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**Economic consequences for households of illness and of paying for
health care in Zimbabwe: A case study**

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**Dissertation submitted to the Faculty of Health Sciences, University of Cape
Town, in partial fulfilment of the academic requirements for the degree: Master
in Public Health (Health Economics)**

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DECLARATION

I, *Mandy Maredza*, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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.....

Okore Okorafor

...../...../.....

Date

DEDICATION

To the Almighty God, who kept me and gave me the spiritual strength to complete this year of study. I also dedicate this work in loving memory of my late mother.

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I am grateful to my family, for their love, support, consistent prayers and encouragement. You were truly my pillars of support. To my friends, especially Ama, Alex and Mafayo, and my classmates in the Health Economics class of 2008, I say thank you for your steadfast friendship and support.

ABSTRACT

This study investigates the economic consequences of illness and of paying for health care in Zimbabwe. It explores the incidence of out-of-pocket (OOP) payments, catastrophic health expenditure (CHE), impoverishment and the factors, (particularly socio-economic factors) associated with them. In addition, this study determines the strategies that households employ to cope with the financial burden of OOP payments in Zimbabwe.

Data was collected from 499 households in Harare urban and Seke rural districts of Zimbabwe. Total monthly household OOP health expenditure was defined as “catastrophic” if it exceeded the threshold level of 40% of a household’s monthly capacity to pay. Logistic regression analysis was used to identify the factors that influence the incidence of CHEs. A non-poor household was impoverished by OOP health expenditure if its total household expenditure after deducting OOP payments was lower than the subsistence expenditure.

The results of this study indicated that, the incidence of CHEs was very high amongst the study population. Households at all levels of wealth incurred catastrophic health expenditures, and the proportion of households incurring CHEs was similar across the asset quintiles. Out-of-pocket payments precipitated impoverishment of non-poor households. Poor households, households with members above 65 years, female headed households, households with member(s) suffering from chronic illness and households with greater use of health services were at higher risk of incurring CHEs. On the contrary, households with a disabled member were less likely to incur CHEs. Besides ‘avoiding seeking care’, selling of assets and borrowing were the 2 most popular strategies used to cope with OOP health care payments.

An analysis of these results suggests that, targeted exemption of vulnerable households, as well as provision of subsidised health services could reduce the economic impact of illness on households. The results of this study also point out to the need for strengthening risk pooling mechanisms through the implementation of community based health insurance schemes and enhancing tax collection. In addition, other strategies that extend beyond the health sector such as economic empowerment of women could be effective in mitigating the economic impact of illness amongst female headed households in Zimbabwe

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ATP	Ability to pay
BP	Benefit package
CBHI	Community-based health insurance
CHEs	Catastrophic health expenditures
CR	Contributory regime
CSO	Central Statistical Office
CTP	Capacity to pay
EA	Enumeration area
FANR	Food, Agriculture and Natural Resources
FPL	Food Poverty Line
GDP	Gross Domestic Product
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GNI	Gross National Income
GoZ	Government of Zimbabwe
HFM s	Health financing mechanisms
HH	Household
HIV	Human Immunodeficiency Virus
ILO	International Labour Organization
LEB	Life Expectancy at birth
LPM	Linear probability model
MHI	Mandatory health insurance
MoHCW	Ministry of Health and Child Welfare
MRI	Magnetic Resonance Imaging
NATF	National AIDS Trust Fund
NHI	National Health Insurance
NHS	National Health Systems
OECD	Organization for Economic Cooperation and Development
OOP	Out-of- pocket
PASS	Poverty Assessment Study Survey
PHI	Private health insurance

RHCs	Rural Health Centres
SADC	Southern African Development Community
SES	Socio-economic status
SHI	Social Health Insurance
SR	Subsidised regime
SSA	Sub-Saharan Africa
TARSC	Training and Research Support Centre
TB	Tuberculosis
TCPL	Total Consumption Poverty Line
USD	United States Dollar
VAT	Value added tax
Vidcos	Village Development Committees
WHO	World Health Organization
ZDHS	Zimbabwe Demographic and Health Survey
ZEPARU	Zimbabwe Economic Policy Analysis and Research Unit
ZimVAC	Zimbabwe National Vulnerability Assessment Committee

CHAPTER 1

INTRODUCTION

1. BACKGROUND

Ill health and its associated costs are of major concern amongst families throughout the world (Gertler & Gruber 2002). This is particularly so since illness is often unexpected and the consequential costs are burdensome even for well-to-do families (ibid). In the developed world, financial protection mechanisms such as public and private health insurance, as well as publicly subsidised health systems have been established (Hatt 2006). The aim of these financial protection mechanisms being to protect families from the devastating effects of out-of-pocket health care payments whilst ensuring that health care is accessed when needed. However despite the abovementioned, the World Health Organization (WHO) has estimated that of the 150 million people worldwide who experience catastrophic health expenditures¹ (CHEs) yearly, 20 million reside in Europe (World Health Organization 2008). This is apart from the fact that more than 40% of the health care in Europe is publicly financed (Savedoff 2004). In addition, about seven million people suffered impoverishment as a result of the catastrophic medical expenses in Europe. With fewer financial protection systems in place in low and middle-income countries compared to Europe, the effects of catastrophic health expenditures are likely to be even more severe.

Out-of-pocket payments are however not the only determinant of catastrophic health expenditures. The combination of poverty and poor access to health services have also been shown to contribute greatly towards household exposure to catastrophic economic consequences (Xu *et al.* 2003; O'Donnell *et al.* 2008). With respect to poverty, poorer households are more vulnerable as even the smallest health care expenditures can push them deeper into poverty (Gilson & McIntyre 2005). Whereas wealthier families may use savings to buffer such expenses, poorer families often have to make agonizing choices that affect their families' livelihoods. Such choices may include selling of assets, reducing investment

¹ Catastrophic health expenditures (CHEs) are health expenditures at such a high level as to force households to reduce spending on other basic goods (e.g. food and water), to sell assets or to incur high levels of debt, and ultimately to risk impoverishment (McIntyre 2007). A full discussion of CHEs is done in chapter 2.

in education, food and housing over and above other things (Knaul *et al.* 2006). This situation initiates a vicious cycle of poverty and ill health.

The vicious cycle of poverty and ill health describes the situation whereby poverty is not only a cause of ill health, but ill health in turn becomes a cause of poverty. On the one hand, the poor through sheer material deprivation are unable to purchase pre-requisites of health such as nutritious food, shelter, adequate housing and proper sanitation (Edejer 2001). On the other hand, the low productive capacity and income deprivation due to ill health conditions and the related health and social costs implies that, the poor become even more vulnerable and less able to recover their former condition, and are in greater danger of moving down the poverty spiral (Haines & Smith 2000)

Catastrophic health expenditure is also only observed when households need and use health services, whilst ignoring those who cannot use health services due to geographical and/or financial constraints (Kawabata *et al.* 2002). However, through the consequent deterioration of health, the latter households probably suffer a greater welfare loss (through lost earnings) than those incurring catastrophic payments through medical spending (O'Donnell *et al.* 2008). Thus, an understanding of the pattern of health service access and use becomes imperative in CHE studies, as it gives an indication of the potential magnitude of the economic burden that households (particularly in low-income countries), face due to health care payments.

The devastating consequences that catastrophic health expenditures have on families have been internationally recognised (Knaul *et al.* 2006). In 2005, the WHO member states made a call for countries to develop health systems that have as one of the primary goals;

“Access to health care without risking financial catastrophe or impoverishment”

Yet despite this recognition, little has been done in many of the developing countries to determine the financial consequences of illness and of paying for health care (Hatt 2006). An important context in which to pursue this type of research is in Zimbabwe. With a collapsing health system which has directly affected health care access and use, high rates of poverty plus declining risk-pooling mechanisms; Zimbabwe notably fulfils the criterion of a country where households are at high risk of catastrophic health expenditures. Thus in the

present work, the economic consequences of health care payment in Zimbabwe are measured, by estimating the catastrophic health expenditure and the impoverishing impact caused by OOP payment for health care services. It is hoped that the results of this work will inform policy targeted at protecting vulnerable households from the devastating effects of OOP payments.

1.1 OVERVIEW OF ZIMBABWE

1.1.1 Socio-economic status of Zimbabwe

Zimbabwe is a low income country located in Southern Africa with a population of approximately 13 million people. Its GDP and GNI per capita are estimated to be US\$2,038 (purchasing power parity) and US\$340 respectively (World Bank 2008). Over the past decade the country has been experiencing a severe economic recession. Real GDP growth registered a negative of -7.3% in 2000; -5.9% in 2002; -3.6% in 2004 and -4.6% in 2007. Thus representing a cumulative decline in real GDP growth of above 40% since 2000 (ZEPARU & TARSC 2006). The economic recession has spurred the cost of basic goods and services including health care services, whilst the incomes of the majority of the population have continued to decline (ZEPARU & TARSC 2006). The consequence of this is that households are finding it more difficult to save in order to meet future unexpected expenditures such as those resulting from unexpected illness. In addition, the country is currently experiencing high unemployment which was estimated at 80% in 2007, and an increase in the informal sector market (Kapp 2007). This has led to reduced contribution to health through tax and insurance mechanisms. Furthermore, this situation has spurred an over-reliance on regressive taxes such as VAT, fuel levies and capital gains taxes to finance health care (Loewenson & Masotya 2009). The latter taxes impose an additional burden on households whose income security has already substantially reduced due to unemployment and increase the potential for poverty that is induced by medical spending.

Poverty has also increased dramatically in Zimbabwe. According to the 2003 Poverty Assessment Study Survey² (PASS), the proportion of households living below the Food Poverty Line (very poor) increased from 20% in 1995 to 48% in 2003, representing an

² The 2003 PASS is the most recent poverty assessment study survey conducted nationwide that used expenditure based methods (more appropriate in the developing country context) to calculate the poverty line. The latest study conducted in 2005 estimated income to define the poverty levels.

increase of 148% (Turugari 2005). On the other hand, the proportion of households below the Total Consumption Poverty Line (very poor and poor) rose from 42% in 1995 to 63% in 2003. This study also found that about 63% of rural households were living below the Total Consumption Poverty Line (TCPL) in comparison to 53% in urban areas, suggesting greater poverty in rural areas. However, between 1995 and 2003, there was a higher percentage increase in incidence of poverty in urban areas (63%) compared to 42% in rural areas (MoHCW 2008). This suggests that proportionally, households in urban areas are becoming increasingly poorer.

The authors cited the deteriorating macroeconomic environment, shrinking formal job opportunities and negative GDP growth rate as the possible causes. Since the conduct of this national survey, all the conditions highlighted above have worsened suggesting that the country is experiencing even greater poverty. Estimates from the most recent data on poverty suggests that between 1990 and 2005, 56% of people were living on under US\$1 a day and 83% earned below US\$2 a day (Government of Zimbabwe (GoZ) & UNICEF 2007). In addition, 72% of female headed households in Zimbabwe are considered poor compared to 58% of male headed households (Crew 2006). However, since 2005, poverty levels have not been measured in Zimbabwe (Loewenson & Masotya 2009).

1.1.2 Health profile in Zimbabwe

The major health indicators of morbidity and mortality show a concerning decline in the performance of the health sector since the country's independence in 1980. Mortality indicators in Zimbabwe showed an improvement in the health status of the population within a decade after independence. However, since the early 1990s, the same indicators either became static or deteriorated. Crude death rate for example dropped from 10.8 per 1000 population in 1982 to 6.1 per 1000 population in 1987 and then rose to 9.4 per 1000 population in 1992 (MoHCW 2008). The overall crude death rate for the country was estimated at 17 deaths per 1000 population in the 2002 census and 20 deaths per 1000 in 2003 (ibid).

The increase in the national crude death rate during this period has been attributed mostly to the HIV epidemic, which in 2002 accounted for 60-80% of deaths among adults aged 15 to 49 years old and children below the age of 5 years (MoHCW 2008; Mutyambizi 2002). It should however be noted that the crude death rate also dropped from the 20.1

deaths per 1000 to 17.2 deaths per 1000 population between 2003 and 2007. This decrease has also been attributed to the decline in adult HIV prevalence from 25% in 2003; to 20% in 2005 and 15.6% in 2007. The decline in HIV prevalence has been credited partly to the change in sexual behaviour among younger people (MoHCW 2008).

Life expectancy at birth (LEB) which is an indicator that is generally used to measure general health status followed a similar trend to crude death rate, increasing between 1980 and 1990 from 56 years to 61 years (MoHCW & CSO 2007). In the mid 1990's there was a levelling off in LEB and a real decline is now being experienced to the extent that LEB dropped to below 60 years by the year 2000 and in 2007 was estimated to be 45 years (MoHCW 2008).

The 2005-2006 Zimbabwe Demographic and Health Survey (ZDHS) revealed that, despite the existence of cost-effective interventions, the prevalence of nutritional deficiencies, communicable diseases, pregnancy and childbirth conditions, and the conditions of the new born are still high in the country (Central Statistical Office (Zimbabwe) & Macro International Inc. 2007). Ten priority conditions have also been identified on the basis of the number of people affected by them and the seriousness of their effects. These conditions are:

1. HIV/AIDS and STDs;
2. Tuberculosis;
3. Acute Respiratory Infection (ARI)
4. Malaria
5. Reproductive Health Conditions
6. Cardiovascular conditions e.g. hypertension
7. Diarrhoeal diseases;
8. Nutritional conditions/problems deficiencies (e.g. PEM, micro-nutrients, diabetes)
9. Injuries and disabilities
10. Mental Disorders (psychiatric and alcohol, drug abuse) (Central Statistical Office (Zimbabwe) & Macro International Inc. 2007)

The selected conditions correspond to the top five (Diarrhoea, Malaria, Tuberculosis, HIV and AIDS and Malnutrition) most commonly reported health problems according to the sampled households in the 2007/8 Malaria indicator Survey report (MoHCW 2008).

It is also important to highlight that at the time that this study was conducted; there was still a nationwide outbreak of cholera in Zimbabwe.

1.1.3 Health system structure in Zimbabwe

Health care in Zimbabwe is provided by the public health sector, private health sector as well as Non-Governmental Organizations. Public health care is delivered based on a four-tiered referral system (MoHCW 2001). The points of entry for uncomplicated cases are the Rural Health Centres (RHCs) and the clinics at the primary level of the system. The first referral level comprises district hospitals while the second referral level is to provincial and general hospitals. Central and specialty hospitals comprise the third referral levels.

In theory, patients are required to present at the primary level first and then to be progressively referred to the secondary up to the quaternary level depending on the complexity of illness (MoHCW 2008). It has however been shown that, the referral system has largely broken down with more patients (estimated at more than 75%) self-referring to central hospitals such as Harare and Mpilo central hospitals (MoHCW 2008; Normand *et al.* 1996). Reasons for self-referral include poor administrative measures that hinder adequate enforcement of the referral chain and most importantly the deterioration in quality of health services particularly at the primary care level.

Self-referral, apart from indicating the gross misuse of resources through the use of high cost services by patients with primary care needs, also has financial implications for individuals and households. This is because the official policy in Zimbabwe is that patients who enter the health care system at the primary level and are referred to a higher level pay no further consultation fee (Normand *et al.* 1996). Thus, those individuals who by-pass the lower levels are not shielded from costs of consultation at higher levels. Even with this policy in place, studies have shown that patients perceive the consultation fee very small in proportion to the total bill at an institution (Normand *et al.* 1996). This perception implies that, exemption from paying consultation fee alone is unlikely to induce patients to comply with the referral system.

1.1.4 Health sector reforms

The early post-colonial era (early 1980s) saw the implementation of the health sector reforms that were geared towards redressing inequities that were inherited during the colonial period

(Mutymbizi 2002). Of particular significance to this study was the implementation of the policy of free health care in 1980 to anyone earning below \$Z150.00 per month (about US\$220.00 at the time) provided they were properly referred (MoHCW 2001). In 1995, access to health care for all citizens attending rural public health facilities was also made free regardless of income (Loewenson & Masotya 2009; MoHCW 2001). Other groups that were specifically exempted from paying user fees (up to district level) were pregnant women, children under 5 and adults over 65 years of age. In addition, user fees were also reduced as a health financing source (Loewenson & Masotya 2009).

1.1.4.1 Challenges experienced (1980-2006)

There have been several challenges faced with this policy reform. Firstly, managing the exemption system has been shown to be costly (Normand *et al.* 1996). In addition, the exemptions have not always been targeted at the rightful beneficiaries (*ibid*). The result being, poor individuals have been paying for health care whilst other richer people have been avoiding health care payments. In addition to this, higher income earners obtained a number of tax funded public subsidies, including tax relief for medical insurance subscriptions (Loewenson & Masotya 2009).

Other challenges that have been reported include drug stock outs at the Government Health Centres that have resulted in private purchases of medicines by categories of individuals who are officially supposed to be exempt from health care fees. Thus, poor people in reality have been faced with ever-increasing OOP payments for health care (MoHCW 1999).

1.1.4.2 Most recent challenges

The most recent data from the 'Access to health services' study conducted in 2007 revealed that, in rural areas, people are paying service fees at district hospitals and also in most rural health centres/clinics (MoHCW 2008). Exemptions for low income earners have also continued to be difficult. Official reports suggest that pregnant mothers, children under 5 and the elderly (over 65 years) are still exempt from public sector fees. However, other³ data suggests that pregnant women are required to pay US\$5 for their first antenatal visit, and a fee of US\$8 for hospital cards is required at the first visit to the polyclinics for infants.

³ This data was obtained at one of the primary level clinics in Harare from documents which were not yet made official

During the later half of 2008, public hospitals throughout the country also started closing down, leaving patients with the option of private health care (Médecins Sans Frontières 2009; Kevin 2009). The private facilities that continued to operate were charging fees ranging from US\$200 in cash for a consultation, US\$500 for an in-patient bed, and US\$3,000 for a caesarean section (Physician for Human Rights 2009). With such high fees the financial impact on households and the impact on access to health care cannot be overlooked.

The adoption of multicurrency national payments system in Zimbabwe in the later part of 2008 also had a significant impact on the medical aid⁴ industry and its associated members. Firstly, by allowing some contributions to be made in the Zimbabwean Dollar and others in currencies such as the United States Dollar and the South African Rand, a ‘two-tiered’ system was created in which the relatively well-off who belonged to the latter schemes had access to a comprehensive benefit package which included access to specialist care. Those who belonged to the former schemes (i.e., making payments in the local currency) however faced dire consequences. Firstly, almost all health care providers refused to offer services to this group of people demanding payment to be made in cash (in any other currency other than the Zimbabwean Dollar) before any health services could be offered. Even worse, some medical aid societies abruptly cancelled membership for this group. Thus, while official figures for the percentage of the population owning medical aid in Zimbabwe still stands at 10% (Association of health care funders of Zimbabwe 2008); in reality a smaller percentage still derives benefits from medical aid.

1.1.5 Health care financing in Zimbabwe

With respect to health financing, Zimbabwe’s health system is financed through four main sources: government funding, private voluntary medical schemes/health insurance, out-of-pocket payments (OOPs) and external funding (MoHCW 2008). The government has remained the major source of health financing in the public health system and taxes also have remained the major source of funding. However, whilst the government still remains a major source of health financing in the public health system, household health financing continues to be significant (ibid). The 2001 National Health Accounts estimated

⁴ Medical aids are considered a form of health insurance as they provide coverage for medicine, visits to the doctor or emergency room, hospital stays and other medical expenses

government's contribution to be 39% of the overall resource package by source of health financing, while the contribution by households was 29% against 10.8% by employers (MoHCW 2001).

The most recent national health accounts data of 2005 estimated that government funding was 44.8% of the total health expenditure whilst private expenditures comprised 55.2% of the total health expenditure. The share of OOP spending as a proportion of private health expenditure was 52%, which is significantly high when compared to other countries in Sub-Saharan Africa (WHO 2007). Namibia and South Africa's share of out of pocket payments as a proportion of total health expenditure were 5.6% and 10.3% in 2004 respectively, compared to 26.2% in Zimbabwe (WHO 2007). Following on from earlier discussion on private medical aid in Zimbabwe, out-of-pocket payments are likely to have increased significantly since these last estimates. Although, there have been policy intentions to implement a Social Health Insurance scheme in Zimbabwe since 1991, this has not yet been implemented. This means that the unemployed (who comprise the majority of the population) and the poor have very little financial protection against health expenditures.

1.2 PROBLEM STATEMENT

The consistent increase in out-of-pocket spending for health care in Zimbabwe (Munyuki & Jasi 2009) is of concern, given the increased economic burdens on households at a time of severe economic difficulty. The key issue in Zimbabwe is that the worsening economic conditions have driven the majority of households into poverty, escalated the cost of basic goods and services and led to significant reduction in public finance for health care (Munyuki & Jasi 2009). The high poverty levels imply that households struggle to meet even the basic food needs and have no surplus cash for health expenses (Russell 2004). As a result, even a small illness cost could be an immense economic burden for such households.

However, even wealthier households in Zimbabwe are vulnerable to disruptions in their living standards when one or member falls ill, particularly since they could incur large medical expenditures. This is particularly so since public health facilities are currently not operating and the private facilities that are operating are charging fees that are beyond the reach of even the most affluent (PHR 2009). In addition to this, the cancellation of health

insurance memberships, which has affected the majority of the formal sector, implies that even more households are vulnerable to the catastrophic economic consequences of illness.

Thus, when one considers the challenging economic environment in Zimbabwe and its implications for the standards of living of households, it becomes important to understand if OOP payments are adding to this economic burden and the extent and implications of this burden on household livelihood. This study therefore measures the economic burden of OOP healthcare payments on households by estimating the catastrophic health expenditure and impoverishing impact caused by OOP payments.

1.3 Policy reforms aimed at protecting households

In recent years up to and including the present year, the Government has drafted and implemented several policies that are aimed at protecting individuals and households (either directly or indirectly) from the devastating effects of OOP health expenditures. These policies include:

1. Health Assistance policy targeted at the chronically poor. This policy aims to assist the chronically poor and the vulnerable to gain access to health care, by provision of free health care. Categories of individuals who fall under the vulnerable include children below the age of 5, the elderly above the age of 65 and those living in rural areas. This policy has been discussed in earlier sections
2. The government implemented the National AIDS policy and National AIDS Trust Fund (NATF) in 1999. The NATF is a 3% levy collected from taxable income from all sectors. This fund is aimed at mitigating the impact of HIV and AIDS by increasing the availability of free ARVs amongst other goals (United Nations 2008).
3. The government also implemented a Malaria policy and a Malaria project that was funded in 2003 by the Global Fund (WHO 2004a)
4. Other disease specific policies include the policy on free treatment for tuberculosis (TB) patients at government facilities in Zimbabwe (WHO 2004b).
5. The Macro-Economic Policy Framework for 2005-2006 set the basis for the creation of a specific fund for the poor with disabilities and other extraordinary ailments (Government of Zimbabwe 2003)
6. The “National Health Strategy for Zimbabwe 1997-2007” also aimed at providing free treatment for the majority, but also stated that the policy of free health would

create disincentives for people to join the private medical insurance schemes (Loewenson & Masotyia 2009).

The Ministry of Health and Child Welfare (MoHCW) is currently drafting a new national health strategy for 2008-2012, and has circulated a working consultative document, “Developing a national health strategy for 2008-2012”.

The policies described above though good policies fail to account for a variety of issues that are important if policies that protect households from OOP health expenditures are to be implemented successfully in Zimbabwe. One is the fact that the poverty distribution itself seems to have changed, with urban households becoming increasingly poorer in comparison to rural households. Thus the current focus on the rural population has the potential of missing out many urban households for whom social protection policies are indeed a major necessity. In addition to this, current developments in the private health insurance (PHI) system have left even the few households that previously had health insurance at risk of CHEs from OOP payments. Thus, the emphasis on restricting free health care so as to promote enrolment with the PHI schemes may result in even more households facing devastating financial consequences as a result of OOP health expenditures.

1.4 OBJECTIVES OF THE STUDY

The overall objective of this research is to identify the economic consequences for households of illness and of paying out-of-pocket for health care. Specifically the research aims at accomplishing the following:

1. To determine the incidence of catastrophic health expenditures in Zimbabwe
2. Investigate how incidence of catastrophic payments varies across groups of different socio-economic status
3. To identify the determinants of catastrophic health expenditures in Zimbabwe
4. To determine incidence of poverty that is related to catastrophic payments
5. To determine the crisis coping mechanisms for meeting the cost burden of illness and its implications for future livelihood of households.
6. To evaluate current health policies in Zimbabwe aimed at reducing the economic burden of illness with a view to ascertain if these are in line with the findings of the research.

1.5 JUSTIFICATION OF THE STUDY

Despite, the likelihood that OOP payments could have a significant economic impact on households in Zimbabwe, economic analyses are still scarce. Out of the studies that have investigated the impact of OOP payments, most have focussed on the impact on utilization (Russell 1996; Nanda 2002; Makuto & James 2007). Other studies have gone a step further to finding out how households cope with the direct and indirect cost burdens of illnesses such as HIV in Zimbabwe, but with no explicit estimation of the impoverishing and catastrophic impact (Mutiyambizi 2002; Mutangadura *et al.* 1999). This study contributes to the aforementioned literature with estimation of the burden of OOP payments for health care, utilizing recently developed methods of catastrophic and impoverishing impact assessment.

The findings of this study will also provide empirical evidence on the incidence and intensity of impoverishment and catastrophic health expenditures. The availability of such evidence is a crucial step towards developing a health system that offers households financial protection from OOP health expenditures. In addition, policy makers also need to know the groups of people that are most vulnerable to CHEs as well as the general risk factors for catastrophic health expenditures. Since this research is diverse and spans over these multiple issues, the findings of this study will be useful in formulating targeted and equitable social and financial protection policies. Furthermore, the results of the incidence of poverty due to OOP payments will provide relevant evidence that could be used to enhance the effectiveness of the already existing poverty alleviation strategies.

Notwithstanding the issues raised above, it is also important to note that ill health in itself has wider economic implications for the country. The World Bank in its 1993 report ('Investing in Health') defined a role for health in the pursuit of economic development (Suhrcke *et al.* 2006). In 2001 the Commission on Macroeconomics and Health (CMH) significantly reinforced the strength of the economic argument for investing in health (*ibid.*). At a time when Zimbabwe is facing severe economic challenges, investing in health could be of immense benefit.

Finally, Zimbabwe recently witnessed a major political move when the two opposition parties formed a Government of National Unity. This situation opened a window of opportunity for new policies to be put onto the political agenda. Taking into consideration

that existing policies seem to marginalise the groups of people that are considered to be vulnerable to catastrophic medical expenditures, the findings of this study will be an important contribution to this policy making process.

1.6 ORGANIZATION OF THE THESIS

This section presents an outline of the rest of the thesis. Chapter 2 provides a review of the literature that is relevant for this study. This includes: literature on health care financing; different measures of assessing household financial protection and literature on catastrophic and impoverishing health expenditures and household coping strategies.

Chapter 3 presents a conceptual framework for analyzing the determinants of catastrophic health expenditures and draws on the literature presented in chapter 2. Chapter 4 provides a detailed description of the research methodology. In this chapter the data required to successfully complete the study are set forth. This chapter also presents the methodologies that were employed by other researchers analyzing catastrophic and impoverishing health expenditures. The rationales for choice of analytical techniques chosen for this study are presented

Chapter 5 presents the results of the data analysis. Demographic analyses are presented which are important in understanding the results for determinants of catastrophic health expenditures. The results for the incidence of catastrophic health expenditures; incidence of impoverishing health expenditures and determinants of CHEs are presented. This chapter concludes with a discussion of the strategies that households employ to cope with the financial burden of OOP payments.

Chapter 6 discusses the results presented in chapter 5 in the context of the objectives set forth. The conclusions and policy recommendations presented in chapter 7 complete the study

CHAPTER 2

LITERATURE REVIEW

2 INTRODUCTION

This chapter reviews literature on relevant concepts for this study. Literature on health care financing; catastrophic health expenditures; crisis coping mechanisms of households and the methodological issues around catastrophic health expenditure studies is reviewed.

