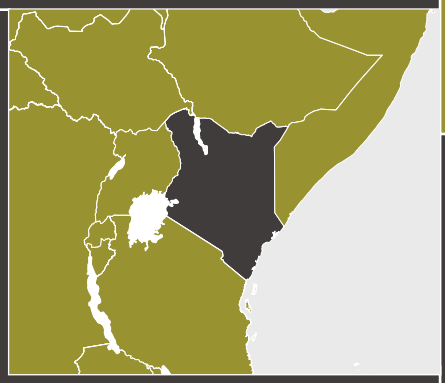
policy

February 2015

CATASTROPHIC HEALTH EXPENDITURES AND IMPOVERISHMENT IN KENYA



This report was prepared by Diana Kimani, University of Nairobi and Thomas Maina, of the Health Policy Project.

USAID FROM THE AMERICAN PEOPLE

PEPFAR

HEALTH POLICY PROJECT

Suggested citation: Kimani, D. and T. Maina. 2015. *Catastrophic Health Expenditures and Impoverishment in Kenya*. Washington, DC: Futures Group, Health Policy Project.

ISBN: 978-1-59560-070-7

The Health Policy Project is a five-year cooperative agreement funded by the U.S. Agency for International Development under Agreement No. AID-OAA-A-10-00067, beginning September 30, 2010. The project's HIV activities are supported by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). It is implemented by Futures Group, in collaboration with Plan International USA, Avenir Health (formerly Futures Institute), Partners in Population and Development, Africa Regional Office (PPD ARO), Population Reference Bureau (PRB), RTI International, and the White Ribbon Alliance for Safe Motherhood (WRA).

Catastrophic Health Expenditures and Impoverishment in Kenya

FEBRUARY 2015

This publication was prepared by Diana Kimani[1] and Thomas Maina[2] of the Health Policy Project.

[1] University of Nairobi, [2] Health Policy Project

The information provided in this document is not official U.S. Government information and does not necessarily represent the views or positions of the U.S. Agency for International Development.

CONTENTS

Contents ..... **iii**

Executive Summary ..... **iv**
Background iv
Methods iv
Results iv
Conclusion iv

Abbreviations ..... **v**

Introduction **1**
Measuring Catastrophic Expenditure 2

Methods and Data **4**
Methods 4
Wagstaff and van Doorslaer approach *4*
Xu approach *5*
Data 7

Results **8**
Incidence and Intensity of Catastrophic Health Expenditures 8
Household Impoverishment 11
Xu (2005) results *11*
Wagstaff and van Doorslaer (2003) results *13*
Discussion of Results and Conclusion 13

Policy Recommendations **15**
Limitations 15

References **16**

Annex **20**

EXECUTIVE SUMMARY

Background

Healthcare in many developing countries, including those in sub-Saharan Africa, is predominantly funded through out-of-pocket spending by households. Providing financial protection from exorbitant out-of-pocket expenses is an important tool for a country's health system to ensure equitable access to care. A household without such protection may be forced to pay huge medical bills to treat an ailing family member, exposing it to financial catastrophe and impoverishment. This report estimates the incidence and intensity of catastrophic healthcare expenditure and impoverishment in Kenya in 2003 and 2007. This study was funded by the United States Agency for International Development (USAID) and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the Health Policy Project.

Methods

HPP's research is based on data sets obtained from two nationally representative household health expenditure and utilization surveys conducted in 2003 and 2007 (n = 8,414). The surveys provided detailed information on households' use of healthcare, the related out-of-pocket spending on health, household consumption expenditures, and health insurance.

The study uses descriptive analysis to investigate the incidence and intensity of catastrophic health expenditures and impoverishment. To estimate these variables, we used the methods of both Wagstaff and van Doorslaer (2003) and Xu (2005). We also applied several thresholds reported in other studies to demonstrate the sensitivity of measures of catastrophic expenditures.

Results

Among households that used healthcare services in 2003, 10.3 percent experienced catastrophic health expenditures and 3.5 percent were impoverished by having to pay for healthcare services at the point of consumption. In 2007, 11.1 percent of households experienced catastrophic health spending, with 4 percent impoverished. The poorest households experienced the highest incidence of catastrophic health expenditures in 2003 and 2007 (20%).

The highest rate of impoverishment in 2003 was 13 percent, and occurred in the second-poorest quintile. In 2007, the rate of impoverishment was highest in the middle quintile (6.1%). Approximately 2.5 million people were pushed below the national poverty threshold in 2007 as a result of paying for healthcare services.

Conclusion

Kenya hopes to achieve universal health coverage and reduce the prevalence of catastrophic health expenditure. The country can realize these goals by focusing on policies that offer more financial protection to the poor and vulnerable. Already, the government has implemented several policies geared toward reducing out-of-pocket spending and extending financial protection to the poor. These include the "10/20 policy," introduced in 2004, that standardized user fees at lower-level health facilities; the 2013 free maternal health policy, and the abolition of user fees at primary health facilities, also in 2013. However, these measures are short term, with the long-term objective being the introduction of the National Health Insurance Scheme (NHIS). To accomplish that, Kenya must reform the National Hospital Insurance Fund to expand coverage with a comprehensive benefit package for all Kenyans, including the poor and vulnerable.

ABBREVIATIONS

HPP	Health Policy Project
MPO	mean positive overshoot
NHA	National Health Accounts
NHIF	National Hospital Insurance Fund
NSHIF	National Social Health Insurance Fund
OOP	out-of-pocket
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
USAID	United States Agency for International Development
WHO	World Health Organization

INTRODUCTION

The fundamental goal of a healthcare system is to ensure that people have access to high-quality care. At the same time, the system should protect households from incurring healthcare expenditures that are high enough in relation to incomes that they adversely affect households' economic well-being. This is often referred to as a health system's "financial protection" goal (Baeza and Packard, 2006). In many low- and middle-income countries, out-of-pocket (OOP) expenditure is the biggest source of healthcare financing. Its effect on household economic status can be severe, particularly among the poor.

According to the World Health Organization (WHO, 2000), direct OOP payment at point of service is an inequitable way to finance a health system because it burdens social groups unequally, especially the poor and the elderly. In such a health system, the greatest financial burden tends to be placed on the household, and if the cost of healthcare exceeds the ability to pay at time of service, the likely response is to avoid or delay seeking necessary care. Families are often forced to choose between saving members from illness and suffering by purchasing healthcare and satisfying other basic needs such as education, food, and housing (Knaul et al., 2006). Thus, health spending, especially catastrophic expenditure, can be an important additional source of poverty (Baeza and Packard, 2006; Van Doorslaer et al., 2006; Wagstaff and Van Doorslaer, 2003).

Catastrophic health expenditures relate, generally, to spending on health above a certain threshold that results in financial distress to a proportion of households and may cause impoverishment. It does not necessarily equate to high healthcare costs. Even health expenditures that seem small and affordable relative to household income can be financially disastrous for poor households (Su et al., 2006). According to Elgazzara et al. (2010), OOP spending on healthcare has become a policy concern for three reasons. First, direct payments for health services may push households into poverty or into deeper poverty. Second, households facing these health expenses may cut back on other essential household spending. A relatively small payment can mean financial catastrophe for a poor household whose budget is already stretched to the limit, forcing reductions in other basic expenses such as food, shelter, clothing, or children's education. Similarly, large healthcare expenditures can lead to financial catastrophe and bankruptcy, even for rich households (Xu et al., 2007). Third, households may choose to forgo necessary healthcare services rather than face the steep financial consequences of paying for them, thus creating a vicious cycle of ill health, disability, and poverty.

