

**DETERMINANTS AND DISTRIBUTION OF CATASTROPHIC HEALTH  
EXPENDITURES AND IMPOVERISHMENT IN KENYA**

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## DECLARATION

I hereby declare that this is my original work and that to the best of my knowledge it has not been presented for the award of a degree at any other university.

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### Approval

This research paper has been submitted for examination with our approval as university supervisors.

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## **ABSTRACT**

The Constitution of Kenya, 2010 guarantees citizen the right to health. The Kenya health policy commits the government to offer easy, accessible, reasonable and valuable health care services to the population countrywide (Republic of Kenya, 2015a). However, the government is faced with budgetary constraints; hence the health services are provided under a serious resource constrained setting.

An analysis of patterns of health care expenditure is essential for assessing levels of inequalities in health care needs and access. Furthermore, analyses of differentials on health care expenditure by socioeconomic and demographic characteristics of population could be used to develop appropriate policies and models to new interventions.

The research utilized the secondary data from the Kenya Household Health Utilization and Expenditure Survey (KHHEUS) 2013 to examine the association between households' health care expenditures with socioeconomic variables.

The goal of the research was to provide critical analyses on household out-of-pocket expenditures in Kenya and how these health expenditures become catastrophic pushing the households into poverty. The findings will contribute towards a better understanding of existing variations in catastrophic health expenditures and impoverishment in Kenya.

These results can be used by the government of Kenya, health planners and managers and other stakeholders to facilitate design of appropriate policies which will impact positively to households and particularly the vulnerable ones. The information could contribute to improving financial protection and equitable income redistribution and eventually towards poverty reduction and better health for all Kenyans.

## DEDICATION

To Andres Njuguna

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---

<sup>1</sup> Discussion Paper No. 2 of 2005

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## LIST OF ACRONYMS

GDP	Gross Domestic Product
GoK	Government of Kenya
HISP	Health Insurance Subsidy Programme for the Poor
HMSF	Hospital Management Services Fund
HP+	Health Policy Plus
HSSF	Health Sector Services Fund
IMR	Infant Mortality Rate
KDHS	Kenya Demographic and Health Survey
KHHEUS	Kenya Household Health Utilization and Expenditure Survey
KHP	Kenya Health Policy
KSh	Kenya Shilling
NASSEP	National Sample Survey Evaluation Programme
NHA	National Health Accounts
NHI	National Hospital Insurance Fund
OOP	Out-of-Pocket
THE	Total Health Expenditure
U5MR	Under-five Mortality Rate
UHC	Universal Health Coverage
WHO	World Health Organization

# 1 INTRODUCTION

## 1.1 Background

Health is a basic need that each person is entitled to enjoy. Good health, protection from diseases and quality medical care are necessary for human personal development and survival. Improved quality of life in any country depends highly on the availability and accessibility to healthcare facilities at affordable costs.

In line with Vision 2030 and the Constitution of Kenya 2010 (Republic of Kenya, 2010a), the government is committed to implementing strategic interventions aimed at accelerating the attainment of Universal Health Coverage (UHC) for all Kenyans. The health sector plays a major role for the achievement of vision 2030, since maintaining a health nation is important for a working population which later translates to increased labor productivity.

A household's expenditure on health services is always directly dependent on income, social networks and wealth position of the households (Wild et al., 2004). A lot of Poor households in developing countries forego expenditure on health services in order to use their earnings on basic needs like food and as such positioning them in higher risks of mortalities when diseases become fatal (Russel, 2004).

According to WHO (2005), a household faces "catastrophic" health costs if health expenditure is greater than or equal to 40 percent of a household's non-subsistence income, i.e. income available after basic needs have been met ("capacity to pay"). Households that incur huge OOP are at risk of getting poorer due to healthcare costs and will experience a phenomenon called catastrophic which varies across households.

The main challenge of healthcare access in Kenya lies primarily in the acute scarcity of resources, and inefficient resource allocation. In the past few decades, the out-of-pocket (OOP) expenditure has been increasing since the introduction of user fees in the health sector. Moreover, to limit the rising publicly-financed health expenditures, OOP expenditures have continued to be implemented in the country. However, higher health-related OOP expenditure may burden social subgroups unequally.

## 1.2 Kenya Health System

Kenyan health sector has an articulate and elaborate Kenya Health Policy (KHP 2014 - 2030) to assist the sector realign to new emerging issues to enable the country attain its long term Health goal sought by the country as outlined in the Kenya's vision 2030 and the Kenyan Constitution 2010. The Health Sector is responsible for the provision and coordination of the health policy formulation, ensuring quality of service delivery and regulation and control of health care (Republic of Kenya, 2015a). The responsibility is guided by the understanding that good health guarantees a vigorous population which is able to immensely contribute to the overall productivity and economic development thus contributing directly to the achievement of the national poverty reduction as outlined in the Sessional paper No. 10 of 2012 of Kenya Vision 2030.

The promulgation of the Kenya constitution 2010 saw health services being devolved to county governments except for the referral hospitals (Republic of Kenya, 2010). The Kenya's healthcare system is hierarchically structured with the lowest unit being the community (level 1), and then graduates to dispensaries (Level 2), Health centres (Level 3); primary referral facilities (level 4); secondary referral facilities (level 5) and Tertiary referral facilities (level 6). The county governments are responsible for the first five levels while the national government is responsible for national referral hospitals (Republic of Kenya, 2015a).

Health services in Kenya are provided by both public and private providers, with the latter comprising of both not-for-profit and for-profit providers. Current Ministry of Health data (Master Facility List 2015) shows that there are 9,362 health facilities in the country; of which 46 percent are public, 14 percent are faith based and 40 percent are private<sup>2</sup>.

On key health indicators, the country has made significant improvements in reducing infant and under five mortality rates and maternal mortality ratio. For instance, maternal mortality ratio reduced from 488 in 2008/09 to 362 per 100,000 in 2014 (KNBS and ICF Macro, 2015). Infant mortality rate (IMR) declined from 61 to 39 deaths per 1,000 live births between 2003 and 2014 while under-five mortality rate (UMR) declined from 90 to

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<sup>2</sup>Source: e-health ([www.e-health.go.ke](http://www.e-health.go.ke))

52 deaths per 1,000 live births in the same period. While the gains related to child mortality are remarkable, neonatal mortality remains high and contributes about 60 percent of IMR. (KNBS and ICF Macro, 2015)

Kenya's healthcare is financed from three main sources namely; a) government tax revenue; b) private through companies paying for or directly providing health services for their employees and households through out of pocket payments to health care providers; and c) donors through on and off budget allocations (Republic of Kenya, 2015b).

The government budgetary allocation to health has remained low relative to global commitments like the Abuja declaration of 15 percent allocation of the total government allocation to health. The Government expenditures on the health sector stood at about 6.1 percent of total government expenditure in 2012/13. Total Health Expenditure (THE) amounted to about 6.8 percent of the Gross Domestic Product (Republic of Kenya, 2015b).

In Kenya for the last ten years, Total Health Expenditures have increased by 114 percent in the period between 2001/02 and 2012/13. Development partners account for most of the increase. As shown in Table 1, the total health expenditures according to the National Health Accounts have increased significantly between 2001/02 and 2012/13. The total amount spent on healthcare, including private payments and development partner contributions, was around KSh. 5,679.5 (US\$67) per person in 2012/13; an increase of 62 percent over 2001/02. According to the National Health Accounts (NHA) report, private expenditures on health were KSh. 93 billion in 2012/13. Table 1 provides a summary of health financing landscape for Kenya (Republic of Kenya 2015c).

Overall, most of the funding has seen variations since 2001/02 NHA study. According to the NHA of 2014, private sources contributed 40 percent of THE out of which 80 percent (or 32 percent of THE) was contributed by households as out of pocket payments<sup>3</sup>. Comparatively, public sector financing increased marginally over the past decade to about 34 percent, while external financing for the health sector accounted for 26 percent of THE

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<sup>3</sup> 27 percent was direct out of pocket; while 5 percent was through prepayments.

in 2012/13 up from 16.4 percent in 2001/02, but down from 34.5 percent in 2009/10 (Republic of Kenya, 2015c).