2.1 HEALTH CARE FINANCING

Health care financing is defined as the activity of raising or collecting revenue to pay for the operation of a health care system (Yu *et al.* 2008). Schieber *et al.* (2006) expand on this definition by saying, "...it is also a key determinant of health system performance in terms of equity, efficiency, and health outcomes." Health care financing comprises the basic functions of revenue collection, pooling of risks and purchasing of health services (McIntyre 2007). Revenue collection is concerned with the sources of funds, their structure and the means by which the revenues are collected. Risk pooling, involves the collection and management of financial resources so that large unpredictable individual financial risks become predictable and are distributed among all members of the pool (Gottret & Schieber 2006). Purchasing refers to the manner in which pooled resources are transferred to health service providers in such a way that appropriate and efficient services are available to the population (Kutzin 2001).

At country level, these health financing functions translate into the following objectives:

1. Raising sufficient and sustainable revenues in an efficient and equitable manner, so as to offer individuals, both a basic package of essential services and financial protection⁵ against unpredictable catastrophic financial losses caused by illness or injury.
2. To manage these revenues so as to equitably and efficiently pool health risks and,
3. To ensure the purchase of health services in an allocatively and technically efficient manner (Salehi 2007; Saadah 2008)

⁵ Ensuring financial protection means that no household spends so much on health care that it risks falling into poverty and (if already poor) not overcoming poverty.

Based on these policy objectives, one can infer that the health financing objectives are centred on the principles of equity, efficiency and sustainability and embodied in these principles is the goal of financial risk protection and ensuring universal access to health services. The following section gives a brief discussion of the principles of equity, efficiency and sustainability placing emphasis on the role they play in ensuring financial protection of households.

2.1.1 Equity

Equity in health financing is a term generally used to describe how the burden of financing health care is distributed amongst the population. A key question in assessing equity in health care financing is; “How is the burden of financing health care distributed across groups of different socio-economic status?” The evaluation of equity in health financing generally takes 2 forms, namely; horizontal equity and vertical equity (Mwase 1998). According to Culyer (2001), horizontal equity refers to the equal treatment of equal individuals. In health care financing, this would imply that those with the same ability to pay (ATP) make the same payments for health care. Vertical equity on the other hand, refers to the unequal yet equitable treatment of unequal individuals. Stated another way, this means that those with different ability to pay should make appropriately dissimilar payments.

There is still debate on what the latter means: Should relative shares of income contributed be the same (proportional) for all income groups or higher (progressive) for the richer? The literature on this subject suggests that: high poverty levels, the inability of many households to afford even relatively small health care payments and substantial inequities in the distribution of income across households, particularly in low income countries, imply that; those at higher levels of wealth should contribute a *higher* percentage of their income than lower income groups (ZEPARU & TARSC 2006; Cissé *et al.* 2007). A study conducted in Malawi found that although the average cost of malaria to households was over 7% of household income, for the poorest households these costs were as much as a third of their income (Ettling *et al.* 1994); Thus highlighting the importance of progressivity and not just proportionality in health financing.

With respect to its impact on financial risk protection, an equitable health financing system ensures that, cross-subsidies from the rich to the poor (equity subsidies), and from the healthy to the ill (risk subsidies) can occur (McIntyre 2007). Such cross-subsidies, which are

a result of risk pooling, ensure that no household is impoverished by the need to use health services and that unexpected health care costs do not fall solely on the individual (ibid). Regarding equity subsidies, 3 alternatives often co-exist for generating revenues and financing equity subsidies (Schieber *et al.* 2006). These are: subsidies within a risk pool; subsidies across different risk pools and direct public subsidies through transfers from the government (ibid). These alternatives will be explored in much detail in later sections. However, it is still important to mention that the second and third alternatives for financing equity subsidies are of significant importance when 2 conditions exist. These include: (i) a situation whereby risk pools are fragmented such that low-risk or low income individuals are in one pool and; (ii) a situation whereby significant portions of the population cannot afford health insurance (Saadah 2008; Bitrán *et al.* 2000).

Based on the above discussion, it is apparent that the concept of equity is also directly linked to the health systems goal of fairness in health financing. Fairness in health financing reflects the view that, the risks each household faces as a result of health care costs should not be distributed according to risk of illness but a household's ATP (Economou *et al.* 2004).

2.1.2 Feasibility, Sustainability and Efficiency

The health financing principles of efficiency, sustainability and feasibility though of indirect relevance to the subject of financial protection of households are also worth mentioning.

These principles influence to a great extent whether a proposed health financing mechanism is acceptable to stakeholders and can be implemented (feasible) and whether it will be sustainable in the long term. A sustainable health financing mechanism is critical since it can maintain its level of funding and has the potential to generate more revenues in response to growing health needs (Ekman *et al.* 2008). This in turn means that, such a financing mechanism can maintain its breadth and depth of coverage, thus ensuring that the beneficiaries of such a financing system are protected from the financial risk of illness in the long term. Efficiency, particularly efficiency in revenue collection is also critical to achieving financial risk protection. Generally, a health financing mechanism⁶ is considered to be efficient if it generates a large amount of revenue thus precluding the need for multiple funding mechanisms with each generating a limited amount of funds (McIntyre 2007).

⁶ The categories of funding mechanisms that exist include general taxation, mandatory health insurance and out-of-pocket payments. These will be discussed in more detail in later sections.

Exclusion of multiple funds ensures formation of a large risk pool and consequently better opportunity to redistribute risks within the pool (Schieber *et al.* 2006). Additionally, administrative costs and the costs of fund collection are low with an efficient financing mechanism; leaving sufficient revenues for use in actual health service provision (McIntyre 2007).

2.2 HEALTH FINANCING MECHANISMS

The World Health Organization defines health financing mechanisms (HFMs) as organisational options for a health financing system of how to offer financial risk protection to people against the costs of healthcare (WHO 2009a). Generally, health systems are financed mainly through three mechanisms: i) government funds via general and specific tax revenues, donor funds and deficit financing ii) health insurance which can either be mandatory or voluntary and (iii) Out-of-pocket (OOP) payments (McIntyre 2007). The mix of financing among these three categories tends to differ substantially between countries

2.2.1 Out-of-pocket payments

The term out-of-pocket (OOP) payment refers to payments that are made directly to the health care provider by the patient. These payments can be placed into four categories:

- user fees paid directly to health care providers in public or private health facilities;
- co-payments made by members of a health insurance scheme, which reimburses only a portion of the cost of a health service paid by the members (Belli *et al.* 2004);
- semi- official charges made for consumables such as drugs and medical supplies and
- Under-the-table (unofficial) payments made as a so-called gift and in some instances as precondition for service to health care providers (Mastilica & Bozikov 1999; Belli *et al.* 2004).

Because OOP payments are made at the point of health service access, individuals and households are not shielded from the unexpected burden of health care costs. Furthermore, there is little risk pooling with OOP payments such that the heavy financial burden of the health expenditure falls solely on an individual or household. This situation poses major challenges for equity and financial protection of households (Al-Duaj 2009). With respect to its impact on equity, OOP payments tend to place a disproportionately higher burden on the poorer households. A study in Croatia that examined the burden and distribution of OOP

payments among income groups found that, the lower income groups paid as much as six times the share of income paid by high-income groups. This study therefore highlights the extent of regressivity⁷ of OOP payments as a source of health financing (Mastilica & Bozikov 1999). The results of this study are also consistent with those by Wagstaff and van Doorslaer (1992) who investigated equity in the financing of health care in 10 high-income countries. Counterintuitive evidence from studies conducted in low and middle income countries has however been presented which suggests that, OOP payments can be progressive if the lowest income earners, who are least able to afford health services, rarely use them (O'Donnell *et al.* 2008). The term progressive in this case is argued as misleading since it refers to equitable financing yet inequitable access to services (McIntyre 2007).

In addition to its impact on equity, the heavy financial burden that OOP payments impose on vulnerable households also leave households facing the options of not seeking health care or risking financial catastrophe. A recent systematic review of studies that examined the impact of user charges on health service utilization found that; reducing or removing user fees increased utilization of curative and some preventive services, while increasing or introducing user fees had the opposite effect in most instances (Lagarde & Palmer 2008). The unpredictability of illness further implies that, those households that opt to seek health care end up using ready cash that would otherwise have been intended for other things. According to a study in Ethiopia, households that had used available cash to pay for health care had intended to use the money for basic consumption necessities such as food, fuel, clothes and education (Russell & Abdella 2002)

Families that opt to seek health care despite not having ready cash risk jeopardize their future livelihoods. This is so since households are often forced to borrow money at ruinous interest rates or sell assets such as livestock so as to meet the costs of health care (McIntyre & Gilson 2005; WHO 2009b). A recent study that explored factors associated with household coping behaviours in the face of OOP health payments in 15 African countries (including Zimbabwe) found that: in most countries, around 30% of all households financed out-of-pocket health expenditure by borrowing and selling assets with the situation being predominant amongst the lowest income quintile group (Leive & Xu 2008).

⁷ Regressive contribution refers to a financing mechanism whereby low-income groups contribute a higher percentage of their income than high income groups (Yu *et al.* 2008)

In spite of the evidence that out-of-pocket payments are inequitable, there is also evidence that these payments have helped increase revenues (though marginally) in public hospitals, facilitated the expansion of hospital services and helped improve the quality of services (Akashi *et al.* 2004). Such experiences have been reported in countries like Cambodia, Niger, Cameroon and Jamaica (Akashi *et al.* 2004; Lagarde & Palmer 2008). In Cambodia, a study that investigated the effects of user fees on hospital performance and provider attitudes found that, following the introduction of user fees, there was increased availability of drugs at the National Maternal and Child Health Centre (NMCHC). Other changes included the improved cleanliness of the facility since NMCHC allocated about 2% of user-fee revenue for employing additional cleaners. Similar studies conducted for Niger and Cameroon also found that, utilization of health services also increased in facilities where introduction of user fees was accompanied by improvements in the quality of services (Diop *et al.* 1995, Litvack & Bodart 1993). In addition to improved service delivery, enabling public hospitals to stay in operation is also possibly one of the biggest roles that user fees have played. Jamaica for example, experiences a chronic problem of floods and fires which often leaves the facilities in desperate need of repairs (Lewis 1993). These repairs are however only carried out once user fees have been returned to the hospital. Other documented evidence of the beneficial impact of OOP payments include an improvement in the performance of workers as well as a decrease in staff turnover in countries where user fees have been used to compensate staff salaries (Akashi *et al.* 2004).

The evidence presented above clearly indicates that OOP payments have not only ensured improved service delivery at some public facilities, they have also ensured that these facilities which are mainly utilized by the poor remain operational. However, when one considers that unofficial payments are still demanded in most of these countries (Akashi *et al.* 2004), the overall economic impact of OOP payments amongst the poor cannot be overlooked. Moreover, the difficulty that most countries have faced in enforcing effective exemption policies for the poorest (Mohindra 2008) means that, the improved quality of services possibly benefits wealthier households more since they can opt for cheaper public services. The poorest households on the other hand continue to struggle with health care access. In addition, poor revenue management in many low income countries has resulted in only but a few success stories such as the ones described above. These challenges in turn reveal that the disadvantages of OOP payments, particularly in poor countries and amongst poor households are more substantial than the advantages they offer. Recognition of this, has

spurred a great move towards health financing mechanisms that offer prepayment and for which risk pooling is possible. Prepayment funds are payments that are made by individuals via taxes or health insurance contributions before the need to use health services (McIntyre 2007). Such payments allow pool members to pay for average expected costs in advance, relieves them of uncertainty, and ensures compensation should a loss occur (Schieber *et al.* 2006). Pooling coupled with prepayment thus enables the establishment of insurance and the redistribution of health spending between high- and low-risk individuals and high- and low-income individuals (*ibid.*).

The next section discusses the different prepayment mechanisms, focussing attention on the extent to which each financing mechanism can offer households financial protection

2.2.2 Government revenues

Government funds are generally derived from tax revenues either direct taxes (from personal or company income) or indirect taxes such as value added tax (VAT) and customs duties (Al-Duaj 2009). Other forms of funds also include donor funding which can take the form of loans which have to be repaid along with interest charges or aid grants which do not have to be repaid (McIntyre 2007; Al-Duaj 2009). State-funded systems are examples of health systems that rely primarily on government revenues and operate through either Ministries of Health or National Health Service (NHS) systems.

These systems generally have three main features. First, their primary funding comes from general revenues. Second, they provide medical coverage to the country's entire population and third, their services are mostly delivered through a network of public providers (Gottret & Schieber 2006). These features, particularly the broad coverage and reliance on broad revenue base promote substantial risk pooling and circumvent problems of adverse selection⁸ and risk selection⁹ giving the NHS systems the potential to be equitable.

The extent of equity within these systems is however dependant on several other factors namely: the mix of general (direct and indirect taxes) and specific taxes; other public

⁸ Adverse selection refers to the tendency for insurance to attract only higher risk individuals, thereby raising the average cost of insurance beyond the reach of many people

⁹ Risk selection refers to the process by which insurers screen potential clients and try to enrol individuals who present health risks that are below average

revenue sources and the types of external assistance received (Gottret & Schieber 2006). With respect to taxes, direct income tax has generally been found to be progressive. This is particularly so in low and middle income countries where the highest income groups almost exclusively pay for these taxes (McIntyre 2007). Indirect taxes on the other hand are generally regressive since they are usually levied as a flat rate and result in lower income earners paying a higher proportion of their incomes than the higher income earners (Wagstaff *et al.* 1999). In low and middle income countries such as Hongkong, Thailand, and Nepal, indirect taxes have however been found to be slightly progressive since the basic foodstuffs are often exempt from value added tax (VAT), thus shielding the poor from paying these taxes. Earmarked taxes which are collected for a specific purpose such as the AIDS levy in Zimbabwe, though promoting greater willingness to contribute towards taxes tend to displace funding from general tax revenue. In addition, these taxes tend to impose a greater burden on the tax-payer, particularly if the percentage of those who are formally employed and can actually contribute is very small (Kaulem 2006). Taking into account the relative progressivity of the different types of taxes, NHS in which direct taxes make the greater proportion of tax revenues are likely to be more equitable and offer greater financial protection from health care costs.

In 'pure' National Health Service systems such as the British NHS, 74% of the resources of the NHS came from general taxation in 2001 (with heavy reliance on income tax) while 20% came from national insurance contributions, making this system highly equitable (Gottret & Schieber 2006). In addition to this, the coverage is universal with most health services being accessed for free. This implies that, within this system the largest risk pool has been attained and consequently income cross subsidies are significantly high thus raising the potential of this system to financially protect households from health care costs.

Unfortunately, not all state funded systems offer the same extent of financial protection. Others such as Brazil's *Sistema Unica de Saude* (SUS) despite achieving universal coverage and offering public health service for free still experience high levels of catastrophic health expenditures (Barros & Bertoldi 2008). According to a recent study, out-of-pocket payments for medicines are the major reason why households still face catastrophic health expenditures; thus suggesting the inadequacy of the benefit package offered for beneficiaries within the system (*ibid*). The comprehensiveness of the benefit package is generally limited by the amount of revenues that a health system can collect. In

Brazil for example, the government revenues account for only 40.4% of total health expenditure in comparison to 81% in Britain (Gottret & Schieber 2006; Savedoff 2004).

Other state funded systems which are mainly found in developing countries have been less successful for a variety of reasons. Firstly, since NHS systems are financed from the general budget, the amount of funding available depends on the outcome of annual budget discussions and is vulnerable to changes in political priorities or external shocks (Salehi 2007; Al-Duaj 2009; Drouin 2007). Such external shocks include military conflict that requires additional defence spending (ibid). Also, the low tax base, and high reliance on donor funding (which is generally unpredictable) usually results in an under-funded system which although theoretically should cover the entire population ends up disproportionately serving the richer (ibid). The richer generally benefit more, primarily because the poor have less access to the services and secondly because the poor end up paying for health care in the form of under-the table payments at primary health facilities. A study in Hungary that investigated the inequity of informal payments in health care found out that informal payments were in fact a highly regressive form of health financing (Szende & Culyer 2006).

2.2.3 Mandatory health insurance

The term mandatory health insurance (MHI) refers to a health insurance scheme to which certain groups or the entire population must belong to by law (McIntyre 2007). When a subsection of the population belongs to such an insurance scheme, the term generally used is Social Health Insurance (SHI) while National Health Insurance (NHI) is used for the latter. Mandatory health insurance (as it shall be called hereafter) is distinguished from general revenue-funded systems by the presence of independent or quasi-independent insurance funds and a reliance on compulsory earmarked payroll contributions (Gottret & Schieber 2006; Salehi 2007; Saadah 2008). There is a clear link between these contributions and a set of defined rights for the insured population in this scheme (ibid).

Equity within a mandatory health insurance (MHI) scheme is generally influenced by a variety of factors. The first is the coverage and composition of the risk pools. Generally, MHI schemes tend to begin coverage with the formal sector (owing to the reliance on payroll taxes) before extending to the rest of the population (McIntyre 2007; Rakoloti 2006). When the coverage is restricted to the formal sector or a sub-sector of the population, certain groups, who are typically the poor and unemployed are excluded. When no attempt is made

to subsidize the poor, the impact of a MHI scheme on ensuring financial protection becomes limited to only those individuals who belong to the scheme. The Philippines SHI for example reached 84% coverage in the election year of 2004 through government subsidies to the indigent. However, since then government subsidies to the indigent have reduced which resulted in consequent reduction of enrolment to about 63% (Hsiao & Shaw 2007). In 2007, the probability of facing catastrophic health expenditures was reported to be increasing in higher income groups, while the probability of being impoverished by health expenditures was still predominant in the lowest income decile in Philippines (Ico 2007).

Extending the health insurance to the rest of the population especially the poor and the unemployed requires efficient management of revenues so as to effectively pool health risks. This is usually the case, since the process of extending coverage often requires injection of extra funds in the form of subsidies from the general revenues or subsidies from external funds. These funds can be pooled into one insurance fund as in Hungary or as has been the case in many countries such as Argentina, Chile, Colombia, France, Germany and Japan, separate funds can exist for the different subpopulations (Gottret & Schieber 2006). The presence of many insurance funds, as explained earlier, can have an impact on the equity and extent of financial risk protection of households, particularly if no attempt is made to link up the funds. Such an example of fragmented risk pools can be found in Austria, where health care is organized by sickness funds based on employment sector (Smith & Witter 2004). The plans not only vary in health care needs, they also vary in revenue bases. In addition to this there is no formal attempt to effect transfers between plans (ibid). The result of this, as can be expected has been substantial variations in premium rates between funds for both employers and employees.

On the other hand, even though Japan has multiple insurance funds, cross-subsidization amongst these funds and government subsidies to the high risk pools such as those for the elderly and low-income has led to Japan's health system being able to maintain equity at the same time ensuring financial protection for its population (Rodwin 1994). The Colombian SHI is one other health insurance which has managed to maintain equity by use of a solidarity fund which is used to cross-subsidize membership by the poor. This solidarity fund allows a portion of contributions for SHI from urban and formal sector workers, who are relatively well-off, to be used to cross-subsidize contributions by rural and informal workers (Hsiao & Shaw 2007).

Other factors that threaten the extent to which a MHI scheme can protect its citizens are the depth and range of services included in the benefit package (McIntyre 2007). Colombia for example has two contributory funds, a contributory regime (CR) and a subsidised regime (SR) both of which have separate benefit packages. The wealthier segments of the population belong to the CR, and are covered by a comprehensive benefit package while the benefits package is more limited in the SR to which the poor belong. Although, the financial impact of health care costs has generally reduced since the introduction of the SHI, the limited benefit package for the SR is considered one of the probable reasons why financial protection has not achieved its full potential (Giedion & Uribe 2009). The comprehensiveness of the benefit package as already discussed earlier is a function of the revenue generating capacity of the health financing mechanism. Within the SHI schemes, factors such as the size of the formal sector and the level of government subsidies to the poor become important when designing a benefits package (Hsiao & Shaw 2007).

2.2.4 Voluntary Health insurance

Voluntary health insurance is health insurance to which an individual or group can subscribe without the legal requirement to do so (Salehi 2007). Two types of voluntary health insurance can be identified: private health insurance and community based health insurance

2.2.4.1 Community Based Health Insurance

Community-based health insurance (CBHI) schemes are insurance schemes to which the members of the local, often rural but also peri-urban community pay a small contribution and which then pay the fees charged by local health services (McIntyre 2007). Community-based health insurance schemes have been in existence for a long time and are precursors to SHI schemes such as those in Germany, Japan and Korea and currently they are predominant in Sub-Saharan Africa (Gottret & Schieber 2006; Chankova *et al.* 2008). Recently CBHI schemes have been gaining increasing attention as a potential instrument to protect low-income populations from the impoverishing effects of health care expenditures especially in developing countries (Jakab *et al.* 2001). Proponents suggest that, CBHI schemes promote the establishment of insurance in groups that would otherwise not have access to health insurance; thus increasing financial protection from health care costs amongst these populations.

A systematic review of studies that have looked at CBHI in low income countries that was conducted by Ekman (2004) concluded that; there is strong evidence that CBHI offers some financial protection by reducing OOP spending for health care. On the contrary, other studies are not so optimistic. A systematic review of 258 CBHI schemes that was conducted by the International Labour Organization (ILO) concluded that, the evidence did not justify the assertion that CBHI schemes had been effective in providing financial protection in health care (Sun *et al.* 2009). The reasons for these diverse views can be attributed to the inconsistencies in the interpretation of term “financial protection”. Ekman (2004) considered any reduction in OOP payments for health care as financial protection, whilst the ILO study considered people to be financially protected when they did not have to draw an excessive proportion of their income to finance health care (Sun *et al.* 2009).

Evidence from literature also suggests that CBHI schemes are not without challenges. These include exclusion of the poorest in the community from the financial protection benefits of CBHI schemes (McPake *et al.* 1993; Criel *et al.* 1999; Arhin 1994). The main reason for this exclusion seems to be that, the small premiums that are contributed within these schemes can be out-of-reach for the poorest. Risk pooling within CBHI schemes is also another major challenge. Often, the risk pools are small and fragmented and in certain instances comprise only the poor people (especially when they focus on rural and informal workers only) (McIntyre 2007). Thus cross-subsidies end up being between the poor only, putting an even greater burden on the poor. The average expected cost of health care is also often higher and difficult to predict. Lastly, the funds generated from these schemes are usually low, making sustainability an immense challenge

2.2.4.2 Private health insurance

Private health insurance (PHI) is characterised by contributions that are made via non-income based premiums (Gottret 2007). Usually, PHI is voluntary except in countries such as Switzerland and Uruguay where it is compulsory for an entire population or a subpopulation (Gottret & Schieber 2006). The literature on PHI suggests that, this health financing mechanism is preferable to OOP expenditures, even though its impact on financial protection and access to health services is restricted to those with the ability to pay (Salehi 2007). This latter reason, has invoked much debate regarding how appropriate PHI is, for developing countries. Opponents of PHI suggest that, these schemes tend to serve the

wealthier and healthier segments of the population, a result brought about by the problems of cream skimming¹⁰ and adverse selection that are predominant within the PHI market (Al-Duaj 2009). Evidence from South Africa, also suggests that, when PHI schemes are not under legal obligation to community-rate¹¹ their premiums, this creates an incentive for risk-rating (Soderlund & Hansl 2000). Risk-rating as shown in this study is associated with higher premiums for the higher risk groups (ibid). Higher premiums as can be expected can result in severe financial burden for individuals and households. A study in Brazil also found out that private health plans are the second reason why households still experience catastrophic health events despite the country having achieved universal health coverage through its state funded system and public health services being offered for free (Barros *et al.* 2008; Bos & Waters 2008). The authors highlighted that a significant proportion of the population (estimated at 25%) still buy private health plans, which as Bos & Waters (2008) pointed out have premiums that are quite expensive.

Not all literature on PHI opposes the application of this health financing mechanism in developing countries. In fact, proponents of this method suggest that provided the insurance schemes are well managed, PHI could play a positive role in improving equity and access in developing countries (Sekhri & Savedoff 2005). Sekhri and Savedoff (2005) highlighted 3 critical points to justify this. The first point is that, PHI provides an opportunity for households to avoid large OOP expenditures, in countries where OOP spending still remains the predominant source of health financing. Secondly, the authors highlighted the large informal sector as a major challenge for generating sufficient revenues that are required to fund SHI and NHI systems. Referring to the latter, PHI is therefore regarded as an initial step towards risk pooling and pre-payment, until publicly funded coverage can expand sufficiently. In addition, the existence of PHI is viewed as an opportunity to target publicly funded resources towards the most vulnerable groups whilst those who can contribute towards these schemes can do so. The last point considers the fact that some SHI systems have in fact evolved from PHI systems.

¹⁰ Cream-skimming refers to the practice whereby an insurance scheme enrolls a disproportionate percentage of individuals who present a lower risk than average risk of ill health

¹¹ Community rating of health insurance policies is a method of setting premiums that spreads risk evenly across the entire community. Everyone pays the same rate regardless of age, health status, or claims history (Montgomery 2008)

2.2.5 Health care financing in African health systems

The health financing systems in most parts of Africa are funded predominantly by OOP payments and general tax revenues (Hsiao & Shaw 2007). In Sub-Saharan Africa, OOP expenditure is estimated to account for more than half of total health expenditure whilst virtually all the public health expenditure comes from general tax revenues (Gottret & Schieber 2006). The high level of OOP expenditure observed in Africa can be attributed to the low revenue-raising capacity of general revenues that precludes their use as the main source of health financing. This challenge is also the major reason that led to the implementation of user fees in most African countries in the late 1980s and early 1990s, partly in response to pressure from international organisations such as the World Bank and International Monetary Fund (Gilson & McIntyre 2005). These fees were intended as a cost-recovery mechanism.

Literature on the revenue-generating capacity of user fees suggests however that user fees were largely unsuccessful in raising significant resources in many countries. The results of a review of user fee implementation in 19 African countries showed that, on average revenue from user fees accounted for 6.9% of the public health budget (Yates 2009). However, this increase was accompanied by declines in the utilization of health care services of about 5% to 8% with the declines greater and more sustained in the rural than in the urban areas as shown by a study conducted in Ghana (Badasu 2004). Utilization studies in other countries such as Zaire, Swaziland, Lesotho and Kenya show a similar pattern (Bethune *et al.* 1989; Bennett 1989; Yoder 1989; Moses *et al.* 1992). Given that the impact of user fees on net revenue generation, efficiency, and equity are influenced by the rate and pattern of utilization, these empirical findings are predictive and of profound importance (Bethune *et al.* 1989).

User fees also greatly contributed to increasing the exposure of poor households to the financial risks associated with illness. Firstly was by initiating the vicious cycle of poverty and ill health. Secondly, evidence suggests that by delaying to seek health care, many poor households ultimately incur even greater costs that are potentially impoverishing if the illness becomes severe and requires expensive health care (McIntyre 2007). Recognizing the realities of the worsening economic conditions of their citizens, a number of African states, such as Ghana, Zambia, Zimbabwe and Tanzania adopted policies to exempt the poor and other categories from paying user fees (Badasu 2004). However, exemption policies had

little success in most countries because of several reasons. Some of these include the confusion at the local level of how the exemption system was supposed to work (Save the Children (UK) 2005). In addition, health workers had little incentive to promote exemptions because they could personally benefit from the user fees since some of their salaries were being subsidised by user fees (ibid). In Ghana, for example, only 1 in 1000 patients was exempted from user fees in 1995 despite the recognition that 15-30% of households lived in poverty (Nyonator & Kutzin 1999). A study in Zambia also reported similar findings; thus suggesting that either the poor were not seeking health care or the exemption policy was not being fully implemented (Yates 2009).

