Dynamics of catastrophic and impoverishment health expenditures in Burkina Faso: an analysis of determinants

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ABSTRACT

Background:

The government of Burkina Faso has embarked on a process leading to universal health coverage with the enactment of Law N° 060-2015/CNT on a universal health insurance scheme (RAMU) in 2015. Based on the defined timing, the year 2018 should be devoted to the operationalization of this key programme for the beneficiaries and stakeholders of health. Since the establishment of a health insurance is a highly complex process, it requires total control over all the issues before implementation.

The aim of this study is to estimate the extent of catastrophic and impoverishment expenditures among the population and identify factors accounting for these expenditures over the 2009-2014 period.

Methods

The study uses data from the two most recent surveys on household living conditions (2009 and 2014). Descriptive statistics are reported for relevant variables such as region of residence, residential setting and quintiles of household wealth. An analysis of the determinants of catastrophic health expenditures and impoverishment was carried out using a logistic regression on the data, taking the catastrophic status or impoverishment status of households as dependent variable. Explanatory variables include sex of the household head, household size, age of the household head, etc.

Results

The proportion of households that incur catastrophic expenditures fell from 1.3% in 2009 to 0.8% in 2014, and that of households incurring impoverishment expenditure fell from 1.9% to 1.3% over the same period. Factors such as household location in a rural area or that one of its members has been hospitalized, or that there are persons aged over 60 years or under 5 years are the main factors that are associated with the occurrence of catastrophic health expenditure. Like catastrophic expenditures, the factors that contribute to impoverishing households as a result of out of pocket payments are hospitalizations, disposing of elderly people in the household, and residing in rural areas.

Conclusion

The study provided a categorization of households based on their level of health expenditures. It shows that 1.3% of households, representing 206 217 persons became poor because of out-of-pocket payments. The study concludes that interventions of the health insurance scheme must give greater focus to hospitalizations, the elderly (60 years and over) and children (under 5 year-olds), who represent 26% of the total population.

Keywords

Health financing, out-of-pocket payments, catastrophic expenditure, impoverishment, odd-ratio

Commenté [JA1]: What about impoverishment ? Nothing to say?

Background:

Burkina Faso is a West African country that covers an area of about 274 200 km^2. In 2014, the population was estimated at 17 880 386 inhabitants with an annual GDP per capita of US$ 720. Over three-quarters (77.3%) of the population live in rural areas. In 2014, 40.1% of the population lived below the national poverty line ($734.6 in 2014 PPP).

The health situation of Burkina Faso is characterized by high general and specific mortality rates. Gross mortality was 11.8 per 1000 in 2006 (RGPH 2006). According to the 2014 Continuous Multipurposal Survey, maternal mortality rate was 330 per 100 000 live births and that of infant-child mortality was 81.6 per 1000 live births.

The epidemiological profile is marked by the persistence of communicable diseases and the emergence of noncommunicable diseases (NCDs). In 2014, malaria remains one of the main challenges which constituted the primary reason for consultation (47.5%), hospitalization (51.9%) and death (28.8%). HIV prevalence rate was 0.9% in 2014 with an estimated 3 800 deaths (UNAIDS Spectrum 2015). Tuberculosis constituted the fifth leading cause of death between 2010 and 2015 with an estimated prevalence of 80 cases per 100 000 inhabitants in 2013 (WHO World Health Statistics 2015). Noncommunicable diseases represent a major concern. Prior to 2013, the country did not have any survey data on noncommunicable diseases. Generally, it is estimated that 97.3% of the population is exposed to common risk factors of noncommunicable diseases. According to the ***BurkinaFaso_2013_STEPS_Report***, the prevalence of hypertension, diabetes and obesity was 17.6%, 4.9% and 2.1%, respectively (2013 national survey on NCD common risk factors. In the absence of cancer registers, the situation of cancer is relatively unknown.

The total number of health facilities increased from 2046 in 2010 to 2287 in 2014[1]. In 2014, only 56.7% of the population lived less than 5 km from a health facility and the number of annual contacts per inhabitant rose from 0.56 in 2009 to 0.85 in 2014. The density of human resources for health (doctors, nurses and midwives) is 0.877/1000 population against the WHO standard of at least 4 per 1000 population. The proportion of CSPS[2] meeting the minimum requirements for health workers increased from 83.2% in 2009 to 95% in 2014. The average score for the availability of essential medicines indicated a continuous degradation from 48% in 2012 to 38% in 2014 and further to 33% in 2016 (SARA 2012, 2014 and 2016).