**Table 1: Trends in Health Expenditure (KSh)**

Indicators	2001/02	2005/06	2009/10	2012/13
GDP at current prices (KSh millions)	2,142,988	2,910,359	3,023,090	3,440,115
Government expenditure– general (KSh millions)	405,154	769,094	1,013,194	1,282,088
Total Health Expenditure (THE) (KSh millions)	109,368	135,630	163,395	233,959
Total Health Expenditure (THE) (\$ millions)	1,391.5	1,847.8	2,155	2,742.8
THE per capita (\$)	44.6	51.8	55.8	66.6
THE as a % of nominal GDP (%)	5.12	4.74	5.43	6.801
Government health expenditure as a % of total government expenditure (%)	8.0	5.2	4.6	6.1

Source: Republic of Kenya, 2015b

Overall, the population having access to health insurance averages 17 percent but the rate of insurance coverage is higher for urban population (27 percent) compared with rural population (12 percent). Health insurance coverage is positively correlated with wealth in that insurance coverage is higher in the richest wealth quintiles at 42 percent compared with those in the poorest quintile at 3 percent (Republic of Kenya, 2015c). Some households sell off some of their assets or draw on past savings to meet medical expenses. Capital consumption has long-term effects on a household's ability to pay for consumption goods as well as future health care expenditures (Kyobutungi *et al.*, 2008).

The lack of adequate financial protection is attributed to low funding, fragmentation of resources, low insurance coverage. Direct OOP places the burden of bearing the costs of illness to the sick person and their families, and is therefore a major contributor to inequities. According to WHO (2010), incidence of financial catastrophe and impoverishment falls to negligible levels only when direct OOP falls between 15-20 percent of THE.

### 1.3 Health financing reforms in Kenya

Since 1994, Kenya has relied heavily on the Health Policy Framework in pursuit of its healthcare agenda. The Health Policy Framework came in the wake of increased disease burden across households. Its theme was to offer “quality healthcare that is adequate, reasonable price and available for everybody.” The roll-out of the agenda was divided into two five-year strategic plans: the National Health Sector Strategic Plan I (NHSSP I) (1999 — 2004) (Republic of Kenya, 2010b), the National Health Sector Strategic Plan II (NHSSP II) (2005 to 2010) (Republic of Kenya, 2005) and the National Health Sector Strategic and Investment Plan 2014 – 2018 (Republic of Kenya, 2015d). A summary of the policy reforms in health care financing since independence is outlined in Table 2.

**Table 2: Evolution of health financing architecture in Kenya**

<b>Year</b>	<b>Policy reform</b>
Pre-independence	User charges in all public services.
1963- 1965	The user charges initially continued to exist for 2 year since independence.
1965	The user charges eliminated in all health public centers.
1966	National Hospital Insurance Fund (NHIF) established to provide health insurance for formal employees with mandatory payroll deductions.
1989	User fees re-introduced in all levels of public health care system as part of the Structural Adjustment Programme advocated by World Bank and IMF to supplement government budgets
1990	User fees introduced one year earlier suspended to allow for re-designing with a focus on protecting the poor and vulnerable.
1991- 2003	User fees (Facility Improvement Fund) were later re-introduced in early 1991 through a phasing out approach starting from the hospital level. Children under five, maternal and child health services and TB treatment among others, were exempted from payment.
1998	NHIF Act amended to establish NHIF as a corporate body. The amended Act obligated all Kenyans above age of 18 years and with income to contribute to the fund, as well as providing for voluntary contributions from Kenyans in informal employment.

<b>Year</b>	<b>Policy reform</b>
2004	A noble initiative to enact a Social Health Insurance Fund Bill was unsuccessful.
2004	User fees abolished in public dispensaries and health centres, and replaced by a registration fees of Kenyan Shillings 10 and 20 respectively (the 10/20 Policy). However, there were no mechanisms to compensate health facilities for lost revenue. Consequently, policy implementation could not be sustained.
2004	Maternity fees in public health facilities were abolished, but implementation could not be sustained for reasons similar to the 10/20 policy.
2006	Process of developing a long term health financing strategy initiated
2007	Health Sector Services Fund (HSSF) established under a Legal notice to provide for a financial resources pooling and disbursement mechanism linked to facility level work plans to support operations and maintenance of public health facilities.
2009	Health Sector Services Fund (HSSF) Legal notice amended to establish HSSF (health centers and dispensaries) and Hospital Management Services Fund (HMSF for hospitals). Establishment of the two Funds was an initial attempt to move towards strategic purchasing for health care. However poor implementation capacities remained a challenge
2009	The Ministry of Health revisited the process of development of the health financing strategy initiated in 2006 and completed the draft. However, stakeholder engagement and poor stakeholder coordination emerged to be a major challenge for finalization.
2010	Health Sector Services Fund (HSSF) implemented for all public dispensaries and health centers incorporating funding from GoK, DANIDA and World Bank. The main features of the HSSF mechanism were direct transfer of funds to health facilities (by-passing district treasuries) to eliminate leakages, linkage to health facility work plan and facility level accountability systems.
2012	Civil Servants Scheme – an additional health insurance cover for Civil

Year	Policy reform
	servants and members of the Disciplined forces introduced and implemented by NHIF.
2013	-Finalization of locally commissioned studies to inform finalization of Kenya Health Financing Strategy. -Abolishment of user fees in public dispensaries and health centers and maternity fees in all public health facilities with accompanying national government budgetary allocation.
2014	-Finalization of Kenya Health Policy 2014 – 2030 and Health Bill 2014 -Health Insurance Subsidy Programme for the Poor (HISP) launched on a pilot basis targeting 21,500 households. Implemented by NHIF
2015	-Government sponsored health insurance programme for older persons (above 65 years) and people with severe disabilities introduced with a budgetary allocation of Kenyan Shillings 500 million. -Process leading to the finalization of Kenya health Financing Strategy 2015 – 2030 re-started.
2016	-First Draft of Kenya Health Financing Strategy 2016 – 2030 finalized

*Source: Republic of Kenya (2016)*

#### **1.4 Problem Statement**

Out-of-pocket (OOP) payments have severe consequences for health care access and utilization and are especially catastrophic for the poor. Utilization which is an important indicator of access to health care services refers to the actual uptake of health services. Further, results of inequalities in health and healthcare from household surveys and poverty assessments all show a heavier burden of health care on low-income households (Republic of Kenya, 2015c).

In Kenya, households who utilized healthcare services experienced catastrophic expenditures and were at risk of impoverishment. Impoverishment is the extent to which people are made poor, or made poorer, by health spending and it occurs when expenditure on health exceeds the limit set in the capacity to pay<sup>4</sup>. Health expenditures will be

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<sup>4</sup> Discussed in details in section 3.2



impoverishing at the level when the household per capita expenditure (gross) exceeds household poverty line expenditure level.

In addition, 12.7 percent of sick Kenyans do not seek care when they are ill (Republic of Kenya, 2015c). One of the major reasons for not seeking care is high cost of services accounting to 21 percent of those who did not seek care in 2013. Further, 2.6 million Kenyans (6.2 percent) of households were at risk of impoverishment as a consequence of expenditure on health care depleting household savings and were at a risk of falling into poverty (Republic of Kenya 2015c).

Large health expenditures may have negative effects on consumption behaviour and welfare of a household. Catastrophic expenditures force households to forgo basic needs and push them to poverty. In evaluating economic effects, it is necessary to go beyond out-of-pocket health care expenses and look at the impact of healthcare expenditures on household finance and productivity. Most poor households are unable to meet medical expenses associated because their treatment is protracted and expensive.

Available literature indicates that catastrophic expenditure and impoverishment are experienced in many countries (O'Donnell *et al.*, 2005, 2008; Feenberg and Skinner, 1994; Waters, 2004). However, there exist few studies which has investigated the extent to which catastrophic expenditure causes financial hardships to households (Kimani and Maina 2015; Kimani. 2014, Chuma and Maina 2012). Many of these studies have not gone in depth in understanding the determinants as well as county variation in prevalence of catastrophic expenditure and household impoverishment, partly due to inexistence of county specific data. Lack of documentation of incidence of catastrophic expenditures and impoverishment by households at county level could be a limitation in the development health financing options at the county level.

With devolution, it is important to assess health expenditure taking into account county variation in socio-economic characteristics. Because of future prospects of growth and development, it is important to provide information to policy makers in programming – health expenditures that are catastrophic leading to poverty. This will provide the policy

makers the requisite background facts that are needed in developing policies that will assist in mitigating this.

### **1.5 Research Questions**

The study addressed the following questions:-

- a) What are the determinants of catastrophic health expenditure and impoverishment in Kenya?
- b) What is the distribution of catastrophic health expenditure and impoverishment across counties in Kenya?

### **1.6 Objectives of the Study**

The broad objective of this study was to analyze the distribution of catastrophic health expenditure in Kenya and to assess its poverty effects. The specific objectives of the study included:

- a) To examine the determinants of catastrophic health expenditure and impoverishment in Kenya.
- b) To examine the distribution of catastrophic health expenditure and impoverishment across counties in Kenya.

