitors the HIV epidemic, estimating disease burdens, planning for necessary social and health services, especially in countries where resources and mechanisms for periodic surveys of HIV sero-prevalence (individuals showing antibodies for HIV in their serum) are not yet established (Weniger et al. 1992:1213).

Though AIDS is not directly responsible for death, it leaves the body increasingly vulnerable to other opportunistic infections. Therefore, information on the interaction between HIV and other causes of death is crucial (Adetunju 1998:17, Pisani 1998:24).

People die of opportunistic infections but not of AIDS. In consequence, studies of the incubation period are essential for government to allocate scarce resources to the pandemic (Whiteside 1998:79; Doyle *et al.* 1998:73). Yet, few studies in which the exact time the individual was infected with HIV have been carried out in Africa. Such studies require documenting the presence and frequency of medical signs as symptoms that occur at the time of seroconversion (Mugerwa & Ryder 1994:270). The best way to estimate the incubation period is to study current data and experiences "as well as life-time risks of various opportunistic infections and cancers from routinely collected patient records and cumulative epidemiological literature" (Doyle *et al.* 1998:73).

Furthermore, Couthino (2000:A22) argues that, identifying factors such as age, ethnicity and nutrition, which influence the incubation period, are important for understanding the

natural history (*i.e*. detailed progression from HIV infection to sickness and death) of the disease, since predicting the disease progression is useful for deciding the time to start antiretroviral therapy. The incubation period is also crucial because most future projection requires an in-depth knowledge of this period.

A complicating factor in studies of the incubation period is that the vast majority of Africans do not know their HIV status (Marum *et al.* 2001:527). This is mainly as result of ignorance, stigma, fear of death, and fear of needles. UNAIDS reports that the numbers of people who are unaware that they infected with the virus are the highest in countries worst affected by the epidemic. Less than 10% of people infected in Sub-Saharan Africa know that they are infected (De Cock *et al.* 1991:1; Schoub 1999:236; Marum *et al.* 2001: 527). Such serious under-estimation of AIDS cases may have distorted social, economic and medical implications of AIDS in Sub-Saharan Africa (Mugerwa & Ryder 1994:270). Consequently, most people infected with HIV in these countries are less likely to adopt behaviours that would prevent further transmission. They are, also unable to access healthcare services in the early stages of HIV infection (Marum *et al*. 2001:527).

1.2 Problem statement

The above literature explains the importance of establishing at what stage of the disease individuals seek HIV testing. Opportunistic infections are prevalent among people suffering from AIDS in South Africa, but who do not know that they are HIV positive. This study seeks to shed light on this particular problem by using case level data collected from the Nelson Mandela Metropole.

1.3 Aims and objectives

The project aims to provide more insight into the lack of information concerning the clinical stages of HIV positive individuals. This study also reviews the literature relating to all current case definitions for AIDS in South Africa. Then, anonymous case level patient records from1991-2000 collected from the Region A health district in the Eastern

Cape will be analysed. These records comprise 27 505 cases from the AIDS Training Information and Counselling Centre (ATICC) in the Nelson Mandela Metropole.

The study would attempt to determine:

- The diagnostic stage at the time of the HIV test using the World Health Clinical Staging System.
- Determine whether there is any relationship between diagnostic stage and socio-demographic and community characteristics including, gender population group, diagnostic age, area type and year of diagnosis.

1.4 Hypotheses

The majority of patients in the Nelson Mandela Metropole, *i.e.* Port Elizabeth as it was formerly known, seek HIV-testing when they are already in stages three (late disease) and four (AIDS) (see Appendix C). The following null hypotheses will be investigated:

H_{01}: There is no significant difference between males and females with regards to the diagnostic stage at the time of the HIV test.

H_{02}: There is no significant difference between population groups in relation to the diagnostic stage.

H_{03}: No significant difference exists between age groups with regard to the diagnostic stage.

H_{04}: There is no difference regarding the type of dwelling relating to the stage at the time of HIV testing.

H_{05}: No significant difference exists between urban/ rural areas and the diagnostic stage.

H_{06}: The diagnostic institute is not significant in relation to the stage at the time of HIV testing

1.5 Chapter outline

Chapter two briefly discusses the literature concerning HIV subtypes, the geographical distribution of HIV subtypes and survival after infection. The chapter concentrates on a chronological overview of HIV/AIDS case definitions used for clinical purposes as well as those used for disease surveillance. The emphasis is on showing how African countries have modified the World Organisation Health Clinical Staging System to suit regional differences of HIV/AIDS. This is important since local variations of opportunistic infections are prevalent in different parts of the world. Finally, an evaluation of the World Health Organisation Clinical Staging System in South Africa is presented.

Chapter three outlines the research design and the methodology used to determine the diagnostic stage at the time of the HIV test. In particular how the World Health Organisation Clinical Staging System and International Classification for Diseases (ICD 10) was used in this thesis to infer stages of HIV from diagnostic cases. Further, the chapter outlines the study area, states the hypotheses and explains the rationale behind the data analysis.

Chapter four presents the results obtained from the AIDS Training Information and Counselling Centre (ATICC). The results include the diagnostic stage using the WHO Clinical Staging System and the International Classification for Diseases (ICD10). What follows after, is a description of the population characteristics of individuals in this study. Finally, the relationship between diagnostic stage and age, gender structure and place of residence and diagnostic institutions will be examined.

In Chapter five the results obtained from the AIDS Training Information and Counselling Centre (ATICC) will be discussed. First, the clinical stage at the time of the HIV test will be discussed. Then, the population characteristics of the area will be discussed. The relationships between age, gender structure and urban/rural prevalence, diagnostic institutions and diagnostic stage will be considered.

Chapter six outlines the conclusion. First the results and discussion will be summarized. Afterwards, the limitations of the study will be discussed. Finally, the researcher provides a policy afterword.

Appendices A – F include HIV/AIDS case definitions developed since 1985. Appendix G is the World Health Classification System for Diseases 10 used in Chapter three to classify diseases. Appendix H is the revised clinical staging system (see also Chapter three), based on the World Health Clinical Staging System. Appendix J is the list of tables that includes all tables used to generate graphs in the main text.

Chapter 2
Literature Review

2.1 Introduction

To develop a diagnostic staging system suitable for the data, this chapter reviews literature concerning HIV sub-types and their geographical distribution, as well as the incubation period and natural history of the disease. What follows is a chronological reassessment of classification systems developed for disease surveillance and clinical patient care. Finally, this chapter will discuss the implications of the various World Health Clinical Staging Systems for South Africa.

2.2 Definitions of AIDS

In 1982, AIDS was originally defined by the Centres for Disease Control and Prevention (CDC) in Atlanta, USA, for the purpose of surveillance as follows: “the presence of a reliably diagnosed “opportunistic” disease and of an underlying defect in cell-mediated immunity in the absence of known causes of immune defects such as immunosuppressive therapy or malignancies” (Onin 2002:299). HIV as the cause of AIDS was first discovered by Luc Montagnier and Robert Gallo at the Pasteur Institute in Paris 1985 (Montagnier 2002:2).

AIDS is, by definition, the end-stage disease manifestation of an infection by a virus called the Human Immunodeficiency Virus (HIV). The virus primarily affects two organ systems of the body namely the cells of the immune system and the nervous system. Within the immune system there are two main types of cells that are infected by HIV: firstly, the lymphocytes, and particularly the T-helper or CD4 lymphocytes; secondly, cells called monocytes and macrophages whose function is to rid the body of foreign protein by ingesting them and also to present them to the immune system to enable immune response against them to prepare against them. The HIV virus can replicate in these cells without apparently damaging them and they, thus, act as the major reservoir

for infectious virus in the body. Another effect of HIV on the immune system is lymphadenopathy (the swelling of the lymph nodes) (Schoub 1999:24).

The T-helper (CD4 lymphocytes) regulates the immune system and thus plays a central role in the control of the immune function. The significant loss of the T-helper lymphocytes of the immune system results in a profound loss of immune function and causes immunosuppression. There are several consequences for the body: profound weight loss, chronic diarrhoea and fever.
Immunosuppression - the disabling of the immune system - leaves the body vulnerable to even minor infections (Schoub 1999:24). In general, three kinds of infectious agents may attack the body:

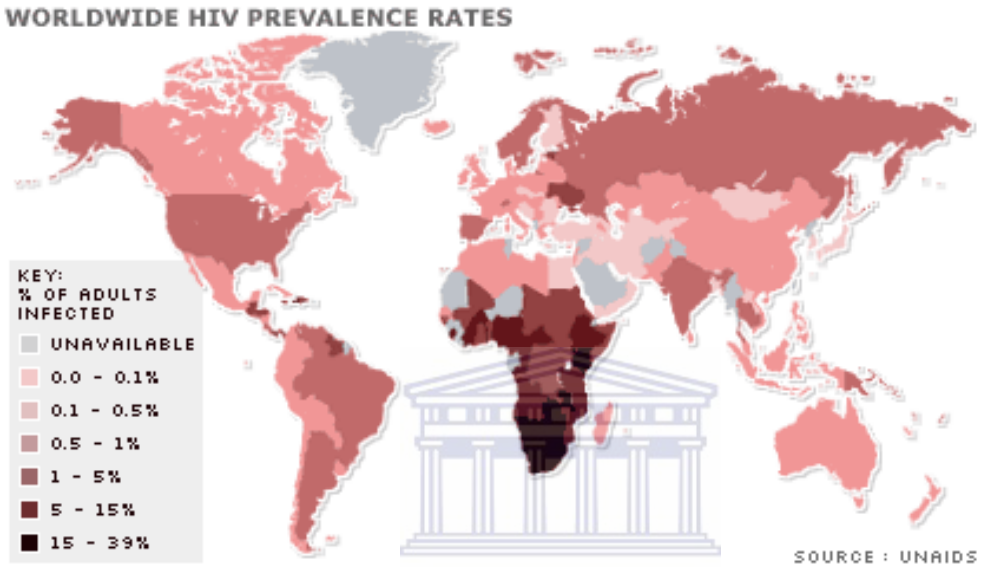
First, there are micro-organisms especially viruses which in HIV negative individuals cause acute but temporary illness. In immunosuppressed individuals these infections are more severe and prolonged.

Second, there are organisms, particularly bacteria (causing tuberculosis, meningitis, salmonella, syphilis, gonorrhea, chlamydia and other sexually transmitted bacterial infections), fungi (causing, pneumocystis carinii pneumonia, candidiasis, cryptococcus and histoplasmosis) and parasitic organisms (causing pneumonia, toxoplasmosis, cryptosporidiosis, isosporiasis, scabies and malaria). In HIV negative individuals these infections cause disease, but are usually readily treated with drugs. In immunosuppressed individuals treatment of these infections are often difficult because there is no assistance from the T-lymphocytes. These infections persist for long periods and are often resistant to drugs.

Third, there are infections with organisms of low virulence (cytomegalovirus, herpes zoster, herpes simplex, human papillomavirus and hepatitis B). Viruses, bacteria, fungi and parasites commonly cause opportunistic infections (Schoub 1999:24-31).

Infected individuals can live with the disease for years without knowing they are infected and during this period they can infect others. Therefore, it is important to diagnose infected individuals as early as possible to prevent them from infecting others.

Figure 2.1: HIV subtypes and their geographical distributions



After discovering HIV infection in Africa in 1983, it became evident that the characteristics of HIV in Africa, were different from those in Western Europe, North America, Australia and New Zealand. This latter pattern is known as HIV-1[1] subtype B. Sexual transmission of the HIV virus was concentrated in so-called high-risk groups, mainly homosexual and bisexual men and intravenous drug abusers, where prevalence in

[1] HIV is classified into two types, HIV-1 and HIV-2. Within HIV-1 are groups of similar viral strains. These are the major (M) subtype and non-M (new [N] and outlier [O]) subtypes. The majority of HIV-1 infections are by M-subtype viral strains. Subtype M HIV-1 is further broken down into nine genetically distinct strains known as clades.

Clade: A group of organisms that are genetically similar and descended from a single parent organism. With HIV, the term "clade" refers to a group of specific HIV-1 strains within an HIV subtype. For example, HIV-1 subtype M contains clades A through H, J, and K. Clades B and C account for the majority of HIV infections around the world.

these groups may be up to 50%. However, in the rest of the world's population, HIV is uncommon and prevalence is usually less than 0.1% (Schoub 1999:24).

Conversely, HIV-1 subtype C is mostly found in Sub-Saharan Africa, Central America and also inner city populations living in deprived socio-economic communities in the big cities of the U.S. It is also the most dominant form of infection in India and parts of China. These geographical regions have limited access to antiretroviral therapy, infectious diseases are more common and tuberculosis is the most common form of opportunistic infection (Morris *et al.* 2000:339). Infection is mainly transmitted by heterosexual intercourse, but with a predominance of female infection. There are several reasons for predominance of female infections in these areas. Females are biologically more susceptible to infections. Also, females in these regions have lower socio-economic status with lower employment levels. As a result of their financial dependence on their partners they are unable to insist on safer sexual practices. Females are also vulnerable to sexual violence and sexual abuse (Budlender & Johnson 2002:9,26). Infection in these areas tends to be more common in urban than rural areas (Schoub 1999:24; Bartos & Piot 2002:208; Budlender & Johnson 2002:34). Also, studies by Medley *et al.* (2004:4) showed that HIV positive females in developing countries who disclose their status, run the risks of being blamed, abandoned, lose economic support, physical and emotional abuse, discrimination and disruption of family and relationships.

Lower infection rates in rural areas in many Sub-Saharan countries may be explained in terms of their immobility and geographic isolation. However rural communities in South Africa are not as static and geographically isolated as those in the rest of Africa (Budlender & Johnson 2002:34). The migrant labour system has caused a steady flow of HIV infected men through the rural communities to their families in rural communities, and the urban areas where they work (Whiteside & Sunter 2000:65; Budlender & Johnson 2002:34).

In South Africa the AIDS epidemic began with subtype B, predominantly in the higher socio-economic white population, affecting mainly homosexual men (Sher 1989:46;

1989:46; Williamson *et. al*. 1995:782; Schoub 1999:24; Budlender & Johnson 2002:38). In 1987 the first black person showed a subtype C infection. This is now the most dominant form of infection in this country (Sher 1989:46; Williamson *et. al*. 1995:782; Schoub 1999:24; Budlender & Johnson 2002:38).

The progression from HIV to AIDS after initial infection varies from 2-20 years, with a median of nine years (Maartens 1999:1255**)**. Research indicates that the median survival is shorter for individuals in Africa where subtype C dominates, than in industrialised countries (Morgan *et al*. 2002:597). The median survival of HIV infected individuals in developing countries is estimated at approximately 7 years (Boerma *et al*. 1998; Deschamps *et al*. 2000:2519; Merli & Palloni 2004:43; Costello *et al*. 2005:582). However, natural history studies of individuals with subtype C are limited (Morris *et al.* 2000:339; Morgan & Whitworth 2001:143; Jaffer *et al*. 2004:462).

The estimated survival time from seroconversion to AIDS in Africa is 4.4 years (Morgan & Whitworth 2001:143). Studies by Morgan and colleagues on HIV-1 patients in rural Uganda estimate the time from seroconversion to stage two of the WHO clinical case definition at 24.5 months. They also estimate the median time from seroconversion to stage three of the WHO definition at 45.5 months (Morgan *et al*. 2002:193). Only one study from Africa has reported the median time from seroconversion to death. The median survival was 9.8 years. However, patients in this study were using HAART (highly active antiretroviral therapy) which prolonged their life expectancy (Morgan *et al.* 2002:601).

Nevertheless, research indicates that viral subtype is not a major determinant of disease progression. Instead, host and environmental factors are major determinants of disease progression (Galai & Kalinkovich 1997:2; Adetunju 1998:17; Hogg *et al*. 1994:1120; Mugerwa & Ryder 1994:271; Mehendale *et al.* 2002:117). Host factors include age and ethnicity. Weiss (1993:1274) suggests that those infected in adolescence and early adulthood progress more slowly. For those infected from birth the progression from HIV to AIDS has a range of 1 to 6.3 years (Anderson 2003:39). Environmental factors, which

play an important role, are socio-economic status, access to health care facilities, and concurrent infection rates of sexually transmitted diseases (Alaeus 2000:32). Hogg and colleagues *(*1994:1120) suggest that there is a link between survival with HIV/AIDS and socio-economic status, the lower the socio-economic conditions, and the shorter the survival time. In Sub-Saharan Africa, one of the poorest regions in the world, the interval between diagnosis with AIDS and the time of death is very short (Adentuju 1998:17). A study in 1997 by Maartens (1999:1258) at the University of Cape Town showed that without antiretroviral therapy the median survival time of homosexual and heterosexual HIV infected persons after diagnosis of AIDS is eighteen months.

So, it is important that HIV positive individuals are diagnosed as early as possible to provide them with antiretroviral therapy. This will prolong their life expectancy and improve their quality of life.

In addition the survival after development of AIDS is shorter in areas where resources are scarce and where only basic health care exists (Maartens 1999:1255; Mehendale et al. 2002:117). This is because most patients in Africa cannot afford antiviral drugs used in the treatment of AIDS and HIV infection. In addition, most African health care facilities providing care for AIDS patients have limited capacity for diagnosing many AIDS-defining opportunistic infections that occur in African patients. Therefore, many opportunistic infections occurring in African patients are left untreated or are improperly treated. Aggravating this situation is the fact that there are limited therapeutic options available in most African health care facilities for treating these opportunistic infections (Mugerwa & Ryder 1994:271). Another explanation is that nutritional deficiencies may contribute to increased immune suppression and lead to faster disease progression (Fawzi et al. 2002:422).

Moreover, diagnostic facilities for CD4 counting can be expensive and scarce in some areas in South Africa, especially in the rural areas of the Eastern Cape. Therefore, it is crucial to develop a clinical case definition that is cheap and easy to apply. Also, such a case definition must be able to recognize opportunistic infections clinically and as early as possible to be properly treated.

2.3 HIV/AIDS diagnostic classification systems/case definitions

Because HIV is relatively new to scientists, understandably different case definitions have arisen in various countries, depending on population factors (children, adults, relative occurrence of opportunistic infections) and on the laboratory infrastructure and training available (De Cock *et al.* 1991:1; Mugerwa & Ryder 1994:271; Schoub 1999:37).