Recognition of the financial burden that user fees impose on households has led to the current move towards their removal with some form of prepayment mechanism that allows risk pooling being strongly advocated for. The World Health Assembly that convened in May 2005 emphasized this by passing a resolution that recognises the absence of financing mechanisms offering risk pooling and prepayment mechanisms in most developing countries (Knaul *et al.* 2006). As already mentioned, CBHI schemes seem to have gained the greatest attention in Africa with social health insurance being a fairly recent innovation. Several countries have already implemented some form of CBHI. Amongst these are Rwanda and Senegal. Ghana is one of the few African countries that recently implemented its national health insurance which after three years had coverage of about 60% (Sulzbach 2008). Private voluntary health organizations are not really widespread and are predominant in a few countries such as Zimbabwe, Namibia and South Africa (Sekhri & Savedoff 2005).

Another form of health financing that falls under general tax revenues that has not been discussed in detail is donor funding. The share of total national health expenditures that comes from donors is high in many Sub-Saharan African nations (Hsiao & Shaw 2007). These funds which are channelled through the government account for more than 25 percent of the public health budget in many countries (ibid). The problem with external funding is it is generally unreliable, and when it comes in the form of loans that have to be repaid (deficit financing) it can further reduce government expenditure through debt servicing (McIntyre 2007).

Several critical issues that have an impact on financial protection can be learned from African health financing systems. Firstly, the heavy reliance on out-of-pocket payments for

health care that is predominant in these countries exposes many households to high financial risk that is associated with illness. In countries of Sub-Saharan Africa for example out-of-pocket payments still account for, on average, about 41 percent of total national health expenditures (Hsiao & Shaw 2007). The presence of a variety and most often fragmented risk pools in one health financing system is another issue. Risk pool fragmentation significantly impedes effective risk pooling, and in many instances can lead to a sizeable portion of the population being missed out from any risk pool (Schieber *et al.* 2006; McIntyre & Gilson 2005).

2.3 ASSESSING FINANCIAL PROTECTION AND EQUITY IMPACT OF OOP PAYMENTS

Until recently, the literature on the distributional aspects of health care financing has been distinctly egalitarian, and has explored, either implicitly or explicitly, the impact of health care payments on income inequality (see Wagstaff & van Doorslaer 2003 for full list of references). This information, as can be expected is of ultimate importance in determining the fairness or equity impact of the different forms of health care financing. However, a limitation of this approach can be regarded as its failure to account for the economic impact of health care payments, particularly OOP payments on household welfare. Understanding the economic impact of OOP payments is imperative if the extent to which households are financially protected (or need to be protected) from health payments is to be established.

More recently, 2 alternative approaches have been developed, that attempt to fill the gap of the inequality or egalitarian based approaches mentioned above. The first approach, termed the ‘catastrophe approach’ is based on the view that, total OOP health care payments in excess of a certain threshold of household resources¹² are catastrophic. The rationale behind this is that, at or beyond a certain level (threshold) households would be forced to cut down on basic consumption, sell productive assets, incur debt and ultimately risk impoverishment (Wagstaff & van Doorslaer 2003). The problem with this approach however is the need to use one’s judgement as to when standards of living are disrupted. As a result, there is no complete consensus regarding the ‘specific *threshold*’ for defining catastrophic health expenditures (Xu *et al.* 2007). Most authors have used threshold levels of 2.5%, 5%, 10% 15% and 20% of total household income (Berki 1986; Wagstaff & van

¹² Household resources are measured either as household income, expenditure or consumption

Doorslaer 2003; Wyszewianski 1986). Other threshold levels include expenditure equal to or above 40% of household's capacity to pay¹³ (Xu *et al.* 2003) ; and expenditure equal to 10% of total consumption (Berki 1986; Xu *et al.*, 2003; Devadasan *et al.* 2007).

The second approach, termed the 'impoverishment' approach, considers health spending to be 'impoverishing' if it is sufficiently large to make a household poor or poorer as determined by shifts along the poverty line (Wagstaff & van Doorslaer 2003). The core idea here is that, no one ought to be pushed into poverty or further into poverty by health expenses. This approach, unlike the 'catastrophe' approach shows how far 'catastrophic' payments actually cause hardship. Wagstaff (2008) gives an example of 2 households to illustrate this point: one with OOP expenditure which is 25% of pre-payment income, and yet nowhere close to the poverty line and another with a mere 1% of pre-payment income, yet that percentage brings it below the poverty line.

A variety of issues arise with the use of these approaches. One is the focus on the cost of medical care. Several authors have argued that other direct costs such as income losses that arise from illness may be more important in terms of their impact on household welfare, as observed in a study that was conducted in Indonesia (Gertler & Gruber 2002). Omitting income losses has however been justified on the grounds that these measures aim at measuring financial protection vis-à-vis health care expenses and that household protection against income losses is an issue of the social protection system more generally and is not specific to the health financing system (Wagstaff 2008).

The second is the assumption that all OOP payments are non-discretionary and that such spending automatically deprives the household of resources. The latter issue assumes that a household budget is fixed, thus if families finance some of their health spending through borrowing, savings or selling of assets, the impacts on their current budgets will be overstated (Hatt 2006).. The third issue deals with the fact that these two approaches identify only the households that incur catastrophic and impoverishing medical expenditures and ignore those that cannot meet these expenses and so forgo treatment (O'Donnell *et al.* 2008). Through the subsequent deterioration of health it is assumed that such households

¹³ Capacity to pay is defined as expenditure net of spending on basic necessities (Xu *et al.* 2003).

possibly suffer a greater welfare loss than those incurring catastrophic payments (Pradhan & Prescott 2002).

In spite of these limitations, medical spending in excess of a substantial fraction of the household budget is informative of at least part of the catastrophic economic consequences of illness, without fully identifying the welfare loss from lack of financing protection against health shocks. This study therefore describes measures of financial protection based on these two approaches.

2.3.1 Catastrophic expenditures: Empirical Studies

A recent global health review of surveys in eighty-nine countries covering nearly ninety percent of the world's population suggests that; 150 million people globally (nearly 2.3% of households) suffer financial catastrophe annually because they pay for health care (World Health Organization 2008; Xu *et al.* 2007). In this review which used a 40% threshold of household's CTP, Xu *et al.* (2007) estimate that catastrophic expenditures range from 0% in the Czech Republic, Slovakia and the United Kingdom to more than 10% in Brazil and Vietnam. Several OECD countries—Portugal, Spain, Switzerland and the United States—all record rates in excess of 0.5% (Wagstaff 2008). A separate study conducted in Georgia using the data from the *Health Utilization and Expenditure Survey* (HUES) of 2007 reported rates of CHEs which were as high as 11% for the entire sample population. The threshold level used was again 40% of CTP.

Another study conducted in Kenya reported CHEs of about 4% (Saksena *et al.* 2006). However, in order to counteract one of the limitations of CHE which is the focus on those who sought health care whilst ignoring those too poor to afford care, this study used a simulation approach to investigate what the level of CHE would have been if all those who were ill had in fact sought care. Based on this simulation, the authors find that CHE would in fact have been as high as 19.05% in the lowest quintile group alone. A major limitation of this approach however is the assumption that all reported illnesses in the survey was perceived as serious enough to require health care. Yet, even with this limitation, this approach is at least informative of the total potential burden of OOP health payments.

2.3.1.1 Determinants of catastrophic health expenditure

At a national level, the share of OOP spending in health financing is seen to play a predictably large role (O'Donnell *et al.* 2005). In the two studies by Xu and colleagues

described above, rates of catastrophic spending were higher in poorer countries and those with limited prepayment systems than in higher-income countries. The latter are considered to have advanced social protection institutions such as social insurance or tax-funded health systems (World Health Organization 2008). Van Doorslaer *et al.* (2007), in a similar study investigated catastrophic health expenditures in 14 Asian countries and concluded that the low incidence of catastrophic payments in Sri Lanka, Malaysia and Thailand can be attributed to the low reliance on OOP spending to finance health care, and the limited user fees in the public sector. The high rates of catastrophic payments observed in South Korea are said to reflect the high co-payments in the country's social insurance system and the partial coverage of inpatient care (Wagstaff 2008).

A significant portion of the literature on CHEs is also dedicated to assessing the performance of existing health insurance schemes in terms of their impact on financial risk protection of households. Knaul *et al.* (2006), in a series of articles, investigated the impact of the *Popular Health Insurance* (SP) (termed *Seguro Popula*) in Mexico on incidence of CHEs. These authors find that, since the introduction of this health financing reform in 2001, incidence of CHEs has reduced. The strength of this particular study was the use of data collected from the same surveys (i.e. National Household Income and Expenditure Surveys). Use of data collected from the same surveys allows more accurate monitoring of time trends since information regarding health expenditure for example is asked in the same way. The latter reduces variability in the estimations of expenditures, such as OOP expenditures. Lu *et al.* (2009) recently pointed this out and argued that the survey design can significantly influence the estimate of OOP payments obtained in a study.

Another important piece of evidence that is brought up by this study is the important symbiosis and mutual reinforcement that can exist between health insurance and integrated social programmes. Prior to the implementation of SP, *Oportunidades*¹⁴ was already running and covered 5 million households living in poverty in Mexico, most of whom had no insurance.

¹⁴ *Oportunidades* is an integrated social development and poverty alleviation programme that includes health, nutrition, micro-finance, and education components

A study that investigated the impact of two Indian community health insurance schemes (ACCORD and SEWA) focussing on hospitalization costs also concluded that, both health insurances halved the number of households that would have experienced CHEs by covering hospital costs (Devadasan *et al.* 2007). Limwattananon *et al.* (2007) also find that, following the introduction of universal health scheme in 2001 in Thailand, rates of catastrophic spending amongst households reduced but were not eliminated. This partial reduction as in the earlier case, points out to the limitations of health insurance to reduce or eliminate catastrophic spending. Such limitation is a function of several factors; the most cited being the low maximum at which the benefits are capped (Devadasan *et al.* 2007). Limwattananon *et al.* (2007) also cite factors such as by passing the designated providers (which is prohibited under the capitation contract model without proper referrals) as one of the major causes why households still incurred CHEs. Other studies that have reported similar findings include a joint ILO, WHO and OECD study covering three developing countries namely South Africa, Kenya and Senegal (Scheil-Adlung *et al.* 2006). This study finds that though membership in health insurance schemes contributes to reducing the probability of incurring catastrophic health expenditures, in South Africa this only concerns the richest quintile that can afford comprehensive benefit packages (*ibid*).

Other studies have however provided counterintuitive evidence of the impact of health insurance on catastrophic health spending (Ekman 2007). In a study conducted in Zambia, Ekman (2007) finds that insurance increased the risk of catastrophic spending. The author proposes that the amount of care per illness episode may have increased, as a result of either supplier induced demand or moral hazard (Wagstaff 2008). What the results of this study misses out though is the fact that in the absence of health insurance, these households may have incurred even greater OOP costs resulting in greater welfare loss; or alternatively, these households would not have sought care at all. Thus, in the absence of adequate data to check the health seeking behaviours before and after ownership of health insurance (as is the case in this study), concluding that HI is a risk factor for CHEs may be misleading.

Nonetheless three other studies conducted for China support Ekman's findings. The first study by Wagstaff and Lindelow (2008) finds that, the urban insurance in China increases the risk of catastrophic OOP spending. The authors suggest that weak regulation of providers alongside fee-for-service payments system and a fee schedule that allows providers to make profits on drugs and high-tech care leads to a case where insured patients

receive more complex care and from higher-level (and hence more costly) providers (Wagstaff 2008). The other study that focussed on China's rural scheme also concluded that these schemes have not resulted in a reduction in risk of CHE. The authors attribute this to the high deductibles and low reimbursement ceilings and similar supply side response as those discussed earlier (Wagstaff *et al.* 2009). Interventions on the supply side in China including introduction of treatment protocols and essential drug lists, have been shown to reduce the incidence of catastrophic health spending (Wagstaff 2008).

Going beyond measurement, one would want to know what characteristics make a household vulnerable to incurring catastrophic payments. Several studies have thus been conducted that have investigated the determinants (or risk factors) for catastrophic health expenditures. In one such study, Xu *et al.* (2006) investigated the impact of eliminating user fees in Uganda on utilization and incidence of catastrophic expenditures. The regression analysis for this study revealed that, whilst 2.92% of households incurred catastrophic expenditures, higher risk of CHEs was associated with being poor, use of health services (particularly private health services), elderly household members (above 65 years), having a household head with little education, and being a female headed household. The latter was however only significant for non-poor households. Lower risk of catastrophic expenditure was associated with living in an urban area. Similar results were found in Indonesia and Lebanon, with additional findings that, formal education, ownership of health insurance, and having a bigger family also significantly reduce the risk of incurring catastrophic expenditures (Xu 2003). For the latter, it is likely that pool of income is higher in bigger families. The threshold level used was 40% of capacity to pay in all three studies

Another study by Knaul *et al.* (2006) which investigated the impact of *Seguro Popular* in Mexico using National Health Income and Expenditure Surveys (NHIES) found that, households (HHs) in the richest quintile were less likely to suffer from CHEs. However, this result was only significant when disposable income included money not only from income but savings, selling of assets and borrowing etc.; thus highlighting the fact that richer HHs generally can finance health from other sources such as savings and not just income. Female headed households were less likely to suffer from CHE whilst having a household head who was 50 years or older; having at least one household member who was 65 years or older and having children less than 5 years old were all risk factors for CHEs. Unlike the previous studies however, in this study the authors found out that larger HH size was a risk factor for

CHE whilst education of the HH and location of residence (urban vs. rural) had no effect on CHE risk.

Ekman (2007) in a study that investigated the impact of health insurance in Zambia also finds that higher income, living closer to a health facility, being formally employed or being a farmer and having malaria in comparison to other illnesses or injury reduces the risk of catastrophic health expenditures. However, contrarily this study finds that compared to renting a house, owning a house or having access to free accommodation increases the risk of catastrophic health expenditures. This latter finding could be a reflection of the problems in the manner in which the data was collected.

Other studies such as the one conducted by Gumber (2001) have investigated determinants of OOP health expenditure in India. This study used primary survey data in Gujarat to find the effect of micro health insurance (SEWA), a women's union, on access to health care and OOP expenditure (Gumber 2001). This study found that; social insurance, health care provider and demographic characteristics of the household are all important determinants of OOP expenditures. A limitation of this study however, is the fact that it used a purposive sample covering 1200 households from Ahmedabad and neighbouring areas (Joglekar 2008). Thus, the sample for this study is not representative of India and the results are only valid for the sample. O'Donnell *et al.* (2005), also estimate the probability of incurring CHEs in six Asian countries including India, using a two part model. This study utilizes household level consumption expenditure data collected by the National Sample Survey Organization for the years 1999-2000 for India. The results of this study showed that, as consumption expenditure increases, the probability of catastrophic OOP expenditure increases. However, inclusion of household's total expenditure as one of the explanatory variables in an economic model has been shown to lead to endogeneity problems. Thus use of alternative measures such as wealth or asset quintiles has been proposed in literature so as to circumvent this problem (Joglekar 2008).

Other authors have directed their focus on the incidence of catastrophic health expenditures amongst the poorer communities. Su *et al.* (2006) investigated determinants of CHEs in a low income district in Burkina Faso using cross-sectional surveys. The variables tested were: illness and treatment episodes; utilization of professional (modern) care; having a disabled member in the family; having a member with chronic illness; household

characteristics such as educational status and gender of household head; size of household; and location of household as well as economic status. Using the framework for analyzing determinants of health care utilization, which was proposed by Andersen and Newman (1973); all the factors investigated in this study are all related in some way to health care utilization. As such, these factors can be distinguished into predisposing factors, enabling resources and illness level factors - a distinction which was proposed by these authors. Predisposing factors are regarded as those factors that increase the propensity of individuals to use health services, for example age, sex and educational level of the individual. Enabling resources would be those factors that allow an individual to use health care services for example high levels of disposable income. Illness level represents types of illnesses, number of illness episodes and disability. It can be expected that, all the factors that are predictive of health care utilization (or higher health care utilization) would also be predictive of CHEs, since OOP expenditures are incurred through utilization of health care.

The multivariate logistic regression analysis for this study confirms some of this theoretical analysis. This study finds that; any type of care seeking following illness, a households' health care utilization especially for professional care, average number of illness and treatment episodes amongst household members, as well as the presence of chronic disease in household were all important factors that lead to catastrophic health payments (Su *et al.* 2006). Limwattananon *et al.* (2007) who find that households using inpatient services at private facilities are at higher risk of incurring CHEs, reinforce the finding on utilization of modern care.

Other studies have also focused on the economic impact of specific diseases particularly, malaria, HIV/AIDS and TB. Castillo-Riquelme *et al.* (2008) investigated the economic impact of malaria between two countries, Mozambique and South Africa using as thresholds for CHE the 10% of household income and 40% of non-food expenditure. The results showed a 32-34% and 9-13% incidence of catastrophic payments amongst households in Mozambique and South Africa respectively (Castillo-Riquelme *et al.* 2008). Many other studies have also been conducted on the economic impact of malaria in countries particularly in Africa (Ettling *et al.* 1994; Sauerborn *et al.* 1991, Asenso-Okyere & Dzator 1997; Attanayake *et al.* 2000; Chuma *et al.* 2006; Onwujekwe & Okonkwo 2000; Konradsen *et al.* 1997). A distinct difference between these studies stems from the cost categories included in the calculation of catastrophic payments. Whilst Castillo-Riquelme *et al.* (2008), considered

both direct and indirect costs such as patient transport, caregiver transport, cost of medicines, consultation fees, cost of diagnostic tests and other costs incurred while waiting to be attended, other studies do not include costs for food and transport. Apart from malaria, CHE studies in Africa have also focused on the burden of HIV/AIDS and tuberculosis amongst households (Russell 2004).

Thuan *et al.* (2006) conducted a study to compare incidence of catastrophic payments that is associated with different types of illnesses both communicable and non-communicable diseases. The results of this study showed that communicable illnesses are predominant amongst the poorer people who also incur the highest catastrophic health expenditures. In addition, this study showed that catastrophic health care spending for a household is usually not a result of one single disastrous event, but rather a series of events and is related more to “everyday illnesses” in a developing country context (Thuan *et al.* 2006). Su *et al.* (2006) in a related study contrarily concludes that non-communicable diseases and the neglected diseases such as Schistosomiasis, Trypanosomiasis and Leishmaniasis, are responsible for a significant proportion of health care costs among the poor. Such diseases are also prevalent in countries such as Zimbabwe (WHO 2002).

2.3.2 Impoverishing expenditures: Empirical studies

A cross-country analysis conducted in Asia looked at the effects of OOP payments on poverty estimates in 11 low to middle income Asian countries i.e. the impact of catastrophic expenditures on the extent of impoverishment (van Doorslaer *et al.* 2006). Using the poverty estimates used by the World Bank (\$1-a-day and \$2-a-day poverty lines), this study estimated changes in the poverty headcount¹⁵ and poverty gap¹⁶ after incorporating OOP payments. The results of this study showed that poverty headcount increased from 19.3% to 22% of total population (so plus 2.7% of population) or an extra 78.25 million Asian people. These people were previously not counted as poor. However, their out-of-pocket spending brought them below the poverty line. This study also showed that largest relative increases were in Bangladesh, India, China and Vietnam and this magnitude was clearly linked to

¹⁵ Poverty head count refers to the proportion of individuals falling below poverty line

¹⁶ Poverty gap refers to the average amount by which resources fall short of the poverty line (%)

OOP finance share and to population share at risk. Yet substantial cross-country variation even at same OOP level seemed to suggest some exemptions to charges for poor were effective (van Doorslaer *et al.* 2006). The findings of this study like those of CHEs need to be interpreted with caution, bearing in mind that OOP health expenditure is not always non-discretionary and similarly household budget is not always fixed. A household that chooses to spend excessively on health payments is not pushed into poverty because of OOP payments. Similarly, a household that borrows or use savings will not suffer a decline of household expenditure that is proportional to the amount dedicated towards health care.

Wagstaff & van Doorslaer (2003) also looked at health care payments and poverty during the years 1993 and 1998 in Vietnam. In 1998, the difference between the prepayment and post-payment poverty headcount (referred to as the poverty headcount adjustment) was around 3.5% whilst, the poverty gap adjustment (%) (Post payment normalised gap minus pre-payment normalised gap) was about 1% (Wagstaff 2008). In 1993, the poverty headcount adjustment was about 4%, meaning that the fall in the headcount was larger for post-payment than pre-payment income. These results show that the share of income absorbed by health spending fell over this period (Wagstaff 2008)

Other studies such as the one by Sheil-Adlung *et al.* (2006) also estimated poverty due to OOP payments focussing on 3 African countries, namely: South Africa, Senegal and Kenya. This study found that impoverishment due to OOP health payments ranged from 1.5% to about 5.4% across these 3 countries. In addition, OOP payments also deepened the poverty level of those already poor. These findings suggest that OOP payments not only precipitate poverty, they also place poor households into a poverty trap from which they may not escape.

Several other studies have also looked at the impact of health reforms on impoverishment. Knaul *et al.* (2007) finds that the proportion of people living on less than \$2 a day declined continually between 1998 and 2004 in Mexico, a period during which SP was also introduced. However, the authors attribute the decline to a combination of macroeconomic policies and poverty reduction programmes such as *Oportunidades*. Limwattananon *et al.* (2007) in a similar study, investigates the incidence of impoverishing expenditures due to household OOP payments, comparing the periods before and after universal health coverage (UC) in Thailand. This study found that rates of impoverishment

were lower following introduction of UC in 2001 but were not zero. The failure of the scheme to eliminate impoverishment is attributed to OOP expenses that people incurred as a result of by passing their designated provider. The household characteristics that are risk factors for impoverishment are similar to those described earlier for catastrophic health expenditures.

2.4 GAPS IN LITERATURE

Despite the substantial evidence that CHEs are a significant problem in African developing countries, which are characterized by poverty and high levels of OOP payments, there seems to be no study that has been conducted specifically for Zimbabwe. Amongst the countries that have been studied, none experienced the extraordinary challenges that Zimbabwe has been currently facing. These include; closure of public sector facilities, inconceivable costs of private health sector fees as well as abrupt cessation of medical aid membership for the majority of beneficiaries of both private and public medical aid schemes. These challenges, which are very context-specific, make it almost impossible to fully understand and address the problem of CHEs in Zimbabwe using studies from other countries, particularly questions regarding the level of CHEs.

In addition to giving insight regarding CHEs, this literature review also gave an indication of the impoverishing impact of OOP payments. However, much of the literature on the impoverishing impact of OOP payments has been derived from studies conducted in Asia, with very few studies conducted in Africa. This study will add to the aforementioned literature by giving evidence of impoverishment from a country which is already experiencing high levels of poverty. This evidence could be of utmost benefit to countries, particularly in Sub-Saharan Africa that are experiencing similar poverty levels to that experienced in Zimbabwe.

2.5 METHODOLOGICAL ISSUES

This section discusses some of the limitations of catastrophic expenditure studies that have not been discussed in previous sections. Specifically are the methods for measuring OOP and catastrophic private health expenditures.

Lu *et al.* (2009) recently investigated the effect of survey design, specifically the number of items and recall period on estimates of household OOP and catastrophic expenditure on health. Using the World Health Surveys these authors investigate the impact of using a one item question (that asks for total OOP health spending in previous 4 weeks) or an eight item measure (which asks 8 detailed questions of health expenditure within 4 weeks) on the estimate of health expenditure. These authors find that in 37 out of 43 countries, the single item measure yielded an estimate of annual health expenditure that was lower than the eight item measure, the result being statistically significant at the 95% level of confidence (Lu *et al.* 2009). Thus, in most countries a lower level of disaggregation (fewer questions) gave a lower estimate of annual health expenditures. In addition to this, the ratio of the percentage of households experiencing catastrophic health spending derived from the single-item measure to that derived from the eight-item measure ranged from 0.166 in Slovakia to about 1.965 in Uruguay. This implies that the use of a single item measure relative to that of an eight item measure, can either under-estimate CHEs, give similar results or over-estimate the impact of CHEs. These authors suggest that this observed variation implies that the methods used to collect health expenditure information can significantly confound analyses of the determinants of catastrophic spending and their variations over time.

Another issue that is investigated by these authors is the impact of recall period on estimates of health expenditure. Using the World Health Surveys for 43 countries, these authors find that the average annual household OOP spending on hospitalization derived from a one month recall period is significantly larger than the one derived from 12 month recall period. Similar results were observed with the Nepal Living Standards Measurement Study (LSMS). When the authors investigated the combined effect of recall period and number of items, it was however difficult to predict which one had the greater influence. Another important point that is raised in this study relates to the type of study that is used to collect information on health expenditures. In two Living Standards Measurement Studies from Bulgaria and Jamaica, these authors find that, questions about health expenditures that are fielded into a health module where people have been primed to think about the recent health experiences generally result in estimates that are higher than those from a health care consumption module.

The use of cross-sectional data in estimating CHEs has often been pointed out as a limitation of CHE studies. Van Damme *et al.* (2003) and Duryea (2007) have argued that

cross-sectional data fails to capture the inter-temporal variations in the incidence of CHEs. They argue that a household incurring expenditure today, may after a few months be worse off, or have recuperated entirely from such expenditures depending on duration of illness, use of savings etc. These authors argue in favour of longitudinal studies that capture household coping strategies in analysis. Recently, Wagstaff (2008) also proposed a method of measuring catastrophic health expenditures that reflects the proceeds of asset sales or funds received through a gift or loan. Another problem with using cross-sectional data when investigating the type of illnesses that lead to the highest catastrophic impact is that some diseases are seasonal and sampling during such periods when the diseases prevalence is high overestimates the catastrophic impact of health payments for those illnesses.

Notwithstanding the arguments presented above, the approaches that have been used thus far have merit in that they capture the amount of money that households have, (or have to find) to finance health care and relating it to standard of living. In addition to this these studies at least in part are informative of the possible magnitude of the problems that countries have in a bid to protect citizens from health expenditures that are catastrophic and they can in fact form the stepping stone towards more detailed and expensive panel data analysis.

2.6 SUMMARY OF CHAPTER

This chapter discussed the different financing mechanisms (out-of-pocket payments government revenues, mandatory health insurance, and private voluntary health insurance) and their implications on equity and financial protection of households. Out-of-pocket payments besides being the least equitable also offer the least financial protection on households. The different prepayment mechanisms presented also offer differential financial protection to households as determined by several factors. First is the size of the risk pool; with bigger risk pools offering greater potential for spreading risks across an insured population. Second is how equitable the system is; with a system whereby the richer contribute more towards health financing offering greater financial protection. Thirdly, is the composition and fragmentation of the risk pools with risk pools in which the poor only subsidise each other being less equitable.

