

**CATASTROPHIC AND IMPOVERISHING HEALTH CARE  
EXPENDITURE IN HOUSEHOLDS AFFECTED BY HIV/AIDS<sup>1</sup>**



**Nandipha Jacobs**

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**CATASTROPHIC AND IMPOVERISHING HEALTH CARE  
EXPENDITURE IN HOUSEHOLDS AFFECTED BY HIV/AIDS**

**Nandipha Jacobs**

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**Supervisors: Prof. S. Terblanche  
Prof. F le R Booyesen**

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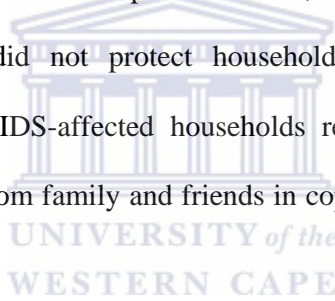
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## **ABSTRACT**

The aim of this study is to investigate catastrophic and impoverishing health care payments in HIV/AIDS-affected households. Quantitative tools of analysis are used to analyse data from a panel study on the socio-economic impact of HIV/AIDS on households in two Free State communities. Burdens of HIV/AIDS-related morbidity increased the likelihood of catastrophe, but not of impoverishment. The incidence of catastrophe and impoverishment in HIV/AIDS-affected households declined over time as morbidity burdens declined and household welfare increased. The utilisation of public healthcare protected households from catastrophe. However, access to medical aid and social welfare grants did not protect households from catastrophe and impoverishment. HIV/AIDS-affected households relied mainly on existing income and assistance from family and friends in coping with catastrophe and impoverishment.



**KEYWORDS:** HIV/AIDS-affected households, health care expenditures, catastrophe, impoverishment, responses.

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## DECLARATION

**I declare that the dissertation hereby submitted by me for the MAGISTER ARTIUM in CHILD AND FAMILY STUDIES degree at the University of the Western Cape is my own independent work and has not been previously submitted by me at another university/faculty.**

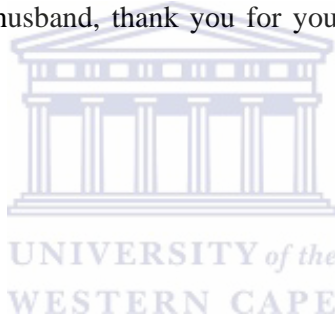




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## CHAPTER 1: BACKGROUND, AIM AND OBJECTIVES

### 1.1 Introduction

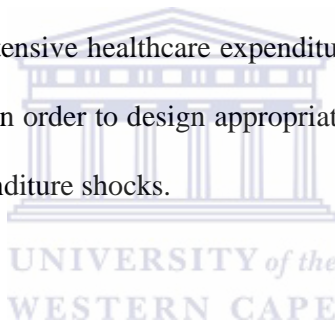
South Africa has the second largest number of people living with HIV/AIDS in the world. The 2004 National HIV and Syphilis Antenatal Sero-Prevalence Survey estimated the prevalence of HIV among pregnant women attending public antenatal clinics in the Free State to be 29.5% (Department of Health 2005: 8). The prevalence among women attending public antenatal clinics in the Lejweleputswa district (Thabong/Welkom) is 33.0% and in Thabo Mofutsanyana 27.1% (Free State Department of Health 2005: 9). The AIDS model of the Actuarial Society of South Africa (ASSA) predicts that by mid-2005 about half a million people would be infected with HIV in the Free State, while 87,000 people would be AIDS sick by mid-2007 (ASSA 2005).

HIV-infected persons belong to households, and their illnesses and subsequent deaths bring about significant social and economic ramifications for their families. Desmond *et al.* (2000) note that the concentration of HIV infection in the productive age group has considerable implications for the productive capacity and income of affected households. Such households bear the brunt of the disease and matters are likely to worsen in the next five to ten years with the anticipated increase in the number of people in their productive years becoming ill with AIDS. Wagstaff (2002) believes that healthcare payments associated with ill health are involuntary and simply the consequence of unwanted health shocks. Xu *et al.* (2003) contend that health systems are able to deliver healthcare services that can make a difference to people's health. However, accessing these services can lead to individuals

having to pay catastrophic proportions of their available income, a situation that can push many households into poverty.

### **1.2 Problem statement**

According to Whitehead *et al.* (2001), the impact of out-of-pocket health expenditure on livelihoods and wellbeing has received little attention internationally, and it is only recently that the subject has appeared on the research agenda. Xu *et al.* (2003) argue a similar case, noting that the World Health Organization (WHO) only recently estimated the magnitude of catastrophic healthcare expenditure. Thus, a need exists to better understand the impact of high or extensive healthcare expenditures on households and its effect on poverty levels in order to design appropriate strategies for protecting households against expenditure shocks.



### **1.3 Aims and objectives**

The general aim of the study is to capture the intensity and incidence of catastrophic health care expenditures in order to describe the degree to which catastrophic health care payments occur among households. Simultaneously, the study sets out to assess the extent to which people are made poor or poorer by health spending, i.e. the impoverishing effects of healthcare spending. Within these general aims the envisaged study has the following specific research objectives:

- Quantify the extent of catastrophic healthcare expenditure in HIV/AIDS-affected and non-affected households.

- Explore the nature of trends in catastrophic health care expenditure in HIV/AIDS-affected and non-affected households.
- Investigate the determinants of catastrophic health care expenditure in households.
- Explore the nature of responses to catastrophic health care expenditures in HIV/AIDS-affected and non-affected households.
- Quantify the extent of impoverishing health care payments in HIV/AIDS-affected and non-affected households.
- Explore the nature of trends in impoverishing health care payments in HIV/AIDS-affected and non-affected households.
- Investigate the determinants of impoverishing health care payments in households.
- Explore the nature of responses to impoverishing health care payments in HIV/AIDS-affected and non-affected households.



#### **1.4 Research methodology**

For the purposes of this study, secondary analysis of data collected for a longitudinal household survey on the socio-economic impact of HIV/AIDS conducted in Welkom and Qwaqwa in the Free State Province from 2001 until 2004, was utilized. Analyses were confined to a sub-sample of 744 households that included at least one ill person in any one wave of the study. The use of this sub-sample is largely attributed to the definition of catastrophic health care expenditures that confined the studied phenomenon to households that included ill persons. The research design of this study is formal in nature. All HIV/AIDS-affected households were sampled purposively, thus the study was

limited to the experiences of poor, predominantly African households that utilised public health care services. Semi-structured face-to-face interviews were conducted with one key respondent, namely the “person responsible for the daily organization of the household, including household finances”. A more detailed discussion of the research methodology followed is provided in Chapter 3.

**1.5 Definition of key concepts (see also 3.7 for a detailed discussion of measurement and definitions of concepts used)**

- **HIV/AIDS-affected households**

Households that at baseline included at least one person known to be HIV-positive or known to have died from AIDS in the past six months, or at baseline or subsequently included someone who suffered from illnesses related to and/or who died for reasons related to HIV, sexually transmitted infections (STIs), tuberculosis, pneumonia, bronchitis and meningitis.

- **Non-affected households**

Households that at baseline resided in close proximity to affected households and did not at baseline or subsequently include someone who suffered from illnesses related to and/or who died for reasons related to HIV, STIs, tuberculosis, pneumonia, bronchitis and meningitis.

- **Catastrophic health care expenditure**

Catastrophic health care expenditure occurs when a household’s total out-of-pocket health care payments equal or exceed 40% of the household’s capacity

to pay or non-subsistence spending (Kawabata *et al.* 2002; Xu *et al.* 2003; WHO 2005; Lamiraud *et al.* 2005).

- **Impoverishment**

A non-poor household is impoverished by health care expenditures when it becomes poor after paying for health care services.

### **1.6 Limitations of the study**

Some of the measures of household welfare and health care expenditure experienced may be biased as a result of the study design (see Chapter 3). As a result of the purposive sampling method used in the study and the small sample size, findings are descriptive or indicative rather than representative. Results can therefore not be generalized to the Free State province or to South Africa. Chronic illness was used as a proxy for HIV/AIDS, but the presence of HIV/AIDS-related morbidity and mortality does not represent the only indicator of the affected status of households. Households may also be affected indirectly by the epidemic in other ways, for example by having to shelter children orphaned by HIV/AIDS. The classification of households into affected and non-affected was based on self-reported diagnosis or causes of death, measures that may suffer from problems of reliability.

### **1.7 Ethical aspects**

Research involving human participants need to be conducted within the parameters of ethical propriety (Neumann, 2000). The myths and secrecy surrounding HIV/AIDS, as well as the fear of stigmatisation and protection of

the identities of people living with HIV/AIDS, posed a real challenge for the research, particularly regarding the identification and selection of participants. Those confidantes or professionals involved with the identification and selection of respondents, especially of the HIV-affected households, facilitated the process within the confines of utmost confidentiality. Anonymity and confidentiality was a priority in data gathering. To ensure privacy, respondent's identities were not disclosed after the information was gathered. Informed consent was obtained from the infected individual(s) or their caregivers (in the case of minors).

The research protocol of the original study was submitted to the Research Ethics Committee of the University of the Free State for approval in order to safeguard the rights of research participants and to ensure that the necessary ethical standards of research in this field are met. Additionally, letters of approval were obtained from relevant officials from the Free State Department of Health at the outset of the study.

### **1.8 Structure of the report**

The mini-dissertation comprises of five main sections, namely the introduction, literature review, the research problem and methodology, the empirical study and the triangulation of information and data obtained during the literature review and empirical study. More specifically, the following chapters comprise this mini-dissertation:

- Chapter 1 introduces the study and provides the rationale and context thereof, including a brief overview of the research methodology.

- Chapter 2 comprises a literature review on catastrophic health care expenditures, impoverishing health care payments and responses thereto.
- Chapter 3 documents the data and methods employed in the quantitative analysis.
- Chapter 4 presents the empirical findings of the research.
- Chapter 5, the conclusion and recommendations, discusses the results and their implications, and marries the results obtained with policy issues. Where applicable, recommendations are made.





## **CHAPTER 2: LITERATURE REVIEW**

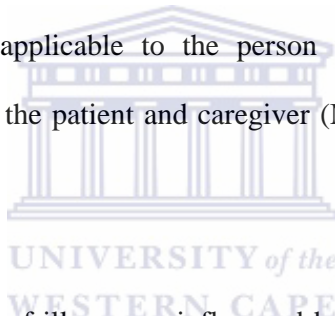
### **2.1 Introduction**

Better understanding of and insight into the impact of high or extensive health care expenditures on households and their effect on poverty levels is needed in order to design appropriate strategies for protecting vulnerable households against the risk of impoverishment. This chapter sets out to place the burden of health care-related expenses and the financial consequences of illness on households in the context of the HIV/AIDS epidemic. Emphasis is placed on the extent to which health care expenditures can be catastrophic and impoverishing. The responses that households utilize in trying to cope with such health care expenditures is also reflected on, as are strategies for protecting households against catastrophic and impoverishing health care payments. The literature review assisted in the formulation of the research problem, familiarisation with current discussions on the matter under study, and analysis of research results.

### **2.2 Costs of illness to households**

Disease and ill health not only cause suffering and death, but also have important cost implications. According to the World Bank (1998), key economic costs associated with illness include lost income from reduced labour supply and productivity, and medical care expenditures that may result in families not being able to smooth their consumption over periods of illness. This scenario exists especially in developing countries where few individuals are covered by formal health and disability insurance.

Wilkes *et al.* (1998) found that an episode of severe ill health imposes both direct and indirect costs on affected households. Direct financial costs in the form of increased household health care expenditures may be incurred if treatment is sought. These costs must generally be met in cash, resulting in additional burdens on household budgets and other assets holdings. Given that the focus of this study is on the financial consequences of illness, direct costs refer to all financial payments made by the household in the process of seeking and obtaining care, excluding transport costs. Several studies considered indirect costs, which represent the costs of time lost to undertaking normal productive activities due to illness and health care seeking activities. These time losses are applicable to the person who is ill and to other household members, i.e. the patient and caregiver (McIntyre & Thiede 2003, Russel 2003).



Direct and indirect costs of illness are influenced by the type and severity of illness and those health service characteristics that influence access and choice of service provider (Russel 2004). As in the case of a study on household health care expenditures conducted in Nepal (Hotchkiss *et al.* 1998), Booysen (2003) report that more affluent (wealthier) households access private care whilst the poor rely mainly on public health services. Even though the poor may be dependent on public health care, they are still exposed to expenditures in trying to access these services. Public health services are not always free and indirect costs can also be incurred when accessing them.

McIntyre *et al.* 2003 (in Lamiraud *et al.* 2005) note that, although free services are intended to be available only to those who cannot afford to pay for health services, in practice, free services are rendered to anyone presenting at public health facilities. Russel (2003) argues that in any setting where poor households can obtain protection against direct costs of illness, for example through tax-based financing, direct costs are likely to be lower.

There is considerable and consistent evidence that the direct costs of health care is regressive, imposing a far greater burden on poor families than on high-income households (McIntyre & Thiede 2003, Russel 2004). Although the poor in general spend less on treatment than other income groups, such spending makes up a higher proportion of their monthly or annual income. A number of reasons can be attributed to this spending pattern which includes poor access to care, inability to pay, greater use of public health services, lack of insurance, lower incomes etc. (Pannarunothai & Mills 1997, Russel 2004).

Goudge and Govender (2000) point out that the regressive nature of health care expenditures is compounded by the fact that:

- the poor have lower health status because of their poor living conditions;
- they are more dependant on their physical ability as a source of income;
- they are less likely to have access to either sickness benefits or health insurance;

- they frequently have insufficient information to make the most cost-effective decisions about health care expenditure, often resulting in them receiving a lower value for money in the health sector; and lastly,
- economic and health crises (such as AIDS and structural adjustment programmes) often impact significantly on the poor.

### **2.3 The impact of HIV/AIDS-induced illnesses on households**

HIV/AIDS mostly affects vulnerable groups of the population, seeing that poor people, especially poor women, are at much higher risk of infection with HIV. Poor people are also more likely to be poorly nourished, thus compromising their immunity and making them more vulnerable to HIV infection (Barnett & Whiteside 2002). Similarly, the situation in which poor people find themselves often prompts behaviour that increases the chances of infection, e.g. migrant labour, sex work, etc. Thus, HIV infection is often concentrated in poor communities, which results in further impoverishment for households and families (Cohen 1998 in Desmond *et al.* 2000).