Essentially the classification systems for AIDS consist of three major features: firstly, laboratory tests for HIV infection as well as for immuno-suppression; secondly, demonstration of what are called indicator diseases, that is the specific opportunistic infections or tumors which predict that the individual is at least significantly immuno-suppressed; thirdly, cerebral manifestation of AIDS as well as other direct effects of the virus such as wasting (Whiteside & Sunter 2000:36).

Given that HIV disease progression is so unpredictable there is a need for a comprehensive system to assist in prognosis, follow-up and timing for interventions (Maartens 1999:1255). Therefore, AIDS case definitions have changed to improve their specificity, *i.e*. the ability to avoid diagnosing people with clinically similar conditions to AIDS, but who do not have AIDS. Case definitions also improved their sensitivity, the ability to pick up as many AIDS cases as possible with the clinical criteria that comprise the definition (Schoub 1999:236).

Thus, over the years HIV/AIDS case definitions have changed to distinguish between HIV positive and HIV negative individuals. In addition, case definitions were revised to diagnose as many as possible HIV/AIDS cases. These revisions are crucial for countries

in Sub-Saharan African, especially South Africa, with high HIV/AIDS prevalence rates. Also, case revisions are critical in areas where the majority of infected individuals are unaware of their HIV status and are infecting others. Consequently, they are spreading the disease.

Two types of classification systems are used, namely, clinical staging systems that improve clinical care and management of patient care and case definitions that are used for surveillance purposes (Onin 2002:302). Clinical staging systems classify HIV/AIDS in a progressive sequence from least to most severe; each has a poorer prognosis or different medical management than the earlier stage (Osmond 1998:2).
Several case definitions have been developed:

The Centres for Disease Control Case Definitions: 1982, 1986, 1987, 1993;
The World Health Organisation/Bangui Case Definition 1985;
The Walter Reed Classification System (WRCS) 1986;
The WHO Clinical Staging System 1989;
Caracas case definition 1992.

Additionally, African countries adapted AIDS case definitions, to suit local circumstances. The following case definitions were developed:

Abidjan case definitions 1991;
Symptomatic case definition, Uganda 1993;
Gambian definition 1993;
Zambian case definition 1993;
Rwandan case definition 1995;
Expanded WHO case definition 1994;
Ugandan case definition 1999.

The conditions and infections listed in the 1982 Center for Disease Control case definition of AIDS were developed primarily for epidemiologic surveillance. However, this case definition requires diagnostic and laboratory technologies that are not always available in developing countries. Nevertheless, this CDC definition has been used as a

model in many countries (De Cock *et al.*, 1993a:6). The 1982 CDC case definition was primarily designed to "enable field workers to carry out surveillance of the number of individuals affected and to monitor the progress of the disease" (Mugerwa & Ryder 1994:276).

The WHO-Bangui classification system was developed in Bangui, in The Central African Republic, in 1985 (see Appendix A) in response to the need for a surveillance definition that did not require special laboratory or diagnostic equipment as required by the 1982 CDC case definition (Weniger *et al.* 1992:1213; Durovni *et al.* 1993:1054). The new case definition relied on clinical criteria alone without the need for serologic verification. It is with this parallel system in mind that many developing countries have adapted this classification system to suit local circumstances since illnesses associated with immune deficiency may vary according to the disease-causing organisms in different regions. In the absence of known causes of immuno-suppression, e.g. cancer, severe malnutrition or other recognized etiologies this classification system requires low major signs (De Cock *et al.* 1993a:6; Onin 2002:300; Weniger *et al.* 1992:1213). It has served a useful purpose in surveillance activities in Africa. The fact that no serologic HIV testing is required to define a case of AIDS has greatly facilitated its use in areas where HIV serology testing is not available (Mugerwa & Ryder 1994:274).

In 1986, the CDC developed the first surveillance case definition (see Appendix B). However, this definition is complex, although comprehensive and universally standardized. Its primary purpose is surveillance and not the practical care of patients (Onin 2002:300). The 1986 CDC surveillance definition is generally inappropriate for Africa because of limited diagnostic facilities (Mugerwa & Ryder 1994:276).

Also in 1986, Redfield and colleagues (Mugerwa & Ryder 1994:278; Onin 2002:301) designed the Walter Reed Staging Classification (WRSC). Like the CDC case definition, the WRSC is better suited for the needs of developed countries since it requires expensive serological testing not easily available in the developing world. This definition relies on a

combination of four clinical and laboratory components: lymphadenopathy; CD4 counts; thrush; and delayed hypersensitivity reaction.

The dependence of the WRSC on CD4 counts, as well as cutaneous response to four tests' antigens, limits its usefulness in most surveillance activities and studies of the natural history of HIV infection in Africa (Mugerwa & Ryder 1994:278; Onin 2002:301). The CDC case definition for AIDS was first revised in 1987 (Osmond 1998:6-7). The adult case definition was broadened to include:

> HIV encephalopathy and HIV wasting syndrome;
> Diagnoses made presumptively in cases with laboratory evidence of HIV infection;
> The elimination of exclusions due to other causes of immunodeficiency in cases where laboratory evidence of HIV infection (Osmond 1998: 6);
> The paediatric case definition for surveillance was broadened to include multiple or recurrent serious bacterial infections, lymphoid interstitial pneumonia or pulmonary lymphoid hyperplasia in children under 13 years old.

Still, this case definition was not adequate to capture all cases of severe HIV-related immunodeficiency. Further expansion of this definition was suggested to include other clinical conditions (Osmond 1998:7). Consequently, this revision of the 1987 CDC case definition indicates that case definitions are not universally applicable. In addition, new knowledge about the disease is responsible for the improvement of HIV/AIDS case definitions.

In 1989 the World Health Organization proposed a Clinical Staging System (see Appendix C) that was developed in response to the limitations of the WHO Bangui definition. The WHO Bangui classification system was developed to enable reporting of the numbers of people with AIDS for the purposes of public health surveillance, rather than patient care. It does not include everyone with symptomatic infection, but only those with severe AIDS diseases (Mugerwa & Ryder 1994:274). Furthermore, not all HIV positive patients have AIDS. Some are dying of HIV-related illnesses not recognized as

AIDS (De Cock *et al*. 1993a**:**6; Mugerwa & Ryder 1994:274). This is especially the case with tuberculosis (TB) patients. The AIDS pandemic has the most profound effect on TB prevalence in Africa and is responsible for the dramatic increase in the prevalence there. Furthermore, TB is also the leading cause of death in persons infected with HIV (Ridzon & Mayanja-Kizza 2001:374). There has been widespread concern that many HIV-seronegative patients with TB would be counted incorrectly as AIDS cases in any clinical case definition used in Africa.

Moreover, findings by Colebunders (1989:902) highlight the difficulty of clinically distinguishing an HIV-infected person from a HIV-seronegative person with TB. Many patients with tuberculosis, regardless of their HIV status, experience weight loss, fever, and cough, decreasing the specificity of the WHO case definition in this sub-population. Thus, without HIV testing, many HIV-seronegative tuberculosis patients will be classified incorrectly as having AIDS. However, if tuberculosis is excluded from the case definition, one of the most frequently HIV associated diseases will go unreported. This definition also fails to include neurological manifestations of AIDS in the definition (Mugerwa & Ryder 1994:274). Colebunders, therefore, suggests that all TB patients in Africa be screened for HIV (Mugerwa & Ryder 1994:274).

Again, this revision highlights the significance of a classification system that recognizes local opportunistic infections. This would enable health facilities to pick up HIV positive individuals as early as possible. Subsequently, providing them with antiretroviral therapy and counselling, to prevent the spread of the disease.

In 1989 WHO Clinical Staging System was aimed at improving clinical management of patients and to assist clinicians to make a more reliable prognosis. It would also enable a better definition of the natural history of HIV infection (Mugerwa & Ryder 1994:274). The system is based on four groups of clinical conditions that are considered to have prognostic value and therefore constitute four stages, plus an assessment of physical activity performance expressed as a four-point score. Patients are classified according to the highest stage recorded for either clinical conditions or physical activity (Osmond

1998:5). Patients may move to a more advanced stage, but cannot then return to an earlier stage. This system is easy to apply and allows for separation of clinical and laboratory staging (Maartens 1999:1255).

The 1989 WHO definition was supposed to be universally applicable (Mugerwa & Ryder 1994:274). The development of this clinical staging system illustrates the importance of recognizing HIV clinically without expensive diagnostic laboratory testing as facilities could be scarce.

Further, the WHO/Bangui clinical case definition was also inapplicable in South America because it did not take account of available serology and other diagnostic resources of this region. It included presumptive criteria for diagnosing AIDS in patients with TB, pneumocytis carinii pneumonia and other terminal cases. This definition based on the CDC definition, required a positive serologic test (Weniger *et al.* 1992:1214).

In addition, none of the other case definitions mentioned above was applicable for countries in South America. Consequently, the Caracas case definition was developed in 1989 to simplify and standardize AIDS surveillance in Brazil, Honduras and Suriname. These countries had diagnostic resources that were intermediate between the developed and the developing world. However, unlike the WHO/Bangui definition, the Caracas definition still required a positive serologic test (Gallant *et al.* 1992:295-296).

In 1991, the Pan-American Health Organization used data from the Brazilian study to develop a simplified clinical case definition of AIDS for adults for potential use of epidemiological surveillance in this region. This revised Caracas definition (Appendix D) was developed because of a need for a clinical AIDS definition in countries where the CDC case definition is not practical. This case definition defines a person as having AIDS when cumulative points assigned for conditions, equal or exceed 10, and show antibodies for HIV in serum. Furthermore, cases in which the total point score equals or exceeds the required score of 10, but HIV serology is pending are considered “provisional cases”. This case definition excludes persons with cancer, or

immunosuppressive therapies, or where the signs/symptoms are attributed to conditions other than HIV infection (Weniger *et al.*1992:1213). This revision illustrates the significance of using medical data to revise and improve current case definitions to include prevalent opportunistic infections.

The 1993 CDC revision (see Appendix E), categorizes persons on the basis of clinical conditions associated with HIV infection and CD4 T-lymphocyte counts. The system is based on three ranges of CD4 T-lymphocyte counts and three clinical categories and is presented by a matrix of nine mutually inclusive categories. The CD4 lymphocyte categories correspond with CD4 –lymphocyte counts per micro litre of blood (Mugerwa & Ryder 1994:276; Onin 2002:299).

According to this classification system any HIV-infected individual with a CD4 T-lymphocyte cell count <200/mm3 has AIDS by definition, regardless of the presence of symptoms or opportunistic infections (Onin 2002:299-300). This revision of the CDC case definition again shows the importance of a clinical staging in areas where diagnostic resources are scarce.

2.4 Application of the World Health Organisation/Bangui Definition in Africa

A study by De Cock and colleagues (1991:1185) in Abidjan found that not all people who tested positive for fully-blown AIDS have early HIV-infection. Some may have advanced disease associated with HIV infection, but do not meet the AIDS case definition. This is because it is difficult to make a distinction between an HIV-positive TB patient and an HIV-negative patient. The WHO/Bangui clinical case definition is thus unsatisfactory because this definition does not require a positive serologic test. Therefore, a modification of the WHO clinical case definition of AIDS in Africa was proposed. This was called the Abidjan or "AIDS Wasting" definition (see Appendix F). In this classification scheme an adult would be classified as having AIDS if the CDC surveillance case definition for AIDS was fulfilled or patients had a positive test for HIV infection plus one or more of the following symptoms: weight loss with diarrhoea or fever, TB, Kaposi's sarcoma or nerve disorders. This proposed scheme provides the

simplicity required in any case definition in Africa, but also requires a positive HIV serologic result (De Cock *et al,* 1991:1185; Mugerwa & Ryder 1994:279). The use of the HIV Wasting Syndrome as indicative of AIDS not only excluded all HIV-seronegative patients (by definition), but also increased the sensitivity of the case definition (Mugerwa & Ryder 1994:273). It is a simple staging system of HIV-infection and disease and will be more useful and effective than a surveillance case definition. It was primarily developed for epidemiological surveillance and may not be adequate for clinical work (De Cock *et al.* 1991:1185).

Furthermore, studies by De Cock and colleagues (1993a:6) in Uganda and Côte d'Ivoire found the WHO/Bangui clinical condition "relatively specific" meaning that the vast majority of people diagnosed as having AIDS will have been correctly assessed. However, studies show that the definition is relatively insensitive, meaning that only patients who have severe illness related to HIV will be included in the definition. TB is widely recognized as the most common opportunistic disease associated with AIDS in Africa. However, because TB causes wasting, cough and fever in most patients, the AIDS definition cannot reliably distinguish between HIV-positive and HIV-negative patients. It does not include everybody with symptomatic HIV infection, but only people with severe HIV disease.

Therefore, in South Africa where TB is prevalent, HIV/AIDS case definitions should reliably distinguish between HIV-positive and HIV-negative TB patients.

In response to this research the Symptomatic HIV case definition was developed for Uganda and Côte d' Iviore in 1993 for the purpose of individual case management. It is useful for diagnosis, if illnesses are related to HIV infection (symptomatic HIV infection). In the Symptomatic definition, a person is asymptomatic when he/she has Herpes Simplex Virus infection and is healthy, although there may be signs of persistent, generalized lymphadenopathy. Symptomatic infection or HIV disease is diagnosed when a person has HIV infection together with illnesses related to immune deficiency. These

illnesses may be mild, moderate or severe. They are characterized, by episodes of illness, followed by recovery and periods of health (De Cock *et al.* 1993a:6).

Furthermore, De Cock and colleagues associate the following conditions, which are not included in the CDC definition, with HIV in women: amenorrhea; recurrent or persistent vaginal candidiasis; severe pelvic infections with abscess formation and cervical cancer. Although the Symptomatic definition does not intend to replace the WHO/Bangui clinical case definition developed for epidemiological purposes which avoids the over-use of HIV testing. HIV testing in this case is used to confirm suspected HIV infection rather than as a diagnostic tool. In addition, a patient with suspected HIV infection can be counselled. Also, many HIV related illnesses can be treated, improving the patient's quality of life. Furthermore, certain drugs cause severe side effects in people with HIV infection, and should not be prescribed incorrectly (De Cock *et al.* 1993a:6) or without proper infrastructure.

Although more exact than the WHO/Bangui clinical definition, the Symptomatic case definition requires more invasive diagnostic tests and is more complicated for health workers to use. Symptomatic HIV infection can be recognized clinically without testing for HIV antibodies. However, confidential HIV testing can be used to confirm a clinical diagnosis provided that patients give their consent and are counselled before such a test (De Cock *et al.* 1993a:6).

Thus, it is critical to select a clinical staging system, especially in the Eastern Cape, where diagnostic facilities are scarce in rural areas. By doing this, HIV positive individuals can be clinically recognized and provided with antiretroviral therapy and counselling, which will prevent them from spreading the disease.

In 1993, the WHO/Bangui clinical case definition was also adapted for surveillance of Gambian patients. The Gambian system also required that patients should be seropositive (antibodies in serum) for HIV. The Gambian system shows that immune damage is closely correlated with the stage of disease based on WHO/Bangui definition of AIDS,

the WHO Clinical Staging System, or that developed by the CDC. It substantiates that CD4 counts are a powerful predictor of survival in symptomatic Gambian patients. The Gambian or WHO clinical staging system is easy and cheap to apply and may serve as an alternative to sophisticated and expensive immunological measurements when trying to stage or predict prognosis (Whittle *et al*.1993:45-49).

In 1993 Zambia also adapted the WHO/Bangui clinical case definition to suit local circumstances and designed local major and minor criteria for the clinical case definition of AIDS. The Zambian National AIDS Surveillance Committee evaluated the WHO case definitions and found in a preliminary study of children in Zambia that a number of patients with obvious AIDS did not fit the WHO case definition for paediatric AIDS. On the basis of these findings they suggested that children with HIV infection who would need special care should be identified at a primary health level. They also recommend that AIDS researchers in Africa work out their own criteria and case definitions of paediatric and adult AIDS for use at national level. When fully evaluated locally, these criteria could be analyzed between regions to seek a unified case definition if possible (Chintu & Zumia 1993:1054).

Further studies (Lifson *et al*. 1995:262) in Rwanda in 1995 suggested the following major modifications to the WHO clinical staging system for use in Sub-Saharan Africa: defining oral candidiasis, pulmonary tuberculosis (PTB) and chronic oral and genital ulcers as stage 4 conditions and replacing weight loss with body mass index.

In 1997, Greenberg and colleagues compared the 1985 WHO/Bangui clinical case definition with the 1994 Expanded WHO case definition. This research involved patients from three university hospitals in Abidjan and TB patients from eight TB centres in Côte d'Ivoire. The following proposals were made: the inclusion of multiple severe HIV-related illnesses in the expanded definition increased the number of reportable AIDS cases in HIV-seropositive patients and the inclusion of HIV seropositivity as a criterion for the expanded definition. Thus, it includes seropositivity as a criterion for the expanded definition to increase its specificity. Based on these findings, researchers

recommended the use of the 1994 expanded definition for surveillance purposes in areas of the developing world where HIV serologic testing is available (Onin 2002:301). Another African country that adapted the WHO/Bangui clinical case definition was Uganda. In 1999 the Ugandan Medical Research Council conducted research in rural Uganda. Its objective was to assess whether the WHO staging classification for HIV provided prognostically valuable and applicable information in rural Uganda. Their findings prompted a revised clinical staging system. Bacterial infection and unexplained prolonged fever for more than one month should be considered as an asymptomatic condition. Cryptosporidiosis or HSV infection for more than one month should be considered as persistent generalized lymphadenopathy (PGL) condition and oral candidiasis should be considered as a symptomatic condition. Furthermore, the study suggests that: PTB and Extra pulmonary tuberculosis (ETB) are associated with a better prognosis than other stage 3 and 4 conditions. Body mass index is a better prognosis marker than weight loss. When total CD4 counts were used combined with clinical conditions, there was evidence to suggest that the combination provided prognostically better staging when only clinical conditions or total lymphocyte counts (TCL) were used independently. This work has shown that WHO clinical condition categories are good indicators of disease progression even without being revised to incorporated laboratory categories. This is important for areas with limited access to laboratory markers (Malamba *et al.* 1999:2555-2561).