In African health systems a combination of the different financing mechanisms exist in any one country. Risk pools are often fragmented giving rise to risk pooling challenges. The high OOP payments still predominant in Africa also raise critical questions as to the extent to which health systems are providing financial protection to households. Lack of financial risk protection from OOP payments, is a major threat to household welfare. Thus, this review presents two measures of assessing household financial protection, namely; the “catastrophe” approach and “impoverishment” approach. Empirical evidence on the incidence of catastrophic health expenditures (CHEs) and impoverishment as well as the risk factors for CHEs was also presented. Based on the empirical literature, the incidence of CHEs and impoverishment (worldwide) ranges from between (0% to 10.5%) and (0% to 5.5%) respectively. The chapter ended with a discussion of the methodological limitations of catastrophic health expenditure studies

CHAPTER 3

CONCEPTUAL FRAMEWORK

3 INTRODUCTION

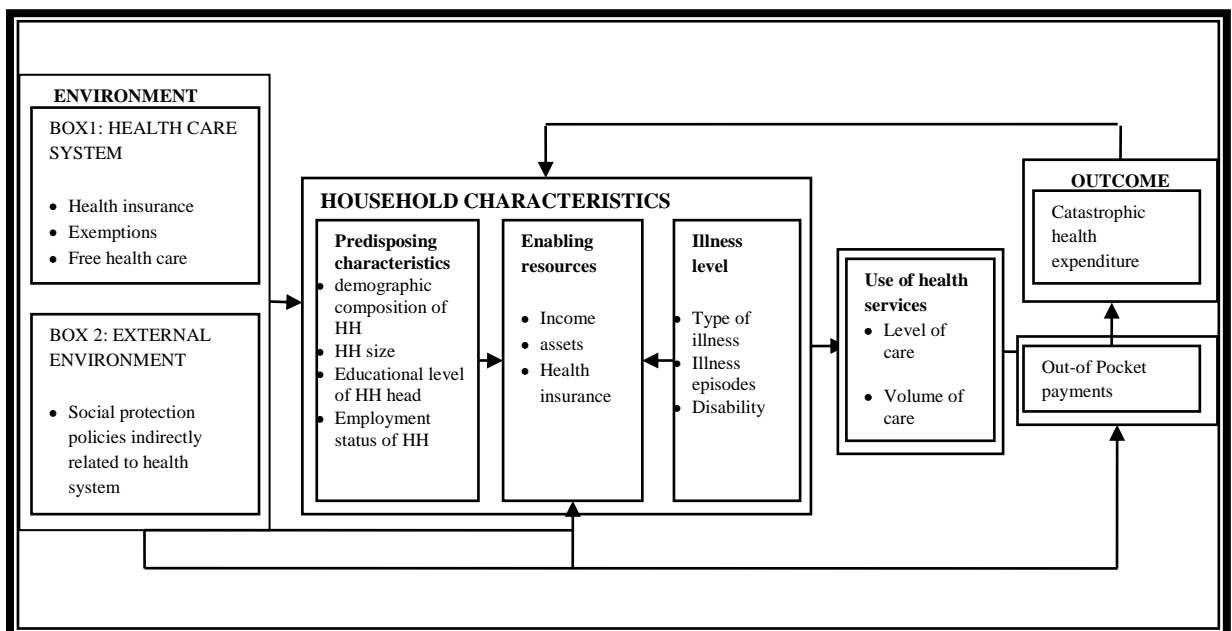
The preceding literature review gave information regarding the factors that are considered to be determinants of catastrophic health expenditures (CHEs). These factors range from household characteristics such as income, to factors related to the health care system, particularly policies on health care financing. Using the information gathered from the literature review, this study outlines a conceptual framework for analyzing how the different factors influence whether a household incurs a catastrophic health expenditure or not.

Based on the literature review, incidence of catastrophic health payments is presumed to be a function of two components:

- (i) the level of OOP payments incurred by the household and;
- (ii) the ability of the household to meet such health care costs

Since OOP costs are presumed to be driven by the type and quantity of health care consumed and the extent of third party coverage of the services; factors that are predictive of health care use alongside health insurance coverage would be expected to determine to a large extent the level OOP expenditures a household incurs (Crystal *et al.* 2000). These factors together with some measure of a household's ability to pay (such as household income or consumption); capture the characteristics that make a household vulnerable to catastrophic payments. The conceptual framework in fig 2.1 below, which has been adapted from Horstman (2007), is used in this study to show the possible pathways by which these factors influence the occurrence of a catastrophic health event.

Figure 3.1: Conceptual framework for analyzing determinants of catastrophic health expenditures



According to the conceptual framework that is outlined in figure 3.1 above, incidence and intensity of catastrophic health expenditures is a function of three main components: 1) household characteristics; 2) health services utilization and 3) the environment - which is divided into the health care system and the “external” environment

3.1.1 Household Characteristics

Household characteristics are distinguished into predisposing characteristics, enabling resources and level of illness. This distinction is based on the framework proposed by Andersen and Newman for evaluating determinants of health care utilization (Andersen & Newman 1973). According to these authors, pre-disposing factors would be those factors that increase the propensity of households to incur health care costs as a result of use of health services. Such factors include: (i) demographic composition of the household; (ii) household size; (iii) educational level of the household head and (iv) employment status of the household head.

Enabling resources are regarded as those resources that make it possible for households to use health care services. These resources include the household income and whether a household has access to health insurance or not. Illness level includes: (i) the types of illnesses (perceived or diagnosed) that household members suffer from; (ii) Illness episodes (iii) presence of disabled member(s) in the household. Various inter-relationships exist between these household characteristics as will be explained below.

With respect to predisposing characteristics, it can be expected that risk of CHEs is higher for households with very young or very elderly members¹⁷. This is so since health care utilization for these particular groups is generally high and consequently more of the household resources tend to be devoted towards health care (Habibov 2009). Elderly members for example are at higher risk of chronic illnesses which usually entail the use of expensive prescription medications and lifetime treatment. Young children, for reasons such as weakly developed immune systems are susceptible to various illnesses that also necessitate the use of health care more frequently (Andersen & Newman 1973).

¹⁷Children aged 5 years and below are usually considered the very young in literature whilst the elderly are usually those above age 65 (Riveira *et al.* 2006).

In addition to this, elderly members and young children do not fully participate in the income generating activities of the household. This implies that, households with a higher proportion of these individuals may also have fewer available resources than those with a higher proportion of economically active individuals (Habibov 2009). Taking these 2 factors together, the expectation is that, these households will spend more on health care from fewer available resources which significantly increases their vulnerability to catastrophic health expenditures. The same explanation would apply for households with illnesses that are severe, and households with disabled members.

The other predisposing factors such as educational level and employment status of household head plus household size tend to influence the occurrence of catastrophic health expenditures through their effect on enabling resources. Attaining an education for example increases one's opportunity to be employed and earn a salary or wage. At the same time, average earnings increase measurably with higher levels of education (Bauma & Paeya 2004). Using the law of demand and supply, it is expected that, the more disposable income a household has, the more likely they are to utilize health care especially higher level care since they can afford it (King *et al.* 2002). Consequently, one would expect the health care costs incurred to be much higher for wealthier households.

Although health care costs can be much higher for wealthier households, OOP costs may not necessarily be high. This is so since wealthier households also have greater ability to purchase health insurance, especially private health insurance as is the case in Zimbabwe. Thus, even with higher total costs of health care, the ownership of health insurance would shield wealthier households from incurring high OOP costs that could lead into financial catastrophe. However, the protective effect of health insurance would be limited to services within the benefit package (BP) such that excessive use of services beyond the BP would explain why some wealthier households would end up incurring CHEs. Despite this, differences in ability to pay between wealthier and poorer households can be so substantial that even with high OOP costs in the former group, the share of income (or expenditure) dedicated to health care would still be proportionally lower for the wealthier than poorer households.

Education has also been shown to influence the way people understand health and their responsibilities in securing their health and that of others (MoHCW 2008). For that reason

households in which the head of the household is educated are more likely to place greater value on preventive health care, such that the probability of household members falling ill reduces (Joglekar 2008). Consequently the need to use more expensive curative health services also decreases.

Household size can be expected to have either a positive or negative influence on the incidence of CHEs depending on how the size of the household impacts on the household resources. On the one hand, larger households through the pool of income can reduce the vulnerability of the household to catastrophic health expenditures. On the other hand, larger households could also mean more demands on the household resources for basic needs such as food and education particularly if the household has fewer economically active individuals.

3.1.2 Health service use

The type and level of health services used by households as already mentioned also determines whether households are at risk of financial catastrophe or not. Type of health services refers to the different health services that households utilize, for example; pharmacy, private practitioner, public hospitals, traditional healers etc. The level of care refers to primary care, secondary care and tertiary care. The different levels of care are an important determinant since costs of care tend to vary across different levels of care (Normand *et al.* 1996). Costs vary across the levels of care as a consequence of the type of services offered at each level. Primary level facilities for example deal with uncomplicated health cases and also focus on preventive more than curative health care. On the other hand, tertiary level facilities offer the most sophisticated services such as Magnetic Resonance Imaging (MRI) Scans, which require the use of expensive equipment and expensive specialist services (MoHCW 2008). Consequently, the cost of such services is high. Non-use of health care services, as can be expected would result in a household not incurring any OOP health care costs. This would therefore mean households in which no care is sought do not experience CHEs even though they may still experience greater welfare loss from not seeking care.

3.1.3 Environment

The environment is another significant factor that influences the vulnerability of households to catastrophic health expenditures. The environment as can be seen in the conceptual framework is distinguished into the health care system and the external environment. The health care system is characterised by health policies that influence whether households incur OOP costs or not. Such policies include user fee exemption policies and policies on free health care. Exemption policies for example are usually targeted at the vulnerable groups such as the poor, the elderly and the very young; thus protecting them from catastrophic health expenditures. Supply factors on the other hand such as the shortages of medicines within the health system (or exclusion of medicines from the benefit package), would increase vulnerability of households to CHEs even if the health care itself is free. This is so since households would have to resort to purchasing medications from private healthcare providers who are more expensive (Habibov 2009).

The external environment concerns policies indirectly related to the health system, for example the government's concern about AIDS. It can be hypothesized that a higher concern about AIDS by the government, will lead to lower levels of out of pocket spending on HIV/AIDS, due to more financial support through the health care system (Horstman 2007).

Other social protection policies include grants to the poor which increase their level of resources. In addition to this, government's concern about environmental factors such as access to clean drinking water, proper sanitation, use of clean cooking fuels and housing conditions amongst others can reduce the health risks to which the households are exposed to. Access to clean water for example reduces the incidence of water-related diseases such as diarrhoeal illnesses, whilst long exposure to household indoor pollution increases the risk of respiratory infections (Smith 2000). In this regard, one would expect that households with poor access to safe drinking water and clean sources of cooking fuel and who have poor living conditions will have a higher probability of falling ill. Higher probability of falling ill would translate into higher OOP health expenditures provided health care is sought.

3.1.4 Impact of catastrophic health expenditures

Beyond just disrupting household consumption, CHEs can ultimately impoverish a household. This can be expected if a household dedicates so much of its resources such as income or in some cases assets that can be readily converted into cash towards health care.

Since the incidence and intensity of CHEs determines whether households are impoverished by OOP expenditures or not, the same factors that determine whether households incur CHEs are also predictive of the incidence of poverty due to OOP health expenditures. Thus, factors that determine the incidence of CHEs, also determine why some households are impoverished by OOP health care expenditures.

3.1.5 Summary

This section presented a conceptual framework that outlined how the different factors namely; health system factors, external environment factors, household characteristics and health utilization factors influence the occurrence of a catastrophic health event.

These factors as shown are inter-related in the manner in which they make households vulnerable to catastrophic health expenditures. The conceptual framework outlined above will thus be used in the analysis of determinants of catastrophic health expenditure in this study

CHAPTER 4

METHODOLOGY

4 INTRODUCTION

This chapter describes the methods of fieldwork and data analysis used in this study. It outlines the sampling frame, study area, the sample size and the data collection techniques. The principles and rationale, for guiding decisions taken before and during data collection are also explained. Further, the methods of data analysis that are used in this study and the rationale for choice of methods are explained.

4.1 SURVEY SITE

The data that was used for this study was collected via a household survey conducted by the researcher in the Harare province and Seke rural district in Zimbabwe. The household survey was conducted within the periods: January to February 2009. The two areas were selected for the survey for several reasons. One is the researcher's familiarity with the locations, languages spoken and cultures in these areas. The second is the urban-rural distinction. The third reason is the close proximity of the rural and urban sites to each other that made it possible to carry out the surveys within the budget constraints.

Harare, the capital city of Zimbabwe has an estimated population of 2,800,000 with 1,600,000 living in its metropolitan area (Muronda 2008). Harare is one of 2 cities (the other being Bulawayo) that has provincial status. This province covers an area of 872 square kilometres (CSO 2004). According to the basic administrative division of Zimbabwe, a province is sub-divided into districts, which are further sub-divided into wards. In the case of rural areas, wards are classified even further into Village Development Committees (Vidcos). Harare Metropolitan Province is divided into four districts: Harare Rural, Chitungwiza, Epworth and Harare Urban (Mutonodzo 2008). Harare Urban comprises 373,058 households, and has the largest proportion (76%) of the population (ibid). This present study took place in Harare urban district, which is made up of 48 wards spread over 27 suburbs. The suburbs can be divided into three broad categories based on socio-economic stratification (Muronda 2008). These are high, medium and low-density suburbs.

Generally, high density areas are densely populated areas where the low income people reside while low density areas are sparsely populated areas where high income earners mostly reside (Mutandwa & Gadzirayi 2006). However, some middle income and low income earners also reside (either as domestic workers, lodgers or as tenants) in low density areas making this classification of socio-economic status by residential area less concrete. Nevertheless to aid selection of a sample that represents urban population characteristics particularly heterogeneity in income, it was imperative to include households from high density, medium density and low density suburbs in this study. The suburbs that were surveyed in this study are shown in table 4.1.1.

Table 4.1.1 Suburbs in Harare urban district surveyed in this study by name and type

Suburb	Suburb type
Malborough	Low density
Greencroft	Low density
Old Highfield	High density
Glenview 1	High density
Kuwadzana 1	High density
Old Highfield	High density
Warren Park 1	Medium density
Tynwald South	Medium density

Seke rural district which is in the Mashonaland East province has 21 wards. According to the 2002 population census, Seke district comprises 19 091 households with 39 213 males and 38 627 females. The average household size is estimated at 4.1 persons. For this study, only households in the communal lands were interviewed. Communal land is one of the five land use sectors in Zimbabwe. The others are: resettlement areas, small scale farming areas, large scale farming areas and urban and semi-urban areas. Communal lands in Seke district were thus chosen to capture a representative rural population in which subsistence farming is the principal economic activity.

4.2 SAMPLE SIZE

The question of the number of households to be included in the survey was addressed statistically, to achieve a desired representative sample. According to Duijnhouwer (1998), the sample size of household surveys in which both binomial variables and quantitative variables are measured can be calculated from the following formula

Where;

a constant to be used for samples larger than 60 and 95% confidence limits.

This constant is approximately 4.0 for 95% confidence limits

18

The target sample size for this study was therefore:

4.2.1 Unit of analysis

The unit of analysis in this study was the household. For the purpose of this study, a household was defined as a person or group of related and unrelated persons who live together in the same dwelling unit(s), who acknowledge one adult male or female as head of household, who share the same housekeeping arrangements, and who are considered one unit (Central Statistical Office (Zimbabwe) & Macro International Inc. 2007). The household was chosen as the unit of analysis primarily because expenditures relating to health care and

¹⁸ The design effect is the loss of effectiveness by the use of cluster sampling, instead of simple random sampling. The design effect is basically the ratio of the actual variance, under the sampling method actually used, to the variance computed under the assumption of simple random sampling (Frongillo 1996)

coping mechanisms usually affect the overall household budget and not just the sick individuals (Rahman & Ahmed 2006).

4.2.2 Distribution of households within the study sample

As seen in the equation above, the target sample size for the entire study population was 600 households. The researcher aimed to interview 120 households (20% of households) from the rural areas and the other 80% (480 households) from urban areas. This is despite the fact that 80% of the population reside in rural areas in Zimbabwe. Cost constraints related to travel and accommodation expenses motivated the choice of only 20% of households to be from rural areas.

Out of the 480 households from urban areas, the researcher targeted 288 to be from high density suburbs, whilst the middle and low density suburbs had target sample sizes of 96 households each. The proportion of households chosen from each stratum was done according to the population size in each stratum. Although 5 enumeration areas would have achieved a target sample size of 480 households, the first day of interviews indicated that the number of households in each EA was on average 60 households and not the expected 100 households. The few households observed in each EA is suspected to have been a consequence of the “operation restore order¹⁹” that took place in Zimbabwe in 2005, which led to destruction of homes in both rural and urban areas. Thus the decision was made to select 8 EAs in the urban areas to achieve a desired sample size of 480 households. Likewise, 3 EAs were chosen for the communal lands.

4.3 SAMPLING STRATEGY

This study used a multi-stage sampling procedure to select the study sample. The first stage for selection of urban households involved stratification of the urban district into low density, middle density and high density suburbs. In Zimbabwe residential areas have been historically divided into low density, middle density and high density suburbs. High density, for the black people (where the poor now reside), middle density for the coloureds (where

¹⁹ This operation resulted in the destruction of homes nationwide and it was expected that the number of households in each EA would be much lower than that reported in the last population census of 2002

the middle income now reside) and low density meant for the white (where the better off now reside) (ZimVAC & SADC FANR VAC 2004).

The second stage was random selection of suburbs within the 3 strata. Random selection was performed using the dice roller 3.0 software package. The number of suburbs chosen from each stratum was based on probability due to population size in each stratum. The third stage in sampling was random sampling of one enumeration area (EA) per suburb. Enumeration areas have an average of about 100 households each. To identify the EAs, the Zimbabwe Master Sampling Frame (ZMS02) developed after the 2002 population census was used. In total 8 EAs were selected. The final stage involved sampling of all households within the EA.

4.3.1 Selection of rural sample

The first stage in the selection of the sample from the Seke rural district was purposive sampling of communal lands in the district. According to the ZMS02, rural enumeration areas are stratified into:

- (1) Communal Lands
- (2) Small-Scale Commercial Farms
- (3) Large-Scale Commercial Farms
- (4) Resettlement Areas

In this study, communal lands were purposively chosen for the reasons that were highlighted earlier. The second stage was random selection of 3 EAs from the EAs within the communal lands. The last stage in sampling was sampling of all households in each enumeration area. In total 11 EAs were chosen for this study.

4.4 TRAINING AND FIELD WORK

The researcher adapted an existing training manual from the CSO for this study (Central Statistical Office (Zimbabwe) 2004). The training manual gave: the background of the study; aims and objectives of the study; sample design; role of fieldworker, team leader and supervisor; basic principles of conducting interviews amongst others. Nine field workers who had previous experience in conducting household surveys similar to the one for this study were selected. Two of these acted as the team leaders. Fieldworkers were trained for three days. This was followed by a carefully supervised pilot test on 50 households to assess

the competence of the interviewers. The pilot test also informed changes on the survey instrument. Some of the changes to the survey instrument included the inclusion of a section that specifically asked about pregnancy and pregnancy related costs. This decision was made following the recognition that pregnancy related costs were not being reported even though some piloted households had incurred medical costs related to antenatal care.

4.5 THE SURVEY INSTRUMENT AND DATA COLLECTION TECHNIQUE

4.5.1 The survey instrument

The main aim of this study was to identify the household economic consequences of paying for health care using out-of-pocket (OOP) payments. The study also aimed to identify the risk factors for catastrophic health payments, and health payments induced poverty. In order to do this, the survey instrument which was in the form of a household questionnaire was designed, translated into two dialects and divided into seven sections in which the following information was obtained:

1. Household demographics
2. Education
3. Employment activity and household income
4. Health incidence/ spending/expense
5. Household consumption expenditure and food spending
6. Health expenditure related to pregnancy
7. Household coping strategies
8. Asset ownership

The full survey instrument is attached as appendix 1.

4.5.2 Data collection technique

After training, the team of fieldworkers including the principal researcher started intensive data collection which was completed in three weeks (from 15th January 2009 to 7th of February 2009). The group was divided into 2 teams, each headed by a field supervisor who supervised the team during the entire field work. Each team was deployed into an EA (one EA per team) and interviews conducted with all households in that EA before the team could move to any other EA. In every household, efforts were made to interview the head of the household. However where this was not possible, the most senior member of the household was interviewed.

The total number of households in the 11 EAs surveyed was 547 households. Interviews could only be conducted with 501 of these households. Non-response rate in this study was therefore 8.5%. The other 46 households could not be interviewed for the following reasons:

- i) 15 households in the rural areas had attended a funeral in the neighbouring village
- ii) 10 households in the low density areas and 8 households in middle density areas could not be interviewed as there was no one available at home during the time of the survey. Efforts had already been made to conduct the survey on a Sunday afternoon when most respondents are not at work.
- iii) 13 households could not be interviewed in the high density areas as they refused to respond. The respondents felt that the project was politically affiliated²⁰ and were afraid responding would place their lives at risk.

The researcher felt that the households that could not be interviewed were atypical and would not have much of an effect on the results of the study. More so, the budget constraints could only allow follow up of a few households.

4.5.3 Data management and quality checks

To ensure quality and accurate primary data collection, the researchers had three days training before field work and the instruments were field-tested. In addition, completed questionnaires were checked for inconsistencies and errors at the end of each day both by the field supervisor and the researcher. Any query or inconsistent questionnaire was returned to the fieldworker in question for re-interview with the respondent. The field supervisors and the researcher also acted as “quality controllers” as they were with the field workers all the time.

4.5.4 Data management

A double data entry system was used with data entry carried out at the Central Statistics Office (Zimbabwe) by data entry clerks and independently by the researcher. Data entry ran

²⁰ The survey was conducted at a time of political instability. There were several reports of politically motivated violence especially in high density areas a few months prior to the survey.

concurrently with data collection and it took two weeks. EPI INFO version 6 was used for data entry. Data cleaning on the original data files was conducted using EPI INFO and SPSS (Statistical Package for Social Scientist) version 12. Tabulation and further statistical analysis was conducted in STATA version 10. Verification was done on almost 5% of the forms. Data cleaning was also continuous up to report writing.

4.6 ETHICAL CONSIDERATIONS

The University of Cape Town Research Ethics Committee and the Medical Research Council of Zimbabwe approved this study.

4.7 DATA ANALYSIS

This section presents the methods of data analysis used in this study. First, a theoretical model that explains whether CHE is a reliable measure of welfare change is presented and justification for use of this method given. Second, a discussion of the different methods of calculating catastrophic health expenditures and impoverishment due to health spending is presented. A discussion on measurement of variables and definitions of concepts used in this study follows. Finally, regression based models for determining risk factors for catastrophic health expenditures are presented.

4.7.1 Catastrophic health expenditure as a measure of welfare change

Until recently, the literature on catastrophic and impoverishing health expenditures has been supported almost entirely by empirical evidence. This lack of economic theory has led to concerns regarding the plausibility of using CHE as a measure of change in household welfare. However, in 2008, Naga and Lamiraud proposed an economic framework which as the authors pointed out, is possibly the first economic framework to be developed in this field that addresses whether a budget share can indeed be informative about a sign of a change in welfare.

According to these authors, a change in household welfare arises from either a change in household income (m), a change in one or more prices (p) or a change in both prices and income. When the focus is placed on income as a predictor of change in household welfare (since income shocks are considered household specific and prices perceived to affect all

individuals alike), the resulting change in welfare can be approximated by the following equation:

$$\Delta W \approx \frac{\partial W}{\partial Y} \Delta Y$$

Where:

Y_0 = Household's base period income

Y_1 = Household's current period income

$\frac{\partial W}{\partial Y}$ = since the marginal utility of income ($\frac{\partial W}{\partial Y}$) is always positive
 ΔW = change in welfare

Letting $\beta = \frac{\partial W}{\partial Y}$, equation 4.1 can be rewritten as:

$$\Delta W \approx \beta \Delta Y$$

What the equation 4.2 above simply shows is that the change in welfare is always of the same sign as the change in income. In the presence of panel data, information on change in income can be easily obtained in order to assess whether household welfare has reduced or not. However, in the absence of such data, cross-sectional surveys have been used and a budget share of OOP health expenditure (which is the basis for measuring CHEs) is used as a proxy measure of disruptions in household welfare.

If one defines the budget share β_i for good (i) in the current period as

$$\beta_i = \frac{P_i Q_i}{Y}$$

Then equation 4.1 can be simplified as shown in equation 4.4 below. For a full explanation of the transformation, the reader is referred to (Naga & Lamiraud 2008).

$$\Delta W \approx \sum \beta_i \Delta Q_i$$

Because β_i and ΔQ_i have the same sign, and

a high level of the budget share is considered equally compatible with a scenario where (for which) and with a situation that (corresponding to). Simply expressed therefore, a budget share according to these authors is limited in its scope of identifying households with a change in welfare unless the sign of the income change is known.

Other authors have previously used other theoretical explanations to support this finding (Wagstaff 2008). These authors have suggested that, medical spending in its own does not automatically deprive households of resources since households in most instances are able to smooth out consumption through use of savings, borrowing, selling assets amongst other things. What these arguments tend to miss out though, is the fact that even if households are able to smooth out consumption through the strategies mentioned above, they still incur costs in financing their OOP payments (Adhikari *et al.* 2009). When households borrow money for example, they have to repay in subsequent periods, often at exorbitant interest rates. On a similar note, when they sell assets or use savings, in subsequent periods they forgo returns on assets and savings (Wagstaff 2008). In addition to this, poor households have been found to almost exclusively report reducing consumption in food, education and transport etc so as to finance increases in non-subsistence expenditure for example expenditure on health care. This is so since non-subsistence expenditure is usually very low in poor households. This can be hypothesized to be the situation in Zimbabwe owing to the high poverty levels in the country.

Thus, whilst the catastrophic expenditure approach that is currently being used may be considered a naive approach in that it assumes that consumption drops concurrently with medical outlays; it still has its merits (Wagstaff 2008). These include the fact that it still captures the amount of money that households have or have to find when they are faced with OOP medical costs and relating it to their standard of living.

4.7.2 Measurement of economic consequences of health care payments

Following on from previous discussions, two different measures are used to evaluate the economic burden and consequences of health care payments for this study:

- i. Catastrophic payments caused by OOP payment for health care services
- ii. The impoverishing impact of OOP healthcare payments

The choice of catastrophic and impoverishing health costs as measures of financial protection is based on the ethical principle that no household should spend more than a given fraction of their income on health care; such a fraction is defined in this study as α . As already mentioned in the previous chapter, the choice of α is somewhat arbitrary and depends on what the total household OOP health expenditure share is defined in relation to. In the literature reviewed OOP share of health expenditure has been defined in relation to:

1. Y prepayment income
2. X total household expenditure (
3. Household's "capacity to pay"

Pre-payment income or expenditure in this study refers to income or expenditure before any deductions on necessities for example spending on food.

4.7.3 Estimating catastrophic health expenditure

The variable on catastrophic health expenditure is constructed as a dummy variable with value 1 indicating a household with catastrophic expenditure, and 0 without catastrophic expenditure as shown in equation 4.5 below.

(Equation 4.5)

Where;

When Y represents income Y , the threshold levels that have been commonly used are: 2.5%, 5%, 10% 15% and 20% of total household income (Berki 1986); (Wagstaff & van Doorslaer 2003; Wyszewianski 1986). Threshold levels of 5%, 10%, 15% and 25% have been used when the OOP payment share is defined in relation to total household expenditure (O'Donnell *et al.* 2008).

The catastrophic threshold levels that have been used for health payments defined in relation to capacity to pay (CTP) have however varied depending on how capacity to pay is defined. According to the WHO methodology that was proposed by Xu (2005), catastrophic spending

occurs when health care for a household exceeds 40% of the household's capacity to pay ().

Where;

(Equation 4.6)
(Equation 4.7)

denotes the total expenditure and FEXP denotes food expenditure. SE stands for subsistence expenditure and is the average food expenditure for households whose food expenditure share of total expenditure is in the 45th to 55th percentile.

The second approach by Wagstaff (2003) calculates capacity to pay as income net of spending on basic necessities (not just food expenditure). The equation is shown below. The threshold levels that have commonly been used when CTP is defined in this way are: 15%, 25% and 40% of household's CTP.

(Equation 4.8)

Where;

is the prepayment income; is the deductions on necessities such as food spending.

Threshold levels used with this method are; 10%, 20%, 30% and 40%.

4.7.3.1 Estimating catastrophic health expenditure in this study

In this study the health payments share is estimated in terms of capacity to pay . The WHO methodology for estimating capacity to pay (equations 4.6 and 4.7 above) is used. This method has been chosen for 2 main reasons. Firstly, is the fact that this method has been commonly adopted in studies that estimate catastrophic health expenditures in developing countries (Xu *et al.* 2006; Thuan *et al.* 2006; Riveira *et al.* 2006). Most importantly, CTP (roughly non-food spending) is chosen since non-food expenditure better distinguishes between the rich and poor; hence would be a better measure of assessing impact of OOP payments on household welfare in low income countries (O'Donnell *et al.*

2008). In this study however, catastrophic health expenditures will be defined using a range of threshold values instead of the single threshold value of 40% of CTP. As mentioned in the preceding literature review the 40% threshold level is arbitrary and use of a range of threshold levels (i.e. 15%, 25% and 40% in this study) allows the reader the opportunity to choose the threshold level to which they can give more weight.