At the financial level, the health system is characterized by a lack of financial resources, a fragmentation of financing and a universal health insurance scheme ~~(RAMU)~~ that is not yet operational. Indeed, the cost of health care is estimated at US$ 1077.4 million (Health MTEF for 2014) for an allocated budget of US$ 888.8 million, representing a financial gap of US$ 188.6 million. The overall expenditure structure of health indicates that despite the efforts made by the government and its partners to improve financial accessibility of the people to health services, this expenditure is still largely borne out-of-pocket by households (estimated at 32.2% by the 2014 health accounts report compared to the standard of less than 20%).

In this regard, to improve public health financing and provide quality health care particularly to vulnerable communities, the government has been pursuing several initiatives over the last ten years. These include subsidies for child delivery and emergency obstetrical and neonatal care since 2006, enactment of a law instituting the universal health insurance scheme in 2015, validation of a national health financing strategy (2017-2030) and; free health care for under 5 year-olds and pregnant women of child-bearing age since 2015. Furthermore, the number of health personnel recruited has increased, a project for the training of physician specialists has been set up, and new health facilities have been established countrywide at all levels of the health system.

[1] Yeabook of statistics of the Ministry of Health ~~Annual Statistics~~
[2] center for basic health care delivery and social promotion

Commenté [JA2]: What is EMC ? it is enquête multisectorielle continue (EMC). In english, it is Continuous Multipurposal Survey (CMS)

Commenté [JA3]: Reference ?? hier is the link, please see page 22 https://www.who.int/ncds/surveillance/steps/BurkinaFaso_2013_STEPS_Report.pdf

Commenté [JA4]: ?? What is this ? Centre de santé et de promotion social (CSPS). Which stands for « center for basic health care delivery and social promotion »

Commenté [JA5]: Dollar equivalent will be necessary

Commenté [JA6]: How does this represent a gap ? you're right there ! the allocated budget were missing in this english version. I added it.

Commenté [JA7]: You need to state the objective of this paper.

You already have this well described in the absract. Bring it here also. Thks ! we added it !

Mis en forme : Anglais (États-Unis)

The aim of this study is to estimate the extent of catastrophic and impoverishment expenditures among the population and identify factors accounting for these expenditures over the 2009-2014 period.

Methods:

1- Data

The study used data from the two recent surveys conducted by the National office of statistics on household living conditions (~~EMC~~ Continuous Multipurposal Survey 2014 and Integral Survey on Households Living Conditions~~EICVM~~ 2009). The data are significant at the national level, in terms of administrative provinces and residential setting.

The surveys were conducted based on a stratified two-tier survey plan and the data collected four times, each corresponding to a quarter of the year. Overall, 10 800 households were ~~targeted~~ surveyed across the country in 2014 and 14 520 in 2009.

Data collected on households consumption items are classified into 12 functions that are: (1) food and non-alcoholic beverages; (2) alcoholic beverages, tobacco and narcotics; (3) articles of clothing and footwear; (4) housing, water, electricity, gas and other fuels; (5) furniture, household items and routine household maintenance; (6) health; (7) transportation; (8) communication; (9) hobbies and cultures; (10) education; (11) restaurant and hotel expenses; and finally (12) various goods and services (scissors, combs, toothbrushes, hairdressing, etc.).

2- The Wagstaff and Van Doorslaer methodology

The study used two methods for calculating the incidence of catastrophic expenditures and their impact on impoverishment[3]. The first approach is by Wagstaff and Van Doorslaer (2002) which consist of calculating the budget share of health expenditures, and comparing that share to a threshold[4]. According to that method, a household is said to have incurred catastrophic payments at a specific threshold z if the budget share of health expenditures exceeds z.

Based on this methodology, we retained two thresholds: 10% and 25%. So, a household incurs catastrophic health ~~expe~~expenditures~~ditors~~ at the 10% threshold (25% respectively) if its health expenditure is at least 10% (25% respectively) of its total expenditures[5].

Now, turning to the impoverishment, two different poverty lines have been considered: The first line is the national annual poverty line in Burkina Faso (US$ 734.6 in 2014 and US$ 674 in 2009), and the second uses the equivalent of $1.9 (at the 2011 PPP) per day as poverty line (equivalent to XOF 134,539 per capita in 2009 and XOF 144,941.5 in 2014 as annual poverty line). A household is facing impoverishment expenditures if its per capita expenditure become low than the poverty line when it is net of health expenditure.