According to Kenya's National Health Accounts (NHA), OOP expenditures as a percentage of total health expenditure accounted for 51 percent in 2001–2002, 39.3 percent in 2005–2006, and 29.5 percent in 2009–2010 (NHA, 2002; NHA, 2006; Ministry of Medical Services and Ministry of Public Health and Sanitation, 2010). Although the percentage has been decreasing, it is still quite high, given Kenya's poverty rate. As of 2005, 47 percent of the population was estimated to be living below the poverty line (World Bank, 2008). Projections using national accounts data suggest that the poverty rate has dropped but remains high, between 34 percent and 42 percent (World Bank, 2013).

To address high OOP expenditures, the Kenyan government attempted to introduce the National Social Health Insurance Fund (NSHIF) and the 10/20 policy to cushion the poor and realize the vision set forth in the Kenya Health Policy Framework of 1994. NSHIF, which was never implemented, aimed to expand the coverage and benefits package of the current National Hospital Insurance Fund (NHIF). The 10/20 policy capped the fees charged by government dispensaries at Ksh 10 (US$0.13) and by health centers at Ksh 20 (US$0.26). All children younger than age five and specific health conditions such as malaria and tuberculosis are exempt from payment. However, the policy has not achieved its objectives. A review by Chuma et al. (2009), though conducted in only two districts, indicated that adherence to the policy was poor in both, mainly because of drug shortages, declining revenue, and poor policy design and implementation.

There are a number of barriers to accessing healthcare in Kenya. The *Kenya Household Health Expenditure and Utilisation Survey* of 2007 found that 17 percent of those who needed healthcare

services could not access them from either government or private facilities, largely due to financial constraints (Ministry of Medical Services and Ministry of Public Health and Sanitation, 2009). There is increasing evidence that OOP expenditures are a financial barrier to access to healthcare, and that their impact can be catastrophic and impoverishing (Xu et al., 2007; van Doorslaer et al., 2006).

Measuring Catastrophic Expenditure

Two common approaches are used to measure catastrophic expenditure. The first, proposed by Wagstaff and van Doorslaer (2003), is related to budget share; the second, by Xu (2005), to a household's capacity to pay. Wagstaff and van Doorslaer defined OOP health expenditures as catastrophic if they exceed some fraction of household income or total expenditure in a given period. They reasoned that, if a household spends a large fraction of its budget on healthcare, it must forgo other goods and services essential for well-being. Xu (2005) defined catastrophic health expenditure more specifically in relation to a household's nonfood expenditures. According to Xu, James et al. (2006), health expenditure is catastrophic if a household's financial contributions to health equal or exceed 40 percent of nonfood expenditure or the household's capacity to pay—that is, the income that remains after basic subsistence needs have been met. Both definitions ignore variation in the capacity of households to cope with healthcare costs—savings, assets, credit, and transfers from friends and relatives (Flores et al., 2008). This weakness notwithstanding, the two methods provide useful measures of catastrophic health expenditure and a means for comparison across societies or countries.

Many studies have used these methods to measure the incidence and extent of catastrophic OOP health expenditures: Wagstaff and van Doorslaer, 2003; Xu et al., 2003, 2006, 2006a, and 2007; O'Donnell et al., 2005; Lamiraud et al., 2005; Cavagnero et al., 2006; Gakidou et al., 2006; Knaul et al., 2006; Saksena et al., 2006; Su et al., 2006; Ekman, 2007; Limwattananon et al., 2007; Lee, 2011; Mendola et al., 2007; van Doorslaer et al., 2007; Wagstaff, 2007; Perkins et al., 2009; Galarraga et al., 2010; WHO 2011; Barasa et al., 2012; and Chuma and Maina, 2012. These studies have shown that OOP expenditures lead to catastrophic spending and are major causes of impoverishment.

Most of these studies have been conducted in Asia and Latin America, but a few (Saksena et al., 2006; Su et al., 2006; Xu et al., 2006a; Ekman, 2007; Perkins et al., 2009; Barasa et al., 2012; and Chuma and Maina, 2012) were done in Africa. Although studies in Kenya are few, some—such as Perkins et al., 2009 and Barasa et al., 2012—do not give the true picture of catastrophic health expenditures and impoverishment in the country because they are plagued by problems such as unrepresentative samples and the association of OOP costs only with hospital admissions or maternity care.

The incidence of catastrophic payment does not show the extent to which catastrophic expenditures actually cause hardship. One household may spend a very large amount of its income on health and not cross the poverty line as a result. Another may spend just a small amount of its income and be impoverished. The concept of impoverishment goes deeper than the concept of incidence of catastrophic health expenditures—the idea being that no one ought to be pushed into poverty or further into poverty because of healthcare expenses (Wagstaff, 2008). Impoverishment shows how far people are pushed below the poverty line as the result of health spending, as well as how health spending may push people who are already poor even further into poverty.

The literature provides two methods for measuring impoverishment. According to Wagstaff and van Doorslaer (2003) and van Doorslaer et al. (2007), the difference between poverty estimates derived from household resources gross and net of OOP payments for healthcare may be interpreted as a rough approximation of the impoverishing effect of such payments. Xu (2005) indicated that a nonpoor household is impoverished by health expenditures when it becomes poor after paying for health services, based on a defined poverty line.

The studies cited above have estimated the incidence of catastrophic health expenditures and impoverishment using one or both of the two aforementioned approaches. This paper adds to the existing literature by estimating catastrophic health expenditures and impoverishment using both

methods to analyze 2003 and 2007 household data sets from Kenya. The results show the country's trends in these measures. The paper then explores population characteristics associated with catastrophic health expenditures across Kenyan provinces and income quintiles. That investigation serves as a basis for assessing Kenya's policy options to reduce the incidence of financial catastrophe due to health expenditure.

METHODS AND DATA

Methods

This section briefly discusses the two methods used to analyze catastrophic health expenditures and impoverishment. For detailed descriptions of the two methods, see Wagstaff and van Doorslaer (2003) and Xu (2005). In each method, the incidence of catastrophic payments occurs when OOP health spending exceeds a certain fraction of total household consumption. The two commonly used thresholds are 10 percent of total expenditure/income or 40 percent of nonfood expenditure. We begin by discussing the method of Wagstaff and van Doorslaer (2003) before turning to the method followed by Xu (2005).

Wagstaff and van Doorslaer approach[1]

We calculated the catastrophic expenditure head count as the proportion of households where the ratio of health expenditure to total expenditure (or nonfood expenditure) exceeded a specific threshold. The formula below uses T_i as the OOP health expenditures for household i, x_i as the total expenditure for household i, and $f(x)$ as food expenditure. A household is said to have incurred catastrophic payments if T_i/x_i, or $T_i/[x_i-f(x)]$ exceeds a specified threshold, z. The head count is then given by

$$H = \frac{1}{N}\sum_{i=1}^{N} E_i \qquad (1)$$

where N is the sample size and E is an indicator equal to 1 if OOP payments of a household i as a proportion of its consumption expenditure (total or nonfood) are greater than the threshold, and zero otherwise. The head count estimates the proportion of households that have OOP payments above the chosen threshold but does not measure the amount by which these payments exceed it. The catastrophic payment overshoot is estimated to indicate the amount by which OOP payments exceed the threshold. The overshoot (O) is estimated as follows:

$$Oi = Ei\ ((Ti\ /xi) - z) \qquad (2)$$

where T_i is the OOP payments of household i, xi is the household consumption expenditure (food or nonfood), and z is the threshold budget share. Following this estimation, the average overshoot is estimated as follows:

$$O = \frac{1}{N}\sum_{i=1}^{N} O_i \qquad (3)$$

The intensity of catastrophic expenditure is measured by the payment in excess of the threshold, averaged over all households exceeding that threshold. This measure, referred to as the mean positive overshoot (MPO), is equal to

$$MPO = \frac{O}{H} \rightarrow \qquad O = H\ x\ MPO$$

[1] This section borrows heavily from Wagstaff and van Doorslaer 2003) and O'Donnell et al. (2008).