Research by Maartens in 2000 in Cape Town suggests that AIDS Defining Illness (ADI) is an important determinant of survival, particularly in patients with preserved CD4 counts. Therefore, opportunistic disease could be used as a prognostic adjunct to CD4 counts. This means that stratification of patients can easily be performed in poor resource areas. Expensive therapy can then be limited to patients with favourable prognostic criteria, while survival figures of people in stage four, suffering from diseases such as Wasting Syndrome or encephalopathy, support the institution of home-based terminal care (Post *et al.* 2001:585-586).

The prognostic management provided by opportunistic disease can be used for counselling and management of HIV infected patients. Moreover, prognostic stratification can also be used to avoid irrational spending of scarce health resources (Post *et al*. 2001:585-586).

Thus, based on medical data, HIV/AIDS case definitions in Africa are continuously revised, to include regional opportunistic infections. In addition, changes in case definitions are determined by available diagnostic facilities.

2.5 Conclusion

Regional differences of opportunistic infections and different diagnostic facilities available in countries have determined dynamic changes in classification systems. The Centres for Disease Control and Walter Reed Classification System, which require more advanced diagnostic facilities and are therefore more suitable for the developed world. The WHO/ Bangui case definition or a refinement, requires no serologic testing, is better suited for the developing countries especially in Africa. Some African countries (Côte d'Ivoire, Gambia, Zambia, Rwanda and Uganda) have adapted this WHO/ Bangui case definition to suit local circumstances. Meanwhile, South American countries that have intermediate diagnostic facilities use the Caracas and Revised Caracas case definition that require some serologic testing. Finally, studies of the WHO Clinical Staging System in South Africa, suggest that AIDS defining illness is a useful predictor of survival and stratification of AIDS and should be applied in the management of the disease. To this end the various clinical signs and symptoms have been developed into a table (see Appendix H), which can then be applied to the case level data already collected in Region A, health district of the Nelson Mandela Metropole.

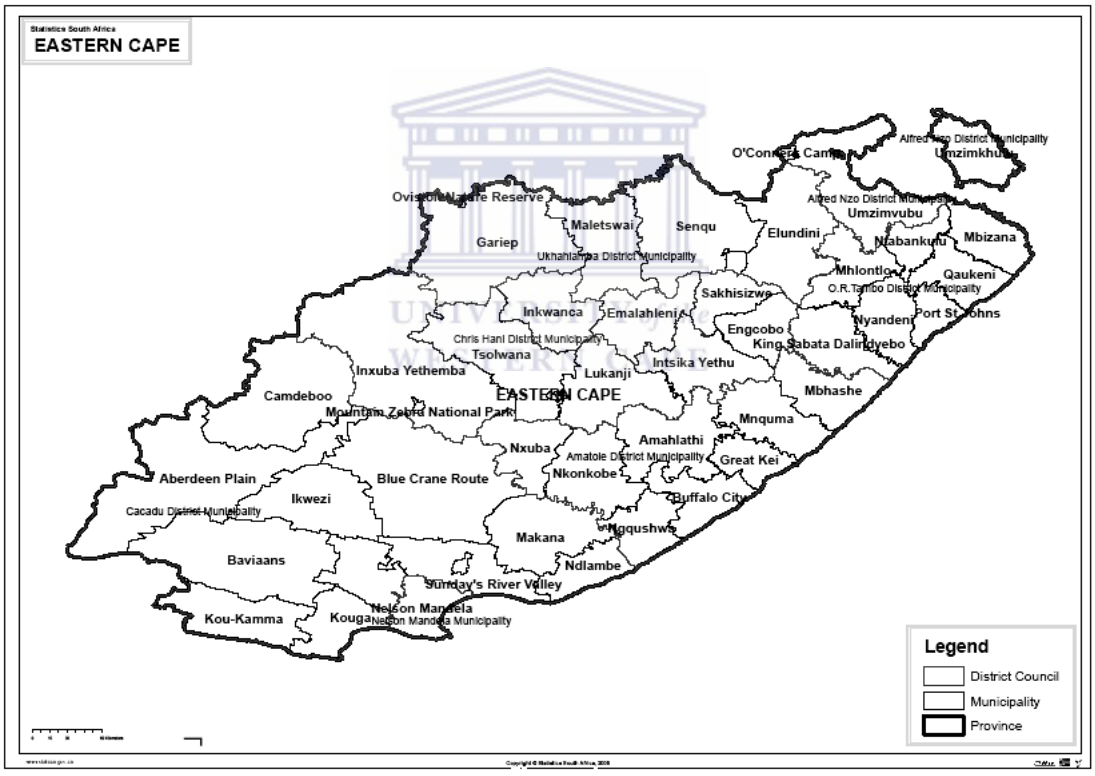
Chapter 3
Research design and methodology

3.1 Introduction

This chapter delimits the study area and explains the rationale behind the data analysis. What follows is a description of the research design and methodology applied to staging the disease based on the WHO Clinical Staging System (WHO CSS).

3.2 Study Area

Figure 3.1 Eastern Cape



Source: Statistics South Africa

The Eastern Cape is South Africa's second largest province encompassing 15% of the country's land mass. The province is considered to be the poorest in the country and the most vulnerable to HIV/AIDS (Shell 2000:2).

Moreover, Census 2001 revealed that the province is home to 15.5% of the total population of South Africa (StatsSA 2004:4). Also, over one third of the population, 36.8% in the area are under 15 years. A further 6.2 % were 65 years and older and 64.4% were aged 29 years or younger (StatsSA 2004:19).

In addition, a report by the Department of Health (DOH) in 2005, estimates HIV prevalence among HIV antenatal attendees in the Eastern Cape at 29.5% (DOH 2006:11). Further, research at the Human Science Research Council in 2005, estimates that HIV prevalence in the age group two years and older in the Eastern Cape is 8.9%. Among people in their reproductive years HIV prevalence was 15.5 % (Shisana *et al*. 2005:35).

However, the highest infections are not in poor rural areas, but in urban areas of the Nelson Mandela Metropole (NMM). HIV prevalence is highest amongst Blacks, growing amongst people of mixed descent and lowest and declining amongst Asians and Whites in the city. The disease has spread rapidly amongst the black population in the city (Shell 2000:2-3).

To explain the severity of the epidemic in South Africa, Whiteside & Barnett (1999) developed the Jaipur Paradigm, to explain this phenomenon. How many people are infected, the rapid the spread among the black population, will be determined by two key variables: (i) the degree of social cohesion in society, and (ii) the overall level of wealth.

> Social cohesion needs further explanation. It may derive from civil society, that part of society which occupies the space between the individual and the state, and the degree to which there is a perceived and acted-upon community of interest in a group or nation. It includes voluntary organisations, NGOs, churches, parent-teacher associations, indeed any grouping of people outside the household and workplace. Social cohesion may also stem from control through an authoritarian political or cultural system or from national beliefs and ideologies, especially organized religion. The unit of analysis may be a whole society but also may be a household or sub-community (Whiteside & Barnett 1999:17).

Wealth is simply the level of income per head. When combined, four types of societies emerged.

Type 1, high social cohesion and high wealth - many societies of the rich world;

Type 2, high social cohesion and low wealth - those societies with strong religious cultures or good governance;

Type 3, low social cohesion and low wealth - countries experiencing civil war or economic collapse, such as Uganda in the early 1980s;

Type 4, low social cohesion and high wealth - societies in transition, such as South Africa, where wealth is very unequally distributed (Whiteside & Barnett 1999:17).

In societies with high income and low social cohesion, truck drivers may earn a relatively high income. However, by the nature of their work, it is also difficult to bring them into contact with Information Education Communication programmes (Whiteside & Barnett, 1999:17; Whiteside & Sunter 2000:65). Whiteside & Sunter (2000:65) explained this theory in the South African context: by applying this conceptual framework to South Africa, one can explain why the epidemic is so severe to date; why it is located where it is; and what may happen.

Under apartheid, the country was subject to extreme social engineering, designed to benefit the minority white population. South Africa's black population was forced into crowded, impoverished homelands, which led to the breakdown of traditional cultural structures. Adult men migrated to urban areas to work in white-owned factories and mines and to live in single-sex hostels. The laws of the regime prohibited them from bringing their families into the cities (Whiteside & Sunter 2000:65; Marks 2002:18). This created a culture of urban and rural wives and prostitution, not necessarily for cash but as part of a survival strategy. Adults, other than their parents, cared for many children. As result of these family break-ups, child abuse and child prostitution became a new phenomenon. Health services were limited, which meant many sexually transmitted infections (STIs) went untreated. The pattern of men moving away from their families for long periods, living in crowded and alien conditions with little power over their lives,

created the ideal situation for the spread of all STIs (Whiteside & Sunter 2000:65). Additionally, the migrant labour system has caused a steady flow of HIV infected men through rural communities (Whiteside & Sunter 2000:65; Budlender & Johnson 2002:34).

Further, the demise of apartheid did end 'temporary' migration. Posel (2003:16;17) provided evidence that the migrant labour system continued until 1999. This research also suggests, that people still migrate 'temporarily', retaining membership in, and ties with, their households of origin. Moreover, research by the Southern African Migration Project in 2004, provided evidence that migration is a important factor in the spread of HIV in Southern Africa (Lurie 2004:23).

Contributing to the spread of HIV, the apartheid system through legislation and formalization of discrimination through education, jobs, and even the regulation of sexual behaviour between race groups was responsible for the creation of the "widespread philosophy of fatalism. A perception of 'what will be, will be' arose which in turn diminished individual worth, responsibility, and accountability. This feeling is still prevalent and makes people live for today without valuing tomorrow" (Whiteside & Sunter 2000:65).

Further, conflict during the final years of apartheid, the cycle of oppression and resistance led to the almost total disruption of civil society (Whiteside & Sunter 2000:65). There was a militarization of society. Armed forces included the defence force, homeland armies, liberation movements, self-defence units and political militias. Military forces have higher levels of infection than the general population (Whiteside & Sunter 2000:65). The violence that categorized the end of apartheid has not disappeared, except in its political form (Marks 2002:20).

Moreover, the steady migration of large numbers of sexually active males bringing their diseases with them resulted in the marginalisation of women and children (Marks 2002:18). Therefore, inequality within society assisted (and continues to assist) the

spread of HIV. Poor women have fewer financial resources and are forced into sexual relationships to ensure the survival of themselves and their children (Whiteside & Sunter 2000:65). In single-sex hostels black men were able to exert power over women who were in town illegally and were dependent on men for a bed (Ramphele 2000:114; Marks 2002:21). These women became vulnerable to sexual exploitation which contributed to the spread of HIV.

Additionally, in the Eastern Cape sexual violence was increasing, soon becoming like a "war on women". This war on women was the outcome of a complex interaction between broader social processes and those of gender power relations, themselves mediated by economic and political factors (Mager 1998:16; Marks 2002:20). Murder, rape and assault are now both cultural and statistical norms and seem to have escalated since 1994 (Turshen 1998:9; Marks 2002:21). Crime and gang violence are the main sources of conflict in South Africa. As a result, rape and gang rape have become extremely effective methods of spreading HIV (Whiteside & Sunter 2000:65).

Aggravating the situation, are cultural factors such as the belief that sleeping with a virgin can cure the disease (Shell 2000:2; Marks 2002:21).These beliefs are setting off higher infection rates amongst young females and children. Furthermore, the taxi industry and migration contribute to high infection levels (Shell 2000:2-3). This sets a grim demographic future for the province. Therefore, information on the life expectancy of AIDS patients in the region is vital for government to develop health and welfare policies to increase the life expectancy of HIV positive individuals.

So, the Actuary Society of South Africa used the four stages of the WHO CSS (see Appendix C) to estimate the proportion of HIV positive people in the Eastern Cape. Findings of Dorrington and colleagues suggest that, in the year 2000, 62% of people living with HIV/AIDS were in stage 1. A further 18% were in stage 2 and 15% were in stage 3. The remaining 5% were in stage 4 (Dorrington *et al. 6: 2002).*

Table 3.1: Stage of HIV infection in the Eastern Cape

WHO Stage 1: Acute HIV Infection	62%
WHO Stage 2: Early Disease	18%
WHO Stage 3: Late Disease	15 %
WHO Stage 4: AIDS	5 %
Total	100%

Source: Dorrington et al. 6:2002

Thus in the year 2000, 62% of HIV positive people in the Eastern Cape were asymptomatic. Without voluntary HIV testing these individuals will only seek testing when they are symptomatic (show symptoms of HIV). Therefore, it is important that a concerted effort is made to diagnose these individuals before they become symptomatic.

3.3 Hypotheses

Patients in the NMM seek HIV testing when they are in the advanced stages three (late disease) and four (AIDS) of the World Health Clinical Staging System of HIV/AIDS (see Appendix C). The following null hypotheses relating to the diagnostic stage at the time of the HIV test will be tested, using the Chi-square test:

H_{01}: There is no significant difference between males and females with regard to diagnostic stage.

H_{02}: There is no significant difference between population groups in relation to diagnostic stage.

H_{03}: No significant difference exists between age groups with regard to diagnostic stage.

H_{04}: There is no significant difference regarding the type of dwelling relating to the stage at the time of HIV testing.

H_{05}: No significant difference exists between urban/ rural areas and diagnostic stage.

H_{06}: The diagnostic institute is not play a significant role in relation to the stage at the time of HIV testing.

3.4 Methodology

3.4.1 Data collection and sampling

Anonymous case level data from January 1991 to April 2000, were collected from the Region A health district in the Eastern Cape. These records comprise 27 505 cases from the AIDS Training Information and Counselling Center (ATICC) in the Nelson Mandela Metropole. HIV testing was voluntary and blood samples were diagnosed at the South African Institute for Medical Research, using the ELISA /Western Blot test.[2]

The data consist of 44 variables, of which the following were analyzed: population group; gender; age; diagnostic date; death date; diagnostic institution; mode of HIV

[2] HIV ELISA/Western Blot is a set of blood tests used in the diagnosis of chronic infection with human immunodeficiency virus (HIV). The HIV ELISA is a screening test for the diagnosis of HIV infection. If this test is positive, it must be confirmed with a second test called the Western Blot, which is more specific and will confirm if someone is truly HIV positive (there are other conditions that may inaccurately produce a positive ELISA test result, including lupus, Lyme disease, and syphilis).

transmission; type of dwelling; urban/rural residence and medical reasons for HIV testing.

3.4.2 Research design /data analysis

The ***why-variable*** **(**why did the patient go for an HIV test) was sorted into medical symptoms and non-medical conditions.

Then, medical symptoms were classified using the WHO International Classification for Diseases 10 for HIV disease (see Appendix G).

Subsequently, medical symptoms were stratified consistently with the four stages of the WHO CSS (see Appendix H).

3.5 Rationale behind data analysis

To estimate the asymptomatic phase we need to know the exact date the individual was infected. This data can be obtained through epidemiologic surveillance using case definitions of AIDS. Since, the infection date was unavailable for all cases the researcher used a surrogate, disease progression staging system, which can be established using the medical symptom of patients during the HIV test. To stage the disease a diagnostic classification system is required. For this purpose the WHO CSS was found to be the most applicable for South Africa because it does not require expensive diagnostic facilities that are not accessible to everybody. This is tabulated carefully in Appendix C. The WHO CSS is cheap and easy to apply in areas with poor diagnostic facilities, such as the Eastern Cape. However, we need to review this definition to suit South African circumstances. Furthermore, research in Uganda in 1999 found the WHO CSS categories to be good indicators of disease progression even without being revised into laboratory categories (Malamba *et al.* 1999: 2555-2561). Further research by Maartens (1999: 1255) on the WHO CSS in 2000 in Cape Town suggests the use of opportunistic illness as prognostic adjunct to CD4 counts.

3.6 Minimizing errors

The sort and frequency procedure was used to find and define missing data. Also, medical symptoms were cleaned and stratified. To minimize errors, the stratified medical symptoms were then checked by a clinical nurse with experience in HIV CD4 counting. She is experienced in this field as she assists with CD4 counting at a Medical Aid company, where CD4 counting is used to determine the stage of an HIV positive individual. Antiretroviral therapy is provided if the individual's CD4 count is below 200 cells/mm3 or if they have opportunistic infections associated with stages three or four of HIV that may be life threatening.

3.7 Conclusion

Case level data of HIV positive patients were collected from Region A, health district in the Nelson Mandela Metropole. Medical symptoms of these patients were first classified consistent with WHO International Classification for Diseases 10 for HIV. Afterwards medical symptoms were staged consistent with the categories of WHO Clinical Staging System. Subsequently, several null hypotheses relating to diagnostic stage of HIV positive people will be investigated. These results will be discussed in Chapter 4.

Chapter 4
Results

4.1 Introduction

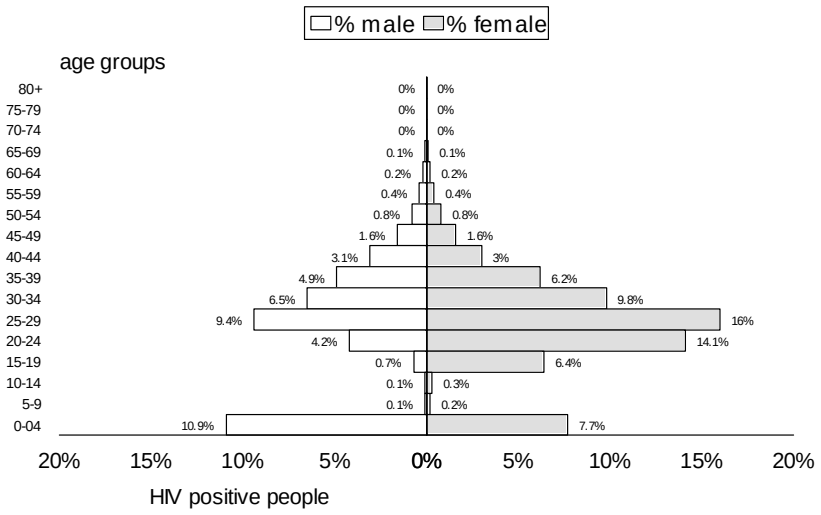
In this chapter, the results obtained from the AIDS Training Information and Counselling Centre (ATICC) will be presented and described. Moreover, the diagnostic stage at the time of the HIV test will be determined, using the World Health Clinical Staging System and the International Classification for Diseases (ICD 10). This chapter also probes whether there is dependence between the diagnostic stage and critical variables such as; gender, population group, diagnostic age, area type, diagnostic institution, dwelling type and year of diagnosis respectively.