The time scale of the impact of HIV/AIDS on households is long-term, and unlike many (if not most) illnesses - the infected person will not recover, but periods of illness will increase in frequency, duration and severity, thus requiring more care (Booyesen & Arntz, 2003). One of the most frequently observed ways in which HIV/AIDS affects households and individuals is through the sudden and tragic loss of income and economic security as household earnings decline and medical expenses increase (Johnson *et al.* 2002, Russel 2003). An adult illness or death reduces household income,

resulting in less labour being available, not only because the affected individual can't work, but also because time is diverted to care for the sick (Barnett & Whiteside 2000)

In addition, illness increases expenditure on medical care, food, washing materials etc. (Barnett & Whiteside 2002). To cope with the change in income and the need to spend more on health care, children are often taken out of school to assist in caring for the sick or to work in order to contribute to the income of households (Wilkes et al 1998; Desmond *et al.* 2000; Whitehead *et al.* 2001). Booysen (2003) argues that because expenditure on food comes under pressure, malnutrition may appear and access to other basic needs such as health care, housing and sanitation could also come under threat.

From the above it is evident that HIV/AIDS-induced illnesses have a negative impact on the livelihoods and wellbeing of many households, reflecting a downward socio-economic spiral (Barnett & Whiteside 2002, McIntyre & Thiede 2003, Russel 2004). A study conducted in Tanzania found that the direct costs of long-term fatal illnesses, particularly HIV/AIDS, had a devastating impact on households in that medical expenses were higher for AIDS deaths than non-AIDS deaths due to the protracted nature of the illness (Ngalula 2002).

Similarly, Ainsworth and Over 1997 (in Desmond *et al.* 2000) note that people diagnosed with AIDS were more likely to seek medical attention than other terminally ill people and were, therefore, more likely to incur direct medical

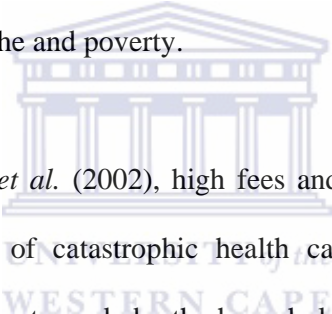
expenses. Russel (2003) points out that the direct cost of malaria as a single disease was found lower than for TB and HIV/AIDS, as the latter two illnesses imposed higher direct cost burdens on households. HIV/AIDS cost burdens were also found higher than those for TB treatment.

Johnson *et al.* (2002) found that many affected households in South Africa are battling to cope with caring for a severely ill household member and having to deal with the economic consequences of the person's illness. In a study among AIDS-affected households in four South African provinces, including the Free State, households reportedly spent between R8 and R4000 per month per household on health care, with fairly wide variation between poor and better-off households. Rural households were found to spend a greater proportion of their monthly income on health care than urban households. It was calculated that households spent an average of 34% of their monthly income on health care. Therefore, the impact of HIV/AIDS at the household level is clearly serious.

Given that poor people are more susceptible to HIV/AIDS than other income groups and considering that caring for people with HIV/AIDS-related illnesses is more expensive than other less chronic illnesses, HIV/AIDS-affected households are more vulnerable to catastrophic and impoverishing health care payments.

## 2.4 Catastrophic health care expenditures

Catastrophic health care expenditures are only observed when households need and use health care services, and when a household must reduce its basic expenses over a certain period of time in order to cope with medical bills or health care costs of one or more of its members (Kawabata *et al.* 2002, Xu *et al.* 2003). The fees or co-payments for health care can be so high in relation to income that it results in “financial catastrophe” for the individual or the household (WHO 2005). Yet Xu *et al.* (2003) argue that catastrophic health expenditures are not always synonymous with high health care costs - if income is very low, even relatively small health care costs can push households into catastrophe and poverty.



According to Kawabata *et al.* (2002), high fees and out-of-pocket payments increase the probability of catastrophic health care expenditures. Out-of-pocket fees refer to payments made by the household at the point of receiving health care. Additionally, lower income groups have a greater proportion of households with catastrophic levels of health spending than do higher income groups. In Thailand, the poor were reported as more likely to pay for health care services from their own income than richer people, which, when combined with lower incomes, places the poor at higher risk of catastrophic payments for health care (Pannarunothai & Mills 1997).

Through a closer examination of the circumstances under which households face catastrophic health care expenditure, Kawabata *et al.* (2002) found that determinants such as income, age of household members, and the employment

status of the household head are associated with catastrophic health expenditures. Moreover, households with chronically ill members, elderly and handicapped members are more likely to be confronted with catastrophic health spending due to their greater need for health services and their lack of financial resources (Kawabata *et al.* 2002, Xu *et al.* 2003, WHO 2005). Conversely, younger and healthy households have a greater likelihood of avoiding catastrophic levels of health care spending (Kawabata *et al.* 2002).

Two studies conducted in the United States (in Xu *et al.* 2003) showed that households headed by older people, people with disabilities, the unemployed, poor people and those with reduced access to health insurance were more likely to be affected by catastrophic health expenditure. Several studies have shown that HIV/AIDS-affected households are more likely to experience catastrophic expenditure than non-affected households (McIntyre and Thiede 2003, Russel 2004).

The WHO (2005), like Xu *et al.* (2003), acknowledge that three factors have to be present for catastrophic payments to arise: the availability of health care services requiring out-of-pocket payments, low household capacity to pay, and lack of prepayment mechanisms for risk pooling. Prepayment refers to funds for health care that are collected through taxes and/or insurance contributions. Moreover, Lamiraud *et al.* (2005) point out that the extent to which illness shocks really result in catastrophic economic consequences for households depends not only on medical care costs, but also on the effects of reduced



labour supply and productivity, and the extent to which households are able to “smooth” their consumption over several periods.

### **2.5 Impoverishing impact of health care expenditures**

Generally, in every society morbidity and mortality are higher among the poor (Wagstaff 2002). “A heightened interest in poverty dynamics has led to the recognition that episodes of major illness are important causes of poverty” (Bloom 2005:10). Ill health can cause household impoverishment through income losses and medical expenses that trigger a spiral of asset depletion, indebtedness and cuts to essential consumption (Russel 2005).

According to Messen *et al.* (2003), there are two major pathways whereby illness can lead to poverty in developing countries: the first is through the death or disability of a household income earner, and the second is through the cost of treatment. From the above it is evident that illness may have a substantial impact on household income and may even make the difference between being below the poverty line or being pushed further below the poverty line. According to Bloom (2005), poverty may impair a household’s ability to prevent and mitigate the impact of health-related shocks.

In investigating the interplay between poverty and health, McIntyre and Thiede (2003) point out that a ratchet effect prevents people below the poverty line who face costs of illness from moving out of poverty. This means that poor households are more vulnerable to being in a poverty/health ratchet since illness is more likely to affect poor households. “This situation is further

aggravated by the lack of extra resources or buffers that can be called upon when in need” (Goudge & Govender 2000:6). According to Whitehead *et al.* (2001) the ratchet effect highlights the limited chances of households recovering from poverty and the ease with which households find themselves caught in the cycle of poverty and ill-health.

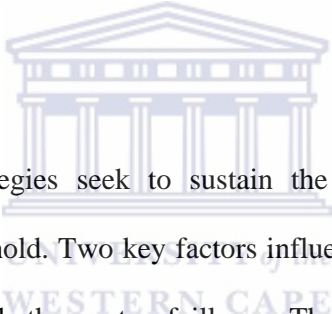
Poverty also plays a role in creating an environment in which individuals are particularly susceptible and vulnerable to HIV/AIDS (Fenton 2004). Although no sector of the population is unaffected by HIV/AIDS, it is the poorest South Africans who are most vulnerable to HIV/AIDS and for whom the consequences are most severe (Malcolm 2002). The complex relationship between poverty and HIV/AIDS, in its many facets, cannot be over-emphasised, especially in cases where households have to cope with a substantial and rapid rise in expenditures on health care with a diminishing source of income.

According to McIntyre and Thiede (2003), many poor households are confronted with accepting to trade the future welfare of all its members against access to health care for one household member, perceived as essential for survival. Thus, the tradeoff is not only between health care expenditure and other forms of expenditure, but also between current and future needs of different household members (Goudge & Govender 2000). Therefore, the associated burden of HIV/AIDS morbidity exposes already vulnerable households to further shocks (Booyesen 2003). Thus, the HIV/AIDS epidemic

has the ability to further impoverish affected households via medical expenditures.

## **2.6 Responses to health care expenditures in households**

Coping strategies can be defined as a set of actions that aim to manage the costs of an event (shock) or process that threatens the welfare of some or all of a household's members. Russel (2003) contends that coping strategies are vitally important for poor households faced with illness shocks, as this would require the mobilisation of often substantial additional resources. The ability to cope with these additional costs is essential for the health and livelihood of poor households.

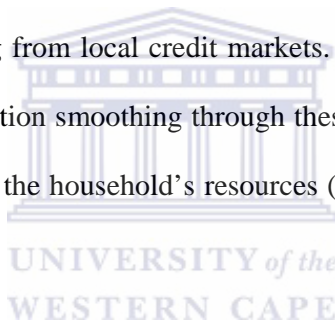


Ultimately, coping strategies seek to sustain the economic viability and sustainability of a household. Two key factors influence a household's ability to successfully cope with the costs of illness. The first is the household's vulnerability or resilience, which is founded on its asset portfolio such as physical and financial capital, as well as less tangible assets such as education and social resources. Social networks on which claims can be made to obtain other resources, particularly information, opportunities and support are also important. Secondly, the type, severity and duration of illness, where illness costs determine the coping strategies that households adopt (Russel 2004).

In situations of poverty where households struggle to meet their basic needs, the loss of a daily wage due to illness or even a relatively small treatment expense is likely to trigger coping strategies (McIntyre & Thiede 2003).

“Including claims on resources outside the household such as social networks or local organisations that offer credit” (Russel 2004:148). Kabir *et al.* 2000 (in McIntyre & Thiede 2003) found that very poor households find that some coping strategies toward the costs of illness are not accessible due to the absence of security. As a result of marginalisation, most of the poor also do not have access to social resources such as informal insurance schemes.

In trying to cope with health care expenditures, families in low income countries often have to rely on informal mechanisms such as drawing on savings, selling assets, accessing transfers from their family and social support networks, and borrowing from local credit markets. The possibility that there is less than full consumption smoothing through these mechanisms suggests a potentially large loss for the household’s resources (Gertler and Gruber 1997; Whitehead *et al.* 2001).



According to Rugalema 2000 (in McIntyre and Thiede 2003), many households struggle rather than cope with the catastrophic costs that accompany the HIV/AIDS epidemic in developing countries. The economic and social viability of many households comes under threat as HIV/AIDS causes a process of impoverishment that coping strategies cannot mitigate.

Russel (2003) highlights that in households affected by HIV/AIDS, coping strategies identified for addressing the direct costs of illness and smoothing consumption levels include using savings and other stores; obtaining help from parents, extended family and other community actors; borrowing; selling

productive assets; cutting food consumption; and withdrawing children from school. Keeping in mind that the poorest have the weakest social resources and are more likely to be excluded from inter-household community support programmes, social networks have been identified as one of the most important resources mobilised by households to obtain finances to pay for treatment (Russel 2004).

### **2.7 Strategies for protecting households from catastrophic and impoverishing health care expenditures**

One conception of fairness in payments for health care is that households ought not to be required to spend more than a given fraction of their income on health in any given period (Lamiraud 2005). While prepayment mechanisms reduce the chances of catastrophic spending, they do not automatically eliminate health care expenditure. In some cases prepayment mechanisms cover only some health needs, may cover only high income groups, and may still require some of the costs of care to be met by the beneficiary. However, it is noted that addressing health service accessibility can protect households from financial catastrophe by reducing out-of-pocket spending (WHO 2005).

To reduce or mitigate direct medical costs, service delivery weaknesses that increase direct costs to households need to be addressed. For example, coverage of tax or insurance based financing systems can be expanded to protect poor households from out-of-pocket payments; quality of care at public facilities can be improved; investments can be made toward more accessible

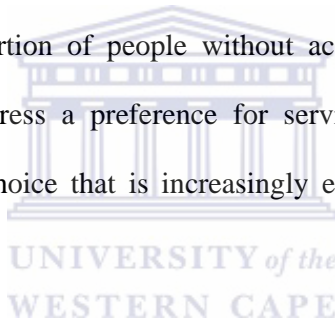
health care; and a greater equity focus or targeting into specific programmes can be introduced (Russel 2003). Other strategies include progressive fee schedules, highly subsidised or free hospital services, and the free provision of certain health services to the poor (Xu *et al.* 2003).

Out-of-pocket health care expenditures are broadly regressive but insurance protection is mainly granted to more affluent households since the rich can afford to contribute to medical schemes. Grant and Grant (2003) found that private insurance offers little for the poor, as they are more likely to be ill and face higher premiums, but are the least able to pay. Lamiraud *et al.* (2005) showed that households without insurance coverage incur out-of-pocket health payments when purchasing some public and most private health care services. Xu *et al.* (2003) argue that the most straightforward approach to reduce out-of-pocket spending would be through the development of social insurance or funding through general taxes. Kawabata *et al.* (2002) also consider social health insurance and general tax based prepayment mechanisms to be sound long-term solutions to addressing catastrophic and impoverishing health care payments.

Health policy reform in the form of social health insurance or more generally social health protection can be implemented to provide coverage to people who generally access public health services and are currently not insured (Lamiraud *et al.* 2005). A social health insurance policy is currently being pursued in South Africa. Affordable insurance packages for all households, irrespective of income group, would also be beneficial. Catastrophic health

care expenditures may continue to be widespread if benefit packages are too limited (Kawabata *et al.* 2002). When expanding insurance coverage, it would nevertheless be important to ensure that benefit packages are sufficient (WHO 2005).

The public sector is currently delivering services to the majority of the population and is mainly accessed by poor communities (Booyesen 2003, Health Systems Trust 2004, Lamiraud *et al.* 2005). Yet, quality of care is influential in the choices that people make as to which sector (public or private) they would visit for care. Havemann and Van der Berg (2004) showed that a substantial proportion of people without access to health insurance, including the poor, express a preference for services provided by private health practitioners, a choice that is increasingly expensive and can further impoverish the poor.



Van Rensburg (2004) point out that quality of care is perceived to be worse in public health care facilities due to longer waiting times, unfavourable staff attitudes and unkept facilities. Improving the quality of care at public facilities would improve utilisation. In this way the public sector would expand population coverage, thus protecting households from out-of-pocket payments. Ensuring and improving the efficiency and sustainability of current health care financing systems would benefit both service providers and consumers, thus strengthening the health system in its entirety.

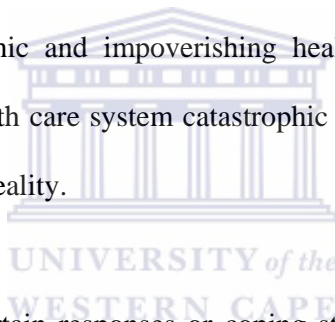
Catastrophic health care expenditures and impoverishing health care payments cannot be solely addressed and tackled by health policy since health expenditures have an impact on broader social outcomes. The role that other policies can have in mitigating the impact of catastrophic and impoverishing health payments is equally important to ensure that households can be protected from such shocks.