### **1.7 Justification of the Study**

Studies by the World Health Organization (WHO, 2010) have shown that households are more likely to incur catastrophic expenditures if they rely on out-of-pocket payments for their healthcare needs. Increase in income has been viewed by most literature as having an effect on increasing consumption of health thus influencing productivity

This study sought to analyze the determinants and distribution of catastrophic health expenditure; assess the impact of poverty on utilization to needed health services using 2013 KHHEUS data at the county level. The findings from the study may be used at county level in developing the health financing strategies and policies that will aim at cushioning households against the claws of catastrophic health expenditure and impoverishment. Further, the paper can be used by academia as a base for analysis of catastrophic health expenditures and impoverishment.

## 2 LITERATURE REVIEW

### 2.1 Introduction

This chapter presents an assessment of the theoretical and empirical literature regarding health care access and utilization, health payments and catastrophic expenditures and their effects on individuals and households within the region and across the globe. It also summarizes a number of theories and approaches on catastrophic health expenditures and impoverishment on individuals and households.

### 2.2 Theoretical Literature

#### 2.2.1 Human capital theory

Human capital theory was developed by Gary Becker (1962) who viewed human capital from an economic perspective and stated that it is a set of skills that increase a worker's productivity and are directly useful in the production process. It suggests that human behaviour is driven by a desire to have tangible and intangible goods such as skills, health and education. Becker investigated the incentive of firms and workers to invest in human capital development aspects such as training, education and health and concluded that individuals invest in health and training to increase their life value. The study concluded that optimal investments in human capital are made during the prime years, even though it lowers earnings due to direct costs and opportunity cost of work, the investment increases net earnings in the foreseeable future since good health conversely raises worker's productivity (Becker, 1962).

Human capital theory is useful in the analysis of individual behaviour of demand and investment. It has been used to analyse addiction as a consistent plan to maximize utility over time by Becker and Murphy (1988). It has also been used to analyse the role of family in the demand for health care by Bolin *et al.* (2002). The family model accounts for interactions between people in a household, and the roles they play in production of own and household health. The theory argues that although a family structure may change over a life cycle, the individuals that a person lives with influence his choice and behaviour. Therefore, own income and a family's joint resources determine an individual's health production function.

Grossman (1972) presented a new theory based on human capital theory where he treated medical care as endogenous. The model explains that individuals invest in health stock through utilization of medical care services. Using a typical demand function, Grossman showed that each individual ranked various combinations of goods and services that would produce value. The individual is assumed to maximize utility subject to various constraints, among them income. Thus, when an individual invests in stock of knowledge their productivity and income rises in the future. With the high incomes the individual will then be able to buy more goods and services that give him higher utility. Grossman (2004) further argues that improvements in health not only raise an individual's productivity but also affect markets and household productivity. He concluded that health is demanded as a consumption commodity that yields utility, and as an investment commodity that increases productivity, since good health increases the time allocated for production by individual and household, and it also saves time lost by care givers.

### **2.2.2 The Health Belief Model**

The health belief model developed in the 1950's by a group of psychologists as a conceptual framework to study the failure of individuals to adapt disease preventive measures such as screening and vaccination. The model is based on the psychological theory that argues that human behaviour depends largely upon an individual's estimation of the likelihood of achieving a goal, and the value he places on the goal. It is described as containing sets of interacting variables relating to utilization of health care services including; individual's perceived susceptibility, illness severity, rational perception of benefits versus costs and signals to action.

This model focuses on four main aspects, firstly, the perceived susceptibility of an individual's assessments of beliefs and susceptibility relating to illness and health risks in general risk including vulnerability notion to ill-health. Secondly, the perceived severity that influences an individual to assess the seriousness of developing a disease, or leaving it untreated that could lead to pain, disability or death from a disease, thus causing an effect on the family life and social relationships, thereby causing negative impact on productivity.

Thirdly, the perceived benefit and action cue when an individual's susceptibility to a certain condition perceived to be severe is linked to a force that leads to a certain behaviour change, it does not give any defined course of action that the individual is likely to take. The course of action is hypothesized to depend on an individual's beliefs concerning the effectiveness of the various measures that are feasible in the reduction of illness, and the associated threat. Therefore, an individual who is "sufficiently threatened" can be expected to adopt health recommended actions, unless the individual perceives those actions as unfeasible or not efficacious.

Lastly, are the individuals perceived barriers that lead an individual to avoid recommended behaviours or actions, if they perceive certain aspect of health having some potential negative effects, it may hinder adoption of recommended actions. These barriers are assumed to lead to some cost-benefit analysis that assists individuals in weighing the effectiveness of some recommended health actions. The health actions are further analysed on cost, risk (e.g., adverse effects), spite (e.g., painful) and time consumption. Janz and Becker (1984) reviewed some empirical literature relating to the application of the health belief model to a variety of preventive measures such as screening for breast cancer and genetic disorders, and vaccination found large support for the model. Though limited to attitudes and beliefs the model is, nevertheless, appropriate in explaining an individual's health behaviour.

## **2.3 Empirical Literature**

### **2.3.1 Determinants of catastrophic health expenditures**

Income level and expenditure greatly affect healthcare expenditure. Parker and Wong (1997) noted that the low income household and those uninsured paid more out of their pockets health expenditure. According to Swadhin (2010), the current expenditure on food, chronic illness, birth deliveries and education are major factors influencing catastrophic expenditure.

In some situations, healthcare and treatment costs rise beyond what households can afford<sup>5</sup> forcing them to give up consumption of some basic goods. This is referred to as catastrophic expenditure (Xu *et al.* 2003; Wagstaff and van Doorslaer, 2003). Health insurance could cushion households from catastrophic health expenditure (Knaul *et al.* 2006; Lamiraud *et al.* 2005; Limwattananon *et al.* 2007). Ever since Popular Health Insurance scheme was introduced in Mexico in 2001 the incidence of catastrophic health expenditure dropped significantly (Gakidou *et al.* 2006). The same happened in Thailand after the introduction of universal health care scheme in 2003 (Limwattananon *et al.* 2007).

Pradhan and Prescott's (2002) simulation analysis of catastrophic risks among households in Indonesia confirms catastrophic expenditures among households. From an examination of household survey data for 59 countries Asia, Xu *et al.* (2003) saw that any expenditure on healthcare in a household that exceeds 30-40 per cent of a family's income is catastrophic. Berki (1986) finds a positive relationship between health care costs and prevalence of catastrophic expenditure.

Perkins *et al.* (2009) in their case study of the out of pocket expenditure to women and their families while accessing maternity care (facility deliveries) in Kenya, Tanzania and Burkina Faso found out that there were no cost variation in irrespective of the wealth quintile but costs were high for complications.

Garg (1998), O'Donnell *et al.* (2005) and Fun and Zick (2005) found that in Asia and other developing economies, households often slide into poverty when health costs escalate. Health costs reduce a household's disposable income due to lost earnings and low productivity.

Nugent (2008) in India found that the main source of healthcare finance in a household in the event of a chronic disease is savings. Savings account for 40-50 per cent of the total healthcare expenditure in households experiencing a chronic disease. Financial assistance from friends and relatives contribute 10-15 per cent.

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<sup>5</sup>This is referred to as catastrophic expenditure by Wagstaff and Van Doorslaer, 2003

### **2.3.2 Definition and Measurement of Catastrophic Health Expenditures**

Berki (1986) pioneered the work on catastrophic health expenditures and since then various definitions of catastrophic health expenditure have been developed. Berki states that an expenditure on medical care becomes financially catastrophic when it endangers the family's ability to maintain its customary standard of living. When health care costs and expenditures are too large they may constitute a large portion of a household's budget. This may in turn affect the consumption of other household goods and services. It is further assumed that households experience catastrophic expenditures when their health expenditure exceeds 40 percent of the household's capacity to pay (Berki, 1986).

Wagstaff and Van Doorslaer (2003) observe that the ethical position on how to measure catastrophic expenditure is that no one ought to spend more than a given fraction of income on health care. They recommend their approach to researchers interested in showing associations between the state of poverty and the state of health catastrophic expenditure in the absence of health insurance. They conclude that high health expenditures on health care can erode a household's living standards.

Chollet and Betley (1987) define catastrophic exposure as the situation where health expenditure exceeds a household's disposable income, or is beyond non-insurable risk threshold. Russell (1996) defines catastrophic expenditure in relation to the household's ability to pay, thus it focused on the opportunity cost of healthcare to the household concerned. However, Stiglitz (1988) finds it subjective to try assigning numerical values in defining catastrophic risks arguing that the fundamentals differ with countries.