4.7.4 Measuring incidence and intensity of catastrophic health expenditure

The extent to which a given sample of households has been exposed to catastrophic health expenses is measured using the headcount or incidence (Equation 4.9). This measure gives the (number) or fraction of households whose health care costs as a proportion of exceeded the threshold (Equation 4.9) (Wagstaff & van Doorslaer 2003). The formula for (Equation 4.9) is:

$$H = \frac{1}{N} \sum_{i=1}^N I_i \quad \text{(Equation 4.9)}$$

Where;

N is the sample size

And;

$$I_i = \begin{cases} 1 & \text{if } O_i \geq T \\ 0 & \text{otherwise} \end{cases} \quad \text{(Equation 4.10)}$$

Where;

I_i is an indicator which is equal to 1 for households with catastrophic health expenditure

And is equal to 0 for households without catastrophic health expenditure

O_i represents the household OOP health expenditure

T is the non-food expenditure (CTP) for household i

T is the threshold level as a percentage

The catastrophic payment headcount, though indicating the incidence of catastrophic medical payments does not reflect the amount by which households exceed the threshold, or simply the intensity of the catastrophic occurrence. This study therefore defines another measure, the catastrophic overshoot (Equation 4.11). The catastrophic overshoot is calculated as:

$$O_i = \frac{O_i - T}{T} \quad \text{(Equation 4.11)}$$

Where;

is the catastrophic overshoot for the entire sample

N is the sample size

is the catastrophic overshoot for household i

represents the household OOP health expenditure

is the non-food expenditure (CTP) for household i

is the threshold level as a percentage

is an indicator which is equal to 1 for households with catastrophic health expenditure

And is equal to 0 for households without catastrophic health expenditure

The catastrophic overshoot as reflected in equation 4.11 above captures the average degree by which payments as a proportion of CTP exceed the threshold ; Thus, giving an indication of the severity or intensity of the catastrophic occurrence.

4.7.4.1 Catastrophic measures that are sensitive to household socio-economic status

The incidence and intensity of catastrophic health expenditures (CHEs) described above, though providing information on the prevalence and magnitude of CHEs do not provide information regarding whether it is the poorer or better-off households who exceed the threshold (Wagstaff & van Doorslaer 2003; Adhikari *et al.* 2009). In light of the fact that society in general and policy-makers specifically are likely to be more concerned if it is the former rather than the latter that exceed the threshold, measurement approaches that show how proportions of those exceeding the threshold vary across the income distribution have been defined in literature (Wagstaff & van Doorslaer 2003).

The first approach by Wagstaff and van Doorslaer (2003) defines the concentration index for and the concentration index for (. A positive value indicates a greater tendency for the better-off to exceed the threshold, while a negative value indicates that the worse off are more likely to exceed the threshold. Similar interpretations hold for the overshoot. In order to take into account the distribution of catastrophic payments, a weighted headcount and overshoot are defined.

(Equation 4.12)

(Equation 4.13)

Where;

is the weighted headcount

is the unweighted headcount

is the concentration index for the indicator

is the weighted overshoot

is the unweighted overshoot

is the concentration index for the catastrophic overshoot for household i

The weighted headcount is larger than H when is negative, indicating that from a social welfare perspective, the catastrophic problem is worse than it appears when H is the focus since it is poorer households that tend to exceed the catastrophic threshold (O'Donnell *et al.* 2008). A similar interpretation holds for comparisons between and (ibid).

An alternative approach that has been suggested by (Wagstaff 2008) involves tabulating the incidence of CHEs and the catastrophic overshoot by prepayment income quintile. This latter method is the one that will be used in this study. However, asset index quintiles rather than prepayment income quintiles will be used due to the reasons that will be highlighted in later sections of this chapter.

4.8 IMPOVERISHING IMPACT OF OOP HEALTHCARE PAYMENTS

Poverty is one of the predominant problems in Zimbabwe. This study is therefore concerned with just how far catastrophic payments cause hardship, and not just the incidence of these expenditures. The ethical position behind assessing the impoverishment impact of OOP payments is that no one should be pushed into poverty or deeper into poverty because of the need to use health care. Taking this into perspective, this study defines measures of poverty that are reflective of the impact of OOP health payments.

4.8.1 Measuring impoverishing impact of OOP payments

The impact of health payments on impoverishment is measured in terms of poverty incidence. The poverty incidence (or headcount index) quantifies the percentage of the population pushed below the poverty line as a result of health care payments. Households that are already poor (i.e. below the poverty line) are therefore not impoverished; they can only be brought deeper into poverty.

To determine incidence of poverty due to OOP payments, a variable P_{OOP} is created. P_{OOP} is equal to 1 when a household is impoverished and equals 0 if household is not impoverished as shown by the equation below.

$$P_{OOP} = \begin{cases} 1 & \text{if } \frac{E_{eq}}{E_{tot}} - PL < \frac{OOP}{E_{eq}} \\ 0 & \text{otherwise} \end{cases} \quad (\text{Equation 4.14})$$

Where;

- E_{eq} = equivalized household expenditure
- E_{tot} = total household expenditure
- PL = poverty line
- n = equivalent household size
- OOP = per equivalent household OOP spending on health care

The equivalent household size n is calculated as:

$$n = \frac{E_{tot}}{E_{eq}} \quad (\text{Equation 4.15})$$

A household equivalence scale rather than the actual household size is used taking into account the economy scale of household consumption (Xu 2005).

The equivalent OOP spending on health care is calculated as:

$$\frac{OOP}{E_{eq}} = \frac{OOP}{E_{tot} \cdot n} \quad (\text{Equation 4.16})$$

Where:

OOP is the total OOP health care payments for the household

Alternatively equation 4.14 can be rearranged as follows;

$$P_{OOP} = \begin{cases} 1 & \text{if } \frac{E_{tot}}{E_{eq}} - PL < \frac{OOP}{E_{tot} \cdot n} \\ 0 & \text{otherwise} \end{cases} \quad (\text{Equation 4.17})$$

Where $E_{eq} = PL \cdot n$ = subsistence expenditure and is the product of the poverty line and the household equivalent scale as shown below:

4.8.2 Defining the poverty line

To compute the poverty headcounts described above, one needs to first establish a poverty line that will be used. Several poverty lines have been defined in literature ranging from absolute poverty lines to relative poverty lines. An absolute poverty line defines poverty in relation to an absolute amount of household expenditure per capita whilst a relative poverty line is defined as some fraction of mean or median household expenditure (O'Donnell *et al.* 2008).

Wagstaff and van Doorslaer (2003) defined 2 poverty lines in their analysis of impoverishment impact of OOP payments in Vietnam. The first poverty line was a food poverty line (FPL) that indicated the cost of reaching subsistence nutritional requirements (2100 calories a day). This poverty line is also termed an absolute extreme poverty line. The second poverty line that they used which is termed a broader based poverty line made some allowance for non-food spending. Other poverty lines that have been defined in literature have been derived from the country's per capita annual income adjusted for inflation (Adhikari *et al.* 2009). World Bank estimates of US\$1 per day and US\$2 per day poverty lines have also been used (van Doorslaer *et al.* 2006). According to Xu (2005), the weighted average of food expenditure in the 45th to 55th percentile range of the sample under study gives the subsistence expenditure per equivalent capita, which is also the poverty line.

4.8.2.1 Computing the poverty line for this study

The poverty line that will be used in this study is a nationally derived FPL for Zimbabwe for the month of February²¹ 2009 that was estimated by the Central Statistics Office (CSO) of Zimbabwe. A nationally derived FPL was chosen to allow generalizability of results to the population from which the samples were taken. Calculation of a poverty line based on a small sample such as the one in this study could have resulted in inaccurate estimation of the FPL. Consequently, households that could be considered non-poor in this study (based on their food share) could in actual fact be considered poor if a nationally representative sample was used; the converse is also possible.

²¹ The period of estimation of the FPL coincides with the survey month.

According to the CSO, the FPL for a family of 5 in February was estimated at USD157.93 (USAID 2009). Using a household equivalence scale described above, the poverty line (PL) per (equivalent) capita would be calculated as:

A household would therefore be considered poor if its total household expenditure per (equivalent) capita is less than the PL otherwise the household is considered non-poor. This is illustrated by the equations below.

$E_{per\ capita} < PL$	(Equation 4.19)
$E_{per\ capita} \geq PL$	(Equation 4.20)

Or alternatively

$E_{per\ capita} < PL$

Consequently, a non-poor household would be impoverished by OOP payments if total household expenditure per (equivalent) capita after deductions of household OOP payments per (equivalent) capita was less than USD64.13 as shown by the equations above.

4.9 EXAMINING INCIDENCE OF OOP PAYMENTS

This study, estimated the incidence of OOP payments (using average OOP payment) by socio-economic status. The average OOP payment is the summation of all the OOP payments made by households in each quintile divided by the number of households in each quintile. At this point, it is important to mention that, preliminary analysis of the distribution of OOP payments (appendix 3) indicated that, OOP payments of USD2940.00, USD1960.00 and USD1526.00 that were made by 3 households in quintile 4 were much higher than other OOP expenditures reported in this study. This study therefore considered these OOP expenditures outliers and removed them from all the analysis that incorporated estimates of OOP expenditures. The latter excludes the estimates of catastrophic health expenditures.

4.10 MEASUREMENT AND DEFINITIONS OF CONCEPTS

4.10.1 Computing total monthly OOP health expenditure

The total household OOP health expenditure for this study was computed from 4 detailed questions that asked questions regarding health spending in the month preceding the survey. The first question captured the cost of medicines for each illness episode and for every sick household member. The second question asked for the total out-of-pocket payments that were paid for the health services used and these included payments for consultation, in-patient stay, laboratory tests, x-rays and any payments made either to prophets or faith healers. Because of the short recall period used in this study, the OOP payments for inpatient and out-patient care were not differentiated. The third question captured costs related to antenatal visits for pregnant women. This category was added following the pilot test which informed that costs for antenatal care were not being reported even though a significant proportion of sampled households had in fact incurred OOP payments as a result of antenatal visits. The fourth question captured costs related to any follow up or medical check-ups that any sick household member may have had.

4.10.2 Computing total household expenditure

To capture total household expenditure, the monetary value in United States Dollar (currency used in survey) for monthly household expenditure on the following: food, education, healthcare, fuel heating, household maintenance, transport, payment of domestic labour, rent and personal items etc were recorded plus the money value of home-made products. To value home-made products households were asked how much they would have to pay if they were to purchase the product at the local grocery store and the market value of that product was the one used for the study. This approach has its limitations in that it possibly overestimates the expenditure of home-made products which are usually cheaper. However, the wide variation in prices even between suburbs in the same socio-economic strata would have made it more difficult to determine exactly what rates to apply since official figures for that month had not yet been released. In addition official figures were also previously under-estimating prices that consumers actually faced (USAID 2009). The total household expenditure was therefore measured as the sum of regular household expenditures and value of consumption of home made products.

4.10.3 Food expenditure and non-food expenditure

Food expenditure in this study referred to the amount spent on all food stuffs by the household plus the value of the household's own family production consumed within the household for a period of one month. Expenditure on alcohol and food consumption outside the house, for example in restaurants was excluded. Non-food expenditure was computed as the difference between the total household expenditure and the food expenditure

4.10.4 Construction of the Asset index

To enable analysis based on groups of different socio-economic status (SES), an index of asset ownership was constructed in this study. However, the approach that has normally been taken for studies on CHEs has been to use per capita consumption expenditure. Using expenditure rather than assets has been argued by some to be of greater merit since it shows the household's ability to meet health care costs at a particular point in time. Nonetheless, recent research suggests that asset-consumption correlation is quite close (Prakongsai 2006). In addition, the asset index though failing to reflect the amount of money a household has at a particular point in time, does manage to capture the household's capacity to finance OOP health expenditure through borrowing and selling of assets. The latter is a common means of financing OOP health payments that is used in developing countries.

Thirdly, most of the studies that used expenditure quintiles, calculated these quintiles based on distribution of per capita consumption expenditures over a large sample. The distribution of expenditure from such a large sample closely resembles that of the population from which the sample was taken. Large sample sizes thus reduce uncertainty in the classification of households into the different quintiles. Different approaches have been taken to reduce uncertainty in the classification of sample households into quintiles when the sample size is small. Thuan *et al.* (2008) compared the results from expenditure quintiles calculated in their study in Vietnam to results that were based on local leaders' classification of SES.

In this study a different approach is taken. Household asset scores are calculated using equation 4.21 below. This equation is the general equation that is used for calculating an asset index. However, the mean and standard deviations and were not calculated based on the sample under study. Rather, the Demographic and Health Survey

(DHS) data²² for Zimbabwe for 2005-2006 which collected similar variables to the ones collected in this study was used to calculate the mean and standard deviations of the variables included in the equation below. This approach reduces uncertainty in the estimation of the asset scores. In addition, asset quintiles for this study are constructed using the cut off levels obtained from analysis of the ZDHS data as shown in appendix 6. This approach ensures that, households for this sample would be placed in the same asset quintile in this study as they would, had a larger (nationally representative sample) been used.

$\text{---} \qquad \qquad \qquad \text{---}$	(Equation 4.21)
--	-----------------

Where:

A_j is the household asset score of the j^{th} household (calculated from the study sample)

f_1 is the scoring factor for the first asset as determined by principal components analysis;

a_{j1} is the j^{th} household's value for the first asset; and

a_1 and s_1 are the mean and standard deviation of the first asset variable over all households in the ZDHS survey (not the study sample).

The variables that were included in the equation and their respective scoring factors, standard deviations and means are shown in the table below.

²² Data was requested from archivemeasuredhs.com

Table 4.10.1 Scoring coefficients, mean and standard deviations

Variable	Scoring Coefficient	Mean	Standard deviation
<i>Assets</i>			
Bicycle	0.1295	0.2685	0.5308
Motorbicycle	0.0957	0.0261	0.3765
Animal cart	0.1193	0.1973	0.5315
Car or truck	0.2455	0.0823	0.4721
Boat with motor	0.0849	0.0208	0.3901
Radio1	0.2268	0.4857	0.5515
TV1	0.3233	0.3086	0.5174
Mobile telephone	0.2992	0.1429	0.4385
Non mobile telephone	0.2218	0.0890	0.3572
Fridge	0.3230	0.1875	0.4460
Livestock own	0.1011	0.6140	0.5325
Access to land for agriculture	0.0780	0.6828	0.5352
Watch	0.1671	0.5832	0.5663
Electricity	0.2958	0.3675	0.5427
<i>Livestock ownership</i>			
cattle	0.1630	2.1882	5.6812
Horses/mules	0.0460	0.1637	2.6565
goats	0.1144	1.9001	4.4427
sheep	0.0993	0.1901	2.0547
poultry	0.0048	5.1686	10.1027
pigs	0.0790	0.1637	2.6565
<i>Source of water supply</i>			
piped water outside the house	0.0000	0.1005	0.3007
piped water inside the house	0.1028	0.2494	0.4327
well/borehole protected	-0.2344	0.2640	0.4408
communal tap	-0.0265	0.0489	0.2157
well unprotected	-0.1119	0.1207	0.3258
river or stream	-0.0092	0.0781	0.2683
<i>Type of toilet</i>			
Blair toilet	-0.4830	0.0200	0.0490
none	-0.2539	0.3134	0.4639
pit toilet	-0.1403	0.0460	0.2100
flush toilet	0.0000	0.2956	0.4564
Pit toilet with slab	-0.2267	0.0680	0.2520
<i>Type of roofing material</i>			
asbestos	0.0000	0.5272	0.4993
tiles	0.2381	0.0184	0.1345
metal	-0.0148	0.0490	0.2159
thatch	-0.1024	0.3935	0.4886
Rustic mat	0.0338	0.0011	0.0328
wood	0.0341	0.0009	0.0293
Other roof	0.0279	0.0012	0.0344

4.11 DETERMINANTS OF CATASTROPHIC HEALTH EXPENDITURES- MULTIVARIATE MODEL

For the analysis of determinants of catastrophic health payments, multiple logistic regression analysis was used. The dependent variable, catastrophic health expenditures is constructed as a dummy variable in which there are 2 outcomes. These are 1 in the case of household incurring catastrophic health expenditure and 0 if otherwise. This 2 outcome type measurement necessitates the use of a binary response model. The binary response model is preferred over conventional linear probability model (LPM) when dealing with binary dependant variables because use of the LPM poses several problems. These include:

1. An error term (μ) which is not normally distributed but follows a Bernoulli distribution
2. The variance of the error term is heteroscedastic²³ because it depends on the values of the independent variables (X)
3. The conditional probability that a household will experience a catastrophic event (Y) given X may fall out of the range 0-1.
4. The values of R^2 obtained as a measure of good fit are questionable

Binary response models include the logit and the probit models. Because the logit model is most popularly used in studies that investigate risk factors for catastrophic health payments, this study uses this model in estimating determinants of catastrophic health payments. The following probability model which is a basic function form of the logistic regression model and has been established as an priori functional form between catastrophic health expenditures and any perceived determinants (hereafter independent variables) is estimated (Xu et al. 2006):

(Equation 4.22)

Where;

= the dependent variable

= the constant

= the independent variable(s)

²³ Heteroscedasticity occurs when the variance of the error term (μ) is not constant for all observations

3. The t-ratios of one or more coefficients tend to be statistically insignificant
4. Although the t-ratios of one or more of the coefficients is statistically insignificant the R^2 can be very high

In this study high correlation amongst variables such as household asset score and education could be a problem since highly educated people are likely to be of higher socio-economic status (SES). Location of the household could also be correlated with SES; with those living in the urban district being of higher SES than those living in the rural district. These two examples are just but only some of the examples of variables that could be linearly related. To detect whether high correlations existed between independent variables, the beta coefficients in the model were checked for large standard errors. In addition, a correlation matrix was generated of all the covariates, to check for coefficients of 0.7 or higher which indicate associations that may be of concern (Kennedy 2003).

4.12 SUMMARY

This chapter presented the methods of data collection and data analysis that were used in this study. The principles and rationale guiding decisions taken before and during data collection were explained. A discussion on the different approaches to measurement of catastrophe and impoverishment was given and the rationale guiding choice of the measurement approaches used in this study explained. Furthermore the concepts used in this study were defined. This section concludes with a presentation of the multivariate model used in this study.

Table 4.12.1: Independent variables for determinants of catastrophic health expenditures		
Variable	Note	Expected sign
<i>Dependant variable (Dummy)</i> CATA40	Catastrophic expenditure at threshold level of 40% CTP 0 = No catastrophic health expenditure	
<i>Independent variables</i> Medaid	Dummy variable identifying at least one sick household member owning medical aid 0 = No medical aid 1 = has medical aid	Negative
Age_65	Dummy variable for identifying households with elderly members above 65 years 0= No elderly 1 = Elderly in HH	Positive
Age_5	Dummy variable for identifying households with young members below 5 years 0 = No Young HH member 1 = Young member in HH	Positive
Gender_hh	This variable identifies each person that comes from a household that is headed by a female. This is a dummy variable: 0 = from female headed household 1 = from male headed household	Negative
Head_edulevel	Treated here as a numerical variable	Negative
District	Dummy variable where: 0 = HH located in rural area 1 = HH located in urban area	Negative
Utilization	Continuous variable identifying number of treatment episodes	Positive
Disable_memb	Dummy variable where: 0 = No disabled member 1 = has disabled member	Positive
Chron_illness	Dummy variable identifying a household where at least one member has chronic illness 0 = No 1 = Yes	Positive
HH_size	Continuous variable indicating size of HH	
Employ_HH	Dummy variable identifying that household head is employed 0 = No 1 = Yes	Positive
Poor	Dummy variable that identifies poor households 0 = Non- poor 1 = Poor	Positive

CHAPTER 5

RESULTS

5 INTRODUCTION

This chapter presents the results of analyses for this study and it shall be organized as follows. Section 5.1 presents descriptive statistics for the study population with regard to demographic and socio-economic characteristics, epidemiological profile and patterns of health care utilization. This section provides information that is useful in understanding results of later sections such as the trend in occurrence of catastrophic health expenditures across socio-economic status. Section 5.2 provides the results of incidence of OOP payments in the study population. Section 5.3 provides detailed analyses of the incidence of CHEs whilst section 5.4 presents results of the incidence of poverty due to OOP payments. Section 5.5 presents results from the multivariate statistical analyses on determinants of CHEs. This chapter concludes with a discussion on household coping strategies in section 5.6.

5.1 DESCRIPTIVE STATISTICS

5.1.1 Demographic and socio-economic analyses

This section presents results of the demographic and socio-economic analyses of the study population that are of relevance for this study. The tables 5.1.1, 5.1.2 and 5.1.3 overleaf show the results of these analyses. As shown in table 5.1.1, the total number of households that were successfully interviewed in this study was 499. Of this, more than 63% fell into the “poor” category. This figure is about 5 percentage points higher than the estimate from the last poverty survey that was conducted in 2003 in Zimbabwe (Loewenson, Masotya 2009). This survey estimated the proportion of people living below the food poverty line in Zimbabwe at 58% in 2003 (ibid). Given the significant changes that have taken place since 2003 in Zimbabwe, one would expect that poverty has indeed increased. Thus the proportion calculated in this study could be an indication of trends in poverty. In addition to this, poverty analysis by district shows that the proportions of poor households in Harare urban district and Seke rural district are both significantly high. As can be expected however, rural households are still relatively poorer in comparison to urban households. This finding is also consistent with the results of the PASS survey, which suggested that urban households are becoming increasingly poorer since 2003 (WHO 2008).

Table 5.1.1: Descriptive statistics for demographic and economic characteristics of the study population (N = 499 Households)

Variables	Options	Frequency	Percentage
Economic Variables			(N = 499)
<i>Poor</i>	Non-poor (Total sample)	180	36.07
	Poor (Total Sample)	319	63.93
	Rural Poor	71	70.30
	Urban Poor	248	62.31
<i>Asset quintiles</i>	1 (Poorest)	68	13.63
	2	15	3.01
	3	88	17.64
	4	262	52.51
	5(Richest)	66	13.23
<i>Employment status of household head</i>	Employed	324	64.93
	Unemployed	175	35.07
<i>Occupational status of household head</i>	Formally employed	198	39.68
	Self-employed	98	19.64
	Casual labourers	28	5.61
<i>Health Insurance (Medical aid)</i>	At least one household member has medical aid	96	19.24
	No household member owns medical aid	403	80.76
<i>Educational level of Household head</i>	No schooling	10	2.00
	Primary	84	16.83
	Secondary	326	65.33
	More than secondary	79	15.83
Demographic variables			
<i>Demographic composition</i>	Elderly > 65 years	54	10.82
	Child < 5 years	173	34.67
<i>Sex of household head</i>	Female	136	27.25
	Male	363	72.75
<i>Household (HH) size</i>	Average HH size in urban district = 4.1 Average HH size in rural district = 4.4 Range of HH size in urban district = (1 - 17) Range of HH size in rural district = (1 - 14)		
Regional variable			
Urban-rural location	Seke Rural District	101	20.24
	Harare Urban District	398	79.76

The classification of households into the different wealth quintiles reveals that, about 66% of households that were sampled in this study belonged to the fourth and highest quintiles. According to the Zimbabwe Demographic and Health Survey (ZDHS), more than 98% of the urban households were represented in the fourth and highest asset quintiles in 2006, while

about six in ten households in rural areas were in the lowest and second wealth quintiles (Central Statistical Office (Zimbabwe) & Macro International Inc. 2007). Bearing in mind that, in this present study, more than 80% of the study sample was from urban areas, one would expect that the proportion of households represented in the fourth and highest quintiles would be much higher than the value found in this study. Nonetheless, these findings reinforce the earlier findings that suggest that, households, particularly those in urban areas, seem to have become poorer over the last few years.

Table 5.1.2: Descriptive statistics for Equivalized²⁴ (per capita) household expenditure by asset index quintile

Asset quintile	Total (USD)	Mean (USD)	Standard deviation
1(Poorest)	3916.80	57.60	67.67
2	611.25	40.75	40.72
3	5836.16	66.32	120.08
4	22012.41	84.99	117.39
5(Richest)	9349.56	141.66	108.35
Total sample	41728.48	84.13	133.24

Table 5.1.3: Descriptive statistics for Equivalized (per capita) household food expenditure by asset index quintile

Asset index quintile	Total (USD)	Mean (USD)	Standard deviation
1(Poorest)	2051.56	30.17	31.95
2	340.05	22.67	14.32
3	3938.00	44.75	95.74
4	12562.90	47.95	74.09
5(Richest)	4324.32	65.52	97.10
Total sample	23217.58	47.00	77.17

Analysis of the trends in the household expenditure per capita by socio-economic quintiles (table 5.1.2) shows that, with the exception of quintile 2, the average household expenditure per capita increases progressively moving across quintile 1 to quintile 5. This is to be expected since those in higher quintiles are considered to be wealthier. Food expenditure per capita, follows a similar trend. In fact, households in the lowest quintile have an average (per capita) food expenditure that is less than half that estimated for those in the richest

²⁴ Equivalized household expenditure is the household expenditure divided by the household equivalent scale

quintile. The findings on food expenditure are of significant importance in this study, as they reveal the impact that poverty has on the ability of households to purchase one of the prerequisites of health, namely, adequate (and possibly nutritious) food. Lack of adequate nutrition could lead to higher incidence of diet-related illnesses, which necessitate the use of health care.

With respect to employment status, the majority of household heads reported that they had some form of employment. This is contrary to what is expected for Zimbabwe, considering that unemployment is estimated at 80% (Kapp 2007). However, this study is not nationally representative and focussed mainly on urban households. In Zimbabwe, the rural population is estimated at 80% whereas in this study, the rural population comprised about 20%. The higher likelihood of employment for those in urban areas could have influenced this finding.

Another important variable that is important in this study is ownership of medical aid. In this study, about 20% of households reported having at least one member who owned medical aid. This study also showed that educational attainment within the study population is very high, with more than 80% of household heads having received secondary or higher education. Similar conclusions were reached in the ZDHS survey which found out that more than 63.0% of respondents had secondary or higher education.

Other descriptive statistics for demographic variables such as demographic composition, and household size are also included in the table. These variables will also be used to aid discussions of findings in later sections of this chapter.

5.1.2 Illness profile in the study area

This section shows the proportion of individuals that reported suffering from illness within the study population as well as the types of illnesses reported. Table 5.1.4 below shows the results of this analysis.

Table 5.1.4: Proportion of individuals suffering from illness by asset index quintile

	Household asset index quintiles					Total
	1 (bottom)	2	3	4	5 (Top)	
Percentage of individuals with illness	26.06	29.31	13.35	13.13	10.76	15.00
Percent of households where at least one member experienced an illness episode	52.94	60.00	34.88	41.25	34.85	40.89

The results of this analysis show that in this survey, about 41% of households had at least one household member who experienced an illness episode in the month preceding the survey. There were 317 individuals (representing 15% of individuals) for these 204 households that experienced at least one episode of illness during this period. This suggests that, some households had more than one member who experienced an illness episode. These findings also indicate that, the burden of illness was quite high within the study population. Analysis of the trends in the proportion of individuals reporting illness across the asset quintiles reveals that, the burden of illness was significantly high amongst households belonging to the 2 poorest quintiles. Nonetheless, the burden of illness was also quite high amongst wealthier households.

The episodes of illness that were reported in this study were classified according to the respondent's self-reported illness. In total, there were 20 different types of illnesses in this study as shown in the table 5.1.5 below.

Table 5.1.5: Types of illnesses reported and pattern of health care utilization by illness type

Illness	Number of illness episodes reported	Incidence of illness as a % of total illness episodes	Number of episodes for which care was sought
Other	102	23.56	47
Flu/Common cold	57	13.16	11
Diarrhoea/Gastroenteritis	42	9.70	14
Asthma	31	7.16	7
High blood pressure	30	6.93	18
Injury	29	6.70	11
Physical disability	22	5.08	11
Fever	19	4.39	7
Cardiovascular conditions	17	3.93	7
HIV infection	16	3.70	4
Diabètes	15	3.46	6
Mental disability	13	3.00	4
Allergies	11	2.54	10
Tuberculosis	9	2.08	9
Stroke	7	1.62	2
Malaria	6	1.39	2
Hepatitis B	3	0.69	1
Kidney problems	2	0.46	2
Cirrhosis of the liver	1	0.23	1
Measles	1	0.23	1
Total	433	100.00	175

This table shows that next to illnesses that are clustered into the category termed “other”, colds/flu was the most commonly reported illness in this study. During the time this study was conducted, the cholera outbreak, which was occasioned by poor sanitation and lack of safe drinking water, was still a major problem throughout Zimbabwe. This is reflected in this study by the high proportion of individuals who reported suffering from diarrhoeal illnesses. The findings of this study also show that the proportion of individuals who reported suffering from chronic conditions namely; asthma, high blood pressure and HIV infection was quite high in this study.