Standard methods of measuring poverty do not account for OOP healthcare payments. If extreme, OOP expenditures could lead to poverty. Wagstaff and van Doorslaer (2003) describe methods to adjust poverty measures on the basis of household expenditure net of OOP spending on healthcare. The three measures of poverty are as follows:

1. Poverty head count, which is the proportion of households living below the poverty line
2. Poverty gap, or the average amount by which resources fall short of the poverty line
3. Normalized poverty gap, obtained by dividing the poverty gap by the poverty line

Calculating these three measures requires setting a poverty line and assessing the extent to which healthcare payments push households below it. The official national poverty line for Kenya is Ksh 1,257 (US$16.65) per person per month—the figure used in this paper to estimate poverty levels before and after healthcare payments. The difference between the relevant poverty measures before and after paying for healthcare is the poverty impact of OOP payments for health.[2] These are given as

$$PI^{H} = Q_{pov}^{post} - Q_{pov}^{pre} \tag{4}$$

Equation 4 represents the difference between the poverty head count before and after paying for healthcare, which is the poverty impact (impoverishment) due to OOP expenditures or impoverishment head count. It represents the proportion of households that were impoverished as a result of paying for healthcare.

$$PI^{G} = G_{pov}^{post} - G_{pov}^{pre} \tag{5}$$

Equation 5 represents the difference between poverty gaps before and after health payments, which is the impoverishment gap. It shows the average deficit in Kenyan shillings to reach the poverty line.

$$PI^{NG} = NG_{pov}^{post} - NG_{pov}^{pre} \tag{6}$$

Equation 6 is the difference between normalized poverty gaps before and after health payments, which is the normalized impoverishment useful for international comparisons.

Xu approach

To estimate catastrophic health expenditures using Xu's method, we required data on OOP health expenditures, household consumption expenditure (exp), food expenditure (food), poverty line (pl), household subsistence spending (se), and the household's capacity to pay.

OOP expenditures made by households at the time they receive health services typically include doctors' consultation fees, purchases of medication, and hospital bills. Although spending on alternative and/or traditional medicine is included in OOP expenditures, spending on health-related transportation and special nutrition is excluded. In addition, OOP expenditures are net of any insurance reimbursement.

Household consumption expenditure comprises both monetary and in-kind payment on all goods and services (excluding healthcare services), and the money value of the consumption of homemade products. Household food expenditure is the amount spent on all foodstuffs by the household, plus the value of food produced and consumed by the household. However, it excludes spending on alcoholic beverages, tobacco, and food consumption outside the home (e.g., in hotels and restaurants).

The approach by Xu (2005) involves first generating food expenditure share ($foodexp_h$) for each household by dividing the household's food expenditure by its total consumption expenditure.

[2] A detailed method on how to calculate the relevant poverty measures before and after paying for healthcare are provided in the annex.

In order to put households on a comparable basis, since a lone adult does not require the same food expenditure as a family of four, each household's equivalent household size ($eqsize_h$) is generated in lieu of using actual household size. Importantly, but less obviously, economies of scale imply that the family of four does not require four times the food expenditure of an individual. This means that achieving comparability is not simply a case of dividing household expenditure by the number of people in the household. Rather, an established scale is used to adjust the expenditures to reflect the household composition and size and put them on a like-for-like basis. This process is known as *equivalization*. The equivalence scale used in this study is 0.56,[3] which implies that food consumption increases with additional household members, but that the increase in consumption is less than proportional to the increase in household size (Xu, et al., 2003).

Equivalized food expenditures ($eqfood_h$) are generated next by dividing each household's food expenditure by the equivalized household size. We identified the food expenditure shares of total household expenditure that are at the 45th (*food45*) and 55th (*food55*) percentiles across the whole sample. We then obtained the weighted average of food expenditure in the 45th to 55th percentile range. This gives the subsistence expenditure per (equivalent) capita, which is also the poverty line (*pl*)

$$pl = \frac{\Sigma w_h * eqfood_h}{\Sigma w_h} \tag{7}$$

where w_h is the equivalized household size in the 45th and 55th percentile. (The poverty line according to this calculation is Ksh 1,454 (US$21.67).[4]

The subsistence expenditure for each household (se_h) is derived by

$$se_h = pl*eqsize_h \tag{8}$$

A household is regarded as poor ($poor_h$) when its total household expenditure is smaller than its subsistence spending.

$$Poor_h = 1 \text{ if } exp_h < se_h$$

$$Poor_h = 0 \text{ if } exp_h \geq se_h \text{ (Xu, 2005 pp 3)} \tag{9}$$

The next step is to calculate household capacity to pay (ctp_h), which is defined as household nonsubsistence spending. Some households may report food expenditure that is lower than subsistence spending ($se_h > food_h$), implying that the household's food expenditure is less than the estimated poverty line of Ksh 1,454. This is because, in both the 2003 and 2007 surveys, respondents were not asked to consider self-production and other noncash means of food consumption. In such a case, the nonfood expenditure is used as nonsubsistence spending.

$$ctp_h = \exp_h - se_h \quad \text{if } se_h \leq food_h$$

$$ctp_h = \exp_h - food_h \quad \text{if } se_h > food_h \tag{10}$$

The burden of health expenditures is defined as OOP expenditures as a percentage of a household's capacity to pay.

$$oopctp_h = \frac{oop_h}{ctp_h} \tag{11}$$

[3] The value of the parameter β has been estimated from previous studies based on 59 countries' household survey data, and equals 0.56 (see Xu et al., 2003). Due to wide coverage of the study of more than 80 percent of world population, the equivalence scale has been applied in many other countries, including Kenya (Xu et al., 2006a).

[4] Exchange rate: US$1 = Ksh 75.5

Catastrophic heath expenditure occurs when total OOP health expenditures equal or exceed 40 percent of a household's capacity to pay or of nonsubsistence spending (or if the value in equation (11) is ≥ 0.4). The variable on catastrophic health expenditure is constructed as a dummy variable, with value 1 indicating a household with catastrophic expenditure and value 0 a household without catastrophic expenditure.

$$cata_h = 1 \quad if \ {oop_h}/{ctp_h} \geq 40\%$$
$$cata_h = 0 \quad if \ {oop_h}/{ctp_h} < 40\% \qquad (12)$$

A nonpoor household is impoverished by health expenditures ($impoor_h$) when it becomes poor after paying for health services. The variable for impoverishment is constructed as a dummy, taking the value of 1 when household expenditure is equal to or higher than subsistence spending but lower than subsistence spending net of OOP health expenditures, and 0 otherwise.

$$impoor_h = 1 \ if exp_h \geq se_h \ and \ exp_h - oop_h < se_h, \ otherwise, \ impoor_h = 0 \qquad (13)$$

Data

The study used data from the 2003 and 2007 *Kenya Household Health Expenditure and Utilisation Surveys*. The Kenya National Bureau of Statistics and Ministry of Health conducted the surveys to inform the NHA estimation and the development of the healthcare financing strategy. The main purpose was to obtain information on household healthcare use and expenditures in Kenya and to understand the population's healthcare seeking behavior and health expenditure patterns. The surveys sought information on household demographics, health situation, use of healthcare, expenditures on health and for other purposes, and household income and assets.

The surveys covered all provinces and districts of the country. In each survey, a total of 737 clusters were selected and divided into 506 rural and 231 urban clusters. Thereafter, 12 households were systematically and randomly selected from each cluster. The sample, therefore, consisted of 8,844 households: 2,772 urban and 6,072 rural, selected to ensure national representation.

RESULTS

Incidence and Intensity of Catastrophic Health Expenditures

The incidence and intensity of catastrophic health payments are reported in Table 1. The incidence of catastrophic expenditures decreases as the expenditure thresholds increase, indicating an inverse relationship between catastrophic head count and the various thresholds. For instance, as the threshold is raised from 10 percent to 25 percent of total expenditure in 2003 and 2007, the estimate of the incidence of catastrophic payments falls from 6.7 percent to 2.7 percent in 2003, and from 14.4 percent to 6.1 percent in 2007. The average overshoot also drops, from 2.2 percent to 1.6 percent of expenditure in 2003 and from 3.0 percent to 1.6 percent in 2007. However, the mean positive overshoot increases as the threshold is raised.