### **2.3.3 Impoverishment**

World Health Organisation (2000) report shows payment for health care out of pockets (OOP), is not an equitable way of financing health services because it lays a burden on some social groups in communities like the poor, rural households, and the aged. In taking the option of OOP, the cost of financing for health is placed on households, and in cases where the cost of health care exceeds the ability to pay, it may lead to delay in seeking healthcare. Poor households may experience food insecurity and low education

attainments when there is an illness occurrence. Some households liquidate precious assets such as land to meet medical bills.

Wagstaff (2008) argues that impoverishment captures how far people are pushed below the poverty line as a result of health care costs. It also measures the probability that health expenditure can push poor households deeper into poverty. The study concludes that besides estimating the likelihood of catastrophic expenditure, it is important to go beyond and assess the likelihood of households becoming impoverished by health care and treatment costs.

Individuals may sometimes find themselves impoverished<sup>6</sup> while making an attempt to spend a catastrophic proportion of their income on healthcare. This would create an opportunity cost in expenditure whereby, an individual may be faced with a tough choice of expenditure in basic needs or health. According to the World health report 2000, one of the major objectives of a health system is to put in place a health financing system that protects the population against the financial risks associated with ill health (WHO, 2000). Studies that have examined household vulnerability to poverty include Ekman (2007) who observes that health systems in Africa are majorly funded through OOP payments which do not offer any protection against financial risks.

Saksena *et al.* (2006) using self-reported need for health care as a proxy for need, sought to estimate the burden from catastrophic health expenditure by taking into account households who would have faced catastrophic health expenditure if they chose to seek health care and then analyzed the role of an insurance program on utilization, the cost of healthcare and the catastrophic health expenditure in Kenya. The results found that there was a significant difference between the total number of households facing catastrophic expenditure and the households who actually faced catastrophic expenditure. This is was partially due to the fact that poorer households did not use services because they could not afford were assumed to be using health care services in the estimation.

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<sup>6</sup> This is when expenditure on health exceeds the limit set in the capacity to pay. Health expenditures will be impoverishing at the level when the household per capita expenditure (gross) exceeds household poverty line expenditure level.



### **2.3.4 Incidence of catastrophic and impoverishment**

Kimani *et al.* (2016) in the analysis of catastrophic health expenditure and impoverishment in Kenya established that 12 percent of households that sought health care experienced catastrophic health expenditures while another 4 percent were impoverished. Further, the incidence of catastrophic expenditures was highest in the lowest quintile.

The burden of health payments pushes poor households deeper into poverty. The situation is aggravated if the illness results in the death of a productive member of a family. Mahal *et al.* (2005) found that households will ordinarily have to pay for care and treatment costs even if the patient dies while undergoing treatment as found in India. The lost income reduces a household's purchasing power for other goods and services catalyzing poverty (Abegunde *et al.* 2007). Ghaffar *et al.* (2004) show those households in lower income levels have little or nothing to spend on healthcare. Subsequently, mitigating interventions are inadequate in most countries as observed by Flores *et al.* (2008) and Xu *et al.* (2003).

Xu *et al.* (2006) study shows that healthcare needs that seem insignificant relative to household income can be disastrous to the financial status of poor families. This is in line with Baeza and Packard (2006): Van Doorslaer *et al.* (2006): and Wagstaff and Van Doorslaer (2003) who concluded that expenditure on healthcare can contribute to poverty. In principal, no one should be pushed into poverty or further into poverty by healthcare expenses. Governments need to put in place policies to cushion households from the adverse effects as recommended by Xu *et al.* (2006).

### **2.3.5 Measurement of Catastrophic health expenditures**

Wagstaff & Doorslaer (2003) proposed the usage of budget shares to measure catastrophic expenditures, in their approach they used a household expenditure as the denominator then the catastrophic payments are explained in reference to the health payments budget share. Nonetheless this budget share may be very small for the poor households who are in the rural areas. The severity of the budget constraint would imply that most resources are absorbed by items essential to sustenance, for example, food, leaving little to spend on

healthcare. This derives from the first limitation of the catastrophic payments approach. Households that cannot afford to meet catastrophic payments are therefore ignored.

The best solution would be to define catastrophic as “non-discretionary expenditure” as advocated by (Wagstaff and Doorslaer, 2003), who define it as a share of net expenditure on basic necessities, or it can be defined as a capacity to pay<sup>7</sup>, as advocated by (Xu, 2005). The challenge lies in the definition of expenditure that is nondiscretionary. We can thereby use household expenditure net of food expenditure as an indicator of living standards. Although not all food purchases are nondiscretionary, non-food expenditure may distinguish between the rich and the poor than it does the total expenditure in a better way.

#### **2.4 Overview of literature review**

The literature reviewed gives an analysis of the theoretical underpinning on health care access and utilization and how it influences the productivity of individual and households. Empirical literature reviewed shows that increased out of pocket expenditure or occurrence of catastrophic health expenditure has been linked to negative effect on individuals and household health outcomes across the world as more households are pushed further into poverty (Berki, 1986; Wagstaff and Van Doorslaer, 2003; Chollet and Betley, 1987; and Stiglith, 1988).

The reviewed literature relates to effects on household income and vulnerability to poverty. The survey shows that economic effects of ill health contrast widely depending on the account of illness and household characteristics (Mahal *et al*, 2005; Wagstaff and Van Doorslaer, 2003).

The approaches used to assess catastrophic expenditure in a household in the reviewed literature point to two distinct approaches related to the measurement of catastrophic health expenditure in the literature.

Assessments of catastrophic health expenditures show the impact of these costs on poor households. While some studies consider the share of OOP expenditure in a household,

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<sup>7</sup> Discussed in details is section 3.2

others measure the incidence and extent of OOP health expenditures across countries of different economic status (Wagstaff and van Doorslaer, 2003; Xu *et al.* 2006; Saksena *et al.* 2006; O'Donnel *et al.* 2005; Van Doorslaer *et al.* 2007). Others evaluate both actual and potential incidence of catastrophic expenditure (Saksena *et al.* 2006). Saksena *et al.* (2006) brings out the difference between households that seek healthcare and those that do not. These studies conclude that catastrophic health expenditures increase the likelihood of a household to slide into poverty but have not looked at the determinants of catastrophic health expenditures and impoverishment and the distribution at sub national levels.

Studies on catastrophic health expenditures and impoverishment done in Kenya have not estimated the incidence of catastrophic health expenditure and impoverishment at county level. Some are case studies (Perkins, 2009), while the others are provide national and regional (province based) estimates (Kimani and Maina, 2015). This study proposes to fill the identified information gap and do a comparison to the national estimates of catastrophic health expenditures and impoverishment.

### 3 METHODOLOGY

#### 3.1 Introduction

This chapter discusses the methodology that was used to analyze the catastrophic health expenditures and impoverishment in Kenya. It discusses the theoretical framework and empirical model for catastrophic health expenditures and impoverishment.

#### 3.2 Estimating Catastrophic Health Expenditures and Impoverishment

This study used the Xu's Approach (Xu, 2005) to estimate catastrophic health expenditures and impoverishment. The approach begins by formulating a food expenditure share (*fdes*) function of the form:

$$fdes = \frac{hfde}{Te} \dots\dots\dots 1$$

Where *hfde* is the household food expenditure and *Te* is the total expenditure. According to (Xu 2005), household food expenditure excludes beverages, alcohol, and food that is consumed outside the homes like in restaurants.

The equivalent household size is given by;

$$eqhsize = hsize^\beta \dots\dots\dots 2$$

Where *eqhsize* is the equivalent household size, *hsize* is the household size and  $\beta$  is an equivalence scale. The equivalent household size, is used in this analysis because it allows for comparability of households. For instance, a family of five does not require five times more food as a family of one. To achieve this process of equalization an established scale used to correct the expenditures of families to replicate the household composition and size and therein put them on a like for like basis.

This process is also used to generate the equivalence food expenditures (*eqfde*) variable by finding the ratio between each household's food expenditure and the equivalent household size:

$$eqfde = \frac{hfde}{eqhsize} \dots\dots\dots 3$$

Food expenditure shares of the 45<sup>th</sup> and 55<sup>th</sup> percentiles named *fd45* and *fd55* respectively, of a sample size are used<sup>8</sup> to calculate the weighted average food expenditure, which eventually forms the subsistence expenditure per equivalent capita (poverty line) in the form of:

$$Pl = \frac{\sum Wh * eqfde}{\sum Wh} \quad \text{where } fd45 < hfde < fd55 \dots\dots\dots 4$$

Where *Wh* is the weight, and *pl* is the poverty line.