With respect to number of illness episodes, 433 episodes of illness were reported. In addition, 18 visits related to antenatal care which resulted in households incurring OOP payments were also reported. Visits that were related to antenatal care were specifically included in this study because of the pilot study which informed that households were in fact incurring significant OOP payments as a result of seeking antenatal care. The table 5.1.6 below also shows the distribution of reported illness episodes according to the illness categories of communicable, non-communicable, injuries and other illnesses.

Table 5.1.6: Distribution of illness episodes by different categories of illness

Category of illness	Illness episodes reported	Number of episodes reported as as proportion of total illness episodes
Communicable	153	35.33
Non-communicable	149	34.41
Other	102	23.56
Injuries	29	6.70
Total	433	100.00

These results indicate that the proportion of individuals who reported suffering from both communicable and non-communicable illnesses was quite high in Harare urban and Seke rural districts.

5.1.1 Health service utilization

Although 204 households (317 individuals) reported having at least one member who experienced an illness episode during the recall period, only 195 households gave

information on whether health care was sought and where the consultation took place. In about 42% of these cases no form of health care was sought as shown in table 5.1.7 below.

Table 5.1.7: Health care utilization by asset index quintile (as a percentage)

Sought health care	Asset quintile					Total
	1 (Poorest)	2	3	4	5 (Richest)	
Yes	69.23	35.71	44.19	59.80	71.87	57.88
No	30.77	64.29	55.81	40.20	28.13	42.12
Total	13.58	2.77	15.25	53.30	15.11	100.00

This table also reveals that, contrary to expectation, health care utilization was higher in the poorest quintile compared to quintiles 1 up to 4. This is possibly because those in the poorest quintiles seek alternative sources of care such as faith healers who are cheaper when faced with illness as shown in table 5.1.8. The findings of this study also show that non-utilization of health care was also high amongst individuals who belong to wealthier households. This finding suggests that, OOP payments may have affected health care utilization even amongst those individuals who belong to relatively wealthier households. However, other factors such as physical access barriers and no self-perceived need could also explain this trend. Nonetheless, in this study 60% of respondents identified lack of money to pay for treatment as the major reason why health care was not sought.

The type of health service utilized is an important factor that influences the amount of OOP payments a household may incur. In this study, the types of health services that were used following illness or injury are shown in table 5.1.8 below.

Table 5.1.8: Health care utilization by asset index quintiles

Asset Quintile	Where consultation took place						Total
	Public facilities	None	Pharmacy	Private Clinics/GPs	Private hospitals	Prophets/ Faith healers	
1 (Poorest)	40.00	30.77	1.54	15.38	0.00	12.31	100
2	21.45	64.29	0.00	14.29	0.00	0.00	100
3	25.58	55.81	2.33	16.28	0.00	0.00	100
4	25.36	44.20	5.07	21.01	4.35	0.00	100
5 (Richest)	37.50	28.13	0.00	34.38	0.00	0.00	100
Total	29.79	42.12	3.08	20.21	2.05	2.74	100

This table shows that the majority of individuals in the poorest quintile and in the wealthiest quintile utilized public health facilities (such as government hospitals, health centres and clinics) following illness or injury. However, utilization of private health care (pharmacies, private clinics, private general practitioners and hospitals) was also high, with about 25% of individuals in the total sample seeking care at the private facilities. Bearing in mind that, private health facilities are generally expensive, the high utilization of private health care even amongst the poorer households is concerning. In this study however, the closure of most public hospitals during the later part of 2008 in Zimbabwe, which extended to about end of February 2009, seems to have encouraged a significant proportion of patients to seek care directly at the private sector.

5.2 INCIDENCE OF OUT-OF-POCKET HEALTH CARE PAYMENTS

In this survey, out of the 126 households who reported having at least one member who sought some form of health services and/or used medicines during an illness episode, 110 of these incurred OOP payments. In 11 cases, households were exempted from paying user fees at the health facility visited, whilst in the remaining 5 cases the medical aid plan paid for the full cost of the service. During the recall period, households in the study population spent a minimum of USD0.20 and a maximum of USD770.00 paying for health care. On average, households paid USD13.68 on health care per month. This figure represents 7.55% of their average household expenditure per month and 16.96% of their average capacity to pay.

5.2.1 Distribution of OOP payments

The table 5.2.1 below shows the average OOP payments, average household expenditure and average capacity to pay in each quintile. The average OOP payment is the summation of all the OOP payments made by households (HHs) in each quintile divided by the total number of households in that quintile. Average household expenditure (HE) is the sum of household expenditure for all households in each quintile divided by the number of households in each quintile. The same applies for average capacity to pay (CTP).

Table 5.2.1: Incidence of OOP payments by asset index quintile

Asset quintile	Number of HHs	Mean OOP payment	Mean household expenditure (USD)	Mean capacity to pay (USD)	Mean OOP payments as share of mean HE	Mean OOP payments as share of mean CTP
1 (Poorest)	68	13.45	84.67	42.15	15.89%	31.91%
2	15	10.73	115.98	36.73	9.25%	29.21%
3	88	9.48	131.51	53.8	7.21%	17.62%
4	259	13.62	184.31	80.48	7.39%	16.92%
5 (Richest)	66	20.7	325.55	171.88	6.36%	12.04%
Total	496	13.68	181.09	80.69	7.55%	16.96%

As expected with greater capacity to pay, average OOP payment is higher for households in the wealthiest quintile compared to households in all other quintiles. However, results of the one-way anova analysis ($\text{prob} > F = 0.6698$) indicate that there is no sufficient evidence to demonstrate a significant difference, at the 5% significance level, among the different populations means. Table 5.2.1 also shows that, the mean OOP payments as share of mean CTP and mean OOP payments as share of HE, is highest in the poorest quintiles. This is to be expected since poorer households generally have fewer resources and much of their expenditure is dedicated towards food as shown by the low value of CTP (non-food expenditure). This finding suggests that poorer households are bearing a heavy financial burden due to OOP health expenditures in Harare urban and Seke rural districts. Notably, the OOP payment as share of mean CTP is less than the threshold level of 40% of CTP for all wealth quintiles. This is possibly because households across all wealth quintiles had low utilization of health care

5.3 INCIDENCE OF CATASTROPHIC HEALTH PAYMENTS

This section presents results of the incidence and intensity of catastrophic health expenditures for the different threshold levels of capacity to pay. However, in this section (and in subsequent sections), all explanations shall focus around CHE estimated at the 40% threshold level. The other threshold levels are included to allow the reader to see the proportions for alternative threshold values. Nonetheless, the same explanation given for the 40% threshold level will apply for the alternative threshold levels.

Table 5.3.1: Incidence and intensity of CHEs for health payments share of capacity to pay

Threshold levels Z_{cat}	OOP payment as share of CTP		
	15%	25%	40%
<i>Headcount measure</i>			
Headcount (H_{cat})	18.03%	17.00%	15.23%
Confidence Interval (95%)	(14.65-21.42)	(13.35-19.91)	(12.07-18.39)
<i>Gap measure</i>			
Overshoot (O_{cat})	11.31%	9.59%	7.24%
Confidence Interval (95%)	(6.81-15.80)	(5.24-13.93)	(3.09-11.39)

In the month preceding the survey, as much as 15% of the sample recorded OOP payments in excess of 40% of their capacity to pay. However, the literature reviewed indicated that, the highest incidence of CHEs (based on nationally representative surveys) is estimated to be around 10.5%. The value obtained in this study is therefore much higher than that reported for other countries. The mean overshoot, which tells us the average degree by which OOP payments (as a proportion of CTP) exceed the threshold, was also relatively high and estimated at 7.24%.

5.3.1 Incidence of CHE by asset quintiles

Table 5.3.2 below shows the proportion of households in each quintile that incurred CHEs for different threshold values of z . As already discussed in chapter 3, the threshold value z is the household's OOP spending as a proportion of capacity to pay.

Table 5.3.2: Catastrophic OOP payments by asset quintiles

Asset quintile	Out-of-pocket spending as share of Capacity to pay		
	$z = 15\%$	$z = 25\%$	$z = 40\%$
1 (Poorest)	22.06%	19.12%	19.12%
2	20.00%	20.00%	13.33%
3	14.77%	14.77%	13.64%
4	19.08%	17.56%	15.65%
5 (Richest)	13.64%	12.12%	12.12%
Total Sample	18.03%	17.00%	15.23%

The findings of this study reveal that, significant proportions of households from all levels of wealth experienced catastrophic health expenditures in this study. The fact that this is so indicates that, even relatively wealthier families paid high OOP payments for health care in this study. The analysis of variance (Appendix 3) also shows that there is insufficient

evidence to demonstrate a significant difference ($p = 0.8212$), at the 5% significance level, among the different population proportions. This implies that the proportion of households incurring CHEs was the same across the asset quintiles and was about 15%. This finding possibly reflects the impact of type of health care utilized, on the level of OOP expenditures a household incurs. As previously discussed, it was the wealthier households in this study that had the highest utilization of private health care which generally offer higher cost services (see table 5.1.8). On the other hand, the majority of individuals who belonged to households in the poorest quintile utilized public facilities and also sought more affordable health care from faith healers.

5.4 IMPOVERISHING IMPACT OF OOP PAYMENTS

This section presents results of the incidence of poverty due to OOP health payments. Table 5.4.1 below shows the results of this analysis by asset quintiles.

Table 5.4.1: Impoverishment by quintile

	Expenditure quintile					Total
	1 (Poorest)	2	3	4	5 (Richest)	
Number of households impoverished	0	0	5	5	4	14
Percentage of households impoverished	0%	0%	5.68%	1.91%	6.06%	2.81%
Percentage of households pushed deeper into poverty	20.59%	20.00%	15.91%	13.13%	10.60%	14.43%

As shown in the table 5.4.1 above, 2.81% of households in this study were pushed into poverty as a result of OOP health care payments. No households in quintile 1 and 2 were pushed into poverty, yet 5 households in each of quintiles 3 and 4 were pushed to poverty due to OOP health expenditures. To aid understanding of these results which seem to go against intuition, the manner in which impoverishment was calculated in this study is reiterated below.

As already mentioned in chapter 3, the variable for calculating impoverishment is only defined for those households whose total expenditure is equal to or higher than subsistence spending. When household expenditure after deduction of OOP payments for health care is

less than subsistence spending for these households, then OOP payments are considered to have impoverished the household. Households, whose total expenditure is already less than subsistence spending before OOP payments, are already poor and are not impoverished, they can only be brought deeper into poverty. This is the reason why no households were pushed below the poverty line in quintile 1 and 2. For the same reason, the proportion of households that are impoverished in the rural district is expected to be lower since rural districts are expected to have a higher proportion of households who are already poor. In this study, only 1 household was impoverished in the rural district. The other 22 who incurred OOP costs were already poor.

In summary, the results presented above for impoverishment, indicate that; not only did OOP payments push households into poverty, they also pushed those households already poor deeper into poverty as shown in table 5.4.1 above..

5.5 DETERMINANTS OF CATASTROPHIC HEALTH EXPENDITURE

Section 5.3 presented results of the incidence of CHEs in this study. In this section, the results of the logistic regression analysis that was conducted to determine the variables that influence the occurrence of CHEs are shown in the table 5.5.1 below, the full Stata output is attached as an appendix. Logistic regression analysis is used to examine the effect of an explanatory variable, keeping the effects of all other variables constant. As already explained in chapter 3, the coefficients used in logistic regression are odds ratios that provide the odds in favour of or against a household experiencing a catastrophic health event. In this study, logistic regression analysis was conducted at all cut off-levels of capacity to pay. Su *et al.* (2006) suggests that, setting one threshold value to determine catastrophic health expense may result in inaccurate estimation, which would lead to misinterpretation of important factors.

The results from the test for multicollinearity indicated that, the associations between independent variables were less than 0.7, thus all the independent variables were included in the analysis. The results of this test are included in the appendix.

Table 5.5.1: Logistic regression on determinants of catastrophic health expenditure at different threshold levels of capacity to pay

Variable	Odds ratios			P-value	Confidence Interval
	15%	25%	40%	40%	40%
Number of times health services were utilized	3.42*	2.74*	2.73*	<0.001	2.10 - 3.56
Household size	1.05	1.04	1.04	0.635	0.90 – 1.19
Household has member above 65 years	2.85*	3.45*	4.03*	0.002	1.65 -9.86
Household has member below 5 years	0.87	0.96	0.91	0.789	0.45 – 1.85
At least one sick household member has medical aid	1.24	1.39	1.06	0.898	0.46 – 2.41
Gender of household head	0.39*	0.39**	0.35*	0.003	0.17 – 0.69
Educational level of household head	1.02	0.99	0.99	0.823	0.92 -1.07
Household has at least one disabled member	0.38**	0.31*	0.28*	0.024	0.09 – 0.85
Household has at least one member with chronic illness	2.34*	2.15*	1.89**	0.080	0.93 – 1.07
Employment status of household head	1.18	1.19	1.53	0.262	0.73 – 3.22
Location of household	0.93	1.06	1.04	0.926	0.46 – 2.33
Socioeconomic status of household	1.77	1.87**	1.82**	0.097	0.90 – 3.70
<i>N</i>	499	499	499		
<i>Prob>F</i>	0	0	0.001		
* Statistically significant at 5%					
** Statistically significant at 10%, otherwise not significant					
Dependent variable: Catastrophic health expenditure defined in relation to threshold levels of: 15%, 25% and 40% of Capacity to pay					

Based on the results of the regression analysis, the major factors influencing the occurrence of a catastrophic health expense are:

- number of times that health services were utilized
- being poor
- having at least one sick member with a chronic illness

- gender of the household head
- having an elderly household member (greater than 65 years old)
- having a disabled member in the household

The results of this study show that, the probability that a household incurred CHEs increased with greater use of health services in the household. Since households in the poorest quintiles carried the heavier burden of illness compared to wealthier households, this finding indicates that, poorer households in the study population are at higher risk of incurring CHEs compared to wealthier households. Poor households in this study were in fact, 1.82 times more likely to incur CHEs compared to their non-poor counterparts. Both these findings are consistent with results from other studies (Xu *et al.* 2003; Xu *et al.* 2006).

The results of this study also showed that female headed households were 2.86 times more likely to incur catastrophic health expenditures in comparison to male headed households. As can be expected, households in which at least one member suffered from a chronic illness were 1.89 times more likely to incur CHEs in comparison to those households where no member suffered from a chronic illness. Having an elderly household member in this study also significantly increased ($p= 0.002$) the probability that a household incurred catastrophic health expenditures. In fact, households with elderly members were 4.05 times more likely to incur catastrophic health expenditures when compared to households with no elderly members. This result is again consistent with findings from other studies (Xu *et al.* 2005; Joglekar 2008).

Another variable which influenced the occurrence of a CHE is having a disabled member in the household. The results show that, households with at least one disabled member are less likely to incur catastrophic health payments. This differed from the assumptions made in this study. Su *et al.* (2006) have however, reported similar findings.

The results of this study also show that the following variables had no effect on the probability that a household incurs CHEs:

- household size
- ownership of medical aid
- educational level of the household head

- employment status of the household head
- having a very young household member (less than 5 years old)
- Household location

The results above are inconsistent with expectations and other empirical studies on catastrophic health expenditure. However, these results, are best understood when explained in the context of the situation that was prevalent in Zimbabwe at the time of the survey. The next chapter provides that detailed discussion

5.6 HOUSEHOLD COPING STRATEGIES

One of the objectives of this study was to determine the coping strategies that households employ to deal with OOP payments of illness. Although the recall period for this study was very short, 15 households reported having done one of the following to cope with OOP costs of health care: Borrowing (4 households); Selling assets (8 households); substituting labour (1 household) and using savings (2 households). The OOP payments for those households who borrowed money to pay for treatment ranged from USD3.00 to USD10.00. The 2 households that used savings had OOP payments of USD37.00 and USD60.00. Selling assets was the frequently employed strategy to cope with illness in this study. OOP payments for those who sold assets ranged from USD17.00 to USD2940.00. There were 4 households that had OOP payments in excess of USD500, for those households that sold assets.

The results of this study also show that out of the 15 households that employed several coping strategies to meet the OOP costs of health care, 9 were poor, whilst the other 6 were non-poor. These results clearly suggest that even modest OOP costs of health care can be quite burdensome for a household. A longitudinal analysis of these households would have been a more appropriate manner of assessing household welfare over time. However, since this was not possible due to time and money constraints these results are used to explain the possible impact of OOP costs on household welfare over time.

5.7 SUMMARY OF RESULTS

This chapter presented results of different analyses that allow us to draw some conclusions concerning the impact of OOP payments on financial protection of households. The results

of this study show that, OOP costs of health care represent a significant proportion of household expenditure in Harare urban district and Seke rural district. With respect to OOP share as a proportion of capacity to pay, the poorest households dedicated a higher proportion of their total household expenditure and non-food expenditure towards OOP payments compared to wealthier households. However, even wealthier households in this study contributed a significant proportion of their non-subsistence expenditure towards OOP financing. For the wealthier households, this could possibly be a consequence of utilization of more expensive health care.

An analysis of how the disease burden was distributed within the study population revealed that, although households in the poorest quintiles carried the heavier burden of illness, the proportion of wealthier households that reported suffering from illness was also quite high. Analysis of the different types of illnesses that were reported within the study population also revealed that, the proportion of households who reported suffering from communicable illnesses particularly diarrhoeal illnesses was very high amongst the study population. However, the number of households who also suffered from non-communicable illnesses was also quite high.

Impoverishment due to OOP payments was 2.81% in this study, a figure which can be considered high when one considers that poverty is one of the major challenges in the country. The results of this study indicate that, poor households were brought even deeper into poverty as a result of health care payments. The results from the regression analysis suggest that: the number of treatment episodes; having at least one sick member with a chronic illness; gender of the household head; being poor, having an elderly household member and having a disabled member in the household are all important factors that influence the occurrence of a CHE.

Analysis of the different ways that households used to cope with OOP health costs revealed that the most popular strategy used by most households was selling of assets. Other coping strategies included; borrowing, use of savings and substitution of labour. Taking into consideration that about 58% of individuals who were ill or injured reported not using health services for several reasons, it would have been interesting to see whether avoiding to seek care was a coping strategy employed by households when faced with OOP costs. However,

the design of the questionnaire did not take this into consideration, making this a limitation of this study.

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CHAPTER 6

DISCUSSION

6 INTRODUCTION

This chapter gives a detailed discussion of the results presented in the preceding chapter. The results are discussed in the context of the objectives set forth.

6.1 INCIDENCE OF CATASTROPHIC HEALTH EXPENDITURES

The overall research objective of this study was to investigate the burden of illness and paying for health care using OOP payments in Zimbabwe. In this regard, the measures of catastrophic health expenditures and impoverishment estimated in this study are used to approximate this burden. Prior to discussing the results of this study, it is however imperative that the limitations of this study that could influence the extent to which this research objective has been met be highlighted.

Firstly, this study is likely to have under-estimated the economic burden of illness for several reasons. The household OOP medical costs were the only costs measured in this study. The transport costs, income losses or time costs due to illness have not been measured. According to Gertler and Gruber (2002) such costs may be more important in measuring household welfare than the direct medical costs of health care. Adhikari *et al.* (2009) even go further to estimate that, using direct medical costs in estimating catastrophic payments results in under-estimation of the magnitude of the catastrophic impact by between 15-22%.

Secondly, the measures of CHEs used in this study only focussed on those who sought health care. Many poor households simply avoid seeking care due to financial considerations; therefore presented figures could underestimate the reality (Gotsadze *et.al.* 2009). Saksena *et al.* (2006) acknowledges this limitation and proposes a simulation approach for estimating the catastrophic health expenditure, using not only observed OOP expenditure but also predicted OOP expenditure. Using data from the Kenyan Household Health Expenditure and Utilization Survey of 2003, this study finds that the catastrophic impact increases significantly especially amongst the poorest quintiles, with the lowest quintile having an increase of about 12%. In this study, about 42.0% of individuals did not

seek care following illness or injury, with lack of money to pay for treatment being highlighted as the major reason why health care was not sought. Therefore, the measures in this study may well underestimate the prevalence of catastrophic health expenditure amongst the households in Harare urban and Seke rural district.

Thirdly, at the time this study was conducted, the cholera epidemic was still high in Zimbabwe. Sampling during such a period when there is an epidemic may result in over-estimation of the catastrophic impact particularly if the households had to pay for treatment. In this study however, only 14 episodes of diarrhoeal illnesses resulted in a medical visit which required households to pay for treatment. The rest of the diarrhoeal illness episodes were either treated for free at the cholera treatment centres (if it was cholera), or individuals self-treated using oral rehydration solution.

Notwithstanding the above limitations, this study showed that, about 15% (at the 40% threshold level) of the study population faced catastrophic health expenditures. This figure suggests that OOP payments have become a major drain on household resources through diverting regular consumption resources to health care expenditure. Whilst comparison with results from other countries is not valid in this study, it is still interesting to note that, the proportion of households that incurred CHEs in this study was significantly higher ($p < 0.001$) than that reported for a low income district in Burkina Faso (Su *et al.* 2006). This suggests that CHE is a major problem that warrants policy attention in Zimbabwe.

There could be several reasons to explain why such a large proportion of households experienced CHEs within the study population. Amongst these are the apparent decline in the proportion of population that is currently benefiting from health insurance coverage, the high poverty levels, the heavy reliance on OOP payments and the high levels of OOP costs of health care. These factors have been shown to play a predictably large role in influencing the occurrence of CHEs at the national level (Xu *et al.* 2003). Focussing on poverty first, the fact that 64% of the households in Harare and Seke rural districts were poor suggests that the majority of households were already vulnerable to even the smallest expenditure on health care. In fact, Joglekar (2008) even argues that, any expenditure on health care should be considered catastrophic for households below the poverty line since these households are unable to meet the subsistence consumption. Thus, the results of this study are consistent

with literature which suggests that; CHE tends to be highest in countries or settings with high poverty levels (van Doorslaer *et al.* 2007; Saksena *et al.* 2006; Xu *et al.* 2005).

The apparent decline in the proportion of households benefiting from health insurance coverage, at a time when households were experiencing high burdens of illness possibly also explains the high incidence of CHEs observed in this study. Since health insurance coverage protects households from the unexpected costs of health care, the “absence” of it within the study population highlights the extent to which households are vulnerable to the unexpected costs of health care. This situation is probably exacerbated by the fact that government expenditure as a proportion of total health expenditure has declined in real terms in Zimbabwe (WHO 2007). In addition, the percentage of total government expenditure allocated to health is estimated at 9.2% in Zimbabwe, a figure which is below the Abuja target of 15% (Govender *et al.* 2008). Since the Abuja target of 15% is considered a fair reflection of the minimum level of government funding necessary to allow citizens access to adequate health at an affordable cost, one can infer that the high levels of CHEs in this study is a consequence of the low commitment of the government to health care funding.

To cite an example, Namibia has one of the highest total health expenditures on health as a percentage of GDP in Africa and this is estimated at 6.8% of the GDP (WHO 2007), whilst the percentage of total government expenditure allocated to health is about 14% (Govender *et al.* 2008). In addition, government expenditure as a proportion of total health expenditure reached a high of 70% in 2005, in comparison to about 44.8% in Zimbabwe. Not only is government health spending high in relative terms, but out-of-pocket expenditures as a proportion of total health expenditures were estimated at 5.6% in 2004 in Namibia in comparison to 26.2% in Zimbabwe (WHO 2007). Whilst this study was not nationally representative and cannot be directly compared with studies from other countries, it is reasonable to infer that Namibia’s low level of CHEs (estimated at about 0.11% in 2003) is attributed to high levels of government funding and low level of OOP payments. On the other hand, the low levels of government funding in Zimbabwe could be playing a major role in influencing the incidence and level of CHEs in Zimbabwe.

Over and above these findings, this study also showed that, the proportion of households that incurred CHEs was not statistically different across the different wealth

quintiles in this study, Findings from other studies suggest that the incidence of CHE shows a significant decline moving from poorer to wealthier quintiles (Saksena *et al.* 2006). What this implies therefore is that, in real terms, households represented in the wealthiest quintiles in this study are probably not as wealthy as households in the fifth quintile of other countries. Other reasons that could explain this situation include; heavy reliance on OOP payments to pay for health care, limited health insurance coverage and greater utilization of higher quality, higher price health services by the wealthier households.

The following section presents a discussion of the results from the statistical analysis that investigated the determinants of CHEs in Zimbabwe. The factors discussed above namely; ownership of health insurance and being poor are also discussed focussing on whether they have a statistically significant effect on the occurrence of a catastrophic health event.

6.2 DETERMINANTS OF CATASTROPHIC HEALTH EXPENDITURES

The preceding chapter laid out a conceptual framework for analyzing the different factors that influence the incidence of catastrophic health expenditures. These factors include: 1) household characteristics 2) health services utilization and 3) the environment. In this section, the results of the regression analyses are discussed, by exploring how these factors, independently and through various inter-links influenced the probability that households in the study population experienced CHEs. The discussion will first focus on the factors that were shown to have a significant effect on the probability that a household incurred catastrophic health expenditures in this study. These factors include:

- (i) being poor
- (ii) having at least one sick member with a chronic illness
- (iii) female headed households
- (iv) greater user of health services
- (v) having an elderly household member (greater than 65 years old)
- (vi) having a disabled member in the household

Based on the results of this study, poor households in Zimbabwe are at a significantly higher risk of incurring CHEs in comparison to non-poor households. This finding is consistent with evidence from empirical and theoretical literature (Su *et al.* 2006; Riveira *et*

al. 2006). Given that, the majority of households in this study were classified as poor and that overall utilization of health care was also low; the findings of this study capture the possible dilemma poor households in the study population currently face – Do they seek care and risk financial catastrophe or do they forego treatment knowing the sustained ill health will reduce their ability to work and generate income? Beyond this, the findings of this study are also important for Zimbabwe in that, they reveal the inadequacy of the currently available financial protection systems, within the health care system, which are targeted at the poor. As highlighted in previous sections, Zimbabwe instituted a user fee exemption policy for those on low incomes (i.e. Z\$400, at the time USD220) in 1980; a policy which targets financial protection of the poor (Loewenson & Masotya 2009). The findings of this study however, are clearly not in line with this policy. The possible explanation for the latter could be that, user fee exemptions have continued to be difficult to implement, even more so in a hyperinflationary environment which would necessitate constant reviewing of the income level at which exemptions should apply. As highlighted earlier, only 11 households reported being exempted from user fees despite 63.93% of the study population being considered poor. In addition to this at least 30% of households who incurred CHEs had used government facilities, showing that utilization of public care did not protect households from CHEs, possibly because user fees were still imposed on the poor.

Secondly, the frequent drug stock outs in the government facilities (Loewenson & Masotya 2009), might have contributed to this effect by forcing patients from poor households to purchase medicines at the private facilities. Furthermore, the closure of most public hospitals during the later part of 2008 which extended to about end of February 2009, seems to have encouraged a significant proportion of patients to seek care directly at the private sector. This is reflected by the descriptive analysis presented in the previous chapter that showed that utilization of private health care was also significantly high amongst individuals belonging to the poorer households. In view of the fact that some private providers who continued to operate during this time were charging fees ranging from US\$200 in cash for a consultation, US\$500 for an in-patient bed, and US\$3,000 for a caesarean section; the type of provider consulted could be one of the major reasons why poor households faced significantly high CHEs in this study (Physician for Human Rights 2009). Available evidence from literature also suggests that the type of health service utilized is a significant predictor of catastrophic health expenditures (Limwattananon *et al.* 2007; Xu 2003; Su *et al.* 2006).