[3] Ke Xu, et al. (2005): Distribution of health payments and catastrophic expenditures-Methodology. Discussion paper No. 2. HSF, World Health Organization

[4] The study retained two cut-offs : 10% and 25%

[5] One can use non-food expenditure instead of total expenditures as basis with the wagstaff et al. method

Commenté [JA8]: You need to provide sub-headings for different entries under the methods section. E.g.

1.Data (include how out-of-of-pocket payment was assessed)
2.Assessing catastrophic payments
3.Assessing impoverishment
4.Etc…

Mis en forme : Titre 3

Commenté [JA9]: What is this ? Define

Commenté [JA10]: Do you mean targeted or surveyed?

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Commenté [JA11]: This should be $1.90 at the 2011 PPP

Note that this should not be the nominal exchange rate. You need to use the PPP to compute the equivalent amount in CFA.

Mis en forme : Police :(Par défaut) +Corps (Calibri), 11 pt, Couleur de police : Automatique, Anglais (États-Unis)

Mis en forme : Police :(Par défaut) +Corps (Calibri), 11 pt, Couleur de police : Automatique, Anglais (États-Unis)

3- The Xu et al. methodology

All these aggregates are therefore estimated at the household level, on a monthly basis and divid~~relat~~ed ~~to~~by the adjusted household size to obtain per capita expenditure. The adjusted household size, according to that method, is obtained by raising the household size to the exponent 0.56. Mathematically, for any household h, the adjusted household size is $eqsize_h = hhsize_h^{0,56}$ where $hhsize_h$ is the number of persons in the household.

The next step is to determine the household's capacity to pay (ctp_h), its subsistence expenditure (se_h) and define a threshold from which a household can be said to be experiencing catastrophic expenditures. The threshold is obtained by using the per capita food consumption of the median household as ~~the~~ a poverty line. Thus, ~~c~~Calculations of subsistence expenditures and poverty line are based on the average food expenditure of households whose food expenditure share of total expenditures is in the 45-55 percentile range. The household's subsistence expenditure is then equal to the product of this threshold and the adjusted household size. $se_h = \frac{\sum w_h * eqfood_h}{\sum w_h} * eqsize_h \ \ where \ eqfood_h = \frac{food_h}{eqsize_h} \ and \ food45 < foodexp_h < food55$

Applied to the databases, the resulting poverty line, namely monthly per capita food consumption of the median household is US$ 74 in 2009 and US$ 90.2 in 2014.

At this stage, a household is poor if its total expenditures (exp_h) are lower than its subsistence expenditures:

$poor_h = 1 \ if \ exp_h < se_h$

$poor_h = 0 \ if \ exp_h \geq se_h$

A household is faced with impoverishment expenditures if it becomes poor because of out of pocket health expenses. In other words, if the equivalized per capita expenditure of the household excluding (out-of-pocket payments) is lower than the poverty line:

$impoor_h = 1 \ if \ exp_h \geq se_h$ and $(exp_h - oop_h) < se_h$

$impoor_h = 0 \ otherwise$

A household's capacity to pay (ctp_h) is the income remaining after basic subsistence needs have been met. It corresponds to the total expenditure of the household excluding its subsistence expenditures.

$ctp_h = exp_h - se_h \ if \ se_h \leq food_h$

$ctp_h = exp_h - food_h \ if \ se_h > food_h$

According to Xu et al., a household incurs catastrophic expenditures if its out-of-pocket health payments exceeds 40% of its capacity to pay. The variable on catastrophic health expenditure is then constructed as a dummy variable with value 1 indicating a household with catastrophic expenditure, and 0 without catastrophic expenditure:

$cata_h = 1 \ \ if \ oop_h / ctp_h \geq 0.4$

$cata_h = 0 \ \ if \ oop_h / ctp_h < 0.4$

4- Empirical model and framework analysis

Furthermore, descriptive analysis and Logit modelling were used in analysing the results. Two Logit models were applied: one relates to catastrophic expenditures and the other indexes impoverishment expenses. The first model uses a binary variable as the dependent variable which takes the value 1 if the household incurs

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Commenté [JA14]: This is confusing and needs to be better explained. You can use equations, where necessary.

Commenté [JA15]: Be consistent. Capacity to pay or ability to pay?

Mis en forme : Numéros + Niveau : 1 + Style de numérotation : 1, 2, 3, … + Commencer à : 1 + Alignement : Gauche + Alignement : 0.63 cm + Retrait : 1.27 cm

catastrophic health expenditures, and 0 where it does not. The dependent variable in the second model is occurrence of impoverishment expenditures in the household. This variable therefore had a value of 1 where it faced impoverishment expenses and 0 where it did not.