For an individual household, the subsistence expenditure (*hse*) is given by:

$$hse = Pl * eqhsize \dots\dots\dots 5$$

As such, a household is poor when its total household expenditure (*Te*) is smaller than the subsistence expenditure i.e:

$$\text{Poor} = 1 \quad \text{if } Te < hse$$

$$\text{Poor} = 0 \quad \text{if } Te > hse \dots\dots\dots 6$$

*Household Capacity to pay (hctp)*

According to (Xu, 2005), Household Capacity to pay is the household non-subsistence expenditure or the effective non-subsistence income of the household. This is modeled in the form:

$$Hctp = Te - hse \quad \text{if } hse \leq hfde$$

$$Hctp = Te - hfde \quad \text{if } hse > hfde \dots\dots\dots 7$$

*Out of pocket health payments share of household capacity to pay (oophctp)*

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<sup>8</sup> These two boundaries of percentiles are proposed and used by (Xu, 2005) in order to minimize measurement errors.

Out of pocket payments as a percentage of a household's capacity to pay defines the burden of the health payments, given by:

$$Oophctp = \frac{hoope}{hctp} \dots\dots\dots 8$$

Where *hoope* is the household's out-of-pocket expenditure and *hctp* is the household's capacity to pay as earlier defined. According to (Xu, 2005) out of pocket expenditure refer to all the payments which are made to receive medical attention like consultation of the doctor fee, bills and buying of medicine, however it does include health related transport expenses or special health diet prescribed (Xu, 2005).

*Catastrophic health expenditure (che)*

This is when a household's out of pocket health expenditure is equal or exceeds 40 percent of a household's capacity to pay; nonetheless Xu explains that the 40 percent can be adjusted depending on a country's specific situation. The catastrophic health expenditure variable is modeled as a binary dummy variable, where 1 represents a household with catastrophic expenditure and 0 without, in the form of:

$$che = 1 \text{ if } \frac{hoope}{hctp} \geq 0.4$$

$$che = 0 \text{ if } \frac{hoope}{hctp} \leq 0.4 \dots\dots\dots 9$$

*Household Impoverishment (hipoor)*

A household who is non-poor is considered to be impoverished by the health payments at the time when he/she becomes poor after paying for the health services. This variable is also modeled as binary dummy, where 1 is when a household's expenditure is equal or higher than the subsistence expenditure but lower than the subsistence expenditure net of out of pocket health expenditures and it is 0 when both of them are equal or higher than subsistence expenditure.

$$hipoor = 1 \text{ if } Te \geq hse \text{ and } Te - hoop < hse$$

hipoor = 0 if  $T_e \geq h_{se}$  and  $T_e - h_{oop} \geq h_{se}$ .....10

To identify the household with catastrophic health expenditures, the study will use a specification criteria in the form:

$$C_j = \frac{T_{ehj}}{T_{hcj} - p^{nj}} \dots\dots\dots 11$$

Where  $C_j$  is the proportion of health expenditure of household  $j$  to the total household consumption less cumulative survival income<sup>9</sup> for all the household members. Following Xu 2005, a  $C_j$  of above 40 percent will indicate catastrophic expenditure.  $T^{ehj}$  on the numerator is the total health expenditure of household  $j$  and  $T^{hcj}$ ,  $p^{nj}$  on the denominator are the total household consumption, poverty line and size of household  $j$  respectively.

### 3.3 Model Specification

To examine the determinants of catastrophic health expenditure, the study uses logit model. Cameron and Trivedi (2005) indicated that either logit or probit can be used because often there is little difference between the predicted probabilities from probit and logit models. Further, the fitted log-likelihoods often are very similar for the two models.

The study specifies a logistic regression model of the form:

$$che = \alpha + \beta X + \epsilon \dots\dots\dots 12$$

Where  $che$  is the catastrophic health expenditures, and will take a value of 1 for a household with catastrophic expenditures and 0 without catastrophic expenditure as specified by (Xu 2005).  $X$  is a vector of the independent variables, (equivalized household size; illness; level of education of the household head; gender of the household head; out of pocket expenditure; employment status of the household head; marital status; age of the household head, distance to health facility; residence; county and household expenditure)

To analyze impoverishment, equation 13 will be used:

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<sup>9</sup>Survival income is net of the combined consumption expenditure for households; one derives the ability to pay; i.e. the remaining income after basic subsistence needs have been met.

$$\text{hipoor} = \alpha + \alpha_1 h_i + \varepsilon \dots \dots \dots 13$$

Where hipoor is a dummy variable indicative of whether a household has experienced impoverishment or not,  $h_i$  is a vector of independent variable.  $\alpha$ ,  $\alpha_1$  are parameters while  $\varepsilon$  is an error term.

### 3.4 Definition and Measurement of Variables

This section provides a definition of variables used in the various models. The dependent variables are: dummies for household catastrophic expenditure, and household impoverishment on account of illness

**Table 3: Definition and Measurement of variables**

Variables	Variable description and measurement	Expected sign	
		Catastrophic exp. equation	Impoverishment equation
Catastrophic health expenditure	Household having catastrophic health expenditure on account illness. Equal to 1 if a household experienced catastrophic expenditures; 0 otherwise		
Impoverishment	Household impoverished on account illness. Equal to 1 if a household experienced impoverishment; 0 otherwise		
Illness	Household report having had any illness 4 weeks prior to the survey (Dummy, presence of any disease =1, 0 otherwise)	Positive	Positive
Location	Dummy, urban =1, 0 otherwise.	Indeterminate	Indeterminate
Household size	Total number of members of a household	Indeterminate	Indeterminate
Household head working status	Dummy variable equal to 1 if household head is working ; 0 otherwise	Negative	Negative
Level of education	Dummy variable equal to 1 if the level of education is Primary and below; 0 otherwise	Negative	Negative
Sex	Dummy variable equal to 1 if the household head is a male; 0 otherwise	Uncertain	Uncertain
Distance to facility	Distance in kilometres to the nearest health facility	Uncertain	Uncertain
Age	Age in years of the household head	Uncertain	Uncertain
Out of pocket expenditure	Total health cost incurred by a household seeking health service	Positive	Positive



### **3.5 Data Source and Description**

The study used the 2013 Kenya Household Expenditure and Utilization Survey (KHHEUS) data. KHHEUS 2013 was conducted as part of the National Health Accounts. The sampling strategy for the KHHEUS 2013 was the National Sample Survey Evaluation Programme five (NASSEP V) to the extent possible which was designed to generate national and county representative estimates of all survey items and indicators and representative estimates for the rural and urban population for both national and county level. The study had targeted 33,675 households (20,350 from Rural and 13,325 from urban). The study covered 1,347 clusters distributed as 814 (60 percent) rural and 533 (40 percent) urban throughout Kenya.

### **3.6 Estimation Issues**

Diagnostic test for multicollinearity was carried out. The study used robust standard errors to address possible heteroskedasticity.

## 4 RESULTS AND DISCUSSION

### 4.1 Introduction

This chapter reports on the parameter estimates of the models discussed in Chapter three. The chapter starts by presenting the descriptive statistics for variables used in the estimation of both catastrophic and impoverishment models. Section 4.3 presents the incidence of catastrophic health expenditures and empirical results for determinants of catastrophic health expenditures while section 4.4 discusses incidence of impoverishment and empirical results.

### 4.2 Descriptive Statistics

This section presents the descriptive statistics for the dependent and independent variables used both catastrophic health expenditure and impoverishment equations. The survey respondents had a mean age of was 45.29 years. Their average schooling was 7.78 years and the average household size was 4.3 persons. About 80 per cent of the respondents were married; 14.9 percent had insurance cover; and 88.2 percent of household heads were working. 24.3 percent of the households reported illness.