Table 1: Incidence and Intensity of Catastrophic Health Expenditures

Catastrophic Payment Measures	2003				2007			
	Threshold Budget Share z				Threshold Budget Share z			
	10%	15%	25%	40%	10%	15%	25%	40%
Wagstaff and Doorslaer methodology: OOP payments as share of total expenditure								
Head count (%)	6.7	4.6	2.7		14.4	10.8	6.1	
Overshoot	2.2	1.9	1.6		3.0	2.4	1.6	
Mean Positive Overshoot (MPO)	32.8	41.7	57.5		20.7	22.2	26.2	
Xu methodology: OOP payments as share of nonfood expenditure								
Head count (%)		14.1	12.7	10.3		20.8	15.5	11.1
Overshoot		9.8	9.0	8.1		5.5	4.9	3.7
Mean Positive Overshoot (MPO)		69.5	70.9	78.6		26.4	31.6	33.6
OOP payments as share of capacity to pay								
Head count				10.0				11.2

Source: Authors' calculations

Results are not quite different at 40 percent of nonfood expenditures and capacity-to-pay thresholds, underscoring the importance of using both methods for comparison. In 2003, 10.3 percent of households that used healthcare experienced catastrophic expenditures when the threshold was set at 40 percent of nonfood expenditure, compared to 10 percent of households when the threshold was set at 40 percent of capacity to pay. Similarly, in 2007, the incidence of catastrophic expenditures was lower when estimated as a share of nonfood expenditures than as a share of capacity to pay. Overall, whatever the threshold, the incidence of catastrophic expenditures seems to be on the rise.

Table 2 shows the incidences of catastrophic health expenditures by province for 2003 and 2007 as shares of total expenditures and of nonfood expenditures, each at 10 percent and 40 percent thresholds.

Table 2: Incidence of Catastrophic Health Expenditures by Province

Province	2003		2007	
	OOP payments as a share of total expenditure	OOP payments as a share of nonfood expenditure	OOP payments as a share of total expenditure	OOP payments as a share of nonfood expenditure
	10%	40%	10%	40%
Nairobi	4.48	6.59	14.23	11.99
Central	8.59	12.75	13.95	9.83
Coast	3.88	10.33	11.97	8.94
Eastern	8.65	11.55	17.68	12.67
North Eastern	9.58	12.92	9.41	7.79
Nyanza	6.97	10.67	16.32	10.33
Rift Valley	6.29	9.22	16.66	14.65
Western	5.23	8.44	15.71	12.48
Total	**6.71**	**10.31**	**14.43**	**11.09**

Source: Authors' calculations

When the threshold is set at 10 percent of total expenditure, North Eastern Province had the most households facing catastrophic expenditures in 2003 and Eastern Province had the most in 2007. At a threshold of 40 percent of nonfood expenditure, North Eastern Province still had the most households experiencing catastrophic expenditure in 2003, with Rift Valley the most in 2007. North Eastern had the lowest incidence of catastrophic expenditure when thresholds were set at 10 percent of total expenditure in 2007.

Figures 1–3 show the incidence of catastrophic health expenditures by quintiles for different thresholds. For all thresholds in all three figures, the poorest quintile had the most households experiencing catastrophic health expenditures. When the threshold is set at 10 percent of total expenditure (Figure 1), the middle quintile had the lowest incidence in 2007. However, when it is set at 40 percent of nonfood expenditure (Figure 2), the richest quintile had the lowest incidence of catastrophic health expenditures that year. When the threshold is equal to or greater than 40 percent of the capacity to pay (Figure 3), the fourth-richest and richest quintiles had the lowest incidence of catastrophic health expenditures. This confirms the assertion of O'Donnell et al. (2008) that the nonfood expenditure threshold may better detect catastrophic payments among the poor.

Figure 1: OOP Payments as a Share of Total Expenditure (z = 10%)

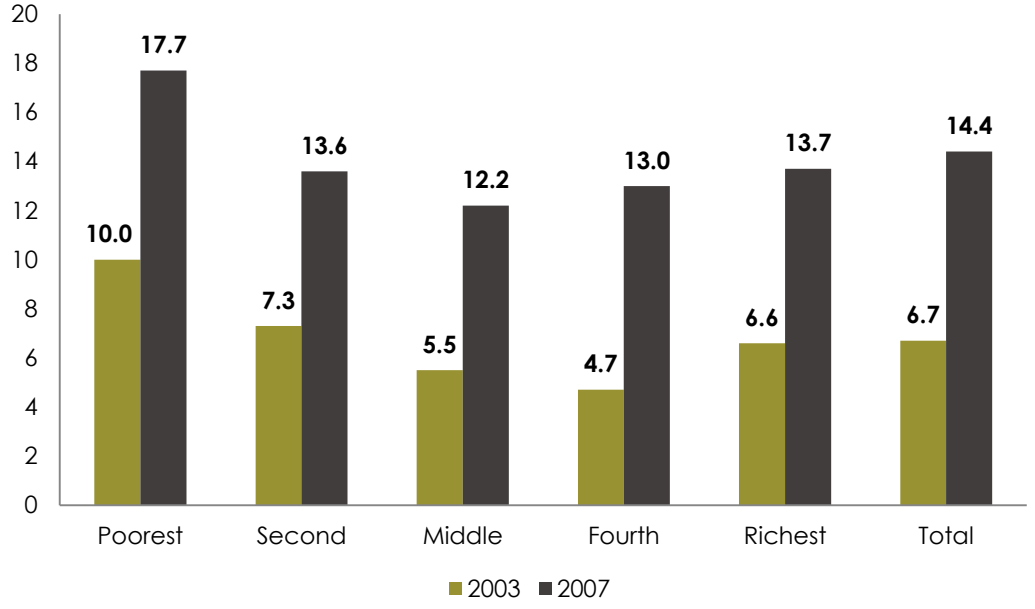


Figure 2: OOP Payments as a Share of Nonfood Expenditure (z = 40%)