In particular, the role that social grants play in mitigating the socio-economic impact of HIV/AIDS cannot be ignored. Social support grants already in place in South Africa such as old age pension, child support and disability grants, can all work to improve the welfare of those suffering the greatest impact from the HIV/AIDS epidemic (Samson *et al.* 2004). A study conducted by the Economic Policy Research Institute (2004) revealed that receipt of social welfare is associated with lower spending on health care, perhaps because social grants are associated with other positive outcomes that reduce the need for medical care. Social grants are known to promote a broader set of outcomes, e.g. improved nutrition and education which encourage health irrespective of direct household spending on medical care. If consistent, these outcomes can rule out further and greater medical spending, and promote a virtuous cycle where better health outcomes economise on household resources, supporting further allocations into long-term investments (including health).



## 2.8 Summary

Financial payments made by households when seeking and obtaining health care services have an impact on the budget of households. The extent of the economic impact of health expenditure on households is largely dictated by the type and severity of the illness. Lower income groups are more susceptible to HIV infections and even more vulnerable to the debilitating impact of high or extensive health care payments. HIV/AIDS-induced illnesses have a negative impact on the livelihoods and wellbeing of many households since the economic security of the household is at risk when health care expenditures increase. As such, poor HIV/AIDS-affected households are more susceptible to catastrophic and impoverishing health care payments. Even within a free public health care system catastrophic and impoverishing health care payments can be a reality.

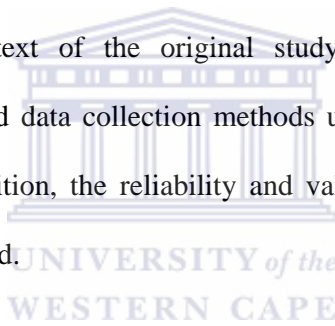


Households resort to certain responses or coping strategies in trying to deal with health expenditures. These include using their own income, savings, medical aid, inheritance money, borrowing money, and receiving help from family, friends and other acquaintances. Therefore, the extent to which responses or coping strategies can mitigate the impact of health care expenditures is largely dependant on the availability and accessibility of resources within and outside the household. Strategies for protecting households from catastrophic and impoverishing health care costs do not, however, necessarily eliminate the existence of catastrophic and/or impoverishing health care expenditures.

## **CHAPTER 3: RESEARCH METHODS/METHODOLOGY**

### **3.1 Introduction**

The aim of quantitative research is to determine how certain variables relate to each other in a given population (Babbie and Mouton, 2001). In this study, results will be measured using numerical data on health care expenditures (medical costs) of selected households and the impact that such expenditures have on household welfare. Data for the study existed and had already been collected by means of a cohort study assessing the impact of HIV/AIDS on households. Chapter three reports on the research strategy of the study within the context of the original cohort study of HIV/AIDS-affected households. Understanding the context of the original study is essential. Thus the population, sampling and data collection methods used in the original study are reflected on. In addition, the reliability and validity of the original and present study are explored.



### **3.2 Research design**

The research design of the study is formal in nature, which involves the use of analytic tools in answering posed research questions, i.e. data is used to answer specific research questions “involving precise procedures and data source specifications” (Cooper and Schindler, 2003:146). A formal study differs from an exploratory design by virtue of the degree of structure and the direct objective of the study.

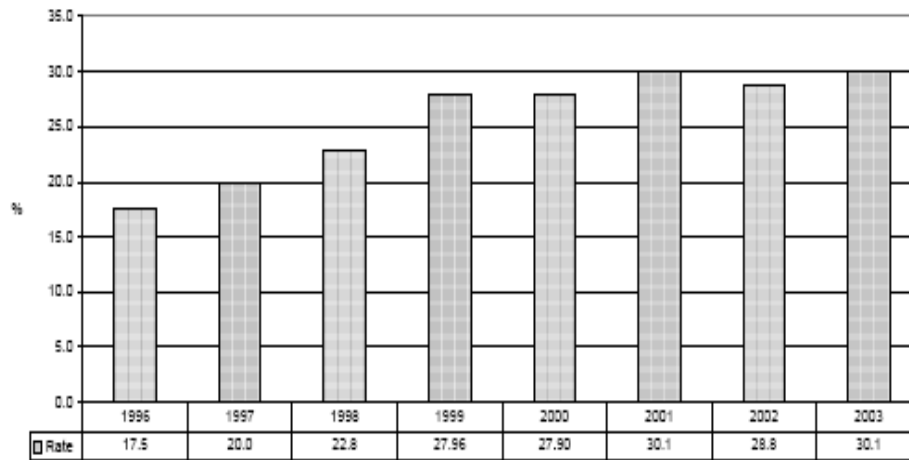
### 3.3 Population

The original study was conducted in two local communities in the Free State and focused on one urban (Welkom) and one rural (Qwaqwa) area. At the district level, the two research sites (Welkom and Qwaqwa) are situated in the Lejweleputswa and Thabo Mofutsanyana districts respectively.

According to a report entitled *Measuring Poverty* published by Statistics SA early in 2000, the particular selection of study sites for the study also allows for comparing the household impact of HIV/AIDS between communities that differ substantially in terms of general standards of living. The Welkom magisterial district is the third richest in the Free State, with a headcount poverty ratio of 0.34 and an average monthly household expenditure of R2,364. The magisterial district of Witsieshoek, which is within the boundaries of the former Qwaqwa, is the poorest in the Free State and also ranks among the poorest in South Africa. The headcount poverty ratio in this district is 0.69, while average monthly household expenditure amounts to R807 (Statistics South Africa, 2000).

HIV/AIDS is particularly rife in these two localities. According to the Free State Department of Health (2005) - as in the case of the provincial HIV prevalence estimates - HIV prevalence in these two districts increased in the late 1990s, but appears to have levelled off in more recent years (see Figure 1).

**Figure 1: HIV prevalence amongst antenatal clinic attendees, Free State province (1996-2003)**



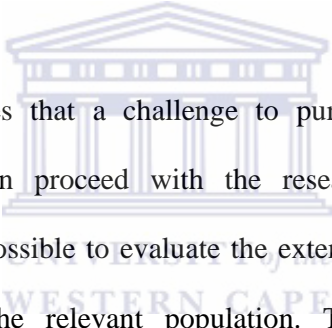
Source: National Department of Health (2004: 3).

### 3.4 Sampling method

The participation of households in the original research project was voluntary and based on confidentiality and verbal informed consent. An inherent difficulty in the original study was the development of a sampling frame, as there is no list of “affected” households in the country. Therefore, through existing relationships, networks with civil society organisations and knowledge obtained from key informants such as health care workers, households affected by HIV /AIDS were sampled purposively to participate in the study.

Non-affected households for the original study were recruited as follows: for each affected household that a fieldworker visited and successfully interviewed, the fieldworker also interviewed a household living in close proximity to the affected household, e.g. a neighbouring household. In order to ensure that this household, following agreement to participate in the study, at

the time was not directly affected by HIV/AIDS, the fieldworker asked the respondent a few key questions, i.e. whether someone in the household was being treated for TB or whether someone has been hospitalised for pneumonia in the past six months. If the respondent answered any of the two questions in the affirmative (that is with a 'yes'), the fieldworker moved to the next household until they found a household that was willing to participate in the study and for which none of the key questions were answered in the affirmative. Thus, several households were visited before successfully identifying a non-affected household for each affected household interviewed as part of the study.



Huysamen (1994) argues that a challenge to purposive sampling is that different researchers can proceed with the research in different ways; therefore, it may be impossible to evaluate the extent to which such samples are representative of the relevant population. The sample of affected households here did not include affected households that mainly utilise private health care services, as they were identified from organisations and/or networks operating in poorer communities. As such, the study is limited to the experiences of poor, predominantly African households that make use of public health care services.

For the purposes of analysis, households were reclassified retrospectively based on the original purposive sampling design and data collected on morbidity and mortality during the survey. *Affected* households at baseline included at least one person known to be HIV-positive or known to have died

from AIDS in the past six months or at baseline, or subsequently included someone who suffered from illnesses related to and/or who died for reasons related to HIV, STIs, tuberculosis, pneumonia, bronchitis and meningitis. *Non-affected* households at baseline resided in close proximity to affected households and did not at baseline or subsequently include someone who suffered from illnesses related to and/or who died for reasons related to HIV, STIs, tuberculosis, pneumonia, bronchitis and meningitis.

### **3.5 Data collection**

In the original study, the same households were interviewed more than once as a category of households who share similar life experiences over a specified period of time (Babbie and Mouton, 2001). This type of longitudinal study is powerful, given that it allows for the observation of changes in the same households over time, which is exceptionally relevant for research on HIV/AIDS because the epidemic has a prolonged impact consisting of illness, death and longer-term effects (Booyesen and Arntz, 2003).

In the original study, interviews were conducted with one key respondent only, namely the person responsible for the daily organisation of the household, including the finances of the household. Interviews were conducted over six rounds of data collection completed respectively in May/June and November/December of 2001; July/August and November/December 2002; August/September 2003; and May/June 2004. The definition used for households is similar to the definition employed by Statistics South Africa in the October Household Survey (OHS), i.e. a

household is a person or a group of persons who live together at least four nights a week at the same address, eat together and share resources.

In the original study, a structured questionnaire for face-to-face interviewing was used as instrument for the collection of primary data. Advantages of this method of data collection relate to high response rates and reduced incomplete responses by permitting for clarification of questions (Babbie and Mouton, 2001). Prior to data collection, a period of training regarding questioning techniques and accurate documentation of information was conducted for all fieldworkers. Moreover, by the time the fieldwork commenced, fieldworkers had received basic HIV/AIDS training provided to AIDS counsellors and volunteer workers by AIDS Training, Information and Counselling Centre (ATICC).

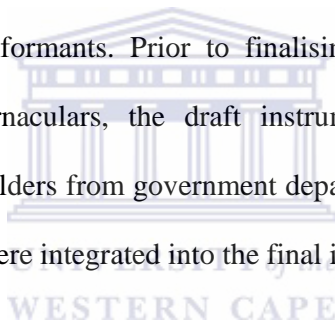
Methods used to identify appropriate secondary data for addressing the research objectives of the present study included: conducting extensive literature searches for familiarisation and knowledge acquisition purposes; stating clearly the research objectives of the present study; identifying the questions that address the objectives as they appear in the original research instrument; and understanding the existing dataset to identify relevant variables for the study.

### **3.6 Validity and reliability of the study**

Internal validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under study (Babbie and Mouton,

2001). Allowing for the study design and overall methodology, all questions used for the purposes of this study were considered to be a valid measure of the variables analysed. The phrasing of questions used and the number of questions available from the original questionnaire were considered satisfactory.

The instrument used in the original study was piloted to test for internal validity. As a means of ensuring external validity, the design of the instrument was informed by a literature review of the methodology of household impact studies, existing questionnaires employed in similar studies, and focus group discussions with key informants. Prior to finalising the questionnaire and translation to local vernaculars, the draft instrument was circulated for comment among stakeholders from government departments, civil society and academics. Comments were integrated into the final instrument.



Reliability is more concerned with the consistency of the results (Babbie, 1998). In this regard, guiding the fieldwork teams during the data collection process of the original study was a priority. Data collection was supervised by a fieldwork manager and data editor at each site. A researcher paid regular visits to the area to undertake quality control and to assist the data editor with the editing of questionnaires. If informants were not at home at the time of the interview, or if questionnaires were returned with missing data, interviewers returned to the households up to five times.



### 3.7 Measurement and definitions of concepts

- **Affected households**

Households that at baseline included at least one person known to be HIV-positive or known to have died from AIDS in the past six months or at baseline or subsequently included someone who suffered from illnesses related to and/or who died for reasons related to HIV, STIs, tuberculosis, pneumonia, bronchitis and meningitis.

- **Non-affected households**

Households that at baseline resided in close proximity to affected households and did not at baseline or subsequently include someone who suffered from illnesses related to and/or who died for reasons related to HIV, STIs, tuberculosis, pneumonia, bronchitis and meningitis.

- **Household income**

The question asked in the questionnaire to measure employment income was “How much income does (NAME) receive every week or month after tax deductions? i.e. what is take-home income in the most recent period?” The question asked to measure non-employment income was “During the past six months did (NAME) get income from any of the following sources? Old-age pension from the state or government, pension from his/her specific work/retirement benefits, disability grant, care dependency grant, child support grant, private maintenance by father/former spouse, foster care grant, workers compensation, unemployment fund, maternity benefit, gratuities/other lump sums and other resources”. The question asked to measure remittances

received was “How much money (Rands\*times) has (NAME) given to this households during the past six months?” Household income was measured as the sum of employment income, non-employment income (including grants), and receipts of remittances for all household members.

- **Household expenditure**

The question asked in the research instrument to measure regular household expenditure was: “Please tell us, in Rands, what your household spends monthly on the following: food, education, health care, household maintenance, fuel heating; lighting; transport; clothing; rent; personal items and personal care and durables”. The question asked in the questionnaire to measure ‘irregular household expenditures’ was: “Apart from the regular expenses previously mentioned, have you bought any items (e.g. once-off school fees, furniture, appliances, durable household goods, motor vehicles, etc.) and paid once-off for them during the past six months?”. Household expenditure was measured as the sum of regular household expenses, irregular household expenses and remittances made to persons not living with the household.

Over- or under-measurement of expenditures is a possibility. Normally, one would expect expenditure-based estimates of household welfare to exceed income-based estimates. Yet, Bachmann and Booysen (2004) report that the income-based estimates of household welfare in this survey exceeded expenditure-based estimates. This may be because the interviewee, i.e. the person in charge of household finances, had a better idea of the employment

status and average earnings of other members of the household than of their individual expenditures. Thus, these expenditure estimates probably reflect mainly expenditure on communal household needs. As such, income here probably represents a better measure of household welfare than expenditure.

- **Monthly health care expenditure**

One of the questions on health care expenditure from the questionnaire was:

“What was (NAME’S) total medical cost for the following in the past month?”

Medical costs included consultation fees, medicine costs, hospitalisation, therapeutic treatment and orthopaedic appliances. Health care expenditure was measured as the sum of the expenditure on consultation fees, medicine or drugs, hospitalisation, therapeutic treatment and orthopaedic appliances incurred for all illnesses recorded in the household in the month preceding the gathering of data. Monthly health care expenditure was also one of the expenditure items in regular household expenses (refer above). When comparing the former measure of health expenditure with the latter measure of health expenditure, under-estimation is evident as health care expenditure needed a more detailed reporting of specific expenditures on a monthly basis. Additionally, health expenditures need not be regular expenditures, but rather irregular and, therefore, not itemised. Thus, the first health care expenditure measure represents a better estimate of such expenses.