4.2 Demographic profile of HIV positive people

Overall 27 505 HIV positive cases were recorded at the ATICC, from January1991 to April 2000.

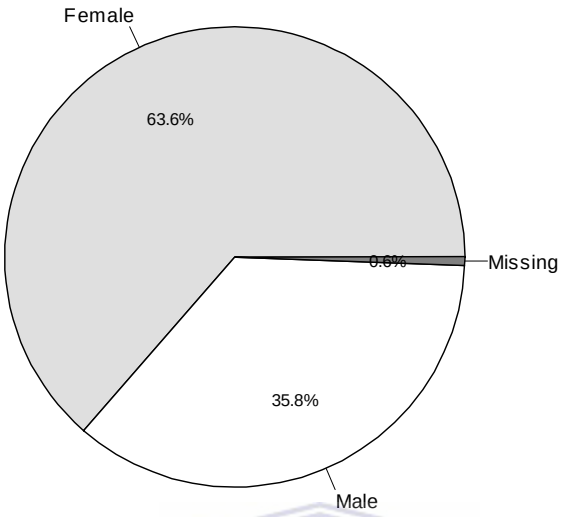
4.2.1 Gender and age composition

Figure 4.1: Age and gender composition of HIV positive people, NMM



Source: NMM ATICC, 2000 (N=27505)

Figure 4.2: Gender of HIV positive people, NMM



Source: NMM ATICC, 2000 (N= 27 505)

Females accounted for almost two-thirds, 63.6% of recorded HIV positive infections in the Nelson Mandela Metropole (NMM), while males accounted for more than a third, 35.8%. In 0.6% of all cases the gender of individuals was not recorded (see Figure 4.1; Figure 4.2 & Table 4.2).

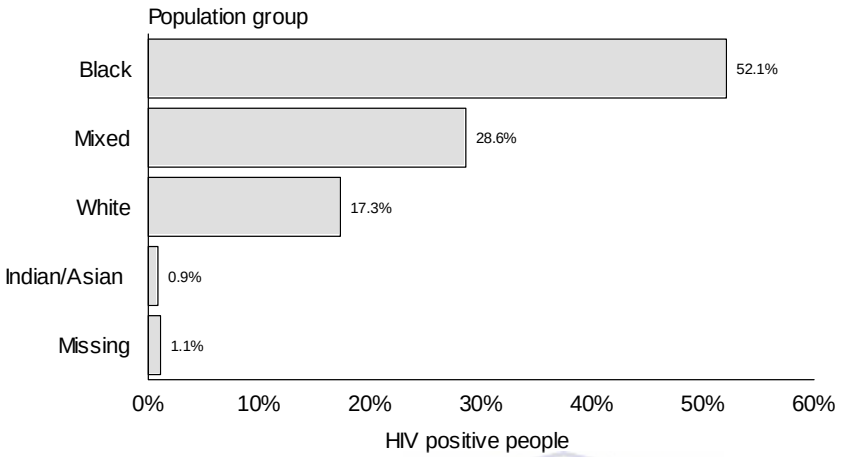
In this study, the majority of HIV positive people were in their reproductive years (15 to 49 years old), which also include part of the labour force. For people over 65 years old, a higher proportion of males than females were diagnosed with HIV (see Figure 4.1 & Table 4.1).

To see the impact of HIV on infants less than 1 year old, a special category for this particular age group was created. The results suggest that 7% of the total group studied were infants under one year old (Table 4.1b).

Moreover, the mean age of HIV positive people in this study was 27.23 years the median age was 28 years and the mode, 29 years. The standard deviation = 11.9 and the interquartile range = 12 (see Table 4.3b).

4.2.2 Population group

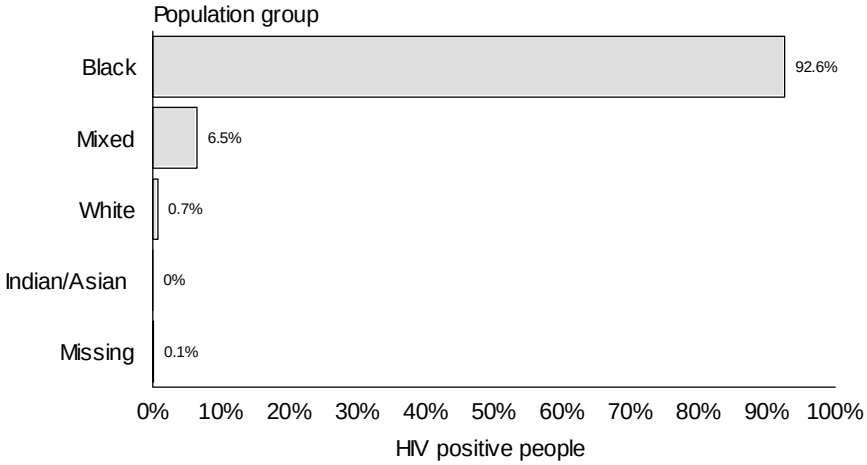
Figure 4.3a: Population group census 1996, NMM



Source: Census 1996, SSA (N=10 6062)

During the 1996 census, over half, 52.1%, of people in the Nelson Mandela Metropole identified themselves as being Black. Whilst 28.6% identified themselves as being from mixed descent, 17.3% identified themselves as Whites and 0.9% identified themselves as Indians. For 1.1%, the population group was not recorded (see Figure 4.3a & Table 4.4a).

Figure 4.3b: Population group of HIV positive people, NMM

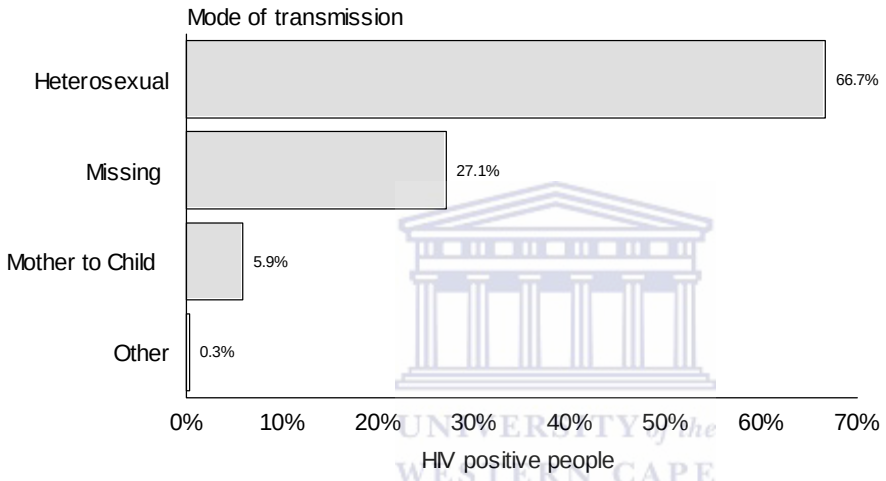


Source: NMM ATICC, 2000 (N= 27 505)

In this study, 92, 6% of people who seek HIV testing were Black, compared to 6.5% people of mixed descent and 6.5% and 0.7% Whites. No Indian/Asians were tested HIV positive. For 0.1% of individuals, population group was unknown (see Figure 4.3b & Table 4.4.b)

4.2.3 Mode of HIV transmission

Figure 4.4: Mode of HIV transmission, NMM



Source: NMM ATICC, 2000 (N= 27 505)

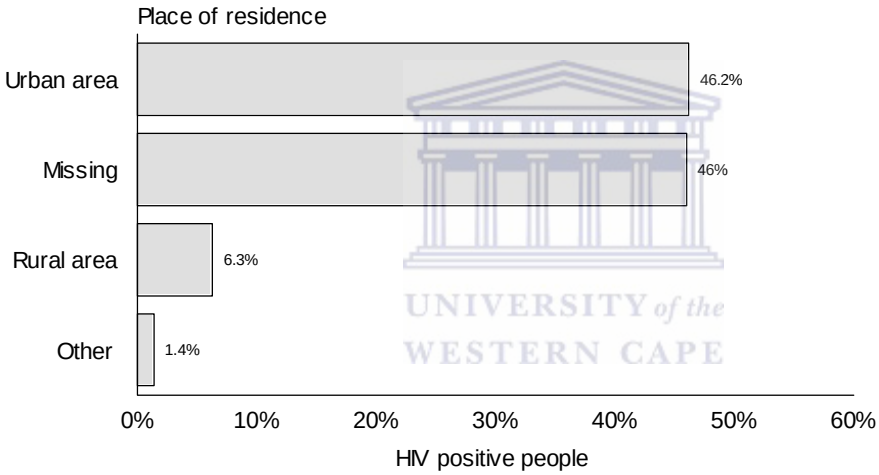
The mode of transmission was already recorded on the database. In this study heterosexual infections accounted for more than two thirds, 66.7%, of HIV infections in the area, while mother to child transmission accounted for 5.9%. The rest (rape, bisexual, homosexual, haemophiliac and other modes of infections) accounted for 0.3%. For the remaining 27.1% the mode of transmission was not recorded (see Figure 4.4 & Table 4.5).

4.2.4 Diagnostic institution

The majority, 56.7%, of HIV positive individuals were diagnosed at hospitals, followed by clinics, 25.9%, at private doctors, 8.5%, at TB hospitals 0.8%, at the Eastern Cape Blood Transfusion services, 1.3% and at prisons 1.2%. Diagnosis for insurance purposes, military hospitals, district surgeon and industry accounted for 5.3% of cases. In 0.2% of cases the diagnostic institutions were not recorded (see Table 4.6).

4.2.5 Place of residence

Figure 4.5: Place of residence of HIV positive people, NMM



Source: NMM ATICC, 2000 (N= 27 505)

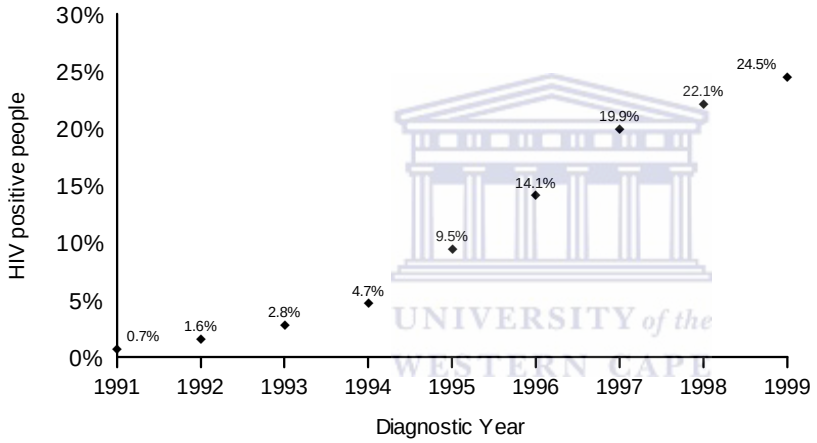
Regional origins of HIV positive people in this study indicate that, 46.2% were from urban areas, while 6.3% were from rural areas and 1.4% were from other areas. In a further 46.0% of cases, the area type was not recorded (see Figure 4.5 & Table 4.7).

4.2.6 Dwelling type

People with street addresses accounted for the majority, 66.4%, of recorded cases, whereas, 22.2% of HIV positive people lived in sites with services (informal settlements provided with water and toilet facilities). The rest (prisons, flats, hostels, farms, business etc.) each accounted for 3% or less. In 57.7% of cases the dwelling type was not recorded (see Table 4.8)

4.2.7 Diagnostic year

Figure 4.6: Year in which HIV positive people were diagnosed, NMM

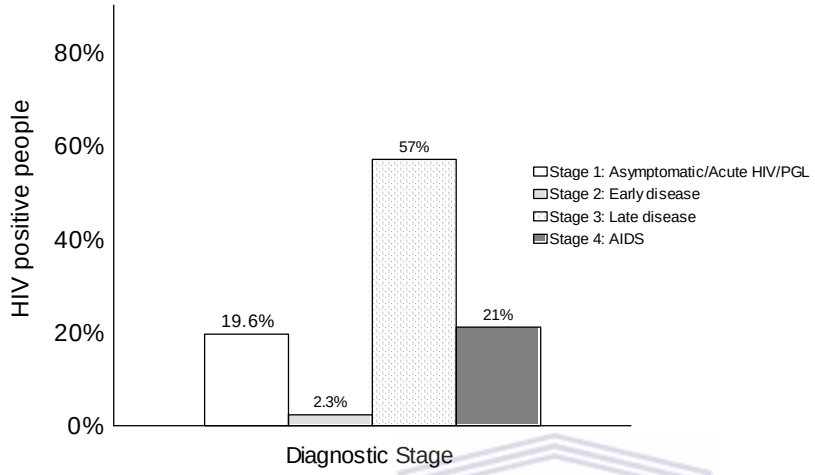


Source: NMM ATICC, 2000 (N= 26 303)

The researcher has excluded the year 2000 because the data was collected only up to April 2000. Of the 26 303 cases, 0.7% were diagnosed HIV positive in 1991, compared to 24.5% in 1999 (see Figure 4.6 & Table 4.9).

4.2.8 Diagnostic stage

Figure 4.7: Diagnostic stage (1989 WHO Clinical Staging System), NMM



Source: NMM ATICC, 2000 (N= 4772)

Staging was done according to the 1989 World Health Clinical Staging System (see Appendix C). Only 17.3% of HIV positive people had information to classify the stage of HIV/AIDS at first diagnosis. Of these 57% were in stage three (late disease). A further 21% were in stage four (AIDS), while 19.6% were in stage one (asymptomatic/PGL/ Acute HIV) and 2.3% were in stage two (early disease). For the rest of the HIV positive people (82.7%) no medical conditions were recorded and staging therefore could not be done. For example, tests for blood transfusion, pregnancy, insurance and other non-medical reasons were excluded (see Figure 4.7 & Table 4.10).

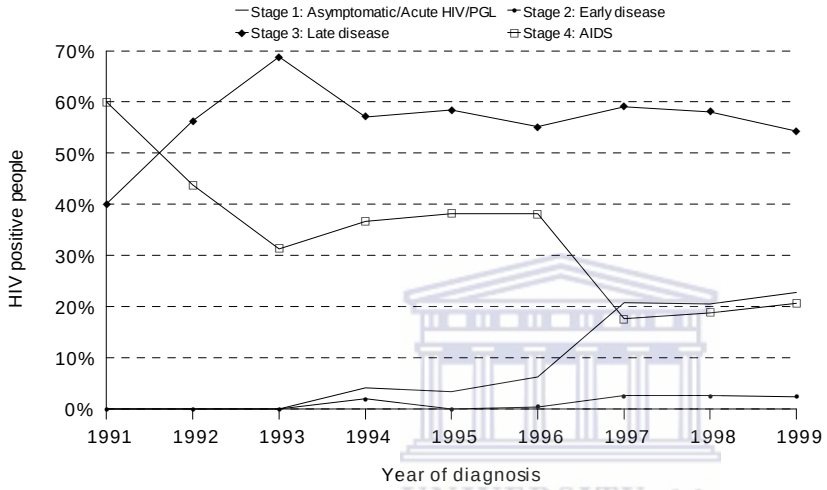
4.2.9 International Classification for Diseases 10 (ICD 10)

When medical conditions of the 17.3% who had information on medical conditions were classified according to the ICD10 (see Appendix G), the results suggest that TB is the most common opportunistic infection in the Nelson Mandela Metropole. More than a third, 34.5%, of HIV positive people suffered from TB, followed by other bacterial infections, 17.5%, and other infectious and parasitic infections, 15.2%. Other specified diseases accounted for 12.7%, viral infections 9.4%, unspecified diseases 2.4%, generalized lymphadenopathy 1.7% and candidiasis 1.4%. Other diseases amount to less

than a percentage each. The majority of these individuals suffered from curable parasitic or bacterial infections (see Table 4.11 & Appendix G).

4.2.10 Diagnostic year and diagnostic stage

Figure 4.8: Diagnostic year (1991-1999) and diagnostic stage of HIV positive people, NMM



Source: NMM ATICC, 2000 (N=4742)

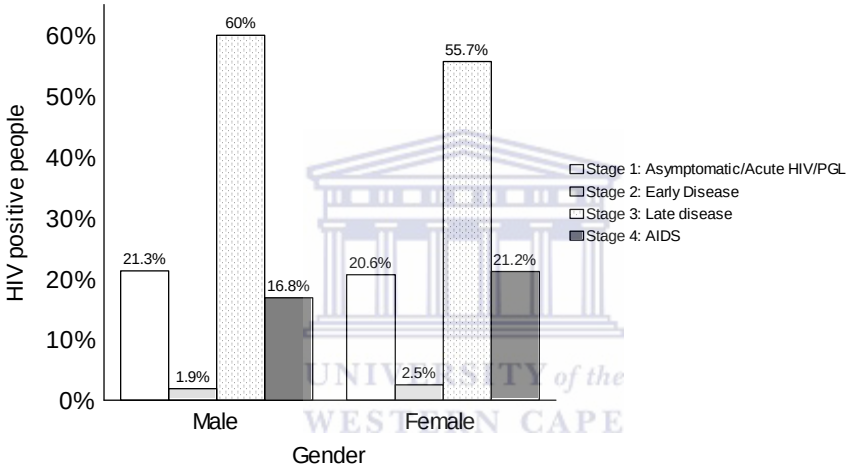
The researcher excluded the year 2000 because the data only included cases up to April. After 1991 the number of people diagnosed in stage four sharply decreased from 60% to 31.3% in 1993. Subsequently, there was another sharp decrease in the number of people diagnosed in stage four, from 38.1% in 1996 to 17.6% in 1997. Whilst the number of HIV positive people diagnosed in stage one sharply increases after 1996, from 6.3% to 22.7% in 1999. There was a sharp increase in the number of people diagnosed in stage three after 1991, from 40% to 68.8% in 1993. Overall, the results indicate that after 1993 the number of people diagnosed with HIV in stage three and four decreased sharply (see Figure 4.8 & Table 4.12).