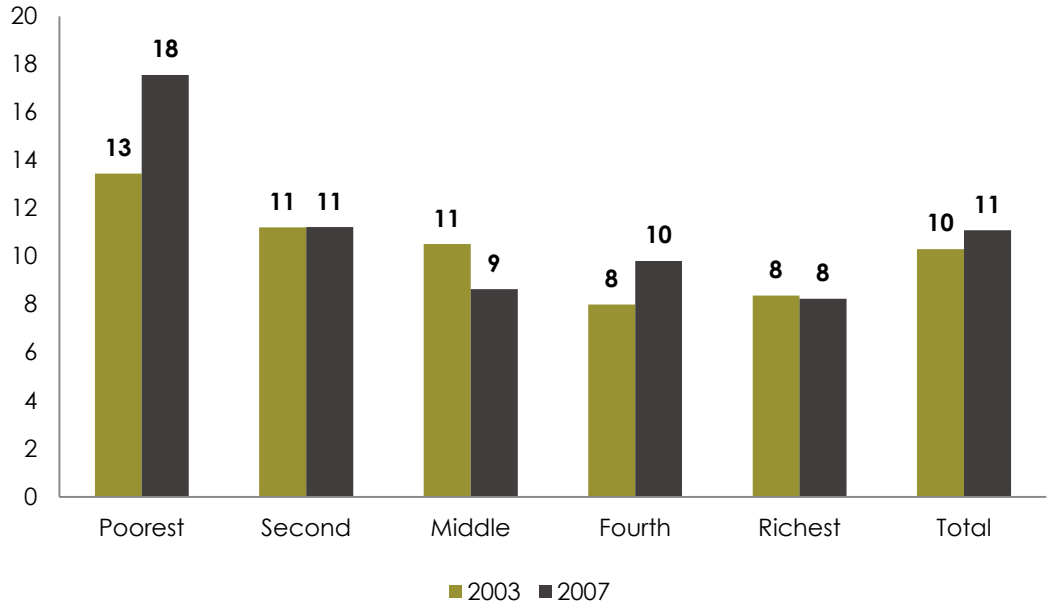
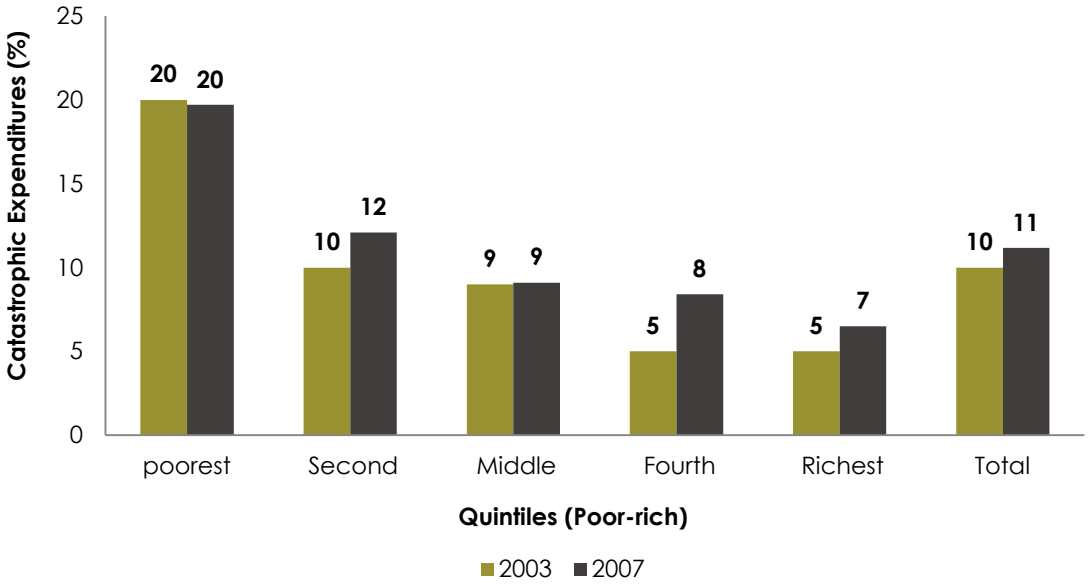


Figure 3: OOP Payments as a Share of Capacity to Pay (z = 40%)



Source: Authors' calculations

Household Impoverishment

Xu (2005) results

OOP expenditures create financial difficulties for some households and push others into poverty. Estimates of impoverishment using WHO's method show that 3.5 percent of households who used health services were impoverished in 2003 and 4.0 percent in 2007. Figure 4 shows that the highest impoverishment in 2007—6.1 percent—occurred in the middle quintile, with the lowest impoverishment in the poorest quintile. This is because households in the poorest quintile were already under the poverty line before health payments. Seemingly, households with higher total expenditure are more likely to spend a large fraction of those resources on healthcare. This reflects the inability of the poorest of the poor to divert resources from basic needs. However, in 2003, the second quintile experienced the highest impoverishment whereas the poorest, fourth, and richest quintiles did not experience any.

Figure 4: Household Impoverishment by Expenditure Quintiles

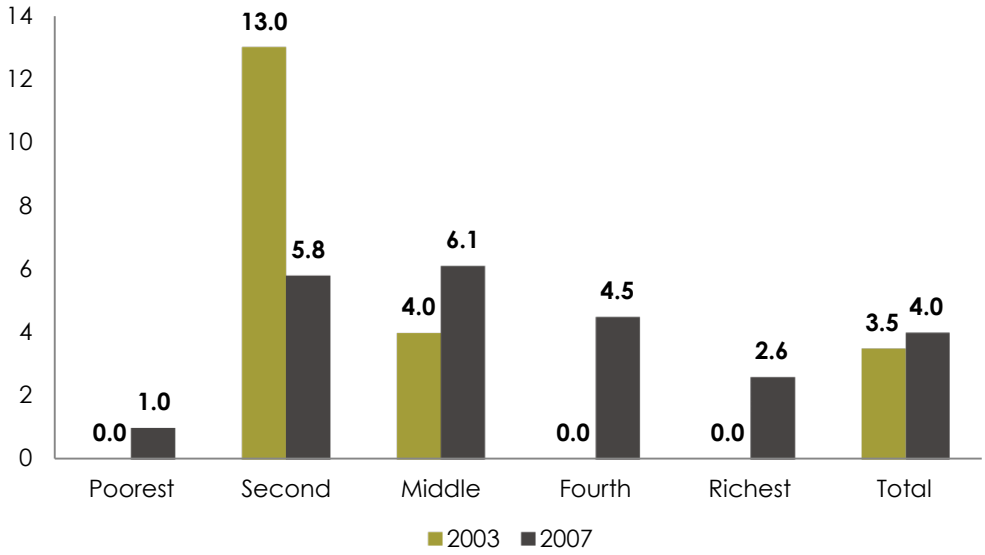


Figure 5 shows impoverishment by province. Central Province experienced the highest impoverishment and North Eastern Province the lowest. This difference may exist because most of those who were impoverished were from the middle quintile and, in Central Province, 25 percent of the population is in this quintile. Most residents of Nairobi Province are in the richest quintile; in Coast, the fourth quintile; in Eastern, the poorest quintile; in North Eastern, the fourth quintile; in Rift Valley, the poorest quintile; and in Western province, the second quintile. This demographic distribution could also explain the fact that although Rift Valley Province had the highest incidence of catastrophic health expenditures, it was not the most impoverished; the poorest quintile, which makes up the majority in Rift Valley, had the least impoverishment.

Figure 5: Impoverishment by Province (2007)