All income and expenditure estimates were converted into real values using recent CPI estimates (2000=100) for the Free State published by Statistics South Africa (2004).

Non-subsistence expenditures are household expenditures not including food expenditures. Capacity to pay is defined as the households non-subsistence spending. Capacity to pay refers to the effective income remaining after basic subsistence needs have been met. Subsistence expenditure was adjusted for the size of the household according to the following household equivalence scale:

$$eqsize_h = hhsiz_eh^{0.56}.$$

- **Catastrophic health care expenditure**

For the purposes of this study, four measures of catastrophic health care expenditure are used as alternative but complementary measures, using the various measures of household welfare and health care payments described below (Table 1). This is done in order to assess the sensitivity of the results to different choices on how catastrophe was measured.

**Table 1: Measures of catastrophe**

Measures of household welfare	Measures of monthly health care expenditures	
	Health care expenditure measured in detail per recorded illness	Health care expenditure measured as a component of regular household expenditure
Expenditure	Catastrophe 1	Catastrophe 2
Income	Catastrophe 3	Catastrophe 4

Catastrophe 3 was considered more reliable than the other three estimates of catastrophic health care expenditure. The reason is that catastrophe 3 used the more reliable measures of household welfare and health care expenditures, i.e. real health care expenditure and income (refer to discussion above). The other

measures of catastrophe underestimated household welfare and/or health care expenditures.

- **Impoverishment**

Based on the alternative measures of household welfare and health care expenditures, four measures of the poverty impacts of health care payments were used. A household was regarded as impoverished when household welfare is equal to or above its subsistence level but below subsistence when subtracting monthly health care expenditure from the estimates of household welfare. The poverty line was defined as the average food expenditure of households whose food expenditure share is in the 45<sup>th</sup> to 55<sup>th</sup> percentile range of the study population.

**Table 2: Measures of impoverishing health care payments**

Measures of household welfare	Measures of monthly health care expenditures	
	Health care expenditure measured in detail per recorded illness	Health care expenditure measured as a component of regular household expenditure
<b>Expenditure</b>	Impoverished 1	Impoverished 2
<b>Income</b>	Impoverished 3	Impoverished 4

The third measure of impoverishing health care payments (impoverished 3) was considered a more reliable measure compared to the other three estimates. The reason is that impoverished 3 used the more reliable measures of household welfare and health care expenditures. The other measures of impoverishment either under-estimated (impoverished 2/4) or over-estimated (impoverished 1/2) the extent of impoverishing health care expenditures.

- **Household responses to health care payments**

The response question used was “What did the household do to cope with these multiple medical expenses?” Responses were coded and represented as a proportion of the sum of all responses used by households. These included using their own income, existing savings, medical aid, inheritance money, borrowing money, and receiving help from family, friends and other acquaintances.

### **3.8 Data analysis**

For the purposes of this study, secondary data analysis will be employed, as it is cheaper and faster than doing original surveys. Secondary analysis refers to the analysis of data collected earlier by another researcher for some purpose other than the topic of the current study (Babbie 1998). “Secondary analysis normally begins where the primary analysis of the data has been completed” (Neumann, 2000: 305), and the re-analysis of the existing dataset is done by another researcher with a purpose different from that of the primary analysis.

The software package STATA version 8 was used to analyse data. In total, 2326 households were interviewed over the course of the original study, including 1339 affected and 987 non-affected households (Table 3).

**Table 3: Number of households observed in waves 1-6 (sample)**

Wave	Affected status	Non-affected status	Total
1	234	170	404
2	226	159	385
3	204	150	354
4	233	173	406
5	224	169	393
6	218	166	384
<b>Total (N)</b>	1339	987	2326

For this study, analyses were confined to a sub-sample of 744 households that included at least one ill person in any one wave of the research (Table 4). The use of a sub-sample is largely attributed to the definition of catastrophic health care expenditures that confined the studied phenomenon to households that included ill persons. The presence of selection and attrition bias meant that the analysis of trends over time was confined to 632 households (Booyesen *et al.* 2005).

**Table 4: Households with at least one ill person**

Wave	Non-affected status	Affected status	Total
1	2	7	9
2	2	20	22
3	13	33	46
4	3	11	14
5	1	20	21
6	118	514	632
<b>Total (N)</b>	139	605	744

Quantitative tools were employed to answer each of the specific research objectives. The T and Chi<sup>2</sup> tests were used to investigate differences in the extent of catastrophic health care expenditures in HIV/AIDS-affected and non-affected households. Bar charts with standard errors were employed to assess trends over time in catastrophic health care expenditures. Similar bivariate

techniques were employed to explore the differences between HIV/AIDS-affected and non-affected households in respect of impoverishing health care payments.

Multivariate analysis in the form of logistic regression analysis was conducted to investigate the determinants of catastrophic health care expenditure, using the various measures of such expenses. Similar, multivariate techniques were employed to investigate the determinants of impoverishing health care payments. These determinants, the choice of which was informed by the literature review, included:

- wave,
- place of residence (urban=1, rural=0),
- household size,
- dependency ratio<sup>2</sup>,
- gender (male=1, female=2),
- age of the head of the household,
- employment status of head of household (employed=1, unemployed=0),
- pensioner head of household (yes=1, no=0),
- marital status of head of household (married=1, unmarried=0)
- affected status of households (yes=1, no=0),
- number of persons in household with HIV/AIDS-related illnesses,
- number of persons in household with other illnesses,

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<sup>2</sup> The dependency ratio was calculated as the number of household members less than 15 years and those over 65 years divided by those between 15 and 64 years of age.



- access to medical aid (0= no ill persons in the household had access to medical aid, 1= some ill persons in the household and some not had access to medical aid ; 2= all ill persons in the household had access to medical aid)<sup>3</sup>.
- use of public health care services (0= no ill persons in the household used public health care services, 1= some ill persons in the household used public health care services , 2= all ill persons in the household used public health care services)<sup>4</sup>,
- household had access to a disability grant (yes=1, no=0) and
- household had access to another social grant (yes=1, no=0).

A priori expectations regarding the relationships between the dependant and independent variables were as follows: rural households, households with larger household size, households with a larger number of dependants, female- and pensioner-headed households with unemployed and unmarried heads, and households headed by older persons are more likely to be faced by catastrophic and impoverishing health care expenditures. Households with a larger number of ill persons (HIV/AIDS related and other illnesses) are also more likely to be faced by catastrophic and impoverishing health care payments.

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<sup>3</sup> In instances sub-categories of these variables were dropped. Here, categories 1 and 2 were combined to represent one category and this combined variable compared households where some ill persons had access to medical aid to ones where no ill persons had access to medical aid.

<sup>4</sup> In instances sub-categories of these variables were dropped. Here, categories 1 and 2 were combined to represent one category and this combined variable compared households where some ill persons used public health care service to ones where no ill persons used public health care services.

The last four determinants in the list of possible determinants were included because they could be linked to policy measures that could be considered important for addressing catastrophic and impoverishing health care expenditures (refer to Chapter 2). A priori expectations in terms of these variables were the following: catastrophic and impoverishing health care expenditures should be less likely in households where ill persons have access to medical aid, where all ill persons used public health care services, and in households that received a disability or other type of social grant.

Logistic regression models were estimated for pooled and panel data. Depending on the appropriate test statistic and overall fit of the model, the results of either pooled or random effects models were reported and discussed.

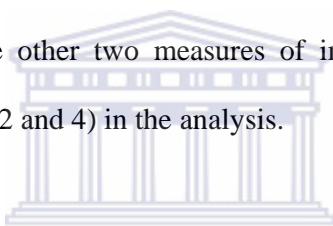
The basic function form of the model is as follows:

$$\gamma = \alpha + \sum \beta_i \chi_i + \varepsilon$$

$$\gamma = \ln(p/1-p)$$

where,  $\gamma$  is the dependent variable (a dummy variable for catastrophic health care expenditure or impoverishing health care payments), the constant  $\alpha$  is a vector of independent variables,  $\beta_i$  is the vector of the coefficients of these independent variables and  $p$  is the probability of the household facing catastrophic and or impoverishing health care payments. Marginal effects were estimated and presented graphically to further describe the effect of certain statistically significant continuous variables on the probability of a household facing catastrophic health care expenditure or incurring impoverishing health care payments.

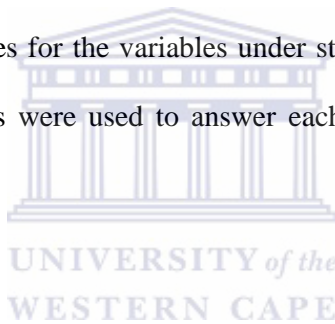
For investigating the determinants of catastrophic and impoverishing health care expenditures within poor and non-poor households, the full model was used in all cases for a common basis of comparison. Reason behind running these poor and non-poor models and comparing the results to those in the full model was to illustrate the dynamic relationship between poverty and/or social status and catastrophic and impoverishing health care expenditures. The functional form used in this instance was identical to that mentioned above. Impoverished 1 and impoverished 3 were the only measures used in the bivariate analysis and regression models since too many variables were dropped when using the other two measures of impoverishing health care payments (impoverished 2 and 4) in the analysis.



T-tests were used to assess the differences in responses to catastrophic health care expenditures in HIV/AIDS-affected and non-affected households. A similar technique was used to explore the differences between HIV/AIDS-affected and non-affected households in respect of responses to impoverishing health care payments. The discussion of the results was confined to only two measures of catastrophe and impoverished, i.e. catastrophe 1 and 3 and impoverished 1 and 3, reason being that when using the excluded measures, too few observations were included for making useful inferences.

### **3.9 Summary**

Secondary data analysis of a cohort study assessing the household impact of HIV/AIDS on two communities in the Free State was conducted. In the original study, face-to-face interviews by means of structured questionnaires with one key respondent were used for the purposes of data collection. Households that participated in the original study were sampled purposively. For the purposes of this study, the analyses of data were confined to a subsample of 744 households that included at least one ill person in any one wave of the study. Due to selection and attrition bias, the analysis of trends over time was confined to 632 households. All numerical data employed were considered valid measures for the variables under study. Bivariate techniques and multivariate analysis were used to answer each of the specific research objectives.



## CHAPTER 4: Results

### 4.1 Introduction

This chapter comprises the presentation and discussion of the bivariate and multivariate analysis used to address the objectives of the study. Results are presented in the same order as the objectives of the study. Firstly, the extent, trends in, determinants of and responses to catastrophic health care payments in HIV/AIDS-affected and non-affected households are discussed, followed by similar discussions on impoverishing health care expenditures.

### 4.2. Extent of catastrophic health care expenditure in HIV/AIDS-affected and non-affected households

Table 5 indicates the extent of catastrophic health care expenditures by affected status. Such expenditures on aggregate were higher in HIV/AIDS-affected households than in non-affected households. Yet, catastrophic expenditures only significantly differed in three of four instances by affected status (catastrophe 1, 3 and 4).

**Table 5: Catastrophic health care expenditures by affected status**

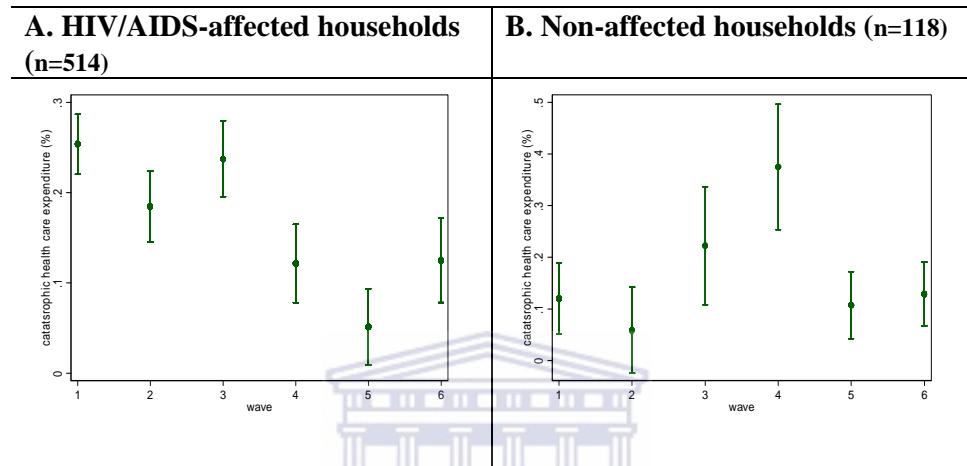
	Catastrophe 1	Catastrophe 2	Catastrophe 3	Catastrophe 4
<b>Non-affected</b>	0.14	0.01	0.07	0.01
<b>HIV/AIDS-affected</b>	0.19	0.02	0.12	0.04
<b>Sample size</b>	n=744***	n=744	n=744***	n=744**

Note: Results of chi squared tests. Differences in proportions with one asterisk (\*) is significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively

### 4.3. Trends in catastrophic health care expenditure in HIV/AIDS-affected and non-affected households.

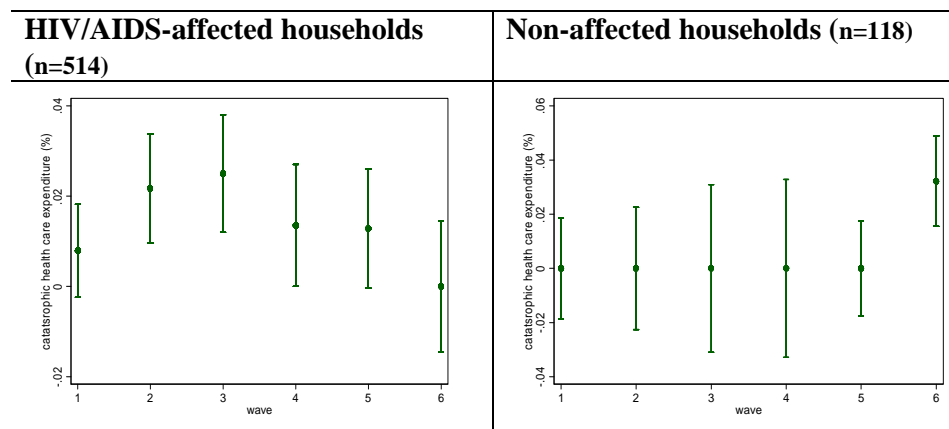
Trends in catastrophic health care expenditures are reflected in the next four figures.