4.3 Cross tabulations

For all cross tabulations, the age group (0-4 years) were excluded for the analysis because this group requires a different diagnostic classification system. Only cases with medical symptoms, from which the diagnostic stage could be derived, were included for cross-tabulation purposes.

4.3.1 Gender and diagnostic stage

Figure 4.9: Gender and diagnostic stage of HIV positive people, NMM



Source: NMM ATICC, 2000 (N= 4388)

A higher proportion of males, 60.0%, compared to females 55.7%, were diagnosed in stage three. While more females, 21.2%, compared to males, 16.8%, were diagnosed in stage four. More or less the same proportion of females, 20.6% and males 21.3% were diagnosed in stage one (see Figure 4.9 & Table 4.13).

The null hypothesis is rejected, which indicates a significant dependence between gender and diagnostic stage, (Chi-square = 15.4; p-value = 0.002, < .05).

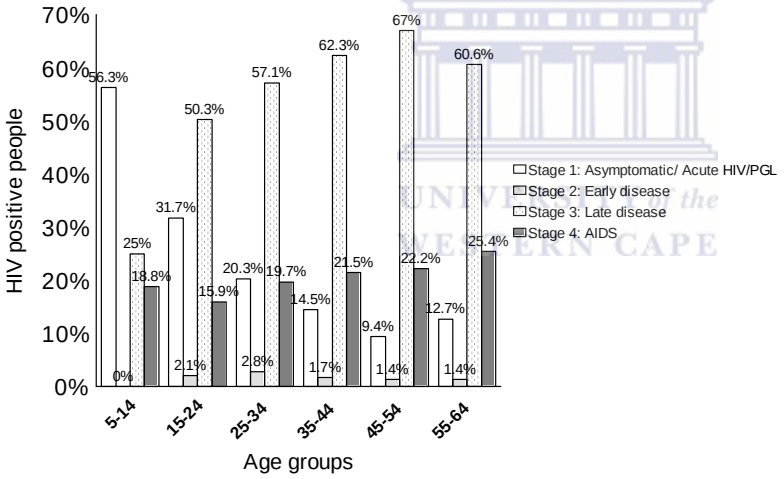
4.3.2 Population group and diagnostic stage

Blacks, 57.1%, and people of mixed descent, 61.3%, are more likely to go for an HIV test when they are in stage three. Moreover, Blacks, 2.2%, as well as people of mixed descent, 3.1 %, are least likely to go for an HIV test in stage two (see Table 4.14).

The null hypothesis is not rejected: The results suggest no dependence between racial groups (Blacks and people of mixed descent) and diagnostic stage (Chi-square = 4.1; p-value = 0.246, > .05).

4.3.3 Age and diagnostic stage

Figure 4.10: Diagnostic age and diagnostic stage of HIV positive people, NMM



Source: NMM ATICC, 2000 (N= 4373)

The researcher excluded people over 74 years because there were not enough cases for analysis purposes. The majority of children aged 5 to14 years were diagnosed in stage one. Most adults younger than 64 years were diagnosed in stage three. However, for people aged 65-74 years old the proportion of people diagnosed in stage three decreased, but the proportion diagnosed in stage four, increased (see Figure 4.10 & Table 4.15).

Consequently, the null hypothesis is rejected which, indicates a significant dependence between age and diagnostic stage at the time of the HIV test, (Chi-square = 144.2; p-value = 0.000, < .05).

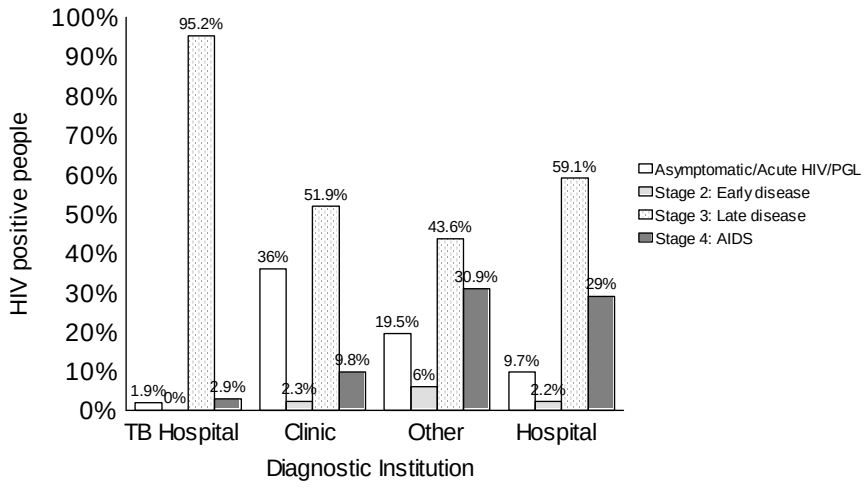
4.3.4 Place of residence

More than half, 56.4%, of HIV positive individuals who lived in rural areas, and, 54.1%, who lived in urban areas, were more likely to be tested in stage three. Just over a quarter, 24.6%, of people who live in rural areas and less than a quarter, 22.1%, in urban areas were diagnosed in stage one. Whereas, 2.5% of people in urban areas, as well as those in rural areas, 2.5%, were less likely to be tested in stage two (see Table 4.16).

The null hypothesis is not rejected; There is no dependence between people living in urban areas and those residing in rural areas in relation to diagnostic stage at the time of the HIV test, (Chi-square = 3.9; p-value = 0.274, >.05).

4.3.5 Diagnostic institution and diagnostic stage

Figure 4.11: Diagnostic institution and diagnostic stage of HIV positive people, NMM



Source: NMM ATICC, 2000 (N= 4770)

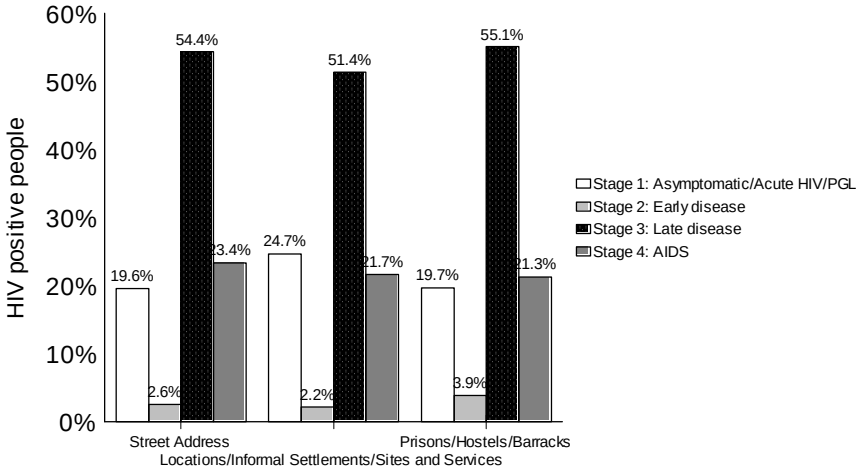
Of the HIV positive people diagnosed in stage one 1.9% were diagnosed at TB hospitals, 36% at clinics, 19.5% at other institutions and 9.7% at hospitals. Of the HIV positive people diagnosed in stage four, 29% were diagnosed at hospitals, 30.9% were diagnosed at other institutions, 9.8% were diagnosed at clinics and 2.9% were diagnosed at TB hospitals. Almost all HIV positive individuals at TB hospitals, 95.2%, were diagnosed in stage three. Just more than half, 51.9%, diagnosed at clinics were in stage three. Of those diagnosed at hospitals, 59.1%, were diagnosed in stage three (see Figure 4.11 & Table 4.17).

In this study, HIV positive individuals diagnosed at clinics are more likely than those diagnosed at hospitals, TB hospitals and other institutions to be in stage one (see Table 4.17).

Therefore, the null hypothesis is rejected: The results indicate a significant dependence between diagnostic institutions compared with stage at the time of the HIV test, (chi-square = 664; p – value = .000, < .05).

4.3.6 Dwelling type and diagnostic stage

Figure 4.12: Dwelling type and diagnostic stage of HIV positive people, NMM



Source: NMM ATICC, 2000 (N= 2999)

The majority of individuals in this study, irrespective of their dwelling type, were tested in stage three (see Figure 4.12 & Table 4.18).

Accordingly, the null hypothesis is not rejected: There is no dependence between diagnostic stage and the type of dwelling, (Chi-square = 10.2; p – value = 0.115, p >.05).

4.4 Conclusion

The results obtained from the AIDS Training Information and Counselling Centre (ATICC), suggest that the majority of people in this study seek HIV testing when they are already in stage three (late disease) and four (AIDS) of the World Health Clinical Staging System. HIV mainly affected people in their reproductive years and part of the labour force. In contrast males over 65 years were more at risk than females in the same age group to be diagnosed with HIV. Also, in this study, HIV had a significant impact on infants (less than 1 year old). Moreover, between 1993 and 1995 more people were diagnosed with HIV. Subsequent to 1993 the number of people diagnosed in stage three and four decreased whilst the number of people diagnosed in stage one increased.

Additionally, the findings suggest that males seek HIV testing earlier than females. Moreover, both Blacks and people of mixed descent were most likely to seek HIV testing when they were in stage three (late disease). Children were tested earlier than adults. Whereas both people living in rural as well as urban areas were more likely to be tested in stage three. In addition, clinics diagnosed HIV earlier than hospitals, TB hospitals and other diagnostic institutions. Finally, the results suggest no association between dwelling type and diagnostic stage.

Chapter 5
Discussion of results

5.1 Introduction

In this chapter the results obtained from the AIDS Information, Training and Counselling Centre (ATICC) are discussed. First, the demographic characteristics of HIV positive people in the NMM (Nelson Mandela Metropole) will be described. These characteristics include; age and gender composition, population group, mode of HIV transmission, diagnostic institution, place of residence, dwelling type and the year the person was diagnosed. Then, the discussion will focus on the association between the diagnostic stage and the demographic characteristics of HIV positive people. These characteristics entails; gender, age, population group, mode of HIV transmission, place of residence, dwelling type, diagnostic institution and the year of diagnosis.

5.2 Diagnostic stage

The results of this study suggest that the majority of HIV positive people whose medical symptoms were recorded, were diagnosed in stage three (late disease) and stage four (AIDS) of HIV infection. Accordingly, the results support the hypothesis that the majority of patients in the NMM seek HIV testing when they were in the advanced stages (three or stage four) of HIV infection. Thus, the results show that people in this study who were diagnosed already suffered from severe opportunistic infections. They required medical care, which could not be provided by primary healthcare facilities.

5.2.1 Tuberculosis

In addition to the diagnostic stage, the findings in the Nelson Mandela Metropole show that more than a third of HIV positive people suffered from TB. Consequently, in this study TB is the most common opportunistic infection in people with HIV. This agrees with the research of Colebunders (1989:902) who found that TB was the most common opportunistic infection in Africa. Colebunders argues that HIV is responsible for a substantial increase in the prevalence in TB. The findings of this study also support the

research of Ridzon & Mayanaja-Kizza (2001:34) who found that TB is the leading cause of deaths in HIV patients in Africa.

Moreover, the results of this study support concerns of Colebunders (1989:902) emphasizing the importance of clinically distinguishing an HIV infected person from a HIV-seronegative person with TB. Colebunders argues that many patients with tuberculosis, regardless of their HIV status, experience weight loss, fever, and cough, decreasing the specificity of the WHO case definition in this sub-population. Subsequently, this study support concerns of Mugerwa & Ryder (1994:274), that without HIV testing, many HIV-seronegative tuberculosis patients will be classified incorrectly as having AIDS. So, the results of this study support suggestions by Colebunders (1989:902), that all TB patients in Africa be screened for HIV.

5.3 Demographic profile

5.3.1 Age and gender composition

Besides the diagnostic stage, the results suggest that people aged 15-49 years are most susceptible to HIV. This is consistent with the other studies which suggest that people in their reproductive years, which also constitute part of the labour force, are most susceptible to HIV(Whiteside and Sunter 2000:58; Dorrington *et al.* 2004:14; Shisana *et al.* 2005:33-34; DOH 2006:17; UNAIDS 2006:505-506; StatsSA 2006:6). People in their reproductive years are more sexually active than the rest of the population. They are more at risk, of contracting STI's and HIV.

Furthermore, the findings of this study indicate that females account for almost two thirds of HIV infection in the NMM. Subsequently, the result of this study is consistent with other studies which suggest that females between 15-49 years are more at risk of contracting HIV than males in the same age group (Whiteside & Sunter 2000:58; Dorrington *et al.* 2004; Shisana *et al.* 2005; DOH 2006:17; UNAIDS 2006; StatsSA 2006). Budlender and Johnson (2002:9,26) explain the predominance of female infections due to the following reasons: Firstly, females are biologically more susceptible to infections than males; Secondly, females in these regions have lower socio-economic

status with lower employment levels; Thirdly, since females are financially dependent on their partners, they are unable to insist on safer sexual practices; Finally, females are also vulnerable to sexual violence and sexual abuse.

Also, the results of this study suggest that males over 65 years are more susceptible than females in the same age group to contract HIV. A possible explanation is that females in this age group are not as sexually active as males in the same age group. Research by Dennerstein and colleagues in 2000, showed that sexual functioning of woman decline significantly with age and the menopausal transition. As a result of this menopausal transition, the relationship with the partner and his ability to perform sexually is adversely affected (Dennerstein *et al.* 2001:459).

Moreover, the results of this study show that HIV is concentrated in the age group 25-29 years, probably the most sexually active group. The prevalence of HIV in the age group 0-4 years is most likely the result of mother to child transmission. HIV prevalence in the age group 5-9 years is probably the result of rape and may be attributed to the belief that sleeping with a virgin is a cure for HIV. The prevalence of HIV in the age group 9-10 years could also be the result of rape or statutory rape. The findings of this study therefore, support arguments by Shell (2000:2) and Marks (2002:21) that cultural factors such as the belief that sleeping with a virgin can cure the disease are setting off higher infection rates. As a result, rape is increasing and, therefore, there are higher infection levels amongst women and children contributing to the spread of the disease (Shell 2000:2-3).

Thus, the findings of this study suggest that HIV/AIDS mainly affects the people in their reproductive years. In particular, females in their reproductive years are more at risk of contracting HIV than males in the same age group. Therefore, the findings support concerns that AIDS will increase the adult mortality rate for all population groups and reduce life expectancy. It will alter the age and gender structure of the population because females who are more vulnerable to the disease will die more quickly. Moreover, this will affect population growth, as females of childbearing age will die (Mostert et al. 1998:97-

100, Whiteside 1998:79; Whiteside & Sunter 2000:70-73; Bartos & Piot 2002:209-210; Ziehl 2002:67-71; Dorrington *et al.* 2004:3). The AIDS pandemic will reduce the average household income and increase medical expenses as workers become ill and children are orphaned this will create an increasing economic and social burden for the government (Mostert et al. 1998:97-100, Whiteside 1998:79; Whiteside & Sunter 2000:70-73; Bartos & Piot 2002:209-210; Ziehl 2002:67-71; Dorrington *et al.* 2004:3). Fortunately, studies by Dorrington and colleagues in 2006, found that government's HAART programme reduced the impact of HIV/AIDS on mortality (Dorrington & Johnson 2006:563).

However, Adetunju (1998) argues, that HIV estimates and results focus mainly on prevalence (absolute number of people infected), prevention and the demographic impact of HIV/AIDS. Also, Udjo (2005:90) is concerned that prior to 1994, there was no systematic collection of mortality data on a national scale in censuses and surveys in the country. Consequently, and with the HIV/AIDS epidemic, estimates of mortality for South Africa vary, and often by a large number. Therefore, AIDS statistics should be treated with caution.

Despite differences in HIV estimates of previous research, the findings of this study support concerns by, Bah (2005:155) that differences in estimates should not distract from the fact that HIV has become South Africa's biggest health problem of the 21st century.

5.3.2 Population group

Besides the age gender profile, the results suggest that HIV infection in the NMM was highest in black population, followed by people from mixed descent. HIV infection in Indians/Asians and Whites were very low. The findings agreed with the findings of Shell (2000:2-3), who found that HIV infection to be highest among Blacks, growing amongst people of mixed descent and the lowest amongst Asians and Whites in the city.

5.3.3 Mode of HIV transmission

In addition to the population group, the results indicate that heterosexual infections in the NMM, accounted for more than two thirds of HIV infection in the NMM. This study, agrees with previous research which suggests that the disease is mainly transmitted through heterosexual intercourse, and is currently the most dominant form of infection in South Africa. (Sher 1989:46; Williamson *et al.* 1995:782; Schoub 1999:24; Budlender & Johnson 2002:38). Unlike the developed world (Western Europe, North America, Australia and New Zealand) where HIV is mostly concentrated in homosexuals and bisexual men, and intravenous drug abusers (Sher 1989:46; Williamson *et. al*. 1995:782; Schoub 1999:24; Budlender & Johnson 2002:38).

5.3.4 Place of residence

The majority of HIV positive people in this study were living in urban areas. This study, as with other studies, suggests that HIV prevalence is higher in urban than in rural areas (Morris *et al.* 2000:339; Shell 2000:2-3). Unlike Sub-Saharan countries, where lower infection rates in rural areas are the result of immobility and geographic isolation of rural communities, South African rural comunities are not as static and geographically isolated as that in the rest of Africa (Budlender & Johnson 2002:34).

The migrant labour system might be responsible for this phenomenon. The Eastern Cape includes former homelands where the migrant labour system was responsible for men working in the cities. Here they would have sex with women other than their wives, which is ideal for the spread of sexually transmitted infections. The migrant labour system has caused a steady flow of HIV infected men through the rural communities to their families in rural communities, and the urban areas where they work (Whiteside & Sunter 2000:65; Budlender & Johnson 2002:34). Thus, the results suggest that temporary migration even after the end of apartheid continued to assist in the spread of HIV.

5.3.5 Dwelling type

Since socio-economic status was not recorded, the type of dwelling could be a helpful indicator of socio-economic status. We expect people with street addresses to be “better off” than those without formal housing and, therefore, to have better access to health facilities and health benefits.