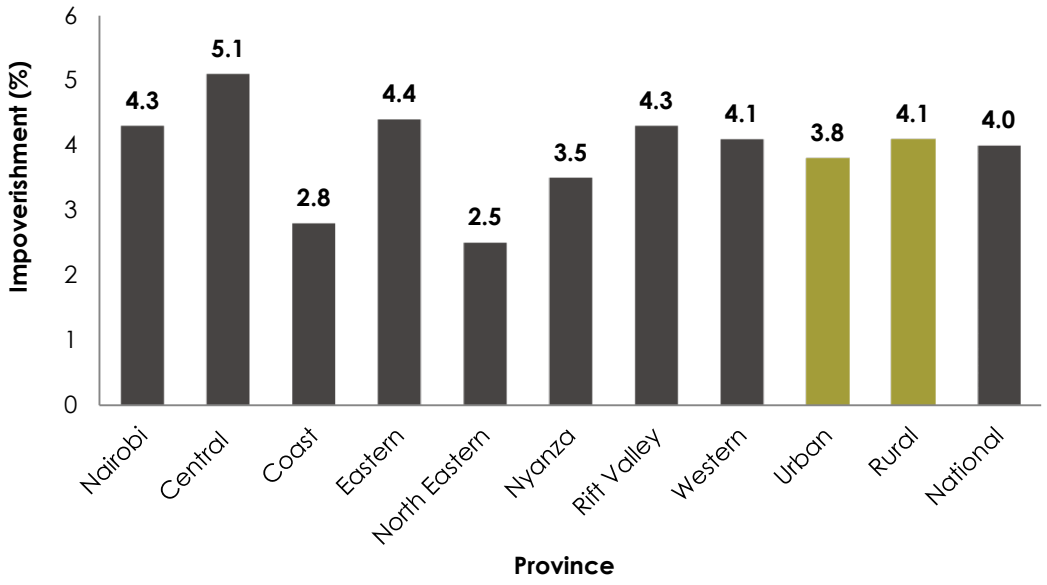
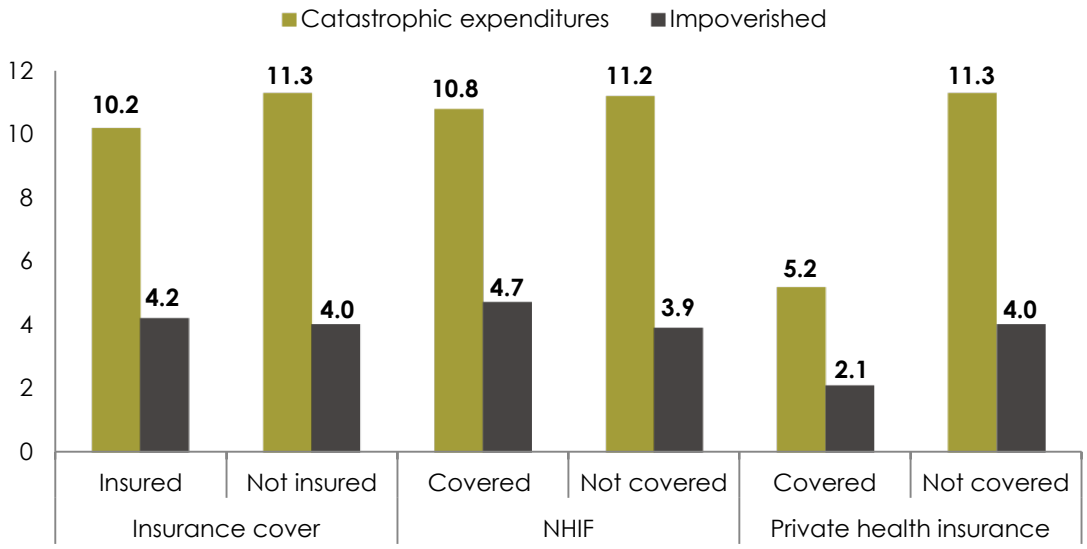


Figure 6 shows catastrophic health expenditures and impoverishment by insurance coverage. Those who had no form of insurance experienced a higher incidence of catastrophic health expenditures than those who had some form.

Figure 6: Catastrophic Health Expenditures and Impoverishment by Insurance Coverage (2007)



Having NHIF coverage does not shield people from impoverishment. Indeed, those with this coverage experienced higher impoverishment than those without it. This could be explained by the fact that NHIF's benefits package is limited in comparison with that of private health insurance. Indeed, private health insurance seems to shield people effectively both from the incidence of catastrophic health expenditures and of impoverishment. Only 5 percent of those with private insurance experienced catastrophic health expenditures, and only 2 percent were impoverished.

Wagstaff and van Doorslaer (2003) results

We estimated household impoverishment by calculating poverty levels using consumption expenditure before and after households make healthcare payments. We calculated both the head count (the proportion of households living below the poverty line) and the poverty gap (the aggregate of all shortfalls from the poverty line, which is the poverty head count multiplied by the average deficit of the poor from the poverty line). To estimate poverty levels before and after healthcare payments in 2003, we used the national poverty line of Ksh 1,257 (US$16.65) per person per month. In 2007, 49.2 percent were living below the poverty line before paying for healthcare. After paying, the head count increased by 3.1 percent. This represents an increase of 6.3 percent of the population below the poverty line, or 2.5 million people falling into poverty as a result of paying for healthcare. The average shortfall from the poverty line (i.e., the poverty gap) was Ksh 4,930 before accounting for healthcare payments and Ksh 5,374 afterward, representing an increase of 9 percent. Table 3 shows the poverty head count and gap before and after paying for healthcare.

Table 3. Poverty Head Count and Gap Before and After OOP Payments (2007)

	Gross of health payment (1)	Net of health payments (2)	Difference	
			Absolute (3) = (2) – (1)	Relative [(3)/(1)*100]
(Ksh 1,257 per month poverty line)				
Poverty head count (%)	49.18	52.28	3.1	6.3
Poverty gap	4,930	5,374	444	9

Discussion of Results and Conclusion

This study suggests that catastrophic health expenditures are a continuing problem in Kenya. First, the estimation of catastrophic health expenditures and impoverishment using the Xu (2005) method shows that 10 percent of households that used healthcare in 2003, and 11 percent in 2007, incurred catastrophic health expenditures; in 2003, 3.5 percent were impoverished as a result and, in 2007, 4.0 percent were impoverished.

Using the Wagstaff and van Doorslaer (2003) method, the incidence of catastrophic expenditure in 2007 was found to be 14.4 percent when the threshold was set at 10 percent of total expenditure and 11.1 percent when the threshold was set at 40 percent of nonfood expenditure. O'Donnell et al. (2008) suggest that if health spending is income-elastic, nonfood expenditure may be preferred as the denominator of the budget share to better detect catastrophic payments among the poor. Catastrophic incidence of 11 percent when the threshold is 40 percent of nonfood expenditure is close to the result of catastrophic incidence using the Xu (2005) method. A recent study by Chuma and Maina (2012) used the same 2007 household expenditure and utilization survey data and found similar results. At the 10 percent of total expenditure threshold, the incidence of catastrophic expenditures was 15.5 percent, while it was 11.4 percent at the 40 percent of nonfood expenditure threshold. These findings suggest that certain segments of Kenya's population bear a significant burden of OOP expenditures.

The incidence of catastrophic expenditures is lower when OOP expenditures are expressed as a percentage of total expenditure than when expressed in terms of nonfood expenditure and capacity to

pay. This implies that food expenditure forms a high proportion of total expenditure, which is typical of low-income countries (Chuma and Maina, 2012).

Further analysis of our findings shows that the poor are most affected by catastrophic health expenditures. High incidence of catastrophic expenditures among this population shows that OOP spending is regressive and that the poor lack sufficient protection.

The difference between poverty estimates derived from the gross of household expenditures and the net of OOP payments for healthcare corresponds to the number of people who are driven into poverty by OOP payments. Our findings show that, in 2007, about 2.5 million Kenyans were pushed below the national poverty line due to OOP expenditures. The poverty gap increased by Ksh 440—probably due to otherwise nonpoor people dropping below the poverty line and poor people falling further below it. The study by Xu et al. (2006a) found that the poverty gap increased by Ksh 336 per year in 2003 as a result of paying for health services. Therefore, OOP expenditures are a major barrier to development.

This finding should be interpreted with caution. It does not provide an estimate of how poverty would change if some form of pre-payment replaced OOP financing of healthcare. Identification of such an effect would require tracing the impact of financing reform on households' use of healthcare, work effort, consumption, and savings. Nonetheless, the result illustrates the magnitude of the impoverishing effect of OOP payments for healthcare that is not currently reflected in poverty estimates. It shows that many people are not counted as poor despite being pushed below the official poverty line (Ksh 1,257 per month) by OOP health spending. A correct estimation of poverty would therefore require factoring the effect of OOP expenditures on nonpoor households that fall below the poverty line only because they are forced to pay for healthcare at the point of consumption.

A study by van Doorslaer et al. (2006) found that, after estimating poverty gross and net of OOP expenditures in 11 Asian countries, Indonesia had the lowest incidence of households being pushed into poverty by healthcare payments. The authors contended that one explanation of the country's apparent success in shielding poor families from high payments for healthcare was its policy of targeted exemptions, implemented through a health card.

POLICY RECOMMENDATIONS

This paper strongly recommends reducing reliance on direct payments for healthcare. Improving and expanding the current health insurance coverage through NHIF and moving toward universal health insurance coverage are the most effective ways of shielding the population from the impoverishing effects of OOP expenditures.

Our findings also show that poverty estimates, which do not account for OOP expenditures, are usually grossly underestimated. Future national poverty estimates should take into account healthcare payments by households, as has been done in this study. Doing so will give the nation an indication of the magnitude of household impoverishment due to OOP expenditures.