**Figure 2: Trends in catastrophic health care expenditure (*Catastrophe 1*)**



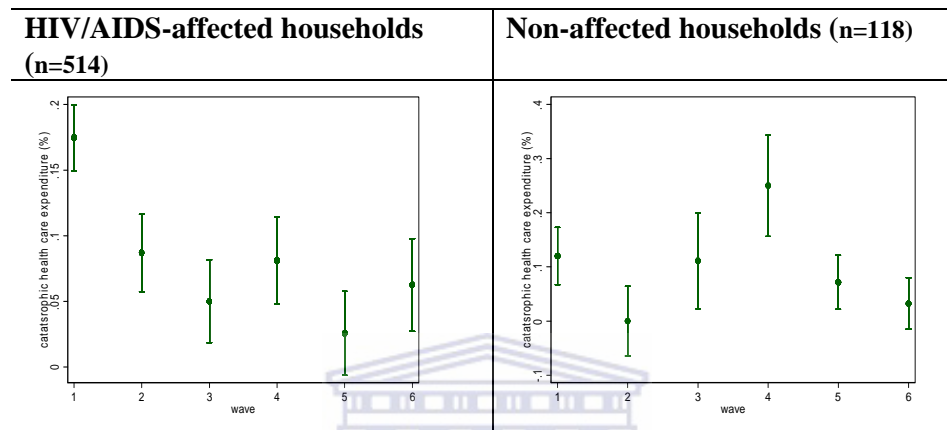
Based on *catastrophe 1*, the incidence of catastrophe in affected households decreased significantly over time although it increased slightly between waves 2 and 3, and again between waves 5 and 6. Trends in non-affected households were erratic. Catastrophic health care expenditure had increased significantly by wave 4, only to significantly decline again in wave 5.

**Figure 3: Trends in catastrophic health care expenditure (*Catastrophe 2*)**



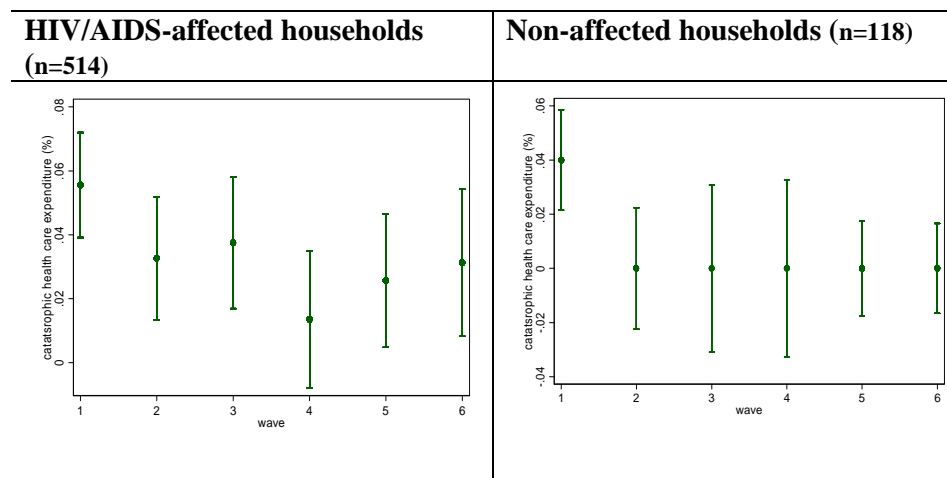
*Catastrophe 2* revealed no significant trend in catastrophic health care expenditure in HIV/AIDS-affected households. In non-affected households catastrophic health care expenditures remained relatively stable until the fifth wave and only increased significantly toward the sixth.

**Figure 4: Trends in catastrophic health care expenditure (*Catastrophe 3*)**



*Catastrophe 3* decreased significantly over time in HIV/AIDS-affected households subsequent to baseline. In non-affected households, as with catastrophe 1 (Figure 1), catastrophic health care expenditure had increased significantly by wave 4 only to decline significantly again by wave 5.

**Figure 5: Trends in catastrophic health care expenditure (*Catastrophe 4*)**

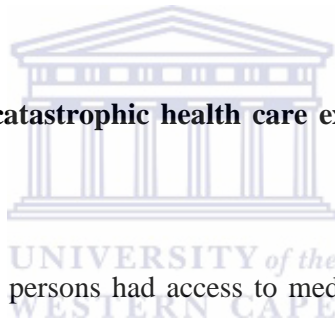


The incidence of *catastrophe 4* in non-affected households decreased significantly over time subsequent to baseline. In HIV/AIDS-affected households *catastrophe 4* was only in wave 4 significantly below baseline proportions.

#### **4.4. Determinants of catastrophic health care expenditure in HIV/AIDS affected households and non-affected households**

Determinants of catastrophic health care expenditures are discussed firstly, through a presentation and discussion of results stemming from the bivariate analysis, followed by results from the multivariate analysis.

##### **4.4.1 Determinants of catastrophic health care expenditure according to bivariate analysis**



In all cases where all ill persons had access to medical aid were households significantly more likely face catastrophic health care expenditures compared to households where no ill persons had access to medical aid. Additionally, households where all or some ill persons used private health care services were significantly more likely to have experienced catastrophic health care expenditures when compared to households where no ill persons used private health services.



**Table 6: Selected household characteristics, burdens of morbidity and access to social grants, by catastrophe**

	Sample size	Catastrophe 1		Catastrophe 2		Catastrophe 3		Catastrophe 4	
		No	Yes	No	Yes	No	Yes	No	Yes
Household size	n=744	5.20	4.72**	5.12	4.36	5.16	4.72***	5.13	4.58
Dependency ratio	n=733	0.70	0.71	0.70	0.68	0.71	0.61***	0.71	0.63
Age of head of household (years)	n=744	51.35	50.94	51.36	45.81	51.64	48.12**	51.44	46.77***
Number of persons in household with HIV/AIDS related illnesses	n=744	0.54	0.67**	0.56	0.55	0.56	0.62	0.56	0.69
Number of persons in household with other illnesses	n=744	0.64	0.61	0.63	0.91***	0.62	0.72	0.63	0.73
Access to a disability grant (yes=1, no=0)	n=744	21.6	16.7	20.6	27.3	21.1	17.1	20.6	23.1
Access to another social welfare grant (yes=1, no=0)	n=744	47.2	49.2	47.8	36.4	49.7	29.0***	48.3	26.9**

Note: Results of t-test. Differences in proportions with one asterisk (\*) are significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively.

**Table 7: Extent of catastrophic health care expenditure by selected household characteristics**

	Sample size	Catastrophe 1	Catastrophe 2	Catastrophe 3	Catastrophe 4
Place of residence:					
Urban	n=744	12.5	2.0	8.2	3.4
Rural		22.5***	1.0	12.0*	3.6
Gender of head of household:					
Male	n=744	18.5	1.8	8.8	3.3
Female		17.2	1.2	11.4	3.6
Employment status head of households in the labour force:					
Unemployed	n=381	21.3	2.9	13.2	5.2
Employed		16.3	0.8	10.6	2.5
Head of household is pensioner:					
No	n=744	18.3	1.8	12.1	4.4
Yes		16.2	0.5	4.7***	1.0**
Marital status of head of household:					
Married	n=744	17.7	1.2	9.9	3.2
Single		17.8	3.3	12.2	5.6
Affected status of household:					
No	n=744	13.7	0.7	7.2	0.7
Yes		18.7	1.7	10.9	4.3**
Medical aid coverage of ill persons:					
No coverage	n=742	16.7	1.0	9.0	2.6
Incomplete coverage		25.0	0.0	25.0	0.0
Full coverage		29.2*	8.3***	22.9***	16.7***
Utilisation of health care services by ill persons:					
Private health care services only	n=742	40.9	3.8	18.9	6.3
Private and public health care services		38.1	9.5	28.6	9.5
Public health care services only		10.1***	0.5***	6.8***	2.5**

Note: Results of chi-squared tests. Differences in proportions with one asterisk (\*) are significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively.

For two measures of catastrophic health care expenditures (catastrophe 1 and 3), place of residence was statistically significantly associated with such expenditures. Catastrophic health care spending was significantly higher in rural households than those in urban areas. Households faced by catastrophic health care expenditure were headed by younger persons compared to households not faced by catastrophe (catastrophe 3 and 4). Households headed by pensioners were significantly less likely to have experienced catastrophic health care spending (catastrophe 3 and 4).

Households that experienced catastrophic health care expenditure were significantly smaller households compared to households not faced by catastrophe (catastrophe 1 and 3). Households that had access to other social welfare grants were also significantly less likely to be faced with catastrophic health care expenditures (catastrophe 3 and 4). Households faced by catastrophe included significantly fewer dependants than households that did not experience catastrophe (catastrophe 3).

HIV/AIDS-affected households were significantly more likely to be faced with catastrophic health spending compared to non-affected households (catastrophe 4). Households that faced catastrophic health care expenditures on average included a significantly larger number of persons with HIV/AIDS-related illnesses and other illnesses compared to households that were not faced by catastrophe (catastrophe 1 and 3).

These variables, with the exception of place of residence, dependency ratio, affected status, gender of head of household, and access to other social welfare grants also were significant determinants of catastrophe when using multivariate analysis.

#### **4.4.2 Determinants of catastrophic health care expenditure according to multivariate analysis**

The discussion of the determinants of catastrophic health care expenditures first deals with the results of the full model before the discussion moves on to the results of the models for poor and non-poor households.

With the exception of model 2, three of the four models of catastrophic health care expenditure (Model 1, 3 and 4) performed adequately in terms of overall fit ( $p < 0.10$ ). The results of model 2 were, therefore, excluded from the subsequent discussion on factors significantly associated with catastrophe.



**Table 8: Determinants of catastrophic health care expenditure (multivariate analysis- full model)**

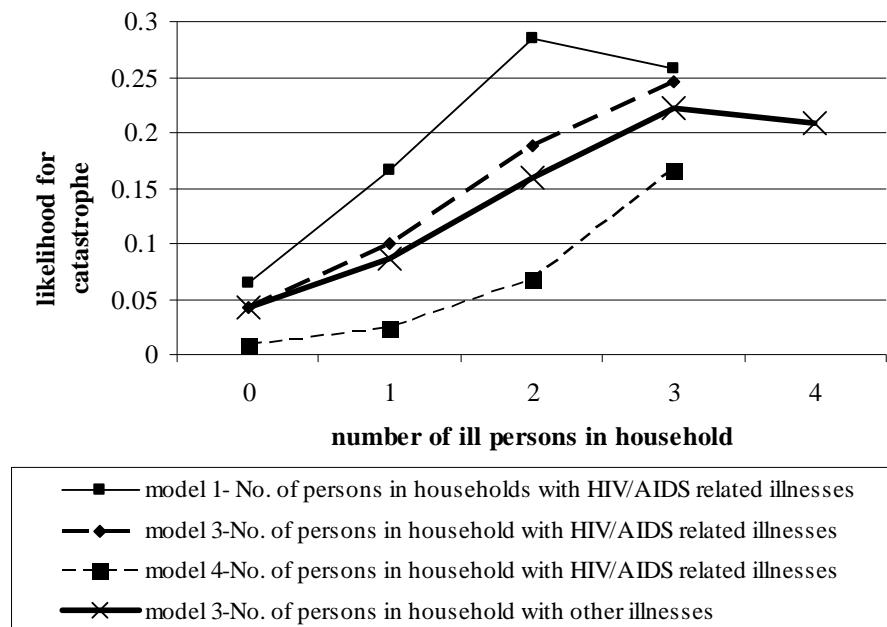
Variables	Model 1 Catastrophe 1	Model 2 Catastrophe 2	Model 3 Catastrophe 3	Model 4 Catastrophe 4
Wave	-0.19* **	0.16	-0.18	-0.51
Place of residence (urban=1, rural=0)	-0.46	1.59	-0.20	-0.15
Household size	-0.03	-0.35	-0.01	-0.05
Dependency ratio	-0.50	0.155	0.33	0.24
Gender of head of household (male=1, female=2)	0.19	-1.96	0.70***	-0.48
Age of head of household	0.00	0.07	0.03	0.12**
Employed head of household (yes=1, no=0)	-0.98**	-2.69**	-0.79***	-1.34***
Single head of household (yes=1, no=0)	-0.12		0.16	1.87***
Affected status	-0.02	1.18	0.44	1.61
Number of persons in household with HIV/AIDS related illnesses	1.19*	0.73	0.98**	1.14***
Number of persons in household with other illnesses	0.51	0.65	0.91**	0.55
No ill person(s) had access to medical aid				
Some ill person(s) had access to medical aid	1.58	0.99	0.03	1.87***
All ill person(s) had access to medical aid	0.36		0.62	
Some ill person(s) had access to medical aid				
No ill person(s) used public health care services				
Some ill person(s) in household used public health care Services	-2.79***	-2.44**	-0.96	0.46
All ill person(s) in household used public health care services only	-1.90*		-1.35*	
Household had access to a disability grant (yes=1, no=0)	0.49	0.64	0.71	-0.47***
Household had access to another social welfare grant (yes=1, no=0)	0.53	0.81	-0.60	-1.46
Constant	-0.46	-4.52	-3.72	-9.62
Sample size (n)	378	378	378	378
Pseudo R <sup>2</sup>		0.33	0.15	0.21
F statistic	27.42 (p < 0.05)	20.37 (p=0.12)	40.67 (p < 0.01)	23.78 (p < 0.10)
LR statistic of random effects logit	2.61 p < 0.10			

Note: Results of one panel (model 1) and three pooled logit models (models 2-4). Coefficient with one asterisk (\*) is significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively.

In three models, the employment status of the head of the household was statistically significantly and negatively associated with catastrophic health care expenditures (models 1, 3 and 4). Households with unemployed heads of households were significantly more likely to be faced with catastrophic health expenses compared to households with employed heads.

In three of the models (models 1, 3 and 4), the number of persons in the household with HIV/AIDS-related illnesses were statistically significant and positive, meaning that households with a larger number of persons with HIV/AIDS-related illnesses were significantly more likely to face catastrophic health care expenditure. Likewise, households with a larger number of persons with other illnesses were significantly more likely to be faced with catastrophic health expenditure (model 3).

**Figure 6: Effects of the number of ill persons in households on likelihood of catastrophe (model 1, 3 and 4)**



The results for catastrophe 1, 3 and 4 tell a similar story: the larger the number of persons in a household with HIV/AIDS-related illnesses, the greater the likelihood of catastrophe. However, in the case of catastrophe 1, if more than two persons have HIV/AIDS-related illnesses, then the likelihood for catastrophe declined. As the number of persons with other illnesses increase, the likelihood of catastrophe also increases. Interestingly, the likelihood of catastrophe for any given number of persons with HIV/AIDS-related illnesses exceeds that for other illnesses (model 3). However, these differences are not statistically significant ( $p > 0.10$ ).