Yet, the majority of HIV positive people in this study had street addresses. We, therefore, expected a lower prevalence, but this is not the case. The results of this study do not support previous studies which suggest that HIV mostly affects the most deprived socio-economic communities with limited antiretroviral therapy (Morris *et al.* 2000:339). The results could therefore not be explained in this study and needs further research.

5.3.6 Diagnostic institution

Regarding the mode of transmission, the results indicate that almost half of people in this study were diagnosed at hospitals. It needs to be considered that hospitals only treat patients referred by primary healthcare facilities, such as clinics. The findings therefore suggest that the majority of people in this study seek HIV testing, when requiring medical attention which could not be provided at primary healthcare facilities such as clinics.

5.3.7 Diagnostic year

In addition to the dwelling type, the results of this study indicated that between 1993, 1994 and 1995 the number people diagnosed with HIV almost doubled for each year.

The Jaipur paradigm theory of Whiteside & Sunter (2000:65) is supported that argues that the social engineering of apartheid created the ideal environment for the spread of HIV, for the following reasons: firstly, the creation of homelands impoverished Blacks, especially in the Eastern Cape. Blacks were prevented from bringing their families in to urban areas. The homelands provided poor access to health care facilities. Secondly, the migrant labour system caused men to move away from their families in the rural areas for long periods. Men being away from their wives for such long periods facilitated urban prostitution, as they had sex with women other than their wives. They then spread

diseases in rural communities which had poor access to health care facilities. Also in urban areas, Blacks had poorer access to healthcare facilities, than Whites did. These events created the ideal environment for the spread of STI's and HIV/AIDS. Thirdly, rural areas had limited access to healthcare facilities and diagnostic facilities for STI's and HIV/AIDS. As a result, STI' and HIV/AIDS went either untreated or improperly treated (Whiteside & Sunter 2000:65; Marks 2002:18,20).

During 1994, South Africa experienced a major political transformation, from apartheid to democracy. Political power was transferred from a white minority to a black majority. For the black majority this transition brought an end to what Whiteside & Sunter (2000:65) calls, "the fatalism that contributed to the spread of HIV".

Consequently, the results of this study support Whiteside and Sunter's theory (2000:65), that the "widespread philosophy of fatalism" which diminished individual worth, responsibility and accountability, created an ideal situation for the spread of HIV/AIDS. People, especially those living in the impoverished homelands, were now free to move to urban areas, to seek basic and free healthcare services.

5.3.8 Diagnostic year and diagnostic stage

Although more people sought HIV testing after 1994, the results also indicated that after 1993, more people were diagnosed in stage one (asymptomatic/acute HIV/PGL) and less people were diagnosed in stage four (AIDS).

As stated in 5.3.6, the demise of apartheid in 1994 gave people, especially those living in the homelands, better access to basic and free healthcare facilities. Yet, in 1993 political change already seemed inevitable, as CODESA (Conference for a Democratic South Africa), was finalised. Two important events took place that year. First, the announcement that first non-racial election to be held on 27 April 1994. Second, an interim constitution was finalised. The interim constitution guaranteed equal rights and access to resources, for all South Africans irrespective of race. These rights included

equal and free access to basic healthcare. The interim constitution also divided the country in the nine new provinces including the former homelands.
Thus, 1993 was significant, especially for people living in the Eastern Cape. People from former homelands were now free to move to urban areas to seek employment and better and free access to basic healthcare. These events might explain earlier diagnosis after 1993.

5.4 Cross tabulations

5.4.1 Age and diagnostic stage

Besides the demographic characteristics, the findings suggested that children in the age group 5 to14 were more likely than adults to be tested in stage one (asymptomatic/ acute HIV/PGL). This could be an artefact of testing, since children have a weaker immune system than adults. Children, because of their weaker immune system are more vulnerable to opportunistic infections. Consequently, they show symptoms of HIV earlier than adults. They thus attend healthcare facilities more frequently and earlier than adults do. Subsequently, children are more likely to be tested earlier than adults.

The results also indicate that people over 65 years old were more likely than children and adults 15 to 49 years old, to be tested in stage four (AIDS). Like children, adults over 65 years have a weaker immune system. But, unlike children, people over 65 years might not have the same access to healthcare facilities. So, people over 65 will be diagnosed later than children and adults younger than 65 years. The results could suggest disease progression for children and people over 65 years is faster, than adults 15 to 49 years old.

Consequently, the results indicate dependence between age and diagnostic stage, (Chi-square = 144.2; p-value = 0.000, < .05).

The results supported findings of other studies which indicated that age, among other host factors, is a major determinant disease progression (Galai & Kalinkovich 1997:2; Adetunju 1998:17; Hogg *et al.* 1994:1120; Mugerwa & Ryder 1994:271; Mehendale *et*

al. 2002:117). Further, the findings could also suggest that disease progression is faster in children than in adults (Weiss 1993:1274; Anderson 2003:39).

5.4.2 Gender and diagnostic stage

The results indicated that more males than females were tested in stage three (late disease), whilst more females than males were tested in stage four (AIDS). A possible explanation for this tendency is the inequality between males and females.

The findings indicated a dependence between males and females in relation to the diagnostic stage, (Chi square = 15.4; p-value = 0.002, < 0.5).

Whiteside and Sunter (2000:65) argued that the apartheid regime's migrant labour system has disempowered, especially black females. Sexually active males migrated in large numbers to urban areas, to live in single sex hostels. They were prevented from bringing their families into the cities.

In these single sex hostels black men were able to exert power over women who were in town illegally and dependent on men for a bed (Ramphele 2000:114; Marks 2002:21). Poorer women with fewer financial resources were forced into sexual relationships to ensure the survival of themselves and their children (Whiteside & Sunter 2000:65). As a result, females became financially dependent on their partners. Females have lower socio economic status with lower employment levels than males (Budlender & Johnson 2002:9,26). Consequently, the migrant labour disempowered women and children (Marks 2002:18).

Since males had higher employment levels and higher socio-economic status than females, they had the advantage of better and earlier access to healthcare, especially privatised medical facilities.

In addition, a study by Medley *et al*. (2004:4) showed that HIV positive females in developing countries who disclose their status, ran the risks of being blamed, abandoned,

to lose economic support, faced physical and emotional abuse and discrimination which led to disruption of family and relationships. Therefore, it is possible that females especially those who are financially dependent on males, would postpone HIV testing, as long as possible**.**

5.4.3 Population group and diagnostic stage

Moreover, the findings indicated that the majority of Blacks as well as people of mixed descent, sought HIV testing when they are in stage three (late disease) of HIV/AIDS. The results suggest no dependence between Blacks and people of mixed descent when compared with diagnostic stage, (Chi-square = 4.1; p-value = 0.246, > .05).

Blacks were worst affected by the apartheid policy. In the Eastern Cape, black people were forced into crowded, impoverished homelands, which led to the breakdown of traditional cultural structures (Whiteside & Sunter 2000:65; Marks 2002:18). The apartheid system through legislation and formalization discriminated against Blacks in terms of education and jobs (Whiteside & Sunter 2000:65).

However, people of mixed descent were given preference above Blacks in terms of employment and education. As a result, the socio-economic conditions of people of mixed descent were better than that of Blacks. Consequently, the majority of people of mixed decent had, and still have, better access to health care facilities than Blacks. Accordingly, one would expect people of mixed descent to be better informed about HIV/AIDS, and would therefore be aware of the importance and benefits of early HIV testing. However, this is not the case and some other phenomenon other than education and socio-economic status could be responsible. Unfortunately, a socio-economic status measurement was not included in the data. Therefore, the association between socio-economic status in relation to HIV testing could not be established in this study and needs further investigation.

5.4.4 Place of residence and diagnostic stage

Since, people in urban areas had better access to health care facilities, one would expect that they would seek HIV testing earlier than people who lived in rural areas. Yet, the results suggest otherwise.

There is no dependence between people living in urban areas and those residing in rural areas in relation to diagnostic stage, (Chi-square = 3.9; p- value = 0.274, >.05).

As stated in 5.3.4, Budlender and Johnson (2002:3) argued that, rural communities in South Africa were not as static and geographically isolated as those in the rest of Sub-Saharan Africa. Additionally, the migrant labour system caused a steady flow of HIV infected men through rural communities (Whiteside & Sunter 2000:65; Budlender & Johnson 2002:34).

Yet, the demise of apartheid did end 'temporary' migration. Posel (2003:16,17) provided evidence that the migrant labour system continued until 1999. This research also found that people still migrated 'temporarily', retaining membership in, and ties with their households of origin. Moreover, research by the Southern African Migration Project in 2004, provided evidence that migration is an important factor in the spread of HIV in Southern Africa (Lurie 2004:23).

As a result, continuous interaction between rural and urban communities, might have kept rural communities well informed about life in urban areas. For this reason, rural communities could be just as aware of HIV/AIDS as urban communities.

In addition, when temporary migrants became infected or sick with HIV/AIDS they would still depend on rural family members for care. Thus, sick family members returning to rural areas might create the same awareness of HIV/AIDS in rural areas as in urban areas. This phenomenon could inspire HIV testing by family members of temporary migrants, in rural communities.

5.4.5 Diagnostic institution and diagnostic stage

The results suggested that clinics were more likely than hospitals, TB hospitals and other institutions to diagnose HIV/AIDS, in stage one (asymptomatic/acute HIV/PGL). The results indicate a dependence between diagnostic institutions compared with stage at the time of the HIV test, (Chi-square = 664; p – value = 0.000, < .05).

These findings indicate that clinics identified HIV positive people earlier than all the other institutions. Hospitals, TB hospitals and other institutions diagnosed those who are already symptomatic. Given that clinics only provide primary health care, the findings suggest that people diagnosed at hospitals and TB hospitals suffered from opportunistic infections that could not be treated at clinics. They were therefore referred to hospitals, TB hospitals or other institutions.

Further, almost all HIV positive people diagnosed at TB hospitals were already in stage three (late disease). These findings again support suggestions that all TB patients be screened for HIV (Colebunders *et al*. 1989:902).

5.4.6 Dwelling type and diagnostic stage

Since socio-economic status was not recorded in this data, the type of dwelling could be a helpful indicator of socio-economic status. It was expected that people with street addresses would be “better off” than people without formal housing (informal settlements/ sites with services/locations). They possibly also had better access to health facilities and healthcare benefits. For that reason, one expects a lower prevalence and earlier testing among people with formal housing. Yet, the results suggest the opposite.

The results suggest no dependence between dwelling type and diagnostic state, (Chi-square = 10.2; p – value = 0.115, >.05).

Consequently, this study does support previous research, which suggested that HIV-1 subtype C is mostly found in inner city populations. The results of this study does not agree with research by Morris *et al*. (2000:339) which suggested that HIV mostly affected the most deprived socio-economic communities with limited antiretroviral therapy.

5.5 Conclusion

In conclusion, the results obtained from HIV positive individuals in the Nelson Mandela Metropole, suggest that the majority sought HIV testing when they were already in the advanced stages three (late disease) and four (AIDS) of HIV infection. HIV mainly affected part of the labour force and people in their reproductive years. Females in their reproductive years were more at risk than males in the same age group to contract HIV. However, males over 65 years of age were more at risk than females in the same age group to contract HIV. Also, HIV/AIDS had an impact on infants (<1 years). Moreover, between 1993 and 1995 more people were diagnosed with HIV. Also, after 1993 the number of people diagnosed in stage three and four decreased, but the number of people diagnosed in stage one increased.

Additionally, the findings suggest that males sought HIV testing earlier than females. Furthermore, both Blacks and people of mixed descent were most likely to seek HIV testing when they were in stage three (late disease). Moreover, children are tested earlier than adults. Whereas, both people living in rural as well as urban areas were more likely to be tested in stage three. Further, clinics diagnosed HIV earlier than hospitals, TB hospitals and other diagnostic institutions. Finally, there was no association between diagnostic stage and dwelling type.

Chapter 6
Conclusion

The purpose of this study was to test whether, the majority of patients in the Nelson Mandela Metropole, *i.e.* Port Elizabeth as it was formerly known, sought HIV-testing when they were already in stages three (late disease) and four (AIDS) of HIV infection (see Appendix C).

The following null hypotheses were investigated:

H_{01}: There is no significant difference between males and females with regard to the diagnostic stage at the time of the HIV test.

H_{02}: There is no significant difference between population groups in relation to the diagnostic stage.

H_{03}: No significant difference exists between age groups with regard to the diagnostic stage.

H_{04}: There is no difference regarding the type of dwelling relating to the stage at the time of HIV testing.

H_{05}: No significant difference exists between place of residence and the diagnostic stage.

H_{06}: The diagnostic institute is not significant in relation to the stage at the time of HIV testing.

The research presented in this thesis supports the hypothesis that people in the Region A health district, NMM seek HIV testing only when they were stages three (late disease) and four (AIDS) of HIV infection. Thus, for the majority of these individuals anti-retroviral therapy had come too late and they were, thus waiting to die.

The findings also indicate that males in the NMM, sought HIV testing earlier than females. Moreover, Blacks and people of mixed descent were most likely to sought HIV testing when they were in stage three (late disease). Also, clinics diagnosed HIV earlier than hospitals, TB hospitals and other institutions. The results also suggested that children were diagnosed earlier than adults. Between 1993 and 1995, more people were diagnosed with HIV. Subsequent to 1993, the number of people diagnosed in stage three and four decreased significantly, but the number of people diagnosed in stage one increased.

The results are similar with other findings which suggest that HIV is mainly transmitted through heterosexual infections. The findings are also consistent with previous researchers which suggested that females in their reproductive years are more susceptible to HIV. In particular, females in this study account for more than two thirds of HIV infection. In addition**,** HIV mostly affects part of the labour force and people in their reproductive years. The findings also support theories which suggest that the social engineering of apartheid was conducive for the spread of HIV/AIDS.

Contrary to previous research the results of this study indicate that HIV did not only affect the most deprived socio-economic areas. Finally, unlike previous research the findings of this study suggest that HIV was more prevalent in urban than rural areas.

Policy afterword

This study has provided better insight into the lack of information concerning the incubation period of HIV positive individuals. This project has also provided a detailed analysis of the disease progression based on new data on AIDS-related conditions and opportunistic infections in the Eastern Cape, which could facilitate the clinical diagnosis of HIV.

In particular, this study aims to encourage health and welfare policies in South Africa aimed at early voluntary testing, counselling services as well as timeous anti-retroviral treatment for HIV positive individuals. Voluntary counselling and testing empower clients to use their test results to reduce the risk of HIV transmission and to make informed decisions about important life events such as partner selection, marriage, pregnancy and family finances (Marum *et al.* 2001:527). Early testing is important because implemented with HAART (Highly Active Antiretroviral Therapy) it increases life expectancy and the quality of life of HIV-positive individuals. Furthermore, a clinical definition of HIV will also facilitate in the diagnosis of individuals who avoid HIV-testing because of the fear of needles, the attached stigma and ignorance about the disease.

Limitations

This study, like other studies in Africa, is based on individuals with unknown dates of seroconversion (Morgan & Withworth 2001:143). Therefore this study cannot predict the median survival time from seroconversion to death. Also, this is not a representative sample and therefore we cannot generalize for whole population. In addition more females were recorded in this study which could skew the results to reflect higher prevalence among females. Still, we can obtain valuable information on opportunistic infections and the incubation period of HIV/AIDS. For some unknown reason, a large proportion of data for the mode of transmission, dwelling type and place of residence was not recorded. This could have distorted the results.

If we understand the level of difference between demographic attributes (age, gender, population group, mode of HIV transmission, dwelling type, diagnostic institution, and diagnostic year), yet we do not understand what cause these differences. Further research is important to understand why these differences occur.

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Appendix A

World Health Organization /Bangui Clinical AIDS Case Definition for Use in Africa: 1985

- **Major signs**
  - Weight loss > 10% body weight
  - Chronic diarrhea > 1 month
  - Prolonged fever > 1 month (intermittent or constant)
- **Minor signs**
  - Persistent cough > 1 month
  - Generalized pruritic dermatitis
  - Recurrent herpes zoster
  - Oropharyngeal candidiasis
  - Chronic progressive and disseminated herpes simplex infection

Source

HIV InSite Knowledge Base Chapter
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Appendix B

Summary of 1986 CDC Classification System for HIV Infection

Group I.	Acute infection
Group II.	Asymptomatic infection[a]
Group III.	Persistent generalized lymphadenopathy[a]
Group IV.	Other disease
Subgroup A.	Constitutional disease
Subgroup B.	Neurologic disease
Subgroup C.	Secondary infectious diseases
Category C-1.	Specified secondary infectious diseases listed in the CDC surveillance definition for AIDS[b]
Category C-2.	Other specified secondary infectious diseases[c]
Subgroup D.	Secondary cancers[b]
Subgroup E.	Other conditions

a Patients in Groups II and III may be sub-classified on the basis of a laboratory evaluation.

b Includes those patients whose clinical presentation fulfils the 1987 definition of AIDS used by the CDC for national reporting.

c Conditions described under Category B in the 1993 classification system.