Limitations

Although this paper contributes to a better understanding of the impact of OOP expenditures on catastrophic expenditures and impoverishment, it has important limitations.

First, the analysis does not capture all potentially catastrophic effects of illness or disability, such as lost earnings, and does not consider all households that postpone seeking healthcare because they lack financial resources.

Second, because of inconsistencies in the categorization of OOP payments, we have not attempted to identify the catastrophic and poverty impacts of specific categories of payments. Some respondents reported total OOP expenditures without categorizing them in terms of drugs, consultation fees, registration, and so forth. That information would have shown which payment category contributed most to catastrophic expenditures and impoverishment. It would also have helped us identify the most important policy areas for Kenya to address the catastrophic and impoverishing impacts of OOP expenditures.

REFERENCES

Baeza, C. and T. G. Packard. 2006. *Beyond Survival: Protecting Households from Health Shocks in Latin America*. Washington, DC: World Bank and Stanford University Press.

Berki, S. E. 1986. "A Look at Catastrophic Medical Expenses and the Poor." *Health Affairs* 5(4): 138 –145.

Bíró, A. 2009. *Healthcare Utilization of Older People in Europe—Does Financing Structure Matter?* Budapest, Hungary: Central European University.

Bredenkamp, C., M. Mendola, and M. Gragnolati. 2011. "Catastrophic and Impoverishing Effects of Health Expenditure: New Evidence from the Western Balkans." *Health Policy and Planning* 26: 349–356.

Cameron, A. C. and P. K. Trivedi. 2005. *Supplement to Microeconometrics: Methods and Applications.* New York: Cambridge University Press.

Carrin, G., C. James, M. Adelhardt, O. Doetinchem, P. Eriki, et al. 2007. "Health Financing Reform in Kenya – Assessing the Social Health Insurance Proposal." *South African Medical Journal* 97: 130–135.

Cavagnero, E., G. Carrin, K. Xu, and A. M. Aguilar-Rivera. 2006. *Health Financing in Argentina: An Empirical Study of Healthcare Expenditure and Utilization*. Tlalpan, DF, Mexico: Fundación Mexicana para la Salud, A. C., Instituto Nacional de Salud Pública.

Chuma, J. and T. Maina. 2012. "Catastrophic Healthcare Spending and Impoverishment in Kenya." *BMC Health Services Research* 12: 413.

Ekman, B. 2007. "Catastrophic Health Payments and Health Insurance: Some Counterintuitive Evidence from One Low-Income Country." *Health Policy*, 83: 304–313.

Elgazzara, H., F. Raada, C. Arfab, A. Matariac, N. Saltid, et al. 2010. *Who Pays? OOP Health Spending and Equity Implications in the Middle East and North Africa*. Washington, DC: World Bank.

Flores, G., J. Krinshnakumar, O. O'Donnell, and E. van Doorslaer. 2008. "Coping with Health-Care Costs: Implications for the Measurement of Catastrophic Health Expenditures and Poverty." *Health Economics* 17(12): 1393–1412.

Gakidou, E., R. Lozano, E. Gonzalez-Pier, J. Abbott-Klafter, and J. T. Barofsky. 2006. "Health System Reform in Mexico 5—Assessing The Effect of the 2001–06 Mexican Health Reform: An Interim Report Card." *Lancet* 368(9550)**:** 1920–1935.

Galarraga, O., S. G. Sosa-Rubí, A. Salinas-Rodrıguez, and S. Sesma-Vázquez. 2010. "Health Insurance for the Poor: Impact on Catastrophic and OOP Health Expenditures in Mexico." *European Journal of Health Economics* 11: 437–447.

Hidayat, B. 2003. "Measuring the Impact of Health Insurance with a Correction for Selection Bias." Paper presented at the Seminar on International Health and Health Economics; Tropical Medicine Heidelberg (TMH) and University of Heidelberg, Germany; November 26, 2003.

Kawabata, K., K. Xu, and G. Carrin. 2002. "Preventing Impoverishment Through Protection Against Catastrophic Health Expenditure." *Bulletin of the World Health Organization* 80(8): 612.

Kenya Institute for Public Policy Research and Analysis (KIPPRA). 2011. *Kenya Economic Report 2011: Transforming Institutions for Effective Delivery of Kenya Vision 2030*. Nairobi, Kenya: KIPPRA.

Knaul, F. M., H. Arreola-Ornelas, O. Mendez-Carniado, C. Bryson-Cahn, and J. Barofsky. 2006. "Evidence Is Good for Your Health System: Policy Reform to Remedy Catastrophic and Impoverishing Health Spending in Mexico." *Lancet* 368(9549)**:** 1828–1841.

Lamiraud, K., F. Booysen, and X. Scheil-Adlung. 2005. *The Impact of Social Health on Access to Healthcare, Health Expenditure and Impoverishment: A Case Study of South Africa*. Geneva, Switzerland: International Labour Office.

Limwattananon, S., V. Tangcharoensathien, and P. Prakongsai. 2007. "Catastrophic and Poverty Impact of Health Payments: Results from National Household Surveys in Thailand." *Bulletin of the World Health Organization* 85(8)**:** 600–606.

Mbugua, J. K., G. H. Bloom, and M. M. Segall. 1995. "Impact of User Charges on Vulnerable Groups: The Case of Kibwezi in Rural Kenya." *Social Science & Medicine* 41(6): 829–835.

Mendola, M., C. Bredenkamp, and M. Gragnolati. 2008. "The Impoverishing Effect of Adverse Health Events: Evidence from the Western Balkans." *World Bank Policy Research Working Paper Series*. Washington, DC: World Bank.

Ministry of Health. 2004. *Kenya Household Health Expenditure and Utilisation Survey Report 2003*. Nairobi, Kenya: Ministry of Health.

Ministry of Health (1994). *Kenya Health Policy Framework: 1994–2010*. Nairobi, Kenya: Ministry of Health.

Ministry of Medical Services and Ministry of Public Health and Sanitation. 2009. *Kenya Household Health Expenditure and Utilisation Survey Report 2007*. Nairobi, Kenya: Ministry of Medical Services and Ministry of Public Health and Sanitation.

Ministry of Medical Services and Ministry of Public Health and Sanitation. 2010. *Kenya National Health Accounts 2009/10*. Nairobi, Kenya: Ministry of Medical Services and Ministry of Public Health and Sanitation.

Mukui, J. 2005. *Poverty Analysis in Kenya: Ten Years On*. Sweden: Central Bureau of Statistics, Society for International Development, Swedish International Development Agency.

Narayan, D., R. Patel, K. Schafft, A. Rademacher, and S. Koch-Schulte. 2000. *Voices of the Poor: Can Anyone Hear Us?* New York, NY: Oxford University Press for the World Bank.

O'Donnell, O., E. van Doorslaer, A. Wagstaff, and M. Lindelow. 2008. *Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation*. Washington, DC: World Bank.

O'Donnell, O., E. van Doorslaer, R. P. Rannan-Eliya, A. Somanathan, C. C. Garg, et al. 2005. "Explaining the Incidence of Catastrophic Health Expenditures on Healthcare: Comparative Evidence from Asia." Working paper available at: http://www.equitap.org/publications/publication.html?id=504.

Olsen, R. J. 1980. "A Least Squares Correction for Selectivity Bias." *Econometrica* 48 (7): 1815–1820.

Pradhan, M. and N. Prescott. 2002. "Social Risk Management Options for Medical Care in Indonesia." *Health Economics* 11: 431–446.

Randa, J. and P. Gubbins. 2013. "Time to Shift Gears: Accelerating Growth and Poverty Reduction in the New Kenya." *Kenya Economic Update, Edition No. 8*. Washington, DC: World Bank Group.