Access to public health care services, as expected, saw the likelihood of catastrophe decline. In two of the models (models 1 and 3), households where all ill persons used public health services were significantly less likely to have experienced catastrophic health expenditures when compared with households where no ill persons used public services. Likewise, households where some ill persons in the household used public health care were less likely to be faced with catastrophic health expenditure compared with households where no ill persons used public health services (model 1 and 2).

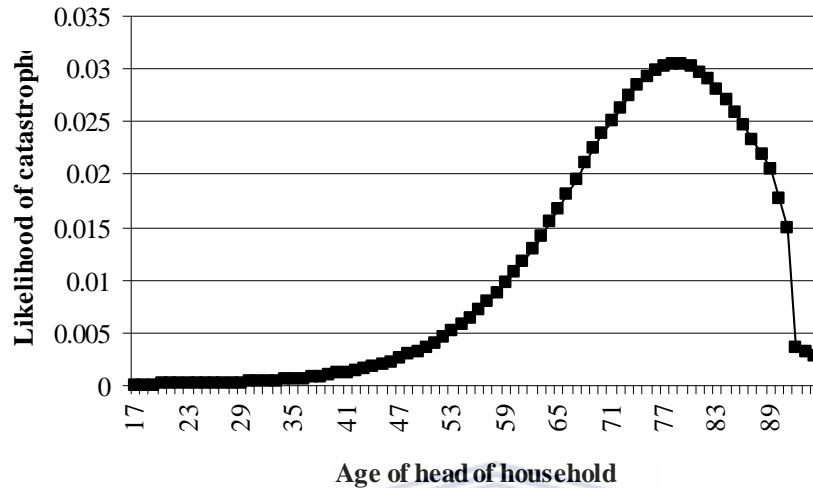
However, access to medical aid did not protect households from catastrophe. Households where some ill persons had access to medical aid were more likely to be faced with catastrophic health care expenditures (model 4) when compared to households where no ill persons had access to medical aid. This is because households that had medical aid mainly used private health services where health expenditures were much higher when compared to those households that used public health services.

In only one model were the following variable statistically significant determinants of catastrophic health care expenditure: as time progressed, households were significantly less likely to be faced by catastrophic health care expenditure (model 1). Female-headed households were significantly more likely to be faced with catastrophic health expenses compared with male-headed households (model 3). Households that had access to a disability grant were significantly less likely to be faced with catastrophic health expenditures (model 4).

Households headed by older people were more likely to be faced with catastrophic health expenses (model 4). The likelihood of catastrophe increased when the head of the household is within the productive age ranges (25-60 years), but then declined considerably once the age of the head of the household was in the pensioner ages (Figure 7). The likelihood for catastrophe started declining once the age of the head of the household reached 79 years. Many households headed by older persons are dependant on old age pensions. Households headed by single persons were more likely to be faced with catastrophic health expenditure (model 4).



**Figure 7: Effect of age of the head of household on likelihood of catastrophe (model 4)**



The following variables were not significant determinants of catastrophe: place of residence, household size, dependency ratio, affected status and access to other social welfare grants.

For both poor and non-poor households, only two of the four models of catastrophic health care expenditures (model 1 and 3) in terms of the F-test performed adequately in terms of overall fit ( $p < 0.10$ ). In models 2 and 4 respectively, the models including non-poor and poor households had not performed adequately in terms of overall fit ( $p < 0.10$ ). The results of model 2 (non-poor) and model 4 (poor) were, therefore, excluded from the discussion of results.

In all four models, poor and non-poor households where some ill persons used public health service were significantly less likely to have experienced catastrophic health expenditures (models 1, 3 and 4 for non-poor households and model 2 for poor

households). Where some ill persons in non-poor households used public health services, the likelihood of catastrophic health expenditure were lower compared with non-poor households where no ill persons used public health services (models 1, 3 and 4). Similarly, poor households where some ill persons used public health services were significantly less likely to face catastrophic health expenditures compared with poor households where no ill persons used public health care (model 2).



**Table 9: Determinants of catastrophic health care expenditures in poor and non-poor households**

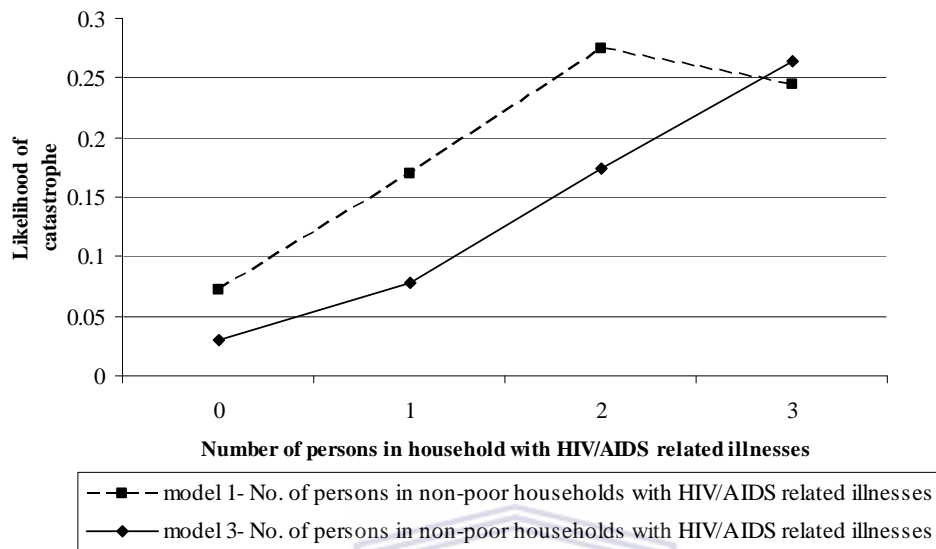
Variables	Catastrophe 1		Catastrophe 2		Catastrophe 3		Catastrophe 4	
	Non poor	Poor	Non poor	Poor	Non poor	Poor	Non poor	Poor
Wave	-0.03	-0.35**	0.11	0.33	0.06	-0.57**	-0.10	-0.16
Place of residence (urban=1, rural=0)	-0.15	-0.88	-0.19	2.47**	-0.22	-0.02	-1.31	0.85
Household size	0.06	0.01	-0.20	-0.37	-0.03	0.01	-0.19	-0.17
Dependency ratio	-0.20	-0.64	0.24	0.18	0.41	-1.02	-0.22	0.03
Gender of head of household (male=1, female=2)	0.39	-0.21	-0.50		0.62	0.42	0.31	-0.35
Age of head of household	-0.03	0.01	-0.01	-0.04	0.02	0.04	0.05	-0.04***
Employed head of household (yes=1, no=0)	-1.27**	-0.06	-1.53		-0.05	-0.99		
Single head of household (yes=1, no=0)	0.46	-0.56			1.15	-0.17	1.11	-0.15
Affected status	-0.55	0.67	-0.63		-0.16	1.77		
Number of persons in household with HIV/AIDS related illnesses	1.13**	0.58	0.25	1.30	1.08***	1.00	0.48	1.47**
Number of persons in household with other illnesses	0.17	0.46	-0.04	1.31***	0.63	1.04***	0.64	0.81
No ill person(s) had access to medical aid								
Some ill person(s) had access to medical aid	1.65		3.22***		0.74		2.30**	
All ill person(s) had access to medical aid	0.25							
No ill person(s) used public health care services								
Some ill person(s) used public health care services	-1.78	-1.37**		-2.89**	-2.01*	1.03	-1.80***	-1.88
All ill person(s) used public health care services	-2.01*					-0.56		-1.68**
Household had access to a disability grant (yes=1, no=0)	-0.48	1.22	1.59	0.83	0.60	1.20	2.37**	-0.67
Household had access to other social welfare grant (yes=1, no=0)	0.27	0.83	1.92		-0.67	0.08	0.19	
Constant	0.79	-0.47	-3.93	-1.56	-4.41	-4.470	-6.76	0.47
Sample size (n)	214	164	214	301	214	164	430	301
Pseudo R <sup>2</sup>	0.18	0.19	0.25	0.25	0.18	0.28	0.25	0.13
F statistic	35.35	30.24	7.93	16.79	23.42	36.88	22.06	18.42
	(p< 0.05)	(p< 0.05)	(p=0.25)	(p< 0.10)	(p<0.10)	(p<0.05)	(p<0.10)	(p=0.10)

Note: Results of pooled logit models. Coefficient with one asterisk (\*) is significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively

Access to medical aid, however, did not protect households from catastrophe. Non-poor households where some ill persons had access to medical aid were more likely to be faced with catastrophic health expenditures (model 4) when compared to non-poor households where no ill persons had access to medical aid. As previously mentioned, this is because households that had medical aid mainly used private health services where health care expenditures were much higher when compared to households that used public health care services.

In two models, as time progressed, poor households were significantly less likely to be faced with catastrophic health expenditures (models 1 and 3). In two models (models 1 and 3), the number of persons in non-poor households with HIV/AIDS-related illnesses were statistically significant and positive. Here, non-poor households, including a larger number of persons with HIV/AIDS-related illnesses, were more likely to be faced with catastrophic expenses compared with non-poor households that included fewer persons with HIV/AIDS related illnesses (Figure 8). However, in the case of catastrophe 1, the likelihood of catastrophe declined if more than two persons had HIV/AIDS-related illnesses.

**Figure 8: Effect of the number of persons in non-poor households with HIV/AIDS- related illnesses on likelihood of catastrophe (model 1 and 3)**



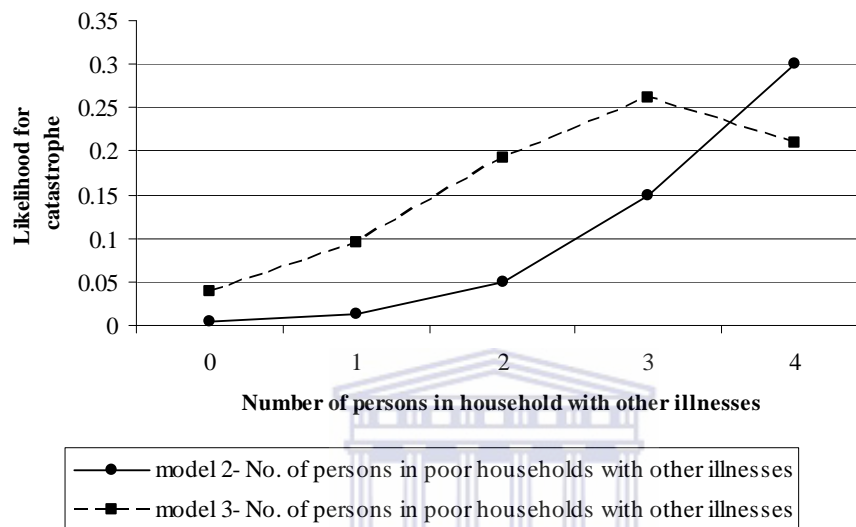
The results tell a similar story for morbidity attributed to other causes: as the number of persons in poor households with other illnesses increase, the likelihood of catastrophe increases (Figure 9).

Poor households with a larger number of persons with other illnesses were significantly more likely to be faced with catastrophic health expenditure compared with poor households with a smaller number of persons with other illnesses. Interestingly, the likelihood of catastrophe 3 for any given number of persons with HIV/AIDS-related illnesses exceeded that for other illnesses. However, these differences on average were not statistically significant ( $p > 0.10$ ).

The above mentioned results are in agreement with a priori expectations. Illness - irrespective of the type - has a devastating affect on the budgets of households, and

the greater the number of ill persons in a household, the greater the burden on the household.

**Figure 9: Effect of number of persons in poor household with other illnesses on likelihood of catastrophe (model 2 and 3)**



In only one model were the following variables statistically significant determinants of catastrophic health expenditures: poor households from rural areas were significantly less likely to be faced with catastrophic health expenses compared to poor urban households (model 2). Non-poor households with employed heads of households were significantly less likely to be faced with catastrophic expenditure compared to non-poor households with unemployed heads of household (model 1). Non-poor households that had access to a disability grant were significantly more likely to be faced with catastrophic health expenditure (model 4).

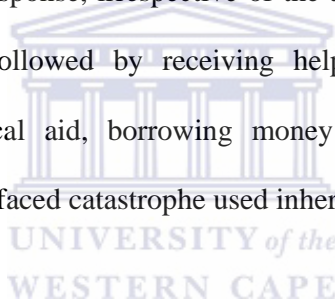
The following variables were not significantly associated with catastrophe in poor and non-poor households in any of the four models: household size, dependency ratio,

gender, age and marital status of the head of household, affected status and access to other social welfare grants.

#### **4.5. Responses to catastrophic health care expenditures**

Table 10 shows the responses used by HIV/AIDS-affected and non-affected households faced by catastrophic health care expenditures to deal with such expenses. Results are only reported for catastrophes 1 and 3 as too small a number of households experienced catastrophes 2 and 4 to allow meaningful analysis.

The most frequently used response, irrespective of the affected status of households, was using own income, followed by receiving help from family, friends and acquaintances, using medical aid, borrowing money and, lastly, using existing savings. No households that faced catastrophe used inheritance money as a response.



Compared to HIV/AIDS-affected households, non-affected households did not use existing savings or borrowed money as responses to catastrophic health expenditures.

**Table 10: Responses to catastrophic health care expenditures, by affected status**

Response	Catastrophe 1			Catastrophe 3		
	HIV/AIDS-affected households	Non-affected households	Total	HIV/AIDS-affected households	Non-affected households	Total
Used own income	61.6	61.1	61.5	52.3	44.4	51.4
Used existing savings	2.6	0.0	2.3	3.0	0.0	2.7
Used medical aid	8.0	27.7 ***	10.8	10.8	44.4 ***	14.9
Borrowed money	3.5	0.0	3.1	4.6	0.0	4.1
Used inheritance money	0.0	0.0	0.0	0.0	0.0	0.0
Received help from family, friends and other acquaintances	21.4	11.1	20.0	26.1	11.1	24.3

Note: Results of t tests. Differences in proportions with one asterisk (\*) is significant at the 1% level, while two and three asterisks are significant at the 5% and 10% levels respectively.

All households used their income as a first response. As a second response, HIV/AIDS-affected households made use of social networks, while non-affected households used medical aid. When comparing HIV/AIDS-affected with non-affected households, more HIV/AIDS-affected households received help from family, friends and acquaintances, borrowed money and used existing savings as responses to catastrophic health expenditures. None of these differences were statistically significant. On the other hand, significantly more non-affected households than HIV/AIDS-affected households used medical aid as response to catastrophic health expenses.

#### **4.6. Extent of impoverishing health care payments in HIV/AIDS-affected and non-affected households**

Table 11 indicates the extent of impoverishing health care payments by affected status. Except for impoverished 2, impoverishment resulting from health expenses was more likely in HIV/AIDS-affected households than in non-affected households.