**Table 4: Summary of Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
Catastrophic	152,566	0.063	0.243	0	1
Impoverishment	23,470	0.046	0.210	0	1
illness	148,537	0.243	0.429	0	1
Insurance	148,537	0.149	0.356	0	1
Location	152,566	0.344	0.475	0	1
Household Size	148,452	4.253	0.828	1	14
Working	148,358	0.882	0.322	0	1
Education	130,746	0.778	0.415	0	1
Gender	148,529	0.738	0.440	0	1
Distance	43,004	6.497	24.395	0	11.2
Marital status	148,529	0.798	0.402	0	1
Age	148,529	45.286	14.495	15	99

*Source: Author's computation*

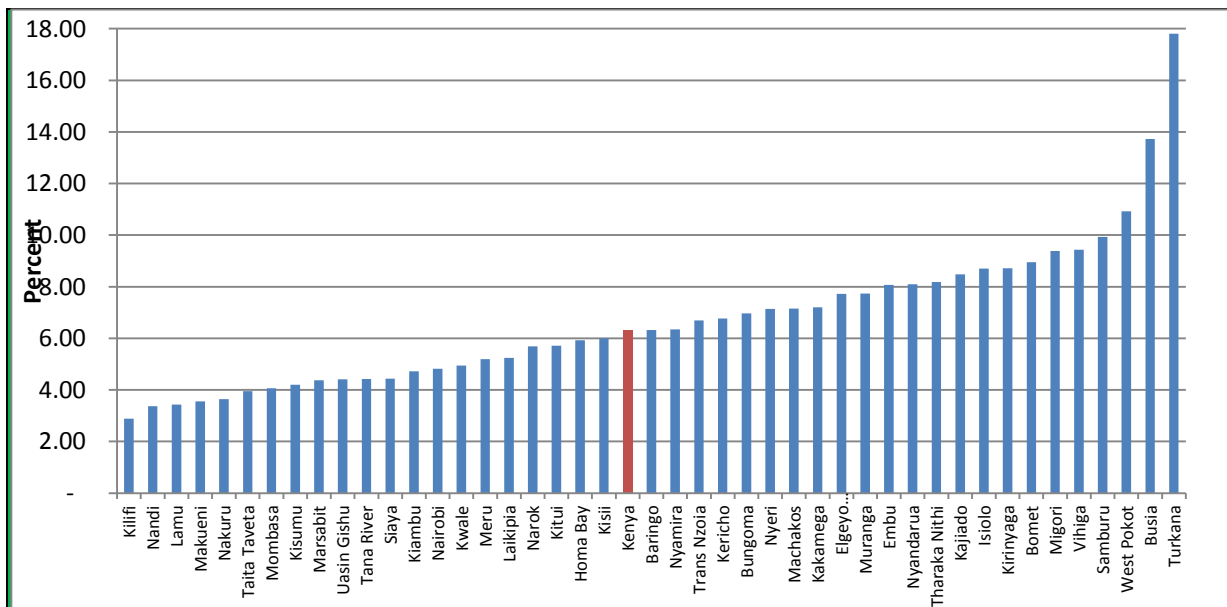
Table 4 further shows that the majority (66 percent) of the households were residing in rural areas. On average household members travelled a distance of 6.497 kilometres to access health services from the nearest health facility. There was a large variation in the number of male and female in the survey with 73.8 percent of the respondent's being male and 26.2 percent were female.

### 4.3 Results for Catastrophic health expenditures

#### 4.3.1 Incidence and Distribution of Catastrophic Health Expenditures in Kenya

The incidence of catastrophic health expenditure was 6.29 percent in 2013 translating to 2.6 million Kenyans. This could be partly due to people joining insurance schemes as earlier shown (Republic of Kenya, 2014b). Further, households in 23 counties experienced a higher incidence than the national level (6.29 percent) with Samburu, West Pokot, Busia and Turkana experiencing over 10 percent (10 percent, 11 percent, 14 percent and 18 percent respectively). Kilifi, Nandi, Lamu, Makueni, Nakuru and Taita Taveta counties had the least levels of catastrophic health expenditures (below 4 percent) at 2.9 percent, 3.4 percent, 3.4 percent, 3.6 percent and 4 percent respectively as shown in the figure 1.

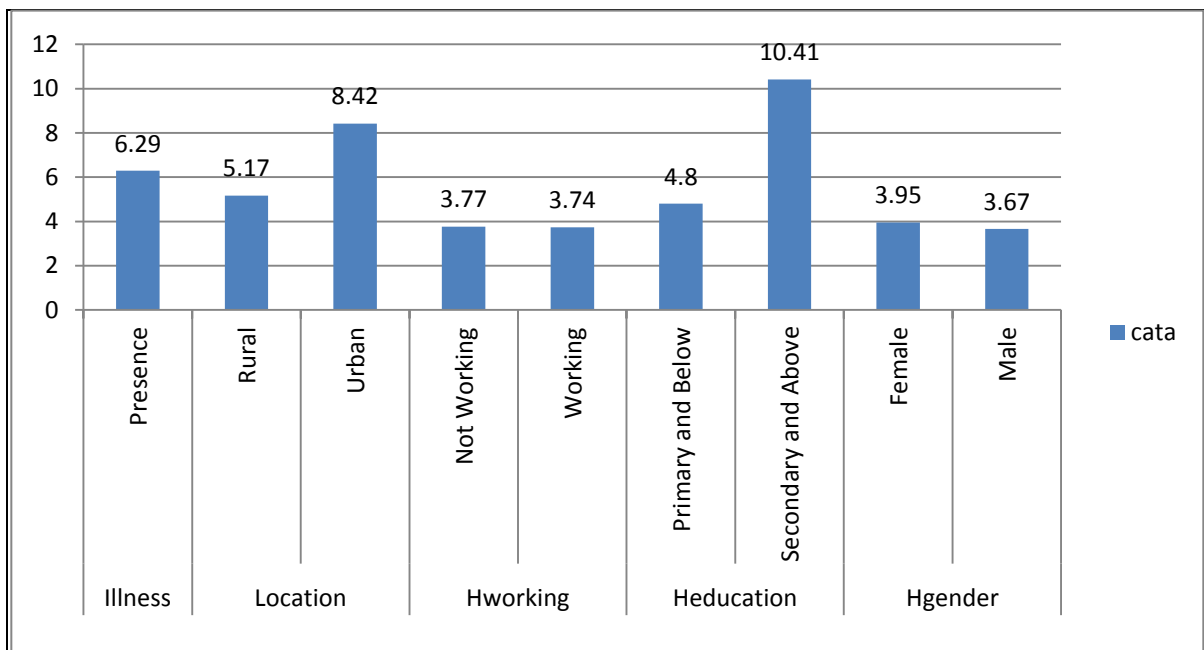
**Figure 1: Incidences and Distribution of Catastrophic Health Expenditures by counties (%)**



### 4.3.2 Catastrophic Health Expenditure by Household Characteristics

The figure 2 presents the social, demographic and economic characteristics of households that experienced catastrophic expenditure. The highest levels of catastrophic health expenditures were experienced by households with secondary education level and above at 10.41 percent. On account of illness, households experienced catastrophic health expenditures at 6.29 percent while in terms of gender, female headed households experienced 3.95 percent with the male headed households at 3.67 percent.

**Figure 2: Incidence of Catastrophic Health Expenditure by Household Characteristics**



Source: Author's computation

Moreover, catastrophic health expenditures were experienced by people living in the urban at 8.4 percent. This could be explained by the fact that; as counties develop, people move to urban areas in search of better livelihood. The cost of living in urban areas has been seen to be higher than in the rural areas. This pushes more urban dwellers to peri-urban or even slum areas where housing and amenities are relatively cheaper. But since the disposable income for this group is little, they may not have enough resources to cover their medical expenses when sick.

### 4.3.3 Determinants of Catastrophic Health Expenditure

Before discussing the empirical results of determinants of catastrophic health expenditures, we needed to rule out the presence of multicollinearity which leads to reduced robustness of the results and could lead to wrong inferences. To assess this problem, we ran pairwise correlation matrix to test the correlation between the explanatory variables in the estimable models. The results are presented in Table 5.

**Table 5: Correlation matrix for variables used in estimation**

Variables	Insurance	Illness	Location	Household Size	Employment	Education	Gender	Distance	Marital status	Age
Insurance	1									
Illness	0.031	1								
Location	0.152	0.011	1							
Household Size	-0.107	0.103	-0.150	1						
Employment	0.089	-0.014	0.041	-0.011	1					
Education	0.210	-0.033	0.155	-0.106	0.450	1				
Gender	0.059	-0.029	0.007	-0.154	0.162	0.015	1			
Distance	0.040	0.036	-0.049	-0.007	-0.009	-0.032	-0.007	1		
Marital status	0.091	-0.022	-0.029	0.195	0.124	0.104	0.396	0.001	1	
Age	0.079	0.004	0.121	0.173	0.122	0.100	-0.004	0.076	0.121	1

**Source:** Author's computation.

The results from the pair-wise correlation matrix presented in Table 5, shows that the correlation coefficients between the explanatory variables are below 50 percent. This means that the problem of multicollinearity in the estimated models is not of concern. Further, the study used robust standard errors to take care of possible heteroskedasticity.

Table 6 shows the probit results for determinants of catastrophic health expenditures. The results shows that insurance, illness, location, household size, employment status of household head, education level of household head, marital status and age are significant at 95 percent and have the expected signs. Gender and distances to health facility are not significant determinants of catastrophic health expenditures. The marginal effects are presented in Table 7.