Source

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Appendix C

World Health Organization Classification System for HIV Infection: 1989

Clinical Stage 1

1. Asymptomatic infection
2. Persistent generalized lymphadenopathy
3. Acute retroviral infection

   Performance Stage 1: asymptomatic, normal activity

Clinical Stage 2

4. Unintentional weight loss < 10% body weight
5. Minor mucocutaneous manifestations (e.g., dermatitis, prurigo, fungal nail infections, angular cheilitis)
6. Herpes zoster within previous 5 years
7. Recurrent upper respiratory tract infections

   Performance Stage 2: symptoms, but nearly fully ambulatory

Clinical Stage 3

8. Unintentional weight loss > 10% body weight
9. Chronic diarrhea > 1 month
10. Prolonged fever > 1 month (constant or intermittent)
11. Oral candidiasis
12. Oral hairy leukoplakia
13. Pulmonary tuberculosis within the previous year
14. Severe bacterial infections
15. Vulvovaginal candidiasis

    Performance Stage 3: in bed more than normal but < 50% of normal daytime during the previous month

Clinical Stage 4

16. HIV wasting syndrome
17. Pneumocystis carinii pneumonia
18. Toxoplasmosis of the brain
19. Crytosporidiosis with diarrhea > 1 month
20. Isosporiasis with diarrhea > 1 month
21. Cryptococcosis, extrapulmonary

22. Cytomegalovirus disease of an organ other than liver, spleen or lymph node
23. Herpes simplex virus infection, mucocutaneous
24. Progressive multifocal leukoencephalopathy
25. Any disseminated endemic mycosis (e.g., histoplasmosis)
26. Candidiasis of the esophagus, trachea, bronchi, or lung
27. Atypical mycobacteriosis, disseminated
28. Non-typhoid Salmonella septicemia
29. Extrapulmonary tuberculosis
30. Lymphoma
31. Kaposi's sarcoma
32. HIV encephalopathy

Performance Stage 4: in bed > 50% of normal daytime during previous month

Source

HIV InSite Knowledge Base Chapter
Published June 1998

Dennis H. Osmond, PhD, University of California San Francisco
http://hivinsite.ucsf.edu/InSite?page=kb-01-01

Appendix D

Revised Caracas Definition: 1991

The revised "Caracas" AIDS definition requires a positive HIV serology, the absence of cancer or other cause of immunosuppression, plus greater than or equal to 10 cumulative points, as follows:

Kaposi's sarcoma (10 points)

Extrapulmonary/non-cavitary pulmonary tuberculosis (10)

Oral candidiasis or hairy leukoplakia (5)

Cavitary pulmonary/unspecified tuberculosis (5)

Herpes zoster less than 60 years of age (5)

CNS dysfunction (5)

Diarrhoea greater than or equal to 1 month (2)

Fever greater than or equal to 1 month (2)

Cachexia or greater than 10% weight loss (2)

Asthenia greater than or equal to 1 month (2)

Persistent dermatitis (2)

Anemia, lymphopenia, or thrombocytopenia (2)

Persistent cough or any pneumonia except TB (2)

Lymphadenopathy greater than or equal to 1 cm greater than or equal to 2 non-inguinal sites greater than or equal to 1 month (2)

For the Brazilian patients from which it was derived, sensitivity is 95% and specificity 100% (91% without HIV serology), compared to 59% and 98%, respectively, for the WHO clinical definition.

Source

http://www.aegis.com/conferences/07wac/WC96.html

Appendix E

The revised CDC classification system for HIV-infected adolescents and adults: 1993

Criteria for HIV infection for persons ages greater than 13 years: a) repeatedly reactive screening tests for HIV antibody (e.g., enzyme immunoassay) with specific antibody identified by the use of supplemental tests (e.g., Western blot, immunofluorescence assay); b) direct identification of virus in host tissues by virus isolation; c) HIV antigen detection; or d) a positive result on any other highly specific licensed test for HIV.

CD4+ T-Lymphocyte Categories

The three CD4+ T-lymphocyte categories are defined as follows:

Category 1: greater than or equal to 500 cells/mL

Category 2: 200-499 cells/uL

Category 3: less than 200 cells/uL

These categories correspond to CD4+ T-lymphocyte counts per microliter of blood and guide clinical and therapeutic actions in the management of HIV-infected adolescents and adults (22-28). The revised HIV classification system also allows for the use of the percentage of CD4+ T-cells (Appendix A).

HIV-infected persons should be classified based on existing guidelines for the medical management of HIV-infected persons (22). Thus, the lowest accurate, but not necessarily the most recent, CD4+ T-lymphocyte count should be used for classification purposes.

Clinical Categories

The clinical categories of HIV infection are defined as follows:

Category A

Category A consists of one or more of the conditions listed below in an adolescent or adult (greater than or equal to 13 years) with documented HIV infection. Conditions listed in Categories B and C must not have occurred.

Asymptomatic HIV infection

Persistent generalized lymphadenopathy

Acute (primary) HIV infection with accompanying illness or history of acute HIV infection (29,30)

Category B

Category B consists of symptomatic conditions in an HIV-infected adolescent or adult that are not included among conditions listed in clinical Category C and that meet at least one of the following criteria: a) the conditions are attributed to HIV infection or are indicative of a defect in cell-mediated immunity; or b) the conditions are considered by physicians to have a clinical course or to require management that is complicated by HIV infection. Examples of conditions in clinical Category B include, but are not limited to:

Bacillary angiomatosis

Candidiasis, oropharyngeal (thrush)

Candidiasis, vulvovaginal; persistent, frequent, or poorly responsive to therapy

Cervical dysplasia (moderate or severe)/cervical carcinoma in situ

Constitutional symptoms, such as fever (38.5 C) or diarrhea lasting greater than 1 month

Hairy leukoplakia, oral

Herpes zoster (shingles), involving at least two distinct episodes or more than one dermatome

Idiopathic thrombocytopenic purpura

Listeriosis

Pelvic inflammatory disease, particularly if complicated by tubo-ovarian abscess

Peripheral neuropathy

For classification purposes, Category B conditions take precedence over those in Category A. For example, someone previously treated for oral or persistent vaginal candidiasis (and who has not developed a Category C disease) but who is now asymptomatic should be classified in clinical Category B.

Category C

Category C includes the clinical conditions listed in the AIDS surveillance case definition (Appendix B). For classification purposes, once a Category C condition has occurred, the person will remain in Category C.

Source

www.hivinsite.ucsf.edu/InSite?=kb-01-01

Appendix F

Revised WHO Case Definition for AIDS in Africa (Abidjan Conference): 1991

" AIDS Wasting Definition"

AIDS in an adult is defined by a positive HIV test and one of the following (in the absence of a condition unrelated to HIV infection that may cause the sign/diagnosis):

1. Weight loss > 10% or cachexia, with diarrhea or both, intermittent or constant, for > 1 month
2. Tuberculosis with weight loss > 10%, or disseminated, miliary, or extrapulmonary tuberculosis
3. Kaposis's sarcoma
4. Neurologic impairment preventing independent daily activities
5. Esophageal candidiasis

Source

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http://hivinsite.ucsf.edu/InSite?page=kb-01-01

Appendix G

WHO International Classification for Diseases 10

Human immunodeficiency virus [HIV] disease (B20-B24)

Note:

The fourth-character subcategories of B20-B23 are provided for optional use where it is not possible or not desired to use multiple coding to identify the specific conditions.

Excludes:

asymptomatic human immunodeficiency virus [HIV] infection status (Z21)

B20 Human immunodeficiency virus [HIV] disease resulting in infectious and parasitic diseases

Excludes: Acute HIV infection syndrome (B23.0)

B20.0 HIV disease resulting in mycobacterial infection

HIV disease resulting in tuberculosis

B20.1 HIV disease resulting in other bacterial infections

Abscess

Bedsores

Boils

Broncho-pneumonia

Bubo

Cystitis

Carbuncle

Cellulitis

Impetigo

Lesions, genital, skin

Pneumonia

Sepsis

Septicaemia

Tonsillitis

B20.2 HIV disease resulting in cytomegalovirus disease

(disease of organ other than liver spleen or lymph node?)

B20.3 HIV disease resulting in other viral infections

Gastroenteritis

Hepatitis

Hepato renal problems

Herpes simplex virus

Herpes zoster

Retrovirus

Rubella

Thyroid fever

Ulcer tongue, genital, peptic, mouth

Warts

B20.4 HIV disease resulting in candidiasis

Candidiasis

Oral candidiasis

Vulva-vaginal candidiasis

B20.5 HIV disease resulting in other mycoses

Cryptococcal

Renal failure

Renal functional problem

Urinary tract infection

B20.6 HIV disease resulting in

Pneumocystis carinii pneumonia

B20.7 HIV disease resulting in multiple infections

Multiple disease

B20.8 HIV disease resulting in other infectious and parasitic diseases

Scabies

Malaria

Jaundice

Ringworm/dermatophyte

B20.9 HIV disease resulting in unspecified infectious or parasitic disease

(*HIV disease resulting in infection NOS)*

Infection

Skin infection

Sores (tongue, mouth, ears, buttocks, face etc.)

Sexually transmitted infections

B21 Human immunodeficiency virus [HIV] disease resulting in malignant neoplasms

B21.0 HIV disease resulting in Kaposi's sarcoma

B21.1 HIV disease resulting in Burkitt's lymphoma

B21.2 HIV disease resulting in other types of non-Hodgkin's lymphoma

B21.3 HIV disease resulting in other malignant neoplasms of lymphoid, hematopoietic and related tissue

Leukemia

Lymphoma

B21.7 HIV disease resulting in multiple malignant neoplasms

Tumors

B21.8 HIV disease resulting in other malignant neoplasms

Cervix cancer

Cervical cancer

Rectal cancer

B21.9 HIV disease resulting in unspecified malignant neoplasm

Malignancies

B22 Human immunodeficiency virus [HIV] disease resulting in other specified diseases

B22.0 HIV disease resulting in encephalopathy

Confusion

Dementia

Meningitis

Psychosis

B22.1 HIV disease resulting in lymphoid interstitial pneumonitis

B22.2 HIV disease resulting in wasting syndrome

Wasting Syndrome

B22.7 HIV disease resulting in multiple diseases classified elsewhere

For use of this category, reference should be made to the morbidity or mortality coding rules and guidelines in Volume 2.

B23 Human immunodeficiency virus [HIV] disease resulting in other conditions

B23.0 Acute HIV infection syndrome

Back ache

Head ache

Influenza

Malaise

Palpitation

B23.1 HIV disease resulting in (persistent) generalized lymphadenopathy

Lymphadenopathy

PGL

B23.2 HIV disease resulting in hematological and immunological abnormalities, not elsewhere classified

Bleeding

Blood in stool

Epistaxis

Haemorrhagia

Hemorrhoids

Menorrhagia

Pancytopenia

Uremia

B23.8 HIV disease resulting in other specified conditions

Ascites

Asthma

Bells' palsy

Bronchitis

Cachexia

Capillus
Cardio pulmonary
Chronic cough
Chronic pain
Cirrhosis
Dysphasia
Epilepsy
Heart failure
Hemoptysis
Malnutrition
Mastitis
Organ failure
Rashes
Swellings
Pericardial effusion
Pharyngitis
Pelvic inflammatory disease
Pleurale effusion
Pyelonephritis
Respiratory arrest
Stroke
Sudden death
Vomiting
Weakness
Weight loss

B24 Unspecified human immunodeficiency virus [HIV] disease

Acquired immunodeficiency syndrome [AIDS] NOS

AIDS-related complex [ARC] NOS

Bowel obstruction

Loss of appetite

Source

http://www3.who.int/icd/vol1htm2003/fr-icd.htm

Appendix H

Diagnostic Clinical Staging System for HIV positive people in the Nelson Mandela Metropole

Clinical Stage 1: Asymptomatic /acute HIV/PGL

Medical name	Condition
Acute Retroviral Infection	Resemble flu, or other viral syndromes.
Anemia	a reduction in the quantity of oxygen-carrying pigment hemoglobin in the blood
Cachexia	Weakness
Malaise	A vague feeling of discomfort
Fever	Elevation of body temperature above the normal 37 C
Headache	Pain in the head
Night Sweats	
Influenza	An acute viral infection of the respiratory tract
Palpitation	an awareness of heartbeat
Persistent Generalized Lymphadenopathy	Lymph nodes are larger than one centimeter in diameter, in two or more other sites other than the groin area for a period of at least three months.
Not HIV related diseases	Staged because person was asymptomatic
Arthritis	inflammation of the joints
Ascites	Effusion and accumulation of serious fluid in the abdominal cavity
Asthma	Recurrent attack of paroxysmal dyspnoea
Bleeding	Escape of blood as from an injured vessel
Bowel Obstruction	Unspecified
Diabetes	Unpredictable fluctuations of blood glucose values and difficult to control

Epilepsy	Paroxysmal disturbances of brain function that may be manifested as episodic impairment or loss of consciousness
Hepatitis	Inflammation of the liver
Hypertension	Persistently high arterial blood pressure
Malnutrition	Any disorder of nutrition
Loss of appetite	
Mastitis	Inflammation of breast
Menorrhagia	Heavy bleeding at menstruation
Metabolic Disorder	Unspecified
STI's	Unspecified Sexually transmitted diseases
Thyroid Fever	Fever pertaining to thyroid gland
Warts	Hyperplasic epidermal lesion caused by Human Papillomavirus

Clinical Stage 2: Early (mild) disease

Cutaneous infections	Skin infections
Rash	Eruption of the skin
Sores	Any lesion of the skin
Other diseases	
Bell's Palsy	Facial nerve palsy
Dehydration	Excessive loss of body water
Hemorrhage	piles
Peritonitis	Inflammation of the peritoneum (membrane lining the walls of abdominal cavity)
Tonsillitis	Inflammation of tonsils due to bacterial or viral infection
Cellulites	An infection in the deep dermis of the skin
Chronic pains in joins	Pain requiring medical attention
Uremia	An excess of nitrogenous and products of protein and amino acid metabolism in the blood
Abdominal pains	Unspecified

Clinical Stage 3: Late disease

Viral infections	
Gastroenteritis	Inflammation of the stomach and intestine
Herpes Zoster	shingles rash**,** viral inflammation of the central nervous system, presenting with localized pain and burning sensations, followed by vesicle eruption (skin blistering) and ulceration
Severe bacterial infections	
Bubo	Enlarged inflamed lymph node
Conjunctivitis	Inflammation of the membrane that covers the eye
Lesions	Any pathological or traumatic discontinuity of tissue or loss of function of a part
Pneumonia	Inflammation of the lungs, caused by bacteria
Sepsis	Presence of pathogenic micro organisms or their toxins in the blood; systemic disease
Respiratory infections or illnesses	
Bronchitis	Inflammation of the bronchi
Chronic couch	Cough required medical attention
Mycosis	Any disease caused by fungi
Pulmonary Tuberculosis	An infectious disease of the lungs caused by bacillus mycobacterium
Renal failure/Dysfunction	Unspecified
Parasitic infections	
Tinea	Ringworm, a parasitic fungus upon the skin
Fungal infections	
Candidiasis	Thrush (infection by fungi most commonly involving skin, oral mucosa, vagina or respiratory tract
Fungi	Unspecified

Other HIV related disease	Staged because patients was HIV positive
Chronic illness	Unspecified
Liver problems	Unspecified
Diarrhoea chronic	Abnormally frequent discharge of semi-fluid or fluid faecale matter from the bowel
Swellings	Abnormal enlargement of a body part or area not due to cell proliferation
Capillus	Unspecified hair disorder
Myositis	Muscle disease
Weight loss	decrease in body weight that is not voluntary
Pancytopenia	Abnormal depression of all the cellular elements of the blood

Clinical Stage 4: Severe disease, AIDS

AIDS	Patient was diagnosed with full blown AIDS, disease not specified
Bacterial infections	
Abscess	A localized collection of pus anywhere in body surrounded and walled off by damaged tissue.
Boils multiple	
Bronco-pneumonia	Inflammation of the lungs
Bedsores	Debicutis ulcer
Carbuncle	A collection of boils
Cystitis	Inflammation of urinary bladder
Impetigo	Bacterial infection of skin
Septicaemiae	Blood poisoning
Viral infections	
Herpes simplex	An inflammatory skin disease marked by the formation of small vesicles in clusters
Herpes zoster multiple	
Rubella	Mild viral infection marked by a pink macular rash, fever and lymph nodes
Retrovirus unspecified	Large of RNA viruses that include leukoviruses and lentiviruses
Hepato renal problems	decreased urine production
Ulcers	A break in the skin extending to all its layers
Mycosis	disease caused by fungi
Cryptococcus	Fungal infection
Urinary tract infection	
Malignancies	diseases tending to worsen and end up in death
Leukemia	A progressive malignant disease of blood-forming organs

Cervical cancer	Cancer of the cervix
Lymphoma	A malignant tumor of the lymph nodes
Kaposi sarcoma	A malignant tumor on the skin, reddish brown or purplish plagues or nodules on the skin and mucous membranes
Tumors	A new growth of tissue
Non-Hodgkins lymphoma	Presence of large tumor
Candidiasis	Thrush, infection by fungi , most commonly involving skin, oral, vagina or respiratory tract
Oesophageale candidiasis	Candidiasis of the gullet
Oral candidiasis	Candidiasis of the mouth
Vulvo-Vaginal Candidiasis	Vulvo-vaginal Candidiasis: candidiasis of the vulva and vagina
Central nervous system dysfunction	Dysfunctions of central nervous system
Encephalopathy	Any degenerative brain disease
Confusion	Disturbed orientation in regard to time, place or person, sometimes accompanied by disordered consciousness
Syncope	Mental disorder that feature loss of contact with reality
Meningitis	Inflammation of the tissue membranes of the brain
Dementia	Chronic persistent disorder of behaviour and higher intellectual function
Psychosis	Mental disorder that feature loss of contact with reality
Cerebrum	Unspecified problems relating to the cerebrum
Mental disorder	Unspecified

Parasitic infections	
Scabies	An infection caused by mite
Jaundice	yellowing of the skin and whites of eyes
Unspecified blood disorders	
Blood formation	Unspecified
Blood Disease	Unspecified
Respiratory infections	
Dysphasia	Difficulty in swallowing
Dyspnea	Difficulty breathing
Fissure	Groove or cleft, unspecified
Hemoptysis	Coughing up blood
Pharyngitis	inflammation in the part of the throat behind the soft palate (paharynx)
Respiratory arrest	Breeding stopped or slowed
Heart disorders and diseases	
Myocardia	Unspecified
Myocarditis	Inflammation of the muscular walls of the heart
Pericarditis	Heart disease
Organ failure	
Heart failure	Unspecified
Lung failure	Unspecified
Organ dysfunction	Unspecified
Liver dysfunction	Unspecified
Lung dysfunction	Unspecified
Wasting syndrome	Gradual loss or decay, losing body weight
Pelvic inflammatory disease	Acute or chronic infection in the uterus, fallopian tubes and ovaries
Stroke	Sudden attack of weakness o one side of the body
STI's resistant	STI's resistant to drugs
Urinary tract infection	An infection that can happen anywhere along the urinary tract - the kidneys, the ureters, the bladder