**Table 11: Impoverishing health care payments by affected status**

	<b>Impoverished 1</b>	<b>Impoverished 2</b>	<b>Impoverished 3</b>	<b>Impoverished 4</b>
<b>Non –affected</b>	5.8	1.2	3.1	0.0
<b>HIV/AIDS-affected</b>	11.5	0.6	4.9	1.0
<b>Sample size</b>	n= 600**	n= 600	n= 654	n= 600

Note: Results of chi-squared tests. Differences in proportions with one asterisk (\*) are significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively

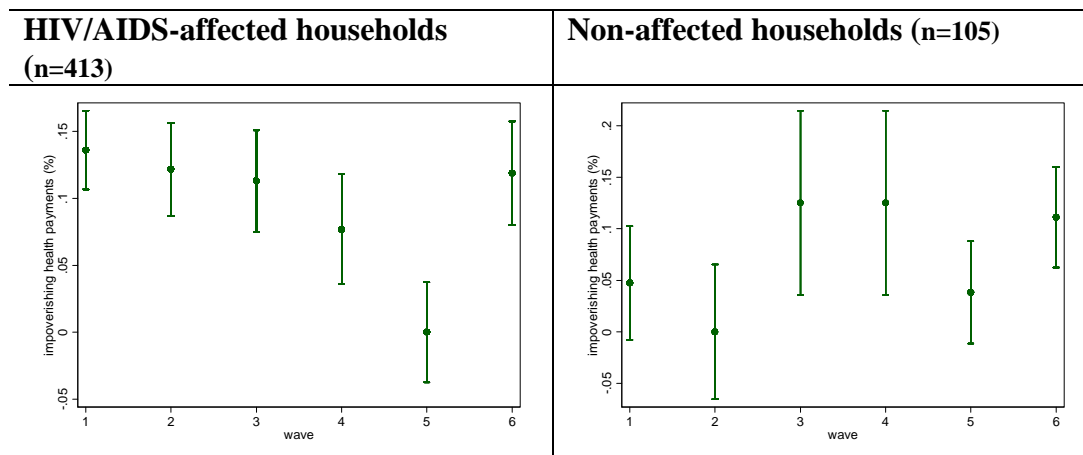
Yet, HIV/AIDS-affected households were only significantly more likely to have become impoverished by health care payments for one of the four measures of the impoverishing impact of such payments (impoverished 1).

#### 4.7. Trends in impoverishing health care payments in HIV/AIDS-affected and non-affected households.

Trends in impoverishing health care payments are reflected in the next four figures.



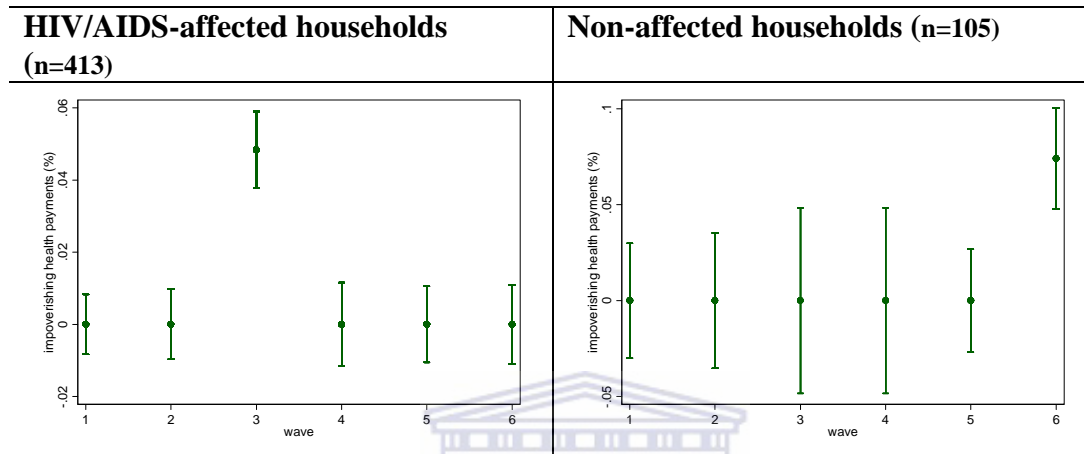
**Figure 10: Trends in impoverishing health care payments (*impoverished 1*)**



Based on *impoverished 1*, impoverishing health payments in HIV/AIDS-affected households declined significantly over time. In the sixth wave however, the incidence of

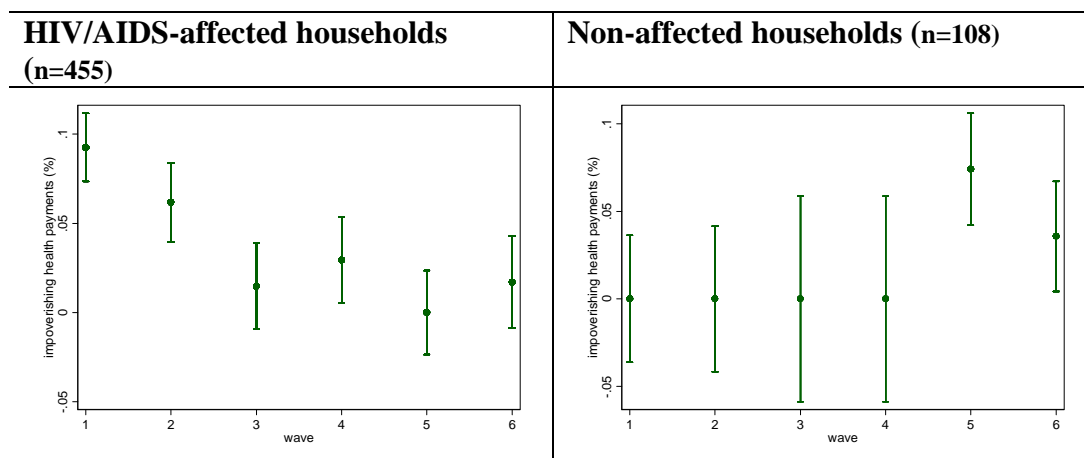
impoverishing health expenditure again increased significantly. In non-affected households, the incidence of impoverishing health payments shows no clear-cut trend over time.

**Figure 11: Trends in impoverishing health care payments (*impoverished 2*)**



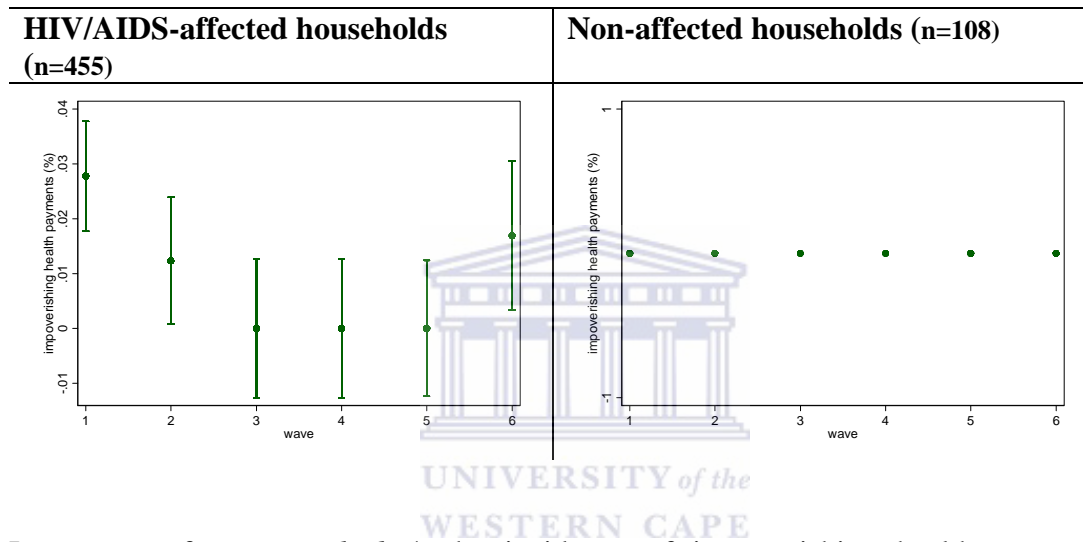
In the case of *impoverished 2*, the incidence of impoverishing health payments in HIV/AIDS-affected households was zero. Only in wave 3 did some HIV/AIDS-affected households experience impoverishing health care expenditures. In non-affected households, impoverishment was also zero and only increased above zero in the sixth wave.

**Figure 12: Trends in impoverishing health care payments (*impoverished 3*)**



Based on *impooverished 3*, impoverishing health payments in HIV/AIDS-affected households declined significantly over time. The incidence of impoverishing health care expenditure in non-affected households in wave 5 was significantly higher compared to baseline, but declined marginally in wave 6. In the first four waves, not one non-affected household was impoverished by health care payments.

**Figure 13: Trends in impoverishing health care payments (*impooverished 4*)**



In respect of *impooverished 4*, the incidence of impoverishing health payments in HIV/AIDS-affected households declined significantly over time. Impoverishing health expenditures declined to zero by wave 3, remained zero in waves 4 and 5, and then increased marginally in wave 6. None of the non-affected households experienced impoverishing health care payments throughout the study.

#### 4.8. Determinants of impoverishing health care payments

When discussing the determinants of impoverishing health payments, results from the bivariate analysis are discussed firstly, followed by the multivariate analysis.

#### 4.8.1. Determinants of impoverishing health care payments according to the bivariate analysis

Evidence from the bivariate analysis show that the following variables were statistically significantly associated with both measures of impoverishing health expenditures (impoverished 1 and 3). Impoverishing health care payments were significantly less likely in households with employed heads.

Households where all ill persons used public health services were significantly less likely to have faced impoverishment compared with households where some or all ill persons used private health care services.

**Table 12: Selected household characteristics, burdens of morbidity and access to social grants, by impoverishment**

	Sample size	Impoverished 1		Impoverished 3	
		No	Yes	No	Yes
Household size	n=600	4.81	5.22	4.40	5.23***
Dependency ratio	n=598	0.75	0.70	0.47	0.71**
Age of head of household (years)	n=600	51.26	52.41	49.23	52.26
Number of persons in household with HIV/AIDS related illnesses	n=600	0.69	0.53**	0.77	0.64
Number of persons in household with other illnesses	n=600	0.58	0.67	0.40	0.14
Access to a disability grant (yes=1, no=0)	n=600	7.69	11.16	4.64	4.57
Access to another social welfare grant (yes=1, no=0)	n=600	9.77	10.92	2.71	6.52**

Note: Results of t test. Differences in proportions with one asterisk (\*) are significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively.

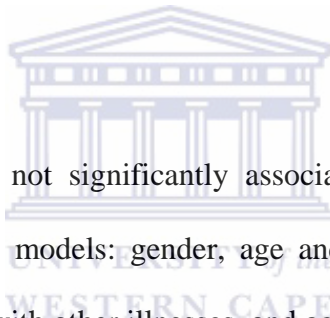
**Table 13: Extent of impoverishing health care expenditure by selected household characteristics**

Variable	Sample size	Impoverished 1	Sample size	Impoverished 3
Place of residence:				
Urban	n=600	5.8	n=654	2.2
Rural		14.6		6.9***
Gender of head of household:				
Male	n=600	9.6	n=654	3.9
Female		11.0		5.2
Employment status head of households in the labour force:				
Unemployed	n=381	18.5	n=328	11.8
Employed		10.6*		3.0***
Head of household is pensioner:				
No	n=600	10.5	n=654	5.6
Yes		9.8		2.2*
Marital status of head of household:				
Married	n=600	10.5	n=654	4.6
Single		8.8		4.2
Affected status of household:				
No	n=600	5.8	n=654	3.1
Yes		11.5*		5.0
Medical aid coverage of ill persons:				
No coverage	n=598	9.7	n=652	4.0
Incomplete coverage		0.0		0.0
Full coverage		18.8		12.8**
Utilisation of health care services by ill persons:				
Private health care services only	n=598	24.1	n=652	7.2
Private and public health care services		21.1		16.7
Public health care services only		5.3***		3.3***

Note: Results of chi squared test. Differences in proportions with one asterisk (\*) are significant at the 1% level, while coefficients with two and three asterisks are significant at the 5% and 10% levels respectively.

The following variables were statistically significantly associated with one measure of impoverishing health payments only: the dependency ratio was significantly associated with impoverishing health care expenditures (impoverished 3). Households impoverished by health expenses included significantly more dependants compared to households not impoverished by such expenditures. Impoverished households on average were significantly larger than non-impoverished households (impoverished 3). Rural households were significantly more likely to be faced by impoverishing health care payments compared to those in urban areas. HIV/AIDS-affected households (impoverished 1) and households with access to other social welfare grants

(impoverished 3) were significantly more likely to have been impoverished by health care payments. However, households faced by impoverishment included significantly fewer persons with HIV/AIDS-related illnesses compared to households not impoverished by health expenditures (impoverished 1). Households headed by pensioners were significantly less likely to have faced impoverishment compared to households not headed by pensioners (impoverished 3). Additionally, impoverishing health payments were also positively and significantly associated with access to medical aid. Households where no ill persons had access to medical aid were significantly less likely to have been impoverished by health care payments compared with households where all ill persons had access to medical aid.



The following variables were not significantly associated with impoverishing health expenditure in any of the two models: gender, age and marital status of the head of household, number of persons with other illnesses, and access to a disability grant.

#### **4.8.2. Determinants of impoverishing health care payments according to multivariate analysis**

Significant determinants of impoverishing health payments are first discussed for all households followed by a discussion of factors associated with impoverishment in poor and non-poor households. Both models (5 and 6), which used impoverished 1 and impoverished 3 as dependant variables respectively, were statistically significant in terms of overall fit ( $p < 0.10$ ).

**Table 14: Determinants of impoverishing health payments (multivariate analysis-  
full model)**

Variable	Model 5 Impoverished 1	Model 6 Impoverished 3
Wave	-0.04	-0.31***
Place of residence (urban=1, rural=0)	-0.64	-0.80
Household size	-0.04	-0.08
Dependency ratio	-0.10	-0.72
Gender of head of household (male=1, female=2)	0.42	1.06***
Age of head of household	-0.01	0.03
Employed head of household (yes=1, no=0)	-0.74***	-1.78***
Single head of household (yes=1, no=0)	0.15	0.05
Affected status	-0.30	0.04
Number of persons in household with HIV/AIDS related illnesses	0.66	0.59
Number of persons in household with other illnesses	0.24	0.94
No ill person(s) had access to medical aid		
Some or all ill persons had access to medical aid	0.34	1.30
Some ill persons had access to medical aid		
No ill persons used public health care services		
Some ill persons used public health care services		0.06
All ill persons used public health care services	-1.48*	-0.50
Household had access to a disability grant (yes=1, no=0)	0.84	1.61**
Household had access to other social welfare grant (yes=1, no=0)	0.22	0.08
Constant	-0.72	-4.12
Sample size (n)	285	325
Pseudo R <sup>2</sup>	0.13	0.26
F Statistic	27.52**	36.02*

Note: Results of pooled logit model at coefficient with one asterisk (\*) is significant at the 10% level, while coefficients with two and three asterisks are significant at the 5% and 1% levels respectively.