Ranson, M. K. 2002. "Reduction of Catastrophic Healthcare Expenditures by a Community-Based Health Insurance Scheme in Gujarat, India: Current Experiences and Challenges." *Bulletin of the World Health Organization* 80(8): 613–621.

Roberts, M. J., W. Hsiao, P. Berman, and M. R. Reich. 2002. *Getting Health Reform Right: A Guide to Improving Performance and Equity*. New York, NY: Oxford University Press.

Russell, S. 1996. "Ability to Pay for Healthcare: Concepts and Evidence." *Health Policy Plan* 11: 219–237.

Saksena, P., K. Xu, and G. Carrin. 2006. "The Impact of Universal Insurance Program on Catastrophic Health Expenditure: Simulation Analysis for Kenya." Discussion paper. Geneva, Switzerland: World Health Organization.

Su, T. T., B. Kouyaté, and S. Flessa. 2006. "Catastrophic Household Expenditure for Healthcare in a Low-Income Society: A Study from Nouna District, Burkina Faso." *Bulletin of the World Health Organization* 84(1): 21–27.

Van Doorslaer, E., W. O'Donnell, R. P. Rannan-Eliya, A. Somanathan, S. R. Adhikari, et al. 2007. "Catastrophic Payments for Healthcare in Asia." *Health Economics* 16: 1159–1184.

Van Doorslaer, E., O. O'Donnell, R. P. Rannan-Eliya, A. Samanathan, S. R. Adhikari, et al. 2006. "Effect of Payments for Healthcare on Poverty Estimates in 11 Countries in Asia: An Analysis of Household Survey Data." *Lancet* 368(9544): 1357–1361.

Vella, F. 1998. "Estimating Models with Sample Selection Bias: A Survey." *Journal of Human Resources* 33(1) 127–169.

Vella, F. 1992. "Simple Tests for Sample Selection Bias in Censored and Discrete Choice Models." *Journal of Applied Econometrics* 7(4): 413–421.

Wagstaff, A. 2008. "Measuring Financial Protection in Health." Policy Research Working Paper # WPS 4554. Washington, DC: Development Research Group, World Bank.

Wagstaff, A. 2007. "Health Insurance for the Poor: Initial Impacts of Vietnam's Healthcare Fund for the Poor." Impact Evaluation Series #11. Policy Research Working Paper #WPS 4134.Washington, DC: World Bank.

Wagstaff, A. and E. van Doorslaer. 2003. "Catastrophe and Impoverishment in Paying for Health Care: With Applications to Vietnam 1993–98." *Health Economics* 12(11): 921–934

Wamai, R. G. n.d. "Healthcare Policy Administration and Reforms in Post-Colonial Kenya and Challenges for the Future." Available at http://www.sylff.org/worldpress/wp-content/uploads/2009/03/wamai.pdf.

Waters, H. R. 1999. "Measuring the Impact of Health Insurance with a Correction for Selection Bias—A Case Study of Ecuador." *Health Economics* 8(5): 473–483.

Wooldridge, J. M. 2002. *Econometric Analysis of Cross Section and Panel Data.* Cambridge,MA: MIT Press.

World Bank. 2008. *Kenya Poverty and Inequality Assessment: Volume 1: Synthesis Report*. Washington, DC: World Bank.

World Health Organization. 2000. *The World Health Report 2000—Health Systems: Improving Performance*. Geneva, Switzerland: World Health Organization.

Xu, K. 2005. "Distribution of Health Payments and Catastrophic Health Expenditures: Methodology." Discussion paper. Geneva, Switzerland: World Health Organization.

Xu, K., C. James, G. Carrin, and S. Muchiri. 2006. "An Empirical Model of Access to Healthcare, Healthcare Expenditure and Impoverishment in Kenya: Learning From Past Reforms and Lessons for the Future." Discussion paper. Geneva, Switzerland: World Health Organization.

Xu, K., D. B. Evans, K. Kawabata, R. Zeramdini, J. Klavus, et al. 2003. "Household Catastrophic Health Expenditure: A Multicountry Analysis." *Lancet* 362(9378): 111–117.

Xu, K., D. B. Evans, G. Carrin, A. M. Aguilar-Rivera, P. Musgrove, and T. Evans. 2007. "Protecting Households from Catastrophic Health Spending." *Health Affairs* 26(4): 972–983.

Xu, K., G. Carrin, N. T. K. Phuong, N. H. Long, D. Bayarsaikhan, et al. 2006. "Health Service Utilization and the Financial Burden on Households in Vietnam: The Impact of Social Health Insurance." Discussion paper. Geneva, Switzerland: World Health Organization.

ANNEX

Let PL be the poverty line and x_s be per capita household expenditure for household i gross of per capita OOP expenditures for healthcare. An estimate of the gross of health payments poverty head count (or poverty head count before paying for healthcare) is

$$H_{pov}^{pre} = \frac{\sum_{i=1}^{N} S_i P_i^{pre}}{\sum_{i=1}^{N} S_i} \tag{1}$$

where $P_i^{pre} = 1$ if $x_s < PL$ and 0 otherwise; S_i is the size of household and N is the number of households in the sample size. Equation (1) is the poverty head count, which refers to the proportion of households living below the poverty line before making healthcare payments.

The pre-payment poverty gap, referring to the aggregate of all shortfalls from the poverty line (i.e., the poverty head count multiplied by the average deficit of the poor from the poverty line) is defined by $g_i^{pre} = P_i^{pre} (x_s - PL)$ and the mean of this gap in currency units is

$$G^{pre} = \frac{\sum_{i=1}^{N} S_i g_i^{pre}}{\sum_{i=1}^{N} S_i} \tag{2}$$

Similarly, if OOP payments are subtracted from household expenditure, then the head count and mean gap are given by

$$H_{pov}^{post} = \frac{\sum_{i=1}^{N} S_i P_i^{post}}{\sum_{i=1}^{N} S_i} \tag{3}$$

$$G^{post} = \frac{\sum_{i=1}^{N} S_i g_i^{post}}{\sum_{i=1}^{N} S_i} \tag{4}$$

respectively, where $p_i^{post} = 1$ if $(xi - Ti)/S_i < PL$ and 0 otherwise, and $g_i^{post} = P_i^{post} (PL - (xi - Ti)/S_i)$.

We can normalize the poverty gap on the poverty line for ease of comparison across countries with different poverty lines and different currencies, as follows:

$$NG^{pre} = \frac{G^{pre}}{PL} \tag{5}$$

and similarly for the post-payment normalized gap.

The mean positive poverty gap (MPG), which measures the intensity of poverty, is given by

$$MPG^{pre} = G^{pre} \Big/ H_{pov}^{pre} \tag{6}$$

and likewise for post-payment MPG.

The measures of the poverty impact of OOP payments (that is, impoverishment) are then simply defined as the difference between the relevant pre-payment and post-payment measures, given as

$$PI^{H} = H_{pov}^{post} - H_{pov}^{pre} \tag{7}$$

Equation (7) represents the difference between the poverty head count before and after paying for healthcare, which is the poverty impact (impoverishment) due to OOP expenditures or impoverishment head count. It represents the proportion of households that were impoverished.

$$PI^{G} = G_{pov}^{post} - G_{pov}^{pre} \tag{8}$$

Equation (8) represents the difference between poverty gaps before and after health payments, which is the impoverishment gap. It shows the average deficit in Kenya shillings to reach the poverty line.

$$PI^{NG} = NG_{pov}^{post} - NG_{pov}^{pre} \tag{9}$$

Equation (9) is the difference between normalized poverty gaps before and after health payments, which is the normalized impoverishment useful for international comparisons.

For more information, contact:

Health Policy Project
Futures Group
1331 Pennsylvania Ave NW, Suite 600
Washington, DC 20004
Tel: (202) 775-9680
Fax: (202) 775-9694
Email: policyinfo@futuresgroup.com
www.healthpolicyproject.com