Appendix I: List of tables

Table 4.1a: Age and gender composition of HIV positive people Nelson Mandela Metropole (NMM)

Diagnostic age * Gender Crosstabulation

			Gender		Total
			Male	Female	
Diagnostic age	0-4	Count	1073	1350	2423
		% of Total	3.9%	4.9%	8.9%
	5-9	Count	34	56	90
		% of Total	.1%	.2%	.3%
	10-14	Count	14	80	94
		% of Total	.1%	.3%	.3%
	15-19	Count	203	1752	1955
		% of Total	.7%	6.4%	7.2%
	20-24	Count	1157	3846	5003
		% of Total	4.2%	14.1%	18.3%
	25-29	Count	2561	4373	6934
		% of Total	9.4%	16.0%	25.4%
	30-34	Count	1765	2677	4442
		% of Total	6.5%	9.8%	16.3%
	35-39	Count	1348	1698	3046
		% of Total	4.9%	6.2%	11.1%
	40-44	Count	835	821	1656
		% of Total	3.1%	3.0%	6.1%
	45-49	Count	435	433	868
		% of Total	1.6%	1.6%	3.2%
	50-54	Count	226	207	433
		% of Total	.8%	.8%	1.6%
	55-59	Count	107	109	216
		% of Total	.4%	.4%	.8%
	60--64	Count	55	42	97
		% of Total	.2%	.2%	.4%
	65-69	Count	24	23	47
		% of Total	.1%	.1%	.2%
	70-74	Count	9	7	16
		% of Total	.0%	.0%	.1%

	75-79	Count	6	5	11
		% of Total	.0%	.0%	.0%
	80-84	Count	2	0	2
		% of Total	.0%	.0%	.0%
	85-89	Count	0	1	1
		% of Total	.0%	.0%	.0%
	90-94	Count	1	0	1
		% of Total	.0%	.0%	.0%
Total		Count	9855	17480	27335
		% of Total	36.1%	63.9%	100.0%

Table 4.1b: Age and gender composition of HIV positive people, <1 years (NMM)

Diagnostic Age *Gender of patient Crosstabulation

			Sex of patient		Total
			Male	Female	
Diagnostic Age	<1	Count	823	1102	1925
		% of Total	3.0%	4.0%	7.0%
	1-4	Count	255	257	512
		% of Total	.9%	.9%	1.9%
	5-9	Count	29	47	76
		% of Total	.1%	.2%	.3%
	10-14	Count	14	80	94
		% of Total	.1%	.3%	.3%
	15-19	Count	203	1752	1955
		% of Total	.7%	6.4%	7.2%
	20-24	Count	1157	3846	5003
		% of Total	4.2%	14.1%	18.3%
	25-29	Count	2561	4373	6934
		% of Total	9.4%	16.0%	25.4%
	30-34	Count	1765	2677	4442
		% of Total	6.5%	9.8%	16.3%
	35-39	Count	1348	1698	3046
		% of Total	4.9%	6.2%	11.1%
	40-44	Count	835	821	1656
		% of Total	3.1%	3.0%	6.1%
	45-49	Count	435	433	868
		% of Total	1.6%	1.6%	3.2%
	50-54	Count	226	207	433
		% of Total	.8%	.8%	1.6%
	55-59	Count	107	109	216
		% of Total	.4%	.4%	.8%
	60-64	Count	55	42	97
		% of Total	.2%	.2%	.4%
	65-69	Count	24	23	47
		% of Total	.1%	.1%	.2%
	70-74	Count	9	7	16
		% of Total	.0%	.0%	.1%
	75-79	Count	6	5	11

		% of Total	.0%	.0%	.0%
	80+	Count	3	1	4
		% of Total	.0%	.0%	.0%
Total		Count	9855	17480	27335
		% of Total	36.1%	63.9%	100.0%

Table 4.2: Gender of HIV positive people, NMM

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	17491	63.6	64.0	64.0
	Male	9855	35.8	36.0	100.0
	Total	27346	99.4	100.0	
	Missing	159	.6		
Total		27505	100.0		

Table 4.3: Diagnostic age; mean median and mode

Statistics

Age of patient*		
N	Valid	27482
	Missing	23
Mean		27.2311
Median		28.0000
Mode		29.00
Std. Deviation		11.90290
Percentiles	25	22.0000
	50	28.0000
	75	34.0000

Table 4.4.a: Population group of NMM, 1996 census

Population group of head of household (Q5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Black	55294	52.1	52.7	52.7
	Mixed	30335	28.6	28.9	81.6
	Indian/Asian	914	.9	.9	82.5
	White	18373	17.3	17.5	100.0
	Total	104916	98.9	100.0	
	Missing	1146	1.1		
Total		106062	100.0		

Table 4.4.b: Population group of HIV positive people, NMM

Population group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Black	25465	92.6	92.7	92.7
	Mixed	1801	6.5	6.6	99.2
	White	199	.7	.7	100.0
	Indian/Asian	10	.0	.0	100.0
	Total	27475	99.9	100.0	
	Missing	30	.1		
Total		27505	100.0		

Table 4.5: Mode of HIV transmission, NMM

How was HIV transmitted

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Heterosexuals	18348	66.7	91.5	91.5
	Other transmission	80	.3	.4	91.9
	Mother to child transmission	1627	5.9	8.1	100.0
	Total	20055	72.9	100.0	
	Missing	7450	27.1		
Total		27505	100.0		

Table 4.6: Institution where HIV was diagnosed, NMM

Diagnostic Institution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hospital	15599	56.7	56.8	56.8
	Clinic	7118	25.9	25.9	82.7
	Doctor	2330	8.5	8.5	91.2
	Insurance	1053	3.8	3.8	95.1
	Eastern Cape Blood Transfusion Services	366	1.3	1.3	96.4
	Prison	335	1.2	1.2	97.6
	TB Hospital	225	.8	.8	98.4
	Military Hospital	178	.6	.6	99.1
	District Surgeon	129	.5	.5	99.6
	Pre-employment	67	.2	.2	99.8
	Industry	43	.2	.2	100.0
	Academic	12	.0	.0	100.0
	Total	27455	99.8	100.0	
	Missing	50	.2		
Total		27505	100.0		

Table 4.7: Place of residence of HIV positive people, NMM

Region Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban area	12704	46.2	85.6	85.6
	Rural area	1745	6.3	11.8	97.3
	Other	395	1.4	2.7	100.0
	Total	14844	54.0	100.0	
	Missing	12661	46.0		
Total		27505	100.0		

Table 4.8: Dwelling type in which HIV positive people lives, NMM

Dwelling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Street Address	7720	28.1	66.4	66.4
	Site and Service	2576	9.4	22.2	88.6
	Prison	368	1.3	3.2	91.7
	Hostel	273	1.0	2.3	94.1
	Barracks	185	.7	1.6	95.7
	Informal Settlement	155	.6	1.3	97.0
	Location	83	.3	.7	97.7
	Flat	59	.2	.5	98.2
	Business	54	.2	.5	98.7
	Farm	39	.1	.3	99.0
	P.O. Box	38	.1	.3	99.4
	Sports Fac	19	.1	.2	99.5
	Hospice	17	.1	.1	99.7
	Care of	16	.1	.1	99.8
	Academic	15	.1	.1	99.9
	Hotel	4	.0	.0	100.0
	Harbour	2	.0	.0	100.0
	Total	11623	42.3	100.0	
	Missing	15882	57.7		
Total		27505	100.0		

Table 4.9: Year HIV was diagnosed, NMM

Year of diagnosis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1991	190	.7	.7	.7
	1992	430	1.6	1.6	2.4
	1993	749	2.8	2.8	5.2
	1994	1232	4.7	4.7	9.9
	1995	2494	9.5	9.5	19.4
	1996	3706	14.1	14.1	33.5
	1997	5238	19.9	19.9	53.4
	1998	5818	22.1	22.1	75.5
	1999	6446	24.5	24.5	100.0
	Total	26303	100.0	100.0	

Table 4.10: Diagnostic stage of HIV positive people, NMM

In which stage was the patient when tested

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Clinical Stage 1	937	3.4	19.6	19.6
	Clinical Stage 2	111	.4	2.3	22.0
	Clinical Stage 3	2721	9.9	57.0	79.0
	Clinical Stage 4	1003	3.6	21.0	100.0
	Total	4772	17.3	100.0	
	Missing	22733	82.7		
Total		27505	100.0		

Table 4.11: International Classification for Diseases 10

International Classification for Diseases 10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		8	.2	.2	.2
	Tuberculosis	1647	34.5	34.5	34.7
	Other Bacterial Infections	837	17.5	17.5	52.2
	Cytomegaloviral Disease	1	.0	.0	52.2
	Other Viral Infections	447	9.4	9.4	61.6
	Candidiasis	69	1.4	1.4	63.1
	Other Mycoses	40	.8	.8	63.9
	Pneumocystis carinii pneumonia	9	.2	.2	64.1
	Multiple Infections	2	.0	.0	64.1
	Other infectious or Parasitic Diseases	726	15.2	15.2	79.3
	Unspecified Infectious and Parisitic Diseases	43	.9	.9	80.2
	Kapis's sarcoma	7	.1	.1	80.4
	Non-Hodgkin's Lymphoma	1	.0	.0	80.4
	Malign. Neoplasms-lymphoid, haematopoietic, related tissue	9	.2	.2	80.6
	Other Malignant Neoplasms	4	.1	.1	80.7
	Unspecified Malignant Neoplasms	5	.1	.1	80.8
	Encephalopathy	42	.9	.9	81.7
	Wasting Syndrome	8	.2	.2	81.8
	Acute HIV infection Syndrome	38	.8	.8	82.6
	Persistent Generalized Lymphadenopathy	80	1.7	1.7	84.3
	Haematological and Imunological abnormalities, not class.	28	.6	.6	84.9
	Other specified conditions	605	12.7	12.7	97.6
	Unspecified HIV disease	116	2.4	2.4	100.0
	Total	4772	100.0	100.0	

Table 4.12: Diagnostic year and diagnostic stage of HIV positive people, NMM

Year of diagnosis * In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				Total
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	
Year of diagnosis	1991	Count	0	0	2	3	5
		% within Year of diagnosis	.0%	.0%	40.0%	60.0%	100.0%
	1992	Count	0	0	9	7	16
		% within Year of diagnosis	.0%	.0%	56.3%	43.8%	100.0%
	1993	Count	0	0	11	5	16
		% within Year of diagnosis	.0%	.0%	68.8%	31.3%	100.0%
	1994	Count	2	1	28	18	49
		% within Year of diagnosis	4.1%	2.0%	57.1%	36.7%	100.0%
	1995	Count	3	0	52	34	89
		% within Year of diagnosis	3.4%	.0%	58.4%	38.2%	100.0%
	1996	Count	17	1	149	103	270
		% within Year of diagnosis	6.3%	.4%	55.2%	38.1%	100.0%
	1997	Count	268	33	763	227	1291
		% within Year of diagnosis	20.8%	2.6%	59.1%	17.6%	100.0%
	1998	Count	325	42	923	299	1589
		% within Year of diagnosis	20.5%	2.6%	58.1%	18.8%	100.0%
	1999	Count	322	34	769	292	1417
		% within Year of diagnosis	22.7%	2.4%	54.3%	20.6%	100.0%
Total		Count	937	111	2706	988	4742
		% within Year of diagnosis	19.8%	2.3%	57.1%	20.8%	100.0%

Table 4.13: Gender and diagnostic stage of HIV positive people, NMM

Gender* In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	Total
Gender	Female	Count	567	69	1536	585	2757
		Expected Count	574.9	62.8	1579.6	539.7	2757.0
		% within Sex of patient	20.6%	2.5%	55.7%	21.2%	100.0%
	Male	Count	348	31	978	274	1631
		Expected Count	340.1	37.2	934.4	319.3	1631.0
		% within Sex of patient	21.3%	1.9%	60.0%	16.8%	100.0%
Total		Count	915	100	2514	859	4388
		Expected Count	915.0	100.0	2514.0	859.0	4388.0
		% within Sex of patient	20.9%	2.3%	57.3%	19.6%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.376(a)	3	.002
Continuity Correction			
Likelihood Ratio	15.624	3	.001
Linear-by-Linear Association	2.963	1	.085
N of Valid Cases	4388		

Table 4.14: Population group and diagnostic stage of HIV positive people, NMM

Population group * In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	Total
Population group	Mixed	Count	36	7	138	44	225
		Expected Count	47.1	5.1	128.9	43.9	225.0
		% within Population group	16.0%	3.1%	61.3%	19.6%	100.0%
	Black	Count	883	93	2379	813	4168
		Expected Count	871.9	94.9	2388.1	813.1	4168.0
		% within Population group	21.2%	2.2%	57.1%	19.5%	100.0%
Total		Count	919	100	2517	857	4393
		Expected Count	919.0	100.0	2517.0	857.0	4393.0
		% within Population group	20.9%	2.3%	57.3%	19.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.145[a]	3	.246
Continuity Correction			
Likelihood Ratio	4.290	3	.232
Linear-by-Linear Association	1.954	1	.162
N of Valid Cases	4393		

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Table 4.15: Diagnostic age and diagnostic stage of HIV positive people, NMM

Diagnostic age * In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	Total
Diagnostic age	5-14	Count	9	0	4	3	16
		Expected Count	3.4	.4	9.2	3.1	16.0
		% within Diagnostic age	56.3%	.0%	25.0%	18.8%	100.0%
	15-24	Count	328	22	521	165	1036
		Expected Count	217.7	23.5	593.0	201.8	1036.0
		% within Diagnostic age	31.7%	2.1%	50.3%	15.9%	100.0%
	25-34	Count	407	56	1143	395	2001
		Expected Count	420.5	45.3	1145.3	389.9	2001.0
		% within Diagnostic age	20.3%	2.8%	57.1%	19.7%	100.0%
	35-44	Count	139	16	599	207	961
		Expected Count	202.0	21.8	550.1	187.2	961.0
		% within Diagnostic age	14.5%	1.7%	62.3%	21.5%	100.0%
	45-54	Count	27	4	193	64	288
		Expected Count	60.5	6.5	164.8	56.1	288.0
		% within Diagnostic age	9.4%	1.4%	67.0%	22.2%	100.0%
	55-64	Count	9	1	43	18	71
		Expected Count	14.9	1.6	40.6	13.8	71.0
		% within Diagnostic age	12.7%	1.4%	60.6%	25.4%	100.0%
Total		Count	919	99	2503	852	4373
		Expected Count	919.0	99.0	2503.0	852.0	4373.0
		% within Diagnostic age	21.0%	2.3%	57.2%	19.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	144.196(a)	15	.000
Continuity Correction			
Likelihood Ratio	142.863	15	.000
Linear-by-Linear Association	107.735	1	.000
N of Valid Cases	4373		

Table 4.16: Place of residence and diagnostic stage of HIV positive people, NMM

Place of residence* In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	Total
Region Type	Rural area	Count	69	7	158	46	280
		Expected Count	62.5	6.9	152.2	58.4	280.0
		% within Region Type	24.6%	2.5%	56.4%	16.4%	100.0%
	Urban area	Count	656	73	1607	632	2968
		Expected Count	662.5	73.1	1612.8	619.6	2968.0
		% within Region Type	22.1%	2.5%	54.1%	21.3%	100.0%
Total		Count	725	80	1765	678	3248
		Expected Count	725.0	80.0	1765.0	678.0	3248.0
		% within Region Type	22.3%	2.5%	54.3%	20.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.889[a]	3	.274
Continuity Correction			
Likelihood Ratio	4.073	3	.254
Linear-by-Linear Association	2.412	1	.120
N of Valid Cases	3248		

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Table 4.17: Diagnostic institution and diagnostic stage of HIV positive people, NMM

Diagnostic Institution * In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	Total
Diagnostic Institution	TB Hospital	Count	2	0	99	3	104
		Expected Count	20.7	2.4	58.9	22.0	104.0
		% within Diagnostic Institution	1.9%	.0%	95.2%	2.9%	100.0%
	Clinic	Count	660	43	950	179	1832
		Expected Count	365.2	42.2	1037.7	386.8	1832.0
		% within Diagnostic Institution	36.0%	2.3%	51.9%	9.8%	100.0%
	Other	Count	29	9	65	46	149
		Expected Count	29.7	3.4	84.4	31.5	149.0
		% within Diagnostic Institution	19.5%	6.0%	43.6%	30.9%	100.0%
	Hospital	Count	260	58	1588	779	2685
		Expected Count	535.3	61.9	1520.9	566.8	2685.0
		% within Diagnostic Institution	9.7%	2.2%	59.1%	29.0%	100.0%
Total		Count	951	110	2702	1007	4770
		Expected Count	951.0	110.0	2702.0	1007.0	4770.0
		% within Diagnostic Institution	19.9%	2.3%	56.6%	21.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	664.292(a)	9	.000
Continuity Correction			
Likelihood Ratio	686.566	9	.000
Linear-by-Linear Association			
N of Valid Cases	4770		

Table 4.18: Dwelling type and diagnostic institution of HIV positive people, NMM

Dwelling type * In which stage was the patient when tested Crosstabulation

			In which stage was the patient when tested				
			Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stage 4	Total
Dwelling type	Street Address	Count	414	56	1150	495	2115
		Expected Count	441.5	55.0	1134.7	483.8	2115.0
		% within Dwelling type	19.6%	2.6%	54.4%	23.4%	100.0%
	Location/Informal settlements/Sites with services	Count	441.5	17	389	164	757
		Expected Count	158.0	19.7	406.1	173.2	757.0
		% within Dwelling type	24.7%	2.2%	51.4%	21.7%	100.0%
	Prison/Hostels/ Barracks	Count	25	5	70	27	127
		Expected Count	26.5	3.3	68.1	29.1	127.0
		% within Dwelling type	19.7%	3.9%	55.1%	21.3%	100.0%
Total		Count	626	78	1609	686	2999
		Expected Count	626.0	78.0	1609.0	686.0	2999.0
		% within Dwelling type	20.9%	2.6%	53.7%	22.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.239(a)	6	.115
Continuity Correction			
Likelihood Ratio	9.896	6	.129
Linear-by-Linear Association	4.501	1	.034
N of Valid Cases	2999		