Several factors may account for the occurrence of catastrophic or impoverishment expenditures in a household. Among these factors, we have conjectured ~~as determinants~~, sociodemographic variables such as the size of the household, its residential region, residential setting (urban or rural), the fact that the head of household is male or female; and socioeconomic variables such as the number of persons aged 60 or more in the household, the number of under 5-year olds, physical access of the household to health and whether or not the household incurred a hospitalization expense. The choice of these variables was due to that fact that many studies[6] in the region have identified them as significant determinants for catastrophic health expenditure and impoverishment expenditure. The aim is to determine, depending on economic, demographic and social characteristics of a household, the likelihood that a household has incurred catastrophic or impoverishment health expenses.

The Table 1 summarizes the explanatory variables used in the two logit models.

[6] Porous safety net: catastrophic health expenditure and its determinants among insured households in Togo, (2018), Esso-Hanam Atake and Djesika D. Amendah

Dépenses en santé et appauvrissement des ménages au Bénin. (2014) HOUENINVO Gbodja Hilaire

Dépenses catastrophiques de santé et leur impact sur l'appauvrissement des ménages et l'utilisation des services de santé : Cas du Burkina Faso (2013), J Edouard O Doamba, Alexandre Ouedraogo et Priyanka Saksena

Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, (2006) Burkina Faso.Su TT1, Kouyaté B, Flessa S.

Mis en forme : Appel note de bas de p.,List Bullet Char1,Footnote Reference Char,List Bullet Char...,List Bullet Char Char,Car Car Char Car Char Car Car Char Char,Car Car Car Car Car Car Car Char Car Car Char Car Car Car Char Char,ftref,BVI fnr, BVI fnr,16 Point, Police :(Par défaut) Cambria, 10 pt, Couleur de police : Texte 1, (aucune)

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Table 1: Explanatory note of the logit model variables

Variables	Type	Modalities	Reference Modality
Gender of head of household	Binary	1= male and 0= female	1
Size of household	continuous	From 1 to 63	No reference
Presence of persons aged 60 years or more in the household	Binary	0= all the members of the household are below 60 years of age 1= at least one person is aged 60 years or more in the household	1
Presence of persons aged below 5 years in the household	Binary	0= all the household members are aged 5 years and over 1= there is at least one infant aged below 5 years in the household	1
Environment	Binary	1= Urban area 0= rural area	1
Physical access to health service	Binary	1= household is less than 30 minutes from the nearest health delivery service 0= household is located at more than 30 minutes from the nearest health delivery service	1
hospitalization	Binary	1= household has experienced at least one hospitalization over the last 12 months 0= the household has not recorded any hospitalization of its members in the last 12 months	1
Region	Category-specific	[1=Hauts-bassins, 2=Boucle du Mouhoun, 3= Sahel, 4= East, 5= South-West, 6= North-Central, 7= West-Central, 8= Plateau Central, 9= North, 10= East-Central, 11= Central, 12= Cascades, 13= South-Central]	Central region, modality n°11
Quintile	Category-specific	Quintile 1, Quintile 2, Quintile 3, Quintile 4, Quintile 5	quintile 1

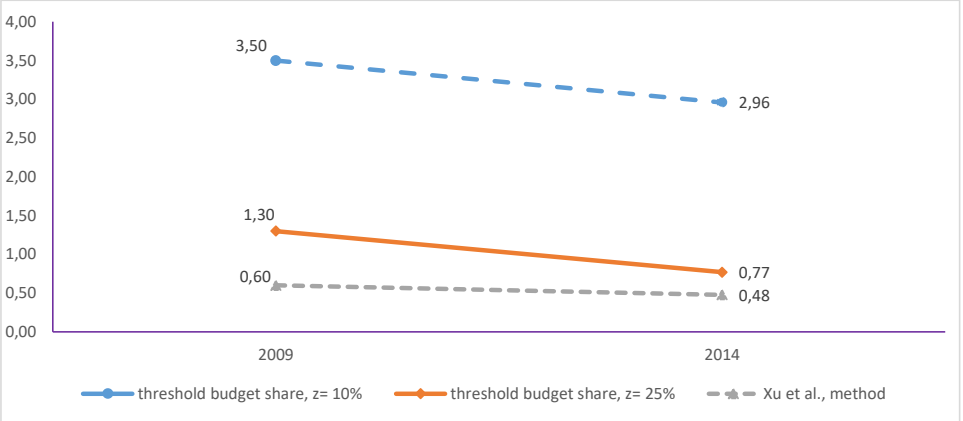
Commenté [JA16]: What does 63 mean? Do you mean the minimum and maximum? 63 is the maximum hhsize in the database yes!