**Table 6: Probit results for determinants of catastrophic health expenditures**

<b>Variables</b>	<b>Coef.</b>	<b>Robust Std. Err.</b>	<b>P&gt;z</b>
Insurance	0.21	0.02	0.00
illness	0.44	0.04	0.00
Location	0.28	0.02	0.00
Household Size	-0.05	0.01	0.00
Employment	-0.10	0.03	0.00
Education	-0.19	0.02	0.00
Gender	0.04	0.03	0.12
Distance	0.00	0.00	0.00
Marital status	-0.07	0.03	0.02
Age	0.00	0.00	0.00
R square	0.0454		
Wald chi <sup>2</sup>	794.68		
Prob > chi <sup>2</sup>	0.0000		

*Source: Author's computation.*

#### **4.3.4 Marginal Effects for determinants of catastrophic expenditure**

Table 7 presents the marginal effects after probit. The results show that the probability of incurring catastrophic health expenditures reduces by 3.7 percent for a household with insurance compared to a household without insurance; increases by 5.8 percent on account of illness; increases by 4.8 percent is a households resides in urban areas; reduces by 3 percent as household size increases since a larger family size has been seen to quickly pool resources especially in instances if illnesses (although this variable is not significant at 95 percent confidence level, it is significant at 90 percent confidence level).

The table further shows that being in employment reduces the probability of incurring catastrophic health expenditures by 1.7 percent (this could be so because people in employment are likely to have insurance covers); level of education (secondary and above) reduces the likelihood of incurring catastrophic health expenditures by 3.4 percent. This is due to the fact that as people get more educated, they are much informed and even take charge of their health. Marital status (if married) reduces the odds of incurring catastrophic health expenditures by 1.1 percent maybe due to the fact that a couple will have more income than while single. Age was seen to increase the likelihood of incurring catastrophic health expenditures by 1 percent (as people grow older, the likelihood of chronic illness is higher and hence higher expenditures on health).

On the other hand, gender and distance were not seen to be significant in estimating catastrophic health expenditures. From the table, one can make inference that; gender (whether male) increases the odds of incurring catastrophic health expenditures by 0.7 percent while distance increases the odds by 0.2 percent.

**Table 7: Marginal effects after probit**

<b>Variable</b>	<b>dy/dx</b>	<b>Robust Std. Err.</b>	<b>P&gt;z</b>
Insurance * ,	-0.037	0.005	0.000
Illness*	0.058	0.004	0.000
Location*	0.048	0.004	0.000
Household Size	-0.003	0.002	0.091
Employment *	-0.017	0.006	0.002
Education*	-0.034	0.004	0.000
Gender*	0.007	0.004	0.130
Distance	0.002	0.005	0.150
Marital status*	-0.011	0.005	0.038
Age	0.001	0.000	0.000

(\*) dy/dx is for discrete change of dummy variable from 0 to 1

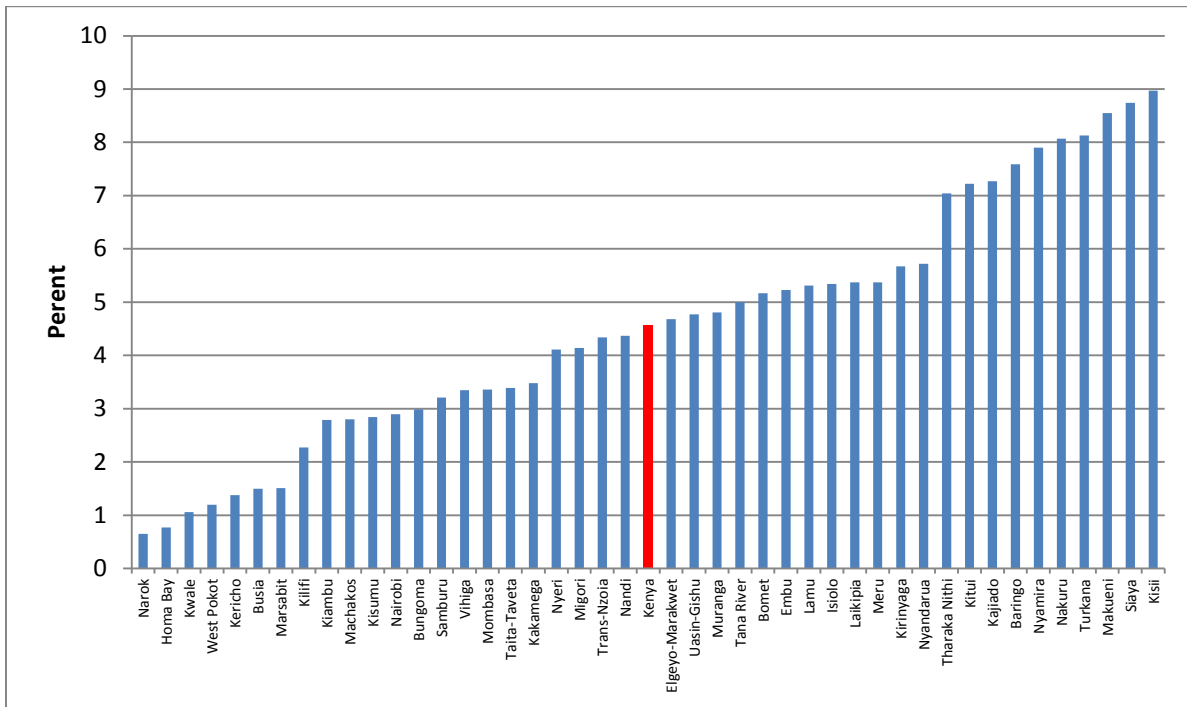
**Source:** Author's computation.

#### **4.4 Results for Impoverishment**

##### **4.4.1 Incidence and Distribution of Impoverishment in Kenya**

The incidence of impoverishment in Kenya was 4.58 percent in 2013. This translates to 1.7 million Kenyans implying that those people were pushed into poverty (or further into poverty) after paying for health care (i.e. by first incurring catastrophic health expenditures) and those who may not have incurred catastrophic expenditures (say like the top wealth quintiles) but may be pushed into poverty by incurring health expenditures. This is the case especially with the of rising incidences of Non-Communicable conditions like Cancer. Further, households in 22 counties experienced a higher incidence of impoverishment than the national level with Nakuru, Turkana, Makueni, Siaya and Kisii counties being highest at 8.07 percent, 8.13 percent, 8.55 percent, 8.74 percent and 8.97 percent respectively as shown in Figure 3.

**Figure 3: Incidences of Impoverishment by counties (%)**



Source: Author's computation.

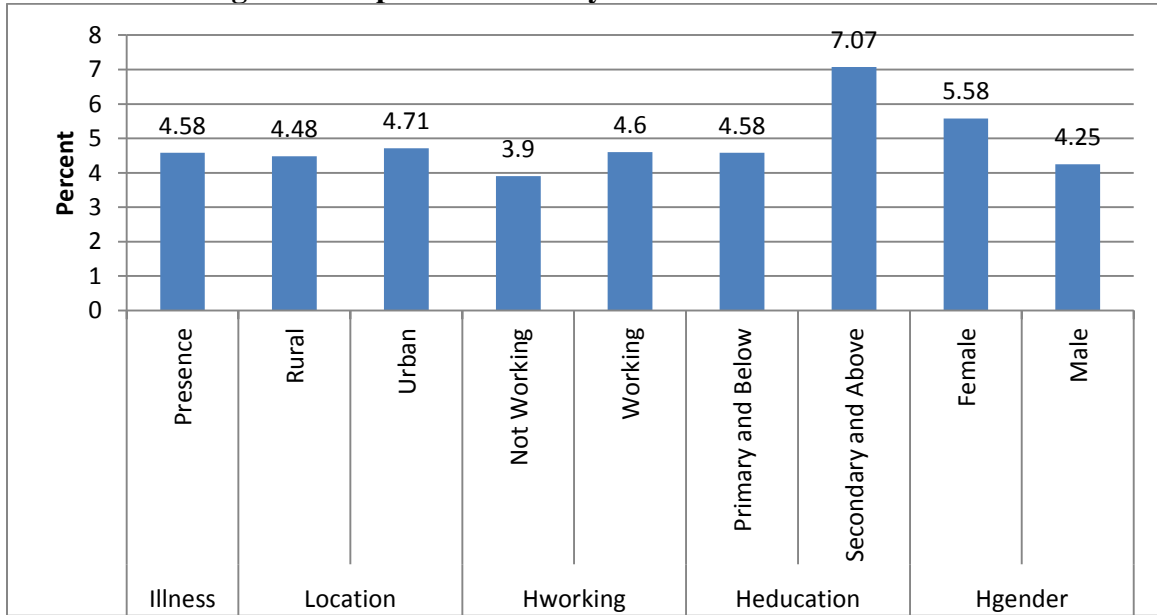
The result illustrates the extent to which health care payments can push a household into poverty i.e. many people who initially are not poor being pushed to poverty after incurring health expenditures. For instance a county like Nakuru with low catastrophic health expenditure but a higher impoverishment.