Another factor that was shown to have a significant influence on the incidence of a catastrophic health event in this study was having at least one household member who suffers from a chronic illness. Chronic illnesses often require lifetime treatment, thus costs incurred by the household are recurrent (Gotsadze *et al.* 2009). This partly explains why chronic illnesses pose a significant burden on household resources. Most often, the chronic illnesses may also require expensive treatment that takes up a significant proportion of the household budget. In this study, the incidence of chronic illnesses was quite high amongst the study population which possibly explains why many households incurred CHEs in this study. Other studies such as the one conducted in Burkina Faso and in other developed countries have reported similar findings (Gotsadze *et al.* 2009; Su *et al.* 2006). The economic burden of illness due to chronic diseases implies that, the Zimbabwean health system faces yet another challenge to provide relatively more expensive health services to address the chronic disease burden.

The results of this study also showed that, as the number of treatment episodes increased, the probability that a household incurred CHEs also increased. This can be expected since greater use of health services increases the share of the household budget that is dedicated towards health care (Joglekar 2008). However, contrary to our hypotheses that disabled persons are likely to be sicker and utilize more health care, this study finds that having a disabled member in the household decreases the probability of incurring CHEs. Other studies that have reported similar findings have attributed this to an intra-household bias in allocation of resources towards non-disabled members of the family that are considered to be economically productive (Su *et al.* 2006). However, this investigation was beyond the scope of this study and recommendations are made for research concerning inequality of health care for the disabled to be undertaken in the study area. This is particularly so given that the prevalence of disabilities was very high within the study population. Nonetheless, the government's Macro-Economic Policy Framework for 2005-2006 that set the basis for the creation of a specific fund for the poor with disabilities and other extraordinary ailments seems to be a step in the right direction (Government of Zimbabwe 2003)

Consistent with evidence from other literature sources, this study found that households with elderly members are more likely to incur CHEs. This finding however goes

against expectation given that the policy for free health care for the elderly above 65 years of age was instituted in Zimbabwe in 1995. Taking into account that recent evidence suggests that this policy is still being implemented successfully (Loewenson & Masotya 2009), push factors towards the private sector could explain why households with elderly members experienced CHEs in this study. These push factors include; drug stock outs at the public facilities as well as the closure of some public facilities that occurred prior to the conduct of this study.

In addition to the factors highlighted above, this study found that female headed households were more likely to incur CHEs. Other studies have found that female headed households are less likely to incur CHEs (Knaul *et al.* 2007), and still others have found that the risk is the same as that for male headed households (Su *et al.* 2006). For Zimbabwe however, these findings are possibly a consequence of the poverty distribution between male and female headed households in the country. According to a report published in 2006 after the Beijing +11 conference in 2004, 72% of female headed households in Zimbabwe were considered poor compared to 58% of male headed households (Crew 2006). Thus the vulnerability of female headed households towards CHEs seems to be occurring via the poverty pathway. What these findings imply is that, the challenge of fighting CHEs also needs to be extended towards the social protection system in general with existing projects aimed at alleviating poverty amongst women being strengthened.

Besides the factors highlighted above other factors that did not have a significant effect on the probability that a household incurred CHEs included most of the household predisposing factors that were investigated. These variables were: household size; having a very young child below the age of 5; employment status of household head and educational level of household head. These findings were in contrast to our assumptions. However possible reasons for the observed findings are discussed below.

Zimbabwe instituted a free health care policy for children below the age of 5 in the public facilities; a policy which based on recent evidence is still being implemented successfully (Loewenson & Masotya 2009). The findings of this study therefore reflect the fact that households with very young members possibly sought care at private health facilities, which offer them no financial protection. Alternatively, an age bias in intra-

household allocation of resources towards adult household members that could ensure productivity may also explain the findings of this study (Su *et al.* 2006).

This study also found that education level and employment status of the household head had no effect on the probability that a household incurred catastrophic health expenditures. This result is again inconsistent with most of the literature, which has consistently shown that having a household head that is employed and/or has higher levels of education reduces the probability that a household faces CHEs (Joglekar 2008; Riveira *et al.* 2006). The theoretical arguments that have been presented in literature include the fact that, those who are employed and have higher levels of education are argued to have higher incomes, hence higher capacity to meet non-subsistence expenditure.

In Zimbabwe however, being employed and having a higher level of education seems to have very little correlation with one's capacity to meet non-subsistence needs, particularly if one is a government employee. Prior to February 2009, a middle income citizen was estimated to earn about USD128.00²⁵, a value which was significantly less than the value of USD282.00 estimated by CCZ to be the amount of money a family of 5 needs to meet the basic subsistence needs (Bateman 2006). From February 2009 to date, the government resorted to giving USD100 per month to all its employees regardless of income grade as a stop-gap measure (USAID 2009). This situation explains to a great extent why being employed showed no impact on the probability of a household incurring CHEs. Furthermore, some households in which the household head was unemployed reported receiving fairly high remittances from family members living outside the country. These remittances were often in the ranges of USD100 to USD500; levels much higher than the salary scales in Zimbabwe. In effect, whether a household head was employed or not made very little difference on the levels of income a family had in this study.

Regarding educational level, some studies have shown that primary and secondary levels of education reduce the probability of incurring catastrophic OOP health expenditure, whilst the gains are not visible at higher levels of schooling (Joglekar 2008). In this study, more than 65% of household heads had completed secondary education, with only 2% of household heads reporting that they had not attended school. The high levels of education

²⁵ All estimates of currencies are valued using the 2008 currency conversion rates

reported in this study possibly explain why educational level had no influence on the distribution of CHEs.

Household size is another factor that showed no effect on the incidence of CHEs. However, evidence from literature has also provided conflicting views on the effect of this variable with some studies suggesting a positive impact (Xu 2003); others a negative (Knaul *et al.* 2007) and still others no effect (Su *et al.* 2006). The fact that ownership of medical aid showed no effect on the probability that a household incurs CHEs is probably a result of the fact that most of the respondents who reported owning health insurance were not deriving any benefit from it. Thus, effectively one could conclude that a sizeable proportion of the study population did not have access to health insurance.

In this study it was also shown that, whether a household lived in a rural area or an urban area had no influence on the probability that they incurred CHEs. This is contrary to what we expected considering that health care is free at all rural primary health centres. However, bearing in mind the above discussion on drug stock outs at government facilities, it is possible that some households might have resorted to seeking health care at the private facilities. Another point to consider is the fact that, in 2008 the “Access to Health Services” study showed that user fees are being imposed on the poor at rural health centres, which would imply seeking health care at government facilities fails to protect these households financially. In addition, removal of user fees at primary health centres does not protect households from expenditures incurred at higher level facilities.

Also, in view of the fact that poverty estimates in both districts were also relatively high, the findings of this study that show that rural-urban location is a non-significant predictor of CHEs are not surprising. Beyond this, these findings also indicate that even households in urban areas still face the same risk of CHEs as rural households. This shows that the current focus on the rural population is in fact missing out many urban households for whom financial protection from OOP payments is critical.

6.2.1 Summary

What can be concluded from the above discussion is that, many households in Harare and Seke rural district face the risk of incurring CHEs. Several factors such as: the presence of chronic illness - which imposes a severe burden on household resources; the need to use

health services frequently, having an elderly household member and being a female headed household are some of the factors influencing the probability that households incur CHEs in Zimbabwe. Apart from these factors, the relatively low income bases in Zimbabwe, high rates of poverty, concurrent with high cost of services means that even those households who are relatively well-off face the risk of catastrophe as a result of OOP payments. The latter is indicated by the fact that a significant proportion of wealthier households faced CHEs in this study. There is very limited coverage of health insurance in Zimbabwe at the moment, a situation which exacerbates the risk of CHEs. In addition to this, current policies that are targeted at the poor and those in rural areas are either being implemented poorly or are being severely affected by the chronic shortages of supplies at government facilities. The latter encourages the poor and those in rural areas to seek health care directly at the private facilities which offer them no financial protection.

6.3 Incidence of poverty due to OOP payments

The results of the impoverishing impact analysis suggest that non-poor households within the study population are pushed into poverty because of OOP health expenditures. Considering the high prevalence of poverty within the study population, having an additional 2.81% of households being brought down the poverty line due to OOP payments is very concerning and highlights the urgent need to reduce OOP payments. In addition to impoverishing households this study indicated that OOP payments seem to have a much greater impact on the intensity of poverty than on poverty incidence, as reflected by the greater proportion of households who sank deeper into poverty. What this implies is that OOP payments are posing a great threat on current poverty reduction strategies in Zimbabwe, at a time when the government and the international community are placing much focus on strategies that will aid poverty alleviation amongst the citizens

6.4 HOUSEHOLD COPING STRATEGIES

This section discusses the coping strategies that were employed in this study by households to cope with the OOP payments for health care. Household coping strategies were investigated in this study to assess the possible impact of OOP payments on household welfare over time. Prior to this discussion however, it is important that we highlight that assessing household welfare over time, is best achieved from a longitudinal analysis which allows follow up of households over a longer period of time. This was however not possible

for this study due to time and money constraints. The findings of this study should thus be interpreted bearing this limitation in mind.

In this study, a total of 15 households reported having borrowed, sold assets, substituted labour or used savings to finance their OOP payments. This value is significantly high as it represents about 14% of the households who sought health care in this study. Several other studies that have been conducted in Zimbabwe have also found that, households employ several different coping strategies when faced with OOP payments. These strategies include those highlighted in our study as well as others such as; purchasing cheaper food, reducing food consumption, avoiding expenditure by going into debt for school fees, electricity and water bills amongst other things (Mutymbizi 2002).

The selling of assets in this study was the most popular strategy that was employed by households to cope with OOP payments. The use of this strategy can however be quite concerning particularly if productive assets such as cars which have the potential to generate future earnings are sold. Losing such assets may mean that in subsequent periods households become even more vulnerable to future income shocks (Mutymbizi 2002).

Borrowing, which was the second most popular strategy employed by households in this study can have a significant impact on future livelihood of households particularly if, households have to repay the debt in subsequent periods at high interest rates. Adhikari *et al.* (2009) explored the impact of method of financing OOP payments on CHEs and finds that, both the amount of OOP payments and the use of loans have a significant impact on the household economy.

Use of savings to fund OOP payments has been reported in literature as having a severe negative impact on things like investments in education for children. According to a study in Ethiopia, households which had used available cash to pay for health care had intended to use the money for basic consumption needs including food, fuel, clothes and education (Russell & Abdella 2002). This study however did not collect information regarding what the households had intended to use their savings for.

Another significant finding of this study is that out of the 15 households who employed the different coping strategies, 9 were poor. This finding is important in that it

reinforces the other findings of this study that OOP payments pose a significant burden on poor households. However, the fact that non-poor households also utilized these strategies also shows that even the relatively wealthier households are at risk of disruptions of household welfare as a result of paying OOP for health care.

6.5 SUMMARY OF CHAPTER

What can be concluded from the above discussion is that the triad of poverty, high OOP payments and low prepayment levels vis-à-vis lack of adequate financial protection seem to be the major reasons why households in Harare urban and Seke rural districts experience CHEs. In addition, households at all levels of wealth are affected suggesting that, the manner in which health care is financed in Zimbabwe (i.e. using OOP payments), is placing a heavy financial burden on the majority of households in Harare and Seke districts, even those that are relatively wealthier. In situations where households cannot meet the full cost of OOP payments, households employ strategies that make them economically vulnerable in future. This makes it very difficult for households particularly those who are already poor to escape the poverty spiral.

CHAPTER 7

CONCLUSIONS AND POLICY RECOMMENDATIONS

7 CONCLUSIONS

This chapter presents conclusions arising from the discussion of results and presents recommendations based on these. The study sought to measure the economic consequences of health care payment by estimating the catastrophic health expenditure and impoverishing impact caused by OOP payments for health care services. In addition, the study sought to determine the characteristics of households that experience CHEs as well as evaluate whether current policies in Zimbabwe are offering vulnerable households financial protection from OOP payments. The key conclusions that can be drawn from this study are presented below.

In Harare and Seke rural districts, where the majority of households are poor and lack access to basic goods and services, OOP payments have become a major drain on household resources. The high level of CHEs observed in this study as well as the poverty due to OOP payment both point out to this. However, the economic burden imposed on households by OOP payments seems to be exacerbated by a variety of factors. Amongst these are the declining levels of health insurance coverage, low levels of government funding and inadequate financial protection of the vulnerable households. At the same time, the lack of access to public health services which are affordable also seems to be playing a role in driving households into catastrophic and impoverishing health expenditures. Thus, there is a clear and urgent need to strengthen mechanisms that are aimed at protecting households from the economic burden of OOP payments within the 2 districts. Such mechanisms would include in particular, improved health insurance coverage, improved government commitment to health funding as well as improved access to public health services.

Catastrophic and impoverishing health expenditures are also a major concern amongst households of differing socio-economic status. The results of this study clearly showed that the proportion of households facing CHEs was similar across socio-economic quintiles, and that OOP payments acted as a physical access barrier for both poor and non-poor households. Furthermore both poor and non-poor households were forced to finance their

OOP payments through strategies that jeopardize their future livelihoods. This confirms the extent to which households from all levels of wealth are struggling to cope with OOP payments. So whilst it may be more feasible under the current economic climate to strengthen financial protection of the poorest households and possibly of vulnerable populations such as the elderly, the ultimate goal should aim at providing all households financial protection through universal health coverage. Such a strategy would inevitably ensure that not only are poor households protected from CHEs, but non-poor households are also shielded from CHEs and impoverishment.

The findings of this study also showed that, the majority of policies that are targeted at financial risk protection of households in Zimbabwe, such as targeted exemptions for the poor and the elderly fall short of expectations. The fact that this is the case suggests that either these policies are inadequate or are not being implemented. As a result, there is a critical need to review these policies particularly since major developments have taken place in the economic environment and the health sector since the institution of these policies.

In the situation of insufficient tax-based funding and a harsh economic environment, short term flexible responses are needed to address the situation of financial risk protection in Zimbabwe. In the long term however, the aim should be to develop prepayment mechanisms such SHI and tax-based financing. For this reason, the next section presents policy recommendations that focus on both short term and long term strategies to address the issue of financial risk protection amongst households in Harare urban and Seke rural districts. In addition, strategies that extend beyond the health sector are also presented.

7.1 POLICY RECOMMENDATIONS

7.1.1 Short term responses

Whilst institution of social health insurance and a sound general tax base in Zimbabwe are probably the preferable long-term solutions that will ensure that the majority of households have adequate financial protection, certain factors pose doubt on the ability of the government to develop such strategies in the short term. These factors include the current harsh economic environment, small formal sector employment and the volatile political environment. In order to make a stepwise movement towards achievement of these goals, short-term flexible strategies are needed first that will ensure that the vulnerable have adequate access to health services at public facilities. These strategies may form the bridge

towards development of a health system, which is funded through general tax funds and social health insurance or a mix of these prepayment mechanisms.

7.1.1.1 Resource mobilization through donor funds

Increased donor funding, both for the development and functioning of public health care provision as well as pro-poor donor funding, are some of the initial strategies that could play a significant role in ensuring that adequate services are available at the public health sector. An improvement in public services is likely to be accompanied by a reduction in the proportion of households that seek health care directly at the more expensive private health care sector. Pro-poor (or health equity) donor funding on the other hand ensures that resources are actually available at the public sector for the vulnerable groups, to the point that exemptions of the vulnerable is not limited by level of resources that are available within the health system.

At this point, it is important to stress that constant reviewing of the income levels at which exemptions should apply becomes a crucial step towards ensuring that exemptions for the poor are effective and that they target the rightful beneficiaries. In addition, strategies such as issuing of an exemption certificate become critical in order to reduce challenges of identifying the individuals that qualify for exemption. Furthermore, it is essential that relevant institutions follow up the process of exemption to ensure that policies are being implemented successfully and uniformly especially at the primary care level.

Challenges

It is understood that donor-funding has its limitations, and can be unreliable, but in highly resource constrained environments such as Zimbabwe, donor funding is possibly the best initial strategy needed to accumulate resources. However, governments and donor agencies still need to agree on that solution. At present, it is possible that the donor community will be willing to bring in funds taking into account the recent recommitment by the donor agencies to rebuild financial relationships with the new power-sharing government in Zimbabwe. Nonetheless, this recommitment comes with its conditions to the point that, the government still needs to strengthen economic conditions for and the level of tax based financing as a primary measure in the event that donors pull out.

7.1.2 Intermediate responses

Whilst improvement of public health services is likely to reduce the number of individuals who are exposed to CHEs within the study population, there is still a danger that exemptions of the poor particularly in urban areas may still continue to be difficult. At the moment, the Zimbabwean health system has made considerable efforts in improving financial risk protection of the rural population through the institution of a free health care policy in rural facilities. However, equity gains could be achieved from blanket abolition of user fees at primary care and district level services including in urban areas. This move would ensure that the majority of poor households in urban areas are also financially protected at the same time circumventing the problems that accompany exemption systems particularly at the primary care level. In addition, the fact that district level services, are at least higher level services ensures that households are also protected from costs incurred at higher level facilities. However, this strategy can only be effective if it is accompanied by supply side responses such as improved drug stocks in the public sector, and increased funding to services in the lowest income areas, reason why resource accumulation through donor funds is an important initial step (Loewenson, Masotyia 2009).

Other advantages that accompany removing user fees at the primary care level include the fact that, it encourages utilization of health services amongst individuals who would not normally have sought health care due to financial constraints. Seeking health care in the early stages of illness ensures that, the illness does not progress to such an extent that it necessitates the use of more expensive treatment - expensive treatment would ultimately lead to catastrophic health expenditures. In addition, timely utilization of health care ensures that, the low productivity capacity and income deprivation that result from consequent deterioration of health are reduced. Furthermore, the removal of user fees at primary level facilities will encourage most patients to utilize the primary health care first, before progressing to the higher level facilities. In this regard, primary health facilities act as gatekeepers, thus encouraging optimal use of resources since resources at higher level facilities will no longer be used to meet primary health care needs.

It is important to mention that high cost-care such as that for hospitalization may not be covered at this point. However, dedication of resources towards services dealing with the heaviest burden of ill health in the community, for which effective interventions exist, can be considered an allocatively efficient manner of dealing with scarce resources at this point.

Once the economic environment permits it would be important that the social health insurance debate be resumed in Zimbabwe. Certain factors need to be considered however before this policy is implemented. These include the fact that a very small formal sector currently exists. Thus, in the initial stages, coverage of SHI may only benefit the relatively few formal sector workers. Taking into account the immense benefits that a SHI scheme offers on both access and financial risk protection, it would be important that strategies such as the ones highlighted below be considered in the long run. These include:

1. Extending the population coverage
2. Extending coverage to the poor and vulnerable
3. Providing benefit packages and cost sharing
4. Considering strategies that go beyond the public sector

7.1.3 Long-term responses

i. Extending the population coverage

Transition to universal coverage is a challenging task and different approaches can be taken. In Zimbabwe for example, coverage of SHI could first be extended to the dependents of the formal sector employees, with the government providing services to the poor or covering their contributions. To extend coverage to wealthier households (who may be largely concentrated in the informal sector), the role of private health insurance could be expanded so that the limited public funds can be largely allocated to the poor. At this point it is important to mention that small tax funded public subsidies would offer an incentive for wealthier households to join the schemes. However, these must not consume a large proportion of the health expenditure to the point that it reduces the resources that ought to be freed for the poor.

ii. Extending coverage to the poor and vulnerable

Extending coverage to the informal sector workers, the poor and the vulnerable is a challenging task. This is particularly so for several reasons. The first is identification of these individuals and accommodating their reduced capacity to contribute towards the SHI. In Harare and Seke districts, this can be a great challenge considering the large pool of persons who belong to poor households as indicated by the results of this study. In addition arranging for specific needs and health risks becomes crucial. Within the two districts that were under investigation in this study, formation of community-based health insurance is an option that is worth exploring in order to risk-share and pool resources at the level of

communities for the poor, informal sector workers and unemployed. Health care providers (e.g hospitals), NGOs and local associations can initiate such programmes. However, these schemes tend to be unsustainable because the level of funds within the risk pool is usually low. Subsidization of these schemes through government funds or external funds would therefore ensure financial stability of these schemes, and reduce the average cost that each household has to contribute towards the scheme.

iii. Providing adequate benefit packages and adjusting cost-sharing

The nature of the benefits package that can be funded by the SHI and CBHI schemes and the range of services offered need to be carefully considered, to strike a balance between cost and risk protection. While a restricted benefits package will cost less than a generous package, it may well be less successful in protecting against CHEs. This study showed that chronic illnesses, which usually require more expensive treatment, were highly prevalent in the study population and exposed households to risk of incurring CHEs. However, a short-term solution may be to focus particularly on funding services and interventions that have been proven to be cost-effective ways to improve the majority of people's health. Such interventions include those targeted at reducing burden of diarrhoeal illnesses that were quite common amongst the study population.

7.1.4 Strategies that extend beyond the health sector

There is potential to improve financial risk protection of households beyond the boundaries of the health sector. This could be facilitated through the implementation of integrated social development and poverty alleviation programmes that include health, nutrition and micro-finance. In addition, improving labour activities for households would ensure that households have an adequate income bases that would make them resistant to health financing shocks. In addition, programmes targeted at improving the economic empowerment of women are expected to have the long term benefits of increasing the income bases of female headed households; thus reducing risk of incurring catastrophic health expenditures.

7.2 SUGGESTIONS FOR FUTURE WORK

Although this study has provided some useful evidence concerning the economic impact of OOP payments within 2 districts in Zimbabwe, it would be important to know if these results

are applicable to the rest of the country. It is recommended therefore that this study be scaled up to a national level.

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APPENDICES

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APPENDIX 1: HOUSEHOLD QUESTIONNAIRE

**ECONOMIC CONSEQUENCES FOR HOUSEHOLDS OF ILLNESS AND OF PAYING FOR HEALTH CARE
IN ZIMBABWE: A CASE STUDY, 2009**

CENTRAL STATISTICAL OFFICE

1 STRICTLY CONFIDENTIAL WHEN COMPLETED

B Interviewer Visits	1	2	3	4
Date				
Results ***				

A	Identification	Province	District	Ward	Sector	EA	Household
----------	-----------------------	----------	----------	------	--------	----	-----------

C	Background characteristics*							Education:			
	For all Persons				0 – 17 years		12 years +	For Persons age 5 years and above			
	2	3	4	5	6	7	8	9	10	11	
P e r s o n N u m b e r	List names of household members, starting with the head of the household	What is (name's) relationship to head of household? 1. Head 2. Spouse 3. Son/Daughter 4. Brother/Sister 5. Nephew/Niece/Cousin 6. Grandchild 7. Parent 8. Other relative 9. Not related 10. Not Known	Is (name) male or female? 1. Male 2. Female	How old was (name) at his/her last birthday? Enter age in completed years ('00" for children less than 1 year)	Is (name's) biological mother alive? 1. Yes 2. No 3. Don't know	Is (name's) biological father alive? 1. Yes 2. No 3. Don't know	What is (name's) marital status? 1. Never married 2. Married 3. Divorced / separated 4. Widowed	Has (name) ever Attended school? 1. Never been 2. At school 3. Left school	If code 1 in Q.9 What is the main reason why (name) never attended school? 1. Financial constraints 2. School too far away 3. Ill/sick young 4. Still too young 5. Other (specify)	What is (name's) highest level of education completed? 00. ECD (Early childhood development) 01-07. Grade 1 to 7 11-16. Form 1 to 6 20. Diploma/Ce-rtificate after Primary 21. Diploma/Ce-rtificate after Secondary 22. Graduate/ Postgraduate	
	1	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	2	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	3	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	4	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	5	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	6	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	7	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	8	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	9	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
	10	1 2 3 4 5 6 7 8 9 10	1 2		1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3 4 5		
*** Result Codes: 1. Completed 2. No household member at home or no competent respondent at home at time of visit 3. Entire household absent for extended period 4. Postponed 5. Refused 6. Dwelling vacant 7. Dwelling destroyed 8. Dwelling not found 9. Other (Specify)-----											

A	Identification	Province	District	Ward	Sector	EA	Household

	E Employment Activity: For Persons age 5 years and above.					Health insurance cover			
	For all Persons								
	12	13	15	16	17	18	19	20	21
P	Is (name) employed 1. Yes 2. No	What is (name's) employment status 1. formally employed 2. Casual labourer 3. Student 4 Other (specify)----- -----	Did (name) usually work but happen to be absent because of leave, sickness, bad weather, or industrial disputes & transport constraints? 1. Yes 2. No	What were the main tasks or duties in the last 30 days? Describe in 2 to 4 words e.g. "Communal Farming"/ Bus Driving".	What is the total monthly income that is received by this household after tax deductions? <i>This amount should include money paid for:</i> -temporary work done - money from outside sources - money from pension fund <i>Note: all money should be converted to USD</i>	Do you have a medical aid insurance cover? 1. Yes 2. No	If code 1 in Q18 Who is paying for the medical insurance cover contributions? 1. Self 2. Employer 3. Other (Specify)----- -----	Has (name) ever been injured /suffered illness in the last 30 days? 1. Yes 2. No	Is there a person with disability in this household? 1. Yes 2. No
er									
s									
o									
n									
N									
u									
m									
b									
e									
r									
1	1 2	1 2 3 4	1 2			1 2		1 2	1 2
2	1 2	1 2 3 4	1 2			1 2		1 2	1 2
3	1 2	1 2 3 4	1 2			1 2		1 2	1 2
4	1 2	1 2 3 4	1 2			1 2		1 2	1 2
5	1 2	1 2 3 4	1 2			1 2		1 2	1 2
6	1 2	1 2 3 4	1 2			1 2		1 2	1 2
7	1 2	1 2 3 4	1 2			1 2		1 2	1 2
8	1 2	1 2 3 4	1 2			1 2		1 2	1 2
9	1 2	1 2 3 4	1 2			1 2		1 2	1 2
10	1 2	1 2 3 4	1 2			1 2		1 2	1 2

STRICTLY CONFIDENTIAL WHEN COMPLETED

A	Identification	Province	District	Ward	Sector	EA	Household
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F Health and Food Expenditure and incidence on main illnesses / injuries												
	22	23	24	25	26	27	28	29	30	31	32	33
P	<i>If code 1 in Q20</i>	Did (name's) Illness prevent the person from carrying out his/her normal Activities?	What was the total number of days (name) Missed due to illness/sickness / Injury?	Who was consulted to deal with illness or injury ?	How much was paid by the medical insurance cover for the main illness / injury?	How much did (name) pay for medicines? <i>Note: all money should be converted to USD</i>	How much did (name) pay in cash for the service at the facility visited? <i>Note: all money should be converted to USD</i>	<i>If code 8 in Q28,</i> What was the main reason why (name) did not visit a health facility?	How many times did the person use health services as a result of the illness or Injury?	In general how much did your family spend on food in the past month? This excludes food that has been bought for resale or exchanging for commercial purposes? <i>Note: all money should be converted to USD</i>	Besides food expenditure, what is the total amount of money that this household pays on other things such as transport, monthly bills, and payment of domestic labour etc every month? (PLEASE USE NOTEBOOK PROVIDED TO STATE ALL RELEVANT ALTERNATIVES INCLUDING HEATH) <i>Note: all money should be converted to USD</i>	Number of meals taken per day by the household members
e	1. Tuberculosis 2. Asthma	1. Yes		1. Government Mission/ Council				1. Facility too far Away				1. one
r	3. Malaria 4. Rheumatic heart disease	2. No		2. Private Clinic Or Doctor	<i>Note: all money should be converted to USD</i>			2. Cannot afford				2. Two
s	5. High blood pressure 6. Measles			3. Private hospital				3. Home Treatment				3. Three
o	7. Hepatitis B 8. Kidney problems			4. Traditional Healer/ Herbalist				4. Treatment not Necessary				4. More than three times
n	9. Stroke 10. Cirrhosis of the liver			5. Prophets/Faith/ Spiritual healers				5 Other				
N	11. Diarrhoea/Gastroenteritis			6. Pharmacy				-----				
u	12. Flu 13. Fever			7. Other (Specify)				-----				
m	14. Injury			8. None				-----				
b	15. Violence related injury			<i>(if code 8 skip to Q31)</i>								
e	16. Cancer											
r	17. Allergies											
	18. Diabètes											
	19. HIV infection											
	20. Mental disability											
	22. Physical disability (Specify)----											
	23. Other (Specify)-----											
1		1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
5	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
6	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
7	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
8	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
9	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4
10	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	1 2		1 2 3 4 5 6 7 8				1 2 3 4 5				1 2 3 4