Commenté [JA17]: If you are using regions in your model, they have to be introduced as individual dummy variables. Therefore, you should have about 12 dummy variables introduced in your model (as explanatory variables)

Commenté [JA18]: Introduce these as dummy variables.

Results

Figure 1 : incidence of catastrophic health expenditures between 2009 and 2014 (in %)



The proportion of households experiencing catastrophic health expenditures falls from 3.5% in 2009 to 2.963% in 2014 according to the Wagstaff and van Doorslaer method at the 10% threshold. This reduction is lower with the Wagstaff and van Doorslaer method at threshold 25%. It decreases from 0.6% to 0.485% between 2009 and 2014. With the Xu method, it falls from 1.3% in 2009 to 0.778% in 2014.

Commenté [JA19]: I am not sure why you have provided this sub-heading but the content does not reflect the title of the sub-section.

You have to provide the right heading to make your writing very organised. Include also the title for the impoverishment results…

Mis en forme : Normal

Commenté [KG20]: Reconstruct in English

Commenté [JA21]: Translate the legend to English.

Commenté [JA22]: Nothing like the SDG model.

Table 2~~1~~: Incidence of catastrophic health expenditures by stratifier in 2014 (in %)

stratifier	2014		
	Wagstaff and van Doorslaer method		Xu et al. methodology
	10%	25%	
Location			
Rural	2.6	0.5	0.9
Urban	4.2	0.3	0.4
Socio-economic status			
Quintile 1	2.3	0.8	1.7
Quintile 2	2.8	0.5	0.6
Quintile 3	3.4	0.3	0.8
Quintile 4	3.2	0.4	0.5
Quintile 5	3.2	0.2	0.2
Region			
Boucle du Mouhoun	3.0	0.1	0.2
Cascades	4.6	0.1	0.3
Central	2.9	0.5	0.1
East Central	2.4	0.4	0.9
North-Central	1.5	0.3	2.5
West-Central	2.0	0.6	0.6
South Central	3.0	0.6	1.1
East	3.0	0.6	0.7
Upper Basins	3.6	0.3	0.3
North	3.5	1.7	1.9
Central Plateau	3.0	1.3	1.1
Sahel	0.6	0.2	0.2
South-West	5.1	0.3	0.4

~~From the foregoing, we note that the more health expenditures a household incurs, the greater its exposure to catastrophic spending. For example, the poorest quintile constitutes the lowest number of households with catastrophic expenses, while the less poor households have the highest incidence of catastrophic expenses. Hence, health is a luxury good for Burkina Faso households.~~

According to the Xu method, the North-Central region has the highest incidence of catastrophic health expenditure in 2014 with about 2.5%. This is followed by the North, South-Central and Central Plateau which have rates higher than 1%.

The four regions that contribute to lowering the national incidence are Central, Sahel, Mouhoun and High Basins. They have the lowest incidence. The remaining five regions are relatively close to the national average. The same trend can be observed with the Wagstaff and van Doorslaer method at the 25% threshold. On the other hand, the Wagstaff and van Doorslaer method at 10% yields a different result because most of the households that spend at least 10% of their consumption to health are in fact the wealthiest households because they can afford to pay.

The ratio between out-of-pocket payments by households and their capacity to pay accounts for their contribution to the financing of the health system (CFS). Based on this contribution, Table 2 presents the results of the factors that are associated with catastrophic and impoverishing health expenditures.

Commenté [JA23]: Chart or Table ?

Mis en forme : Paragraphes solidaires, Lignes solidaires

Commenté [JA24]: Avoid discussing your results. You do this under the discussion section.

It is important to keep in mind that your results may not just mean that health is a luxury good. It may meen that there are several access barriers the poor have to overcome to use health services.

Commenté [JA26]: Because they can afford to pay.

Table 32 : Factors that are associated with catastrophic health expenditures in Burkina Faso (2014)

Variables	Odds Ratio	P>z	[95% Conf,	Interval]
Gender of the household's head (reference : male)				
Gender of the Household's head	2.099	0.079	0.918	4.796
Size of the Household (continuous variable, no specific categorical reference)				
Household's size	1.039	0.155	0.985	1.097
Age				
There are people aged 60 or