#### 4.4.2 Impoverishment by Household Characteristics

The figure 4 presents a summary of the social, demographic and economic characteristics of households that experienced catastrophic expenditure. As shown, impoverishment was experienced highest in people with secondary education and above at 7 percent. This could be occasioned by lifestyle changes as people get better chances for education and later gets into employment (those with employment at 4.6 percent) and mostly in urban areas (with 4.71 percent), their diets changes (consume more alcohol), exercises less and hence the setting in of non-communicable conditions. Impoverishment on the account of illness was at 4.58 percent, while that for females were at 5.58 percent as compared to the males at 4.25 percent.



**Figure 4: Impoverishment by Household Characteristics**



Source: Author's computation

One way in which one could explain high levels of impoverishment experienced by households with secondary education and above at 7 percent is that; as peoples' level of education increases, their chances of formal employment are higher. They tend to migrate to urban areas to take up employment opportunities. With urbanization comes lifestyle changes including diet, consumes more non-healthy foodstuff like junks and take alcohol thereby increasing their chances of non-communicable disease like diabetes, cancers etc. They work for long hours and even do not get time for physical activities. When non-communicable conditions sets in, the costs related consumes savings from employment and may plunge these urban population into poverty when the costs of healthcare eats into their survival income.

#### 4.4.3 The Determinants of Impoverishment

Table 8 shows probit results for determinants of impoverishment. The results shows that insurance, household size and education level of household head are significant at 95 percent and have the expected signs. The other variables are not significant determinants of impoverishment. The marginal effects are presented in Table 9.

**Table 8: Probit results for determinants of impoverishment**

<b>Impoverishment</b>	<b>Coef.</b>	<b>Robust Std. Err.</b>	<b>P&gt;z</b>
Insurance	0.26	0.06	0.00
Illness	0.01	0.09	0.89
Location	0.01	0.06	0.83
Household Size	-0.29	0.04	0.00
Working	-0.17	0.12	0.18
Education	-0.12	0.06	0.05
Gender	0.01	0.01	0.15
Distance	0.00	0.00	0.33
Marital status	-0.06	0.08	0.52
Age	0.00	0.00	0.20
R square	0.0463		
LR chi <sup>2</sup> (10)	103.11		
Prob > chi <sup>2</sup>	0.0000		

**Source:** Author's computation.

#### **4.4.4 Marginal Effects explaining Impoverishment**

Table 9 presents marginal effects after probit. The results show that the probability of being impoverished due to health care costs reduces by 2.3 percent for a household with insurance compared to a household without insurance; reduces by 2.6 percent as household size increases since a larger family size has been seen to quickly pool resources especially in instances if illnesses.

**Table 9: Marginal effects after Probit**

<b>Variable</b>	<b>dy/dx</b>	<b>Robust Std. Err.</b>	<b>P&gt;z</b>
Insurance *	-0.023	0.005	0.000
Illness*	0.021	0.007	0.020
Location*	0.010	0.045	0.000
Household Size	-0.026	0.019	0.826
Employment *	-0.013	0.008	0.023
Education*	-0.011	0.002	0.004
Gender*	0.001	0.001	0.170
Distance	0.001	0.002	0.133
Marital status*	-0.005	0.002	0.046
Age	0.001	0.000	0.009

(\*) dy/dx is for discrete change of dummy variable from 0 to 1

**Source:** Author's computation.

The table further shows that the level of education (secondary and above) reduces the likelihood of impoverished by 1.1 percent. This is due to the fact that as people get more educated, they are likely to be in employment and hence will have some form of insurance.

## **5 SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS**

### **5.1 Summary and Conclusions**

The goal of the research was to provide critical analyses on household out-of-pocket expenditures in Kenya and how these health expenditures become catastrophic hence pushing the households into poverty. Further, analyses of differentials on health care expenditure by socioeconomic and demographic characteristics of population can contribute towards a better understanding of existing variations in catastrophic health expenditures and impoverishment that could be used to develop appropriate policies and models to new interventions.

Insurances, illness, location, household size, employment status of household head, education level of household head, distances to health facility, marital status and age have significance effects on catastrophic health expenditures whereas only household size, insurance and education level of household head are significant in explaining impoverishment.

The results suggest that catastrophic health expenditures continue to be experienced in Kenya and as a result, many families are pushed into poverty. The study used the Xu (2005) method in the estimation of catastrophic health expenditures and impoverishment. The results shows that 6.3 percent of households that used healthcare in 2013, incurred catastrophic health expenditures and 4.6 percent were impoverished. Moreover, the rates of catastrophic expenditures varied considerably between counties. From the results, 23 counties reported a rate of catastrophic health expenditure exceeding 40 percent of capacity to pay while 22 counties reported impoverishment. These rates were higher than the national average, suggesting that about 2.6 million and 1.7 million Kenyans experienced catastrophic health expenditures and were pushed into poverty line due to OOP expenditures.

The result illustrates the extent to which health care payments can push a household into poverty but this is never captured in poverty estimation in the country i.e. many people are not classified as poor despite being below the poverty line after incurring health expenditures. Therefore, there is need to relook at the poverty estimation so as to capture

the people (who were initially not poor) falling below poverty line due to health expenditures.

Urban areas had the highest number of households incurring catastrophic expenditure at a count of 8.4 against the rural at 5.17 percent. Further, Catastrophic health expenditures and impoverishment were experienced by people with secondary education and above at 10.41 percent and 7.07 percent respectively.

This study has some limitations. The income and expenditures data is self-reported and thus not verifiable from other sources. The recall period of 12 months for expenditures on healthcare can be a limitation since it is difficult to ascertain possible inaccuracies in recall can occur for income or expenditures.

Despite the limitations, this study provides critical and useful insights which can evoke important discussion that can inform health financing programming at both national and county levels. The study made several contributions. It examined the determinants of catastrophic health spending and impoverishment as well as the distribution at county level.

## **5.2 Policy Recommendations**

This study has pointed out that health expenditure has significant poverty impacts on households at county level in Kenya. As demonstrated by the findings, substantial proportions of households in Kenya faces catastrophic health expenditures and are at risk of being impoverished. They are likely to forgo health care since they cannot afford.

Van Doorslaer et al. (2006) in a study in 11 Asian countries contended that one the success in cushioning poor households from high healthcare expenditures was policy of targeted exemptions, which can be implemented through health card. At the country level, mechanisms such as prepaid health access vouchers that pool risk and cost are needed to cushion residents from financial risks as they seek care.

As the counties are slowing but steadily developing, it is key to put in place plans that ensures; proper cities and town physical planning including housing, create incentives for

and enhance investments at local level to encourage people to develop the rural areas to curb rural urban migration.

As shown by the results, catastrophic health expenditures were experienced on the account of illness at 6.29 percent while impoverishment on the account of illness was at 4.57 percent. The counties should put mechanisms to ensure that primary health is the responsibility of all citizenry and that routine health care even for check-ups will assist to ensure that peoples' health is kept under check and with this they will have already addressed some of the challenges that come late after an episode of illness.

The level of insurance coverage is quite limited in Kenya (Republic of Kenya, 2015c). As the country is working towards developing a health financing strategy in order to address the issues relating to universal access to healthcare, important decisions have to be made geared towards cushioning the households against falling into poverty as they seek health care. Initiatives that motivate citizenry to join prepayment schemes so that they do not have to fall into poverty when they pay OOP should be encouraged at county level.

WHO 2010, points out that or a country to achieve Universal health Coverage, then it should dedicate more resources. While raising more money for health is crucial in supporting the UHC agenda, it is just as important to get the most out of the resources available. In order to ensure financial risk protection for all, provision of essential package of health should be funded primarily through prepayment mechanisms, while reducing OOP payments to a very minimum. The long-term goal is to ensure that Kenyans have equitable access to the essential package of health, without the risk of financial impoverishment.

### **5.3 Areas for Further Research**

Xu 2005 approach (applied in the study) may however indicate low prevalence of catastrophic health expenditures among poor households since household's expenditure on health services is always directly dependent on income, social networks and wealth position of the households (Wild *et al.* 2004).

The effects of social interactions on household health status are evident. This paper focused on the determinants and distribution of catastrophic health expenditures and impoverishment at county level. Further research is needed to establish the extent to which catastrophic health expenditure and impoverishment affect life satisfaction and subsequent household coping after incidences.

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