In both models, employment status of the head of the household was statistically significantly and negatively associated with impoverishing health payments (model 5 and 6). Households with employed heads of households were significantly less likely to be faced with impoverishing health expenditure compared to households with unemployed heads.

The following variables were statistically significant in one model only: as time progressed, households were significantly less likely to be faced by impoverishing health care payments (model 6).

Female-headed households and households with access to a disability grant were significantly more likely to be faced with impoverishing health payments (model 6). Households where all ill persons in the household had accessed public health services were significantly less likely to be faced with impoverishing health care payments compared with households where no ill persons used public health services (model 5).

The following variables were not significant determinants of impoverishment: place of residence, household size, dependency ratio, age and marital status of the head of household, affected status, number of persons in the household with HIV/AIDS-related and other illnesses, access to medical aid, and access to other social welfare grants.

For non-poor households, both models of impoverishing health payments performed adequately in terms of overall fit ( $p < 0.10$ ). However, in the case of model 5, the model for poor households did not perform adequately in terms of overall fit ( $p > 0.10$ ). Consequently, the results of this particular model are not discussed.



**Table 15: Determinants of impoverishing health payments in poor and non-poor households**

Variables	Impoverished 1		Impoverished 3	
	Non-poor	Poor	Non- poor	Poor
Wave	0.13	-0.53***	38.63	-1.31**
Place of residence (urban=1, rural=0)	-0.49	-3.1***	-173.43	-3.29***
Household size	0.01	0.15	--492.02	0.04
Dependency ratio	0.50	-1.89***	1069.91	-2.03
Gender of head of household (male=1, female=2)	0.08	1.12	-758.14	2.81**
Age of head of household	-0.01	-0.07	57.57	0.05
Employed head of household (yes=1, no=0)	-1.16***	0.07	-469.91	-2.42***
Single head of household (yes=1, no=0)	1.25	-1.89		1.25
Affected status	-0.50	-1.69	-1252.56	0.75
Number of persons in household with HIV/AIDS related illnesses	0.81	0.23	-380.31	3.09***
Number of persons in household with other illnesses	0.14	0.23	-1308.02	5.13***
All or some ill persons had access to medical aid (yes=1, no=0)	0.44		2532.24	
All or some ill persons used public health care services (yes=1, no=0)	-1.92*	-2.02***		1.12
Household had access to a disability grant (yes=1, no=0)	0.94	0.90	2633.05	3.49*
Household had access to other social welfare grant (yes=1, no=0)	-0.28	1.52	315.98	0.10
Constant	-0.89	4.42	-1342.31	-11.01
Sample size (n)	197	88	214	111
Pseudo R <sup>2</sup>	0.16	0.27	1.00	0.56
F statistic	22.42***	21.02	47.45*	45.32*

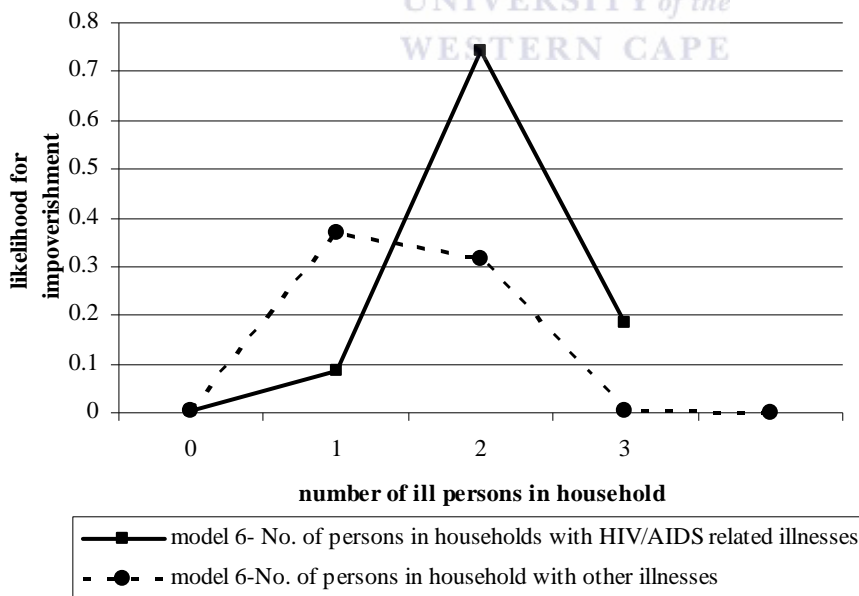
Note: Results of pooled logit model at coefficient with one asterisk (\*) is significant at the 10% level, while coefficients with two and three asterisks are significant at the 5% and 1% levels respectively.

Non-poor (model 5) and poor (model 6) households with employed heads of households were significantly less likely to be faced with impoverishing health payments compared to households headed by employed heads. As time progressed, poor households were less likely to be faced by impoverishing health expenditures (model 5 and 6). Poor rural households were significantly more likely to be faced with impoverishing health payments compared with poor urban households (model 5 and 6).

According to the results, the following variables were statistically significant in one model only: poor female-headed households and poor households that had access to a disability grant (model 6) were significantly more likely to have faced impoverishing health payments. Poor households impoverished by health care expenditures included significantly more dependants compared to non-poor households impoverished by such expenses (model 5).

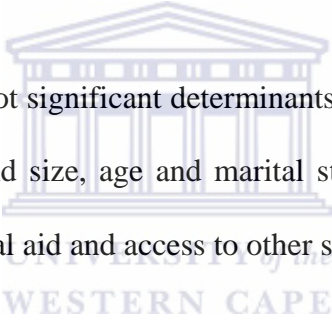
Non-poor households where all ill persons used public health services were also significantly less likely to be faced by impoverishing health payments when compared to households where no ill persons used public health care (model 5).

**Figure 14: Effects of number ill persons in poor households on likelihood of impoverishment (model 6)**



Poor households with larger numbers of persons with HIV/AIDS-related and other illnesses were also significantly more likely to have faced impoverishing health payments

(model 6). As the number of persons in a household with HIV/AIDS-related illnesses, increased the likelihood of impoverishing health payments also increased. However, if three persons had HIV/AIDS-related illnesses, the likelihood of impoverishing health care payments declined sharply (Figure 14). As the number of persons in a household with other illnesses increased, the likelihood for impoverishing health care payments also increased, but declined sharply once three or more persons were ill (Figure 14). These declines in the likelihood of impoverishment at very high morbidity burdens probably is the result rather of the smaller number of households that experienced such high morbidity burdens.



The following variables were not significant determinants of impoverishment in poor and non-poor households: household size, age and marital status of the head of household, affected status, access to medical aid and access to other social welfare grants.

#### **4.9. Responses to impoverishing health care payments**

Table 14 shows the responses to health expenditures used by HIV/AIDS-affected and non-affected households that reported impoverishing health payments. The most frequently used response, irrespective of the affected status of households, was using own income, followed by receiving help from family, friends and acquaintances, using medical aid, and borrowing money. No household that faced impoverishment used existing savings or inheritance money as a response.

**Table 16: Responses to impoverishing health care expenditures, by affected status**

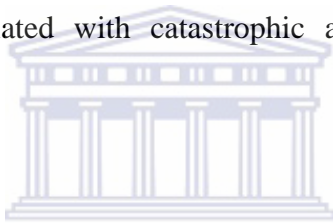
Response	Impoverished 1		Total	Impoverished 3		Total
	HIV/AIDS-affected households	Non-affected households		HIV/AIDS-affected households	Non-affected households	
Used own income	69.1	42.9*	66.1	57.7	0.0**	50.0
Used existing savings	0.0	0.0	0.0	0.0	0.0	0.0
Used medical aid	9.1	57.1***	14.5	15.4	50.0*	20.0
Borrowed money	1.8	0.0	1.6	3.8	0.0	3.3
Used inheritance money	0.0	0.0	0.0	0.0	0.0	0.0
Received help from family, friends and other acquaintances	23.6	14.3	22.6	23.1	25.0	23.3

Note: Results of t tests. Differences in proportions with one asterisk (\*) is significant at the 1% level, while two and three asterisks are significant at the 5% and 10% levels respectively.

When comparing HIV/AIDS-affected households with non-affected households, more of the former borrowed money as a response to impoverishing health expenditures compared to the latter. However, these differences were not statistically significant. On the other hand, a significantly larger number of non-affected households used their medical aid as response to impoverishing health expenditure compared to affected households. A significantly larger number of HIV/AIDS-affected households used their own income as a response to impoverishing health payments compared to non-affected households. There were no statistically significant differences in the proportion of HIV/AIDS-affected and non-affected households that received assistance from family, friends and other acquaintances.

## CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

The aim of this study is to investigate the extent, trends in, determinants of and responses to catastrophic and impoverishing health care payments in HIV/AIDS-affected households. In pursuing the aim, relevant documents and articles from various sources were scrutinised. Secondary analyses of data relevant and appropriate to the present study originate from a panel study on the socio-economic impact of HIV/AIDS on households conducted in Welkom and Qwaqwa in the Free State. This chapter reflects on the main findings of the research, and the structure of the discussion is guided by the sequence of the study's objectives (see Chapter 1). Where possible, recommendations are made to address the challenges associated with catastrophic and impoverishing health care payments.



Similar to Russel (2004), Johnson *et al.* (2002) and McIntyre and Thiede (2003), results show that, on aggregate, HIV/AIDS-affected households are more vulnerable to catastrophic and impoverishing health care expenditures (the latter supported by Booysen 2003). Furthermore, this research notes that the incidence of catastrophic and impoverishing health expenditures in HIV/AIDS-affected households declined significantly over time, most probably as a result of a combination of improvements in household welfare and a decline in burdens of morbidity.

Evidence from the analyses indicates that the likelihood of catastrophic and impoverishing health care payments are significantly higher in households that have a larger number of persons with HIV/AIDS-related and other illnesses. This implies that

direct health care costs have the potential of pushing HIV/AIDS-affected households deeper into poverty, thereby making the medical poverty trap a reality. Illness, particularly of a chronic nature, is impoverishing the poor further rather than pushing the non-poor into poverty.

The findings highlight the important role of the public health care system in protecting the poor against catastrophic and impoverishing health care spending. Having all or some household members utilising public health services significantly lower the likelihood of facing catastrophic and impoverishing health expenditures. Therefore, access to affordable - and in some cases even free - health care services provided by government could prove critical in protecting people from catastrophic and impoverishing health care payments. In particular, poor households who are more vulnerable to HIV/AIDS may remain dependant on the public health system for quite some time and could, as the WHO (2005) indicates, benefit from improved financial protection if they were able to incur less out-of-pocket expenses for medical treatment.

However, the research indicates that some households opt for private over public health services, which is often inherently catastrophic and impoverishing. It is, therefore, logical to promote and encourage greater use of public health care facilities, although such health seeking practices may be difficult to achieve given the perception of that public health care is of an inferior quality (*cf.* Van Rensburg 2004).

The study also investigated the role of social welfare grants and medical insurance in protecting households from catastrophic and impoverishing health spending. Evidence shows that households where all or some ill persons have access to medical aid are significantly more likely to be faced with catastrophic health payments. Households that benefit from medical aid are most likely to access private health services, which are more expensive than public health care, thus often resulting in catastrophe and impoverishment.

Furthermore, the analyses indicate that households that receive a disability grant or other social welfare grants are more likely to be faced with catastrophic or impoverishing health care expenditures. Significantly, therefore, is the finding that social grants do not necessarily assist households in escaping catastrophe and impoverishment. Nevertheless, it should be borne in mind that households would probably be worse off if they do not receive welfare support.

With reference to employment, the research shows households with employed heads to be significantly less likely faced with catastrophic and impoverishing health payments,, thereby accentuating the importance of having an income-generating breadwinner in the household. As expected, female-headed households - who are usually poorer - are more likely to be faced with catastrophic and impoverishing health expenditures when compared with their male counterparts. Rural households were also significantly more likely than urban households to be faced with catastrophic health care payments. Similar

determinants of catastrophic and impoverishing health expenses feature in other studies (cf Kawabata *et al.* 2002; Xu *et al.* 2003 in Chapter 2).

As far as responses to catastrophic and impoverishing health care payments are concerned, own income and assistance from family, friends and other acquaintances (supported by Russel 2004), and the use of medical aid featured prominently in the secondary analyses. Of these responses, the use of own income might entail savings on other expenses, which could prove problematic if these represent important goods such as food and education. Such cutbacks on expenditures may have severe impacts on the future development and welfare prospects of households. Evidence further suggests that catastrophic and impoverishing health payments need not in the longer term be catastrophic and impoverishing. The use of existing savings and borrowing of money, which may impact negatively on household welfare - although more common among HIV/AIDS-affected households - were only employed by a relatively small number of households.

The research emphasise the importance of understanding the economic burden of illness on households in order to inform health and social protection policy that could guard households from catastrophe and impoverishment.



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## APPENDIX 1: DESCRIPTIVE STATISTICS

<b>DETERMINANTS OF CATASTROPHIC AND IMPOVERISHING HEALTH CARE EXPENDITURES</b>					
	<b>Sample</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Between</b>	<b>Within</b>
Wave	744	3.22	1.79	1.41	1.42
Place of residence (urban=1, rural=0)	744	0.47	0.50	0.50	0
Household size	744	5.11	2.64	2.49	0.74
Dependency ratio	733	0.70	0.65	0.65	0.28
Gender of head of household (male=1, female=2)	744	1.56	0.50	0.48	0.15
Age of head of household	744	51.28	14.92	14.82	3.62
Employed head of household (yes=1, no=0)	744	0.62	0.73	0.68	0.36
Single head of household (yes=1, no=0)	744	0.12	0.33	0.29	0.15
Pensioner head of household	744	0.26	0.44	0.42	0.12
Affected status	744	0.81	0.39	0.43	0
Number of persons in household with HIV/AIDS related illnesses	744	0.56	0.58	0.47	0.38
Number of persons in household with other illnesses	744	0.63	0.69	0.53	0.47
No ill persons had no access to medical aid	742	0.13	0.50	0.49	0.24
Some ill persons had access to medical aid	742	0.07	0.26	0.25	0.12
No ill persons used public health care services	742	1.54	0.82	0.78	0.49
Some ill used public health care services	742	0.79	0.41	0.39	0.25
Household had access to a disability grant (yes=1, no=0)	744	0.21	0.41	0.32	0.24
Household had access to other social welfare grant (yes=1, no=0)	744	0.48	0.50	0.46	0.23