STRICTLY CONFIDENTIAL WHEN COMPLETED

A	Identification	Province	District	Ward	Sector	EA	Household

F Health and Food Expenditure and incidence on other illnesses / injuries									
	34	35	36	37	38	39	40	41	42
P e r s o n N u m b e r	<p>If code 1 in Q20</p> <p>What was the other nature of (name's) illnesses/injuries?</p> <p>1. Tuberculosis 2. Asthma 3. Malaria 4. Rheumatic heart disease 5. High blood pressure 6. Measles 7. Hepatitis B 8. Kidney problems 9. Stroke 10. Cirrhosis of the liver 11. Diarrhoea/Gastroenteritis 12. Flu 13. Fever 14. Injury 15. Violence related injury 16. Cancer 17. Allergies 18. Diabètes 19. HIV infection 20. Mental disability 22. Physical disability (Specify)--- ----- 23. Other (Specify)-----</p>	<p>Did (name's) illness prevent the person from carrying out his/her normal activities?</p> <p>1. Yes 2. No</p> <p>E.g. 3 = 1 19 = 2</p>	<p>What was the total number of days (name) Missed due to illnesses/sickness / Injuries?</p> <p>E.g. 3 = 3 days 19 = 2 days</p>	<p>Who was consulted to deal with illness or Injury?</p> <p>1. Government Mission/ Council 2. Private Clinic Or Doctor 3. Private hospital 4. Traditional Healer/ Herbalist 5. Prophets/Faith/ Spiritual healers 6. Pharmacy 7. Other (Specify) 8. None</p> <p>E.g. 3 = 6 19 = 4</p>	<p>How much was paid by the medical insurance cover for the other illnesses / injuries?</p> <p>Note: all money should be converted to USD</p> <p>E.g. 3 = USD 40 19 = USD 100</p>	<p>How much did (name) pay for medicines?</p> <p>Note: all money should be converted to USD</p> <p>E.g. 3 = USD 40 19 = USD 100</p>	<p>How much did (name) pay in total for the service at the facility visited?</p> <p>Note: all money should be converted to USD</p> <p>E.g. 3 = USD 40 19 = USD 100</p>	<p>If code 8 in Q37, What was the main reason why (name) did not visit a health facility?</p> <p>1. Facility too far Away 2. Cannot afford 3. Home Treatment 4. Treatment not Necessary 5 Other specify)----- E.g. 3 = 1 19 = 3</p>	<p>How many times did the person use health services as a result of the illness or Injury?</p> <p>1. once 2. two times 3. three times 4. four times 5. more than four times</p> <p>E.g. 3 = 3 19 = 5</p>
	1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23							
2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
5	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
6	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
7	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
8	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
9	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23								

STRICTLY CONFIDENTIAL WHEN COMPLETED

A	Identification	Province	District	Ward	Sector	EA	Household
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F		Health and Food Expenditure and incidence on pregnancy									
		43	44	45	46	47	48	49	50	51	52
P e r s o n N u m b e r	Is / has been (name) pregnant in the last 30 days? 1. Yes 2. No <i>If code 2 then skip to Q54</i>	Did (name's) pregnancy prevent her from carrying out her normal activities? 1. Yes 2. No	What was the total number of days (name) Missed due to pregnancy?	Did name Incur medical expenditures in the last 30 days as a result of the Pregnancy? 1. Yes 2. No	Who was consulted to deal with pregnancy? 1. Government Mission/ Council 2. Private Clinic Or Doctor 3. Private hospital 4. Traditional Healer/ Herbalist 5. Prophets/Faith/ Spiritual healers 6. Pharmacy 7. Other (Specify) 8. None	How much was paid by the medical insurance cover for the pregnancy expenses? <i>Note: all money should be converted to USD</i>	How much did (name) pay for medicines? <i>Note: all money should be converted to USD</i>	How much did (name) pay in total for the service at the facility visited? <i>Note: all money should be converted to USD</i>	If code 8 in Q47, What was the main reason why (name) did not visit a Health facility? 1. Facility too far Away 2. Cannot afford 3. Home Treatment 4. Treatment not Necessary 5 Other specify)----- -----	How many times did the person use health services as a result of the Pregnancy? 1. once 2. two times 3. three times 4. four times 5. more than four times	
	1	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	2	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	3	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	4	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	5	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	6	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	7	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	8	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
	9	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5
1	1 2	1 2		1 2	1 2 3 4 5 6 7 8				1 2 3 4 5	1 2 3 4 5	

STRICTLY CONFIDENTIAL WHEN COMPLETED CENTRAL STATISTICAL OFFICE

A	Identification	Province	District	Ward	Sector	EA	Household
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F		G													
Health & Coping Strategies : All Persons		Socio economic status of the household:													
	53	54	55	56	57	58					59	60	61	62	63
P e r s o n N u m b e r	Have you done any of the following to meet your treatment Costs?	If code 1 in q53, How much was contributed through the sell of assets? <i>Note: all money should be converted to USD</i>	Did you make any other health payments within the previous month not related to the illnesses? e.g. check-up	Who finally paid for the medical treatment (more than one answer is acceptable).	Does anyone in this family suffer from a chronic illness?	Does any member of the household own the following: 1. Watch 8. Television 2. Bicycle 9. Mobile telephone 3. Motorcycle 10. Non-mobile telephone 4. Animal 11. Refrigerator drawn cart 5. Car or truck 6. Boat with a motor 7. Radio <i>Multiple answers allowed</i>					Does this household own any livestock, herds or farm animals? 1. Yes 2. No	Types of livestock, herds or farm animals owned by the household <i>If none, enter 00</i> <i>If more than 97, enter 97</i> <i>If unknown, enter 98</i>	Does anyone in this household have a bank account? 1. Yes 2. No	Does your household have access to land for agricultural purposes? 1. Yes 2. No	How many acres of land are used by the household members for agricultural purposes?
	1	1 2 3 4 5 6 7		1 2	1 2	1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	2	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	3	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	4	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	5	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	6	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	7	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	8	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	9	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		
	10	1 2 3 4 5 6 7		1 2		1 2	1 2 3 4 5 6 7 8 9 10 11	1 2				1 2	1 2		

STRICTLY CONFIDENTIAL WHEN COMPLETED

A	Identification	Province	District	Ward	Sector	EA	Household
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H	Housing Characteristics								
	64	65	66	67	68	69	70	71	72
P e r s o n N u m b e r	What is the tenure status of the household? 1. Owner/purchaser 2. Tenant 3. Lodger 4. Tied accommodation 5. Parents' / Guardian's / Relative's House.	Type of 1. Traditional 2. Mixed 3. Detached / semi-detached 4. 5. Shacks 6. Other (Specify)-----	Does the household have access to electricity? 1. Yes 2. No	What is the household's main source of water for drinking and cooking? 1. Piped water inside house 2. Piped water outside house (on premise) 3. Communal tap 4. Well/borehole protected 5. Well unprotected 6. River/Stream/ dam 7. Other (Specify)----- -----	What type of toilet facility is used most by this household? 1. Flush toilet 2. Blair toilet 3. Pit toilet with slab 4. Pit toilet other 5. None	What is the household's main source of energy for cooking? 1. Wood 2. Paraffin 3. Electricity 4. Gas 5. Coal/ charcoal 6. Gel 7. Other (Specify) -----	What are the main materials used for the roof? 1. No roof 2. Thatch 3. Rustic mat 4. Wood 5. Planks 6. Metal 7. Wood 8. Asbestos 9. Tiles 10. Cement 11. Other-----	What are the main materials used for the wall? <i>(record observation)</i> 1. Cane/Trunks 2. Mud 3. Stone with Mud 4. Plywood 5. Carton 6. Reused wood 7. Cement 8. Stone with lime/cement 9. Bricks 10. Bricks 11. Cement blocks 12. Wood Planks 13. Other-----	What are the main materials used for the floor? 1. Earth/Sand/Dung 2. Wood 3. planks 4. Parquet or polished Wood 5. Vinyl or Asphalt Strips 6. Ceramic Tiles 7. Cement 8. Carpet 9. Other-----
					2	I	3	Total number of persons in household	Comments
1									
2									
3						Male	:		
4						Female	:		
5						Total	:		
6						Physical address of the household		Enumerator's Name	Date
7									
8								Team Leader's Name	Date
9									
10								Supervisor's Name	Date

APPENDIX 2: INFORMED CONSENT FORM

Version 1.0

12/01/2009



PROJECT TITLE: THE ECONOMIC CONSEQUENCES FOR HOUSEHOLDS OF ILLNESS AND OF PAYING FOR HEALTH CARE IN ZIMBABWE: A CASE STUDY

Principal Investigator: Miss Mandy Maredza
Address: 19 Jels Court, 19 Ceres Road, Avondale, Harare, Zimbabwe
Contact number: 0912902096

WHAT YOU NEED TO KNOW ABOUT THE STUDY

- Joining this study is completely voluntary. This means you can refuse to take part in this research or agree to participate now then change your mind later.
- You also have the right to refuse to answer some questions
- Whatever you decide will not affect you in any way. This means future relations with the research personnel and associated institutions will not be affected.
- You may not receive any direct benefit from being in the research study. However if the results of this study are useful, you and other people may benefit in future
- Details about this study are discussed below. This includes the purpose of the study and risks and benefits of the study. It is important that you understand this information so that you can decide carefully if you would like to take part in the study
- You should ask the researchers, any questions you have about this study at any time.

PURPOSE OF THE STUDY

You are being asked to take part in a research study that is looking at the medical costs that families face when one or more of the family members use health care services. The purpose of this study is to find out if paying for health care out-of-pocket (meaning using cash) can lead families into poverty while increasing poverty of those who are already poor. This research also seeks to find out whether medical costs affect lives of families by causing them to cut down on food bought and eaten in the house, borrow money or stop children from going to school among other things. In addition this study seeks to find out factors that cause some families to be affected by costs of medical care more than others

Why have you been invited to participate?

You have been randomly selected from a list of households in this area where the research is being conducted. 699 other households are part of this research

What will your responsibilities be?

If you decide to take part in the research you will be expected to answer some questions that you will be asked by an interviewer. The interview will take approximately 20 minutes.

Are there any risks involved in taking part in this research?

There are no risks involved with this research

Who will have access to the information that you provide?

All the information will be kept confidential and will only be accessed by the research team and used by the researcher for purposes of this study. In addition to protect your identity, no names will be recorded in this study, codes will be used instead.

What if you have questions about your rights as a research subject?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously or without telling the researcher if you wish the Research ethics committee at the Medical Research Council in Zimbabwe, P O Box CY 573, Causeway, Harare or on telephone 791792 or 791193.

Questions concerning the study

If you have any questions concerning the study please feel free to ask before you sign the consent form. You may also take as much time as is necessary to go over the information

Authorization

By signing this form you are agreeing to take part in the study. You are also indicating that you have read and understood all information and had your questions answered.

The date you sign this document to enroll in this study, that is, today's date, MUST fall between the dates indicated on the approval stamp that is on each page. These dates indicate that this form is valid when you enroll in the study but do not reflect how long you may participate in the study. Each page of this Informed Consent Form is stamped to indicate the form's validity as approved by the MRCZ

Subject's Agreement:

I have read the information provided above. I have asked all the questions I have at this time. I voluntarily agree to participate in this research study.

Signature of Research Subject

Date

Printed Name of Research Subject

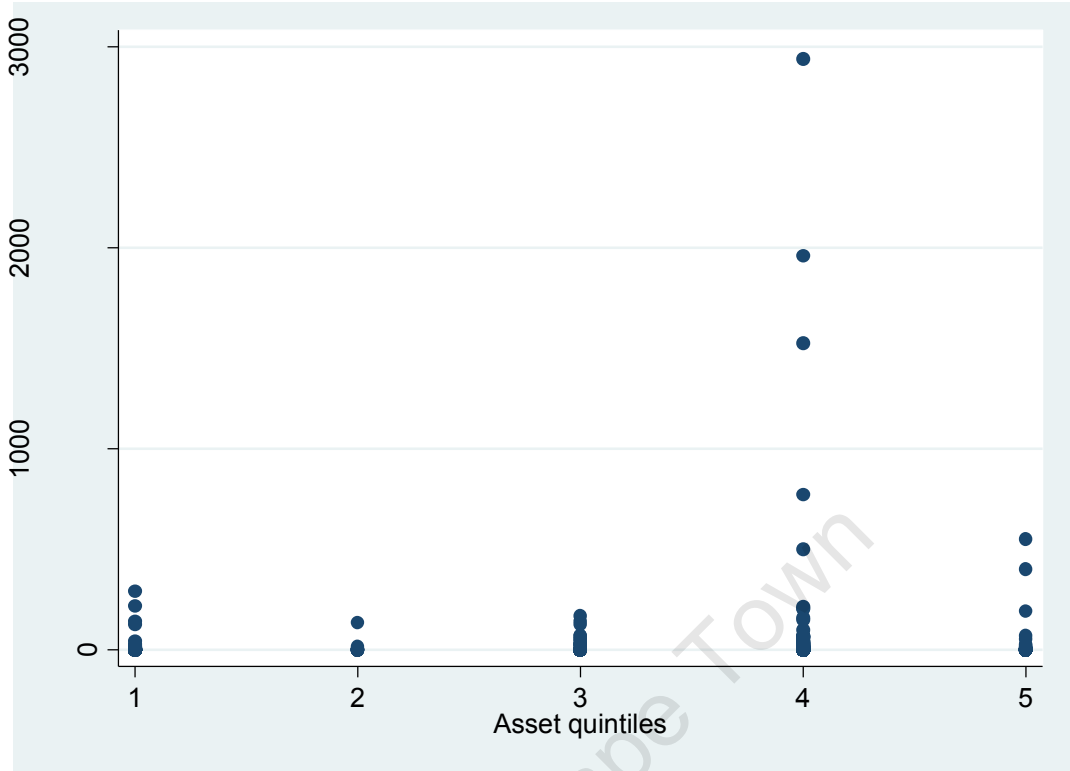
Signature of Person Obtaining Consent

Date

Printed Name of Person Obtaining Consent

University of Cape Town

APPENDIX 3: DISTRIBUTIONAL GRAPH FOR OOP EXPENDITURES BY ASSET QUINTILES



University of Cape Town

APPENDIX 4: DETECTING HIGH LINEAR CORRELATIONS BETWEEN INDEPENDENT VARIABLES

pwcorr CATA40 Utilization hh_size Age_65 Age_5 Medaid Gender_hh Head_edulevel
 Disable_memb chronic_illness Employ_HH District POOR

	CATA15	Utiliz~n	hh_size	Age_65	Age_5	Medaid	Gender~h	
CATA40	1.0000							
Utilization	0.5185	1.0000						
hh_size	0.1313	0.1820	1.0000					
Age_65	0.2057	0.1623	0.1995	1.0000				
Age_5	0.0197	0.0457	0.2689	-0.0369	1.0000			
Medaid	0.0091	0.0365	0.0862	-0.0391	0.0183	1.0000		
Gender_hh	-0.1343	-0.0205	0.0558	-0.0765	0.0771	0.0818	1.0000	
Head_edule~l	-0.1100	-0.0695	-0.1221	-0.3714	0.0323	0.2174	0.2705	1.0000
Disable_memb	0.0389	0.1715	0.2170	0.1451	0.0278	-0.0320	-0.0865	0.2705
chronic_il~s	0.2174	0.1834	0.0680	0.0571	0.0465	0.0557	0.0050	0.0050
Employ_HH	-0.0812	-0.0802	-0.0517	-0.2712	-0.0294	0.2308	0.2764	0.2764
District	-0.0361	-0.0377	-0.0569	-0.0814	-0.0522	0.1446	0.1285	0.1285
POOR	0.0376	-0.0835	-0.0336	0.0064	-0.0228	-0.1204	-0.0849	-0.0849

	Head_e~l	Disabl~b	chroni~s	Employ~H	District	POOR
Head_edule~l	1.0000					
Disable_memb	-0.1712	1.0000				
chronic_il~s	0.0628	0.0088	1.0000			
Employ_HH	0.3182	-0.0597	0.0533	1.0000		
District	0.1643	-0.0985	0.1214	0.0897	1.0000	
POOR	-0.1231	0.0786	-0.0212	-0.1060	-0.0668	1.0000

APPENDIX 5: LOGISTIC REGRESSION ANALYSIS FOR DETERMINANTS OF CATASTROPHIC HEALTH EXPENDITURE

logistic CATA40 Utilization hh_size Age_65 Age_5 Medaid Gender_hh Head_edulevel
 Disable_memb chronic_illness Employ_HH District POOR

Logistic regression	Number of obs	=	499
	LR chi2(12)	=	152.50
	Prob > chi2	=	0.0000
Log likelihood = -136.66586	Pseudo R2	=	0.3581

CATA40	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
Utilization	2.7345	.3672729	7.49	0.000	2.101611	3.55798
hh_size	1.035154	.0754232	0.47	0.635	.8973975	1.194057
Age_65	4.03387	1.840095	3.06	0.002	1.649821	9.862955
Age_5	.907633	.3291583	-0.27	0.789	.4458792	1.847581
Medaid	1.055425	.445458	0.13	0.898	.461493	2.413736
Gender_hh	.34761	.1224896	-3.00	0.003	.1742404	.6934827
Head_edule~1	.9918803	.0360495	-0.22	0.823	.9236823	1.065113
Disable_memb	.2805184	.157924	-2.26	0.024	.093059	.8455981
chronic_il~s	1.889267	.6875739	1.75	0.080	.9257844	3.855467
Employ_HH	1.531719	.582021	1.12	0.262	.7273452	3.225654
District	1.039026	.4295819	0.09	0.926	.4620614	2.336431
POOR	1.822574	.659381	1.66	0.097	.8968769	3.703716

logistic CATA25 Utilization hh_size Age_65 Age_5 Medaid Gender_hh Head_edulevel
 Disable_memb chronic_illness Employ_HH District POOR

Logistic regression	Number of obs	=	499
	LR chi2(12)	=	154.89
	Prob > chi2	=	0.0000
Log likelihood = -147.11891	Pseudo R2	=	0.3449

CATA25	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
Utilization	2.736878	.3663242	7.52	0.000	2.10535	3.557842
hh_size	1.042375	.0725902	0.60	0.551	.9093827	1.194816
Age_65	3.45319	1.5242	2.81	0.005	1.453816	8.202218
Age_5	.9551001	.328987	-0.13	0.894	.4862393	1.876064
Medaid	1.39132	.5438964	0.84	0.398	.6466576	2.993503
Gender_hh	.3865147	.1310339	-2.80	0.005	.1988827	.7511647
Head_edule~1	.9927813	.0347369	-0.21	0.836	.9269802	1.063253
Disable_memb	.3069274	.1631774	-2.22	0.026	.108267	.8701127
chronic_il~s	2.149399	.7431737	2.21	0.027	1.091457	4.232798
Employ_HH	1.189893	.4286383	0.48	0.629	.5873231	2.410674
District	1.058198	.4239831	0.14	0.888	.4825254	2.320672
POOR	1.865244	.6474654	1.80	0.073	.944639	3.683033

```

logistic CATA15 Utilization hh_size Age_65 Age_5 Medaid Gender_hh Head_edulevel
Disable_memb chronic_illness Emplo
> y_HH District POOR

```

```

Logistic regression                               Number of obs   =       499
                                                    LR chi2(12)      =       186.25
                                                    Prob > chi2      =       0.0000
Log likelihood = -142.3735                       Pseudo R2       =       0.3954

```

CATA15	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
Utilization	3.42362	.5232665	8.05	0.000	2.537393	4.619375
hh_size	1.052673	.0741104	0.73	0.466	.9169955	1.208426
Age_65	2.847958	1.287831	2.31	0.021	1.173883	6.90943
Age_5	.8691101	.301904	-0.40	0.686	.4399382	1.716951
Medaid	1.237195	.4843344	0.54	0.587	.5743961	2.6648
Gender_hh	.3869614	.1324279	-2.77	0.006	.1978632	.756781
Head_edule~1	1.016215	.0363083	0.45	0.653	.9474864	1.089929
Disable_memb	.3774017	.197281	-1.86	0.062	.1354725	1.051372
chronic_il~s	2.336194	.8103982	2.45	0.014	1.183688	4.610847
Employ_HH	1.180064	.4251762	0.46	0.646	.5823962	2.391073
District	.9275917	.3699773	-0.19	0.851	.4244713	2.027054
POOR	1.766061	.6131564	1.64	0.101	.8942897	3.487653

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APPENDIX 6: ANOVA TESTS FOR DETECTING STATICAL SIGNIFICANCE ACROSS WEALTH QUINTILES

oneway CATA40 Asset_quintile2, t

5 Household	Summary of Catastrophic health expenditure at 40%		
asset	Mean	Std. Dev.	Freq.
quintiles			
1	.19117647	.39615137	68
2	.13333333	.35186578	15
3	.13636364	.34514092	88
4	.15648855	.36401323	262
5	.12121212	.32887461	66
Total	.15230461	.35967648	499

Source	Analysis of Variance			F	Prob > F
	SS	df	MS		
Between groups	.198901624	4	.049725406	0.38	0.8212
Within groups	64.2259481	494	.130012041		
Total	64.4248497	498	.129367168		

Bartlett's test for equal variances: $\chi^2(4) = 2.6626$ Prob> $\chi^2 = 0.616$

anova oop_hh Asset_quintile2

	Number of obs =	499	R-squared =	0.0048	
	Root MSE =	181.321	Adj R-squared =	-0.0033	
Source	Partial SS	df	MS	F	Prob > F
Model	77634.1274	4	19408.5318	0.59	0.6698
Asset_qui~2	77634.1274	4	19408.5318	0.59	0.6698
Residual	16241416.1	494	32877.3605		
Total	16319050.2	498	32769.1772		

APPENDIX 7: STATA COMMANDS FOR GENERATING VARIABLES

Generating Household asset score

```
gen Household_Assetscore = 0.163*(cattle-2.188)/5.681+0.046*(horses_mules-0.286)/1.767+0.114*(goats-1.90)/4.44+0.01*(sheep-0.19)/2.055+0.005*(poultry-5.169)/10.103+0.079*(pigs-0.164)/2.657+0*(pipedwateroutsidehouseonpremise-0.1)/0.3+0.103*(pipedwaterinsidehouse-0.249)/0.433-0.234*(wellboreholeprotected-0.264)/0.441-0.027*(communalatap-0.049)/0.216-0.112*(wellunprotected-0.121)/0.326-0.009*(riverstreamdam-0)/0.104-0.483*(blairtoilet-0.002)/0.049-0.254*(none-0.313)/0.464-0.14*(pittoilet-0.046)/0.21-0.227*(pittoiletwithslab-0.068)/0.252+0*(flushtoilet-0.032)/0.175+0*(asbestos-0.527)/0.499+0.238*(tiles-0.184)/0.134-0.015*(metal-0.049)/0.216-0.102*(thatch-0.394)/0.489+0.034*(rusticmat-0.001)/0.033+0.034*(wood-0)/0.029+0.028*(Other_roof-0.001)/0.034+0.129*(Bike-0.268)/0.531+0.096*(motorbike-0.026)/0.376+0.119*(Animalcart-0.197)/0.531+0.246*(Car_truck-0.082)/0.472+0.085*(Boat_wmotor-0.021)/0.39+0.227*(Radio1-0.486)/0.551+0.323*(TV1-0.309)/0.517+0.299*(Mobile_phone-0.143)/0.439+0.222*(Non_mobilephone-0.089)/0.357+0.323*(Fridge-0.188)/0.446+0.101*(Livestock1-0.197)/0.531+0.078*(Access_land-0.683)/0.533+0.167*(Watch1-0.58)/0.566+0.296*(Electricity-0.367)/0.543
```

Generate asset quantiles

Cut off levels were calculated from the DHS survey and quintiles for the study calculated as follows:

```
generate Asset_quintile = .
label var Asset_quintile "5 Household asset quintiles"
replace Asset_quintile=1 if (Household_Assetscore <= -2.32)
replace Asset_quintile=2 if (Household_Assetscore >= -2.29) & (Household_Assetscore <=-1.50)
replace Asset_quintile=3 if (Household_Assetscore >= -1.49) & (Household_Assetscore <=-0.258)
replace Asset_quintile=4 if (Household_Assetscore >= -0.256) & (Household_Assetscore <=2.856)
replace Asset_quintile=5 if (Household_Assetscore >= 2.857)
```

Generating other variables

```
generate eqsize = hh_size^0.56

generate eqexp_h = exp_h/eqsize
label variable eqexp_h "Equivalentised per capita household expenditure"

generate CTP = exp_h - food_exp
label var CTP "capacity to pay"
```

Estimating proportion with catastrophic expenditure

```
generate oopctp = oop_hh/CTP
label var oopctp "OOP as share of CTP"
generate cata40 = .
label var cata40 "Catastrophic health expenditure"
replace cata40=1 if oopctp>0.4 | oopctp==0.4
replace cata40=0 if oopctp<0.4
```

```

generate cata15 =.
label var cata15 "Catastrophic health expenditure at 15%"
replace cata15=1 if oopctp>0.15 | oopctp==0.15
replace cata15=0 if oopctp<0.15

```

```

generate cata25 =.
label var cata25 "Catastrophic health expenditure at 25%"
replace cata25=1 if oopctp>0.25 | oopctp==0.25
replace cata25=0 if oopctp<0.25

```

```

gen OVER_15=cata15*(oopctp-(15/100))
gen OVER_25=cata25*(oopctp-(25/100))
gen OVER_40=cata40*(oopctp-(40/100))

```

```

summarize cata15 cata25 cata40

```

```

summarize OVER_15 OVER_25 OVER_40

```

```

tabstat oop_hh, by( Asset_quintile) stat(mean)
tabstat eqexp_h, by( Asset_quintile) stat(mean)
tabstat CTP, by( Asset_quintile) stat(mean)

```

Estimating poverty

```

sca PL = 64.13
generate se = PL*eqsize

```

```

generate poor=.
replace poor=1 if exp_h<se
replace poor=0 if exp_h>se | exp_h==se
label var poor "1=poor household; 0=nonpoor"

```

OR ALTERNATIVELY (Gives same results)

```

generate poor1=.
replace poor1=1 if eqexp<PL
replace poor1=0 if eqexp>PL | eqexp==PL
label var poor1 "1=poor household; 0=nonpoor"

```

***Identification of households impoverished by OOP payments**

```

generate OOPi = oop_hh/ eqsize
generate impoor=.
replace impoor=1 if eqexp_h>PL & (eqexp_h - OOPi)<PL
replace impoor=0 if impoor!=1
label var impoor "impoverishment"

```

```

generate impoor1=.
replace impoor1=1 if total_hhexp>se1 & (total_hhexp - oop_hh)<se1
replace impoor1=0 if impoor1!=1
label var impoor1 "impoverishment"

```

```

tab impoor Asset_quintile, col

```

tab impoor1 Asset_quintile, col

tab poor Asset_quintile, col
tab poor1 Asset_quintile, col

Checking for high linear correlations*

pwcorr CATA40 Utilization hh_size Age_65 Age_5 Medaid Gender_hh Head_edulevel
Disable_memb chronic_illness Employ_HH District POOR

Logistic regression analysis*

logistic CATA40 Utilization hh_size Age_65 Age_5 Medaid Gender_hh Head_edulevel
Disable_memb chronic_illness Employ_HH District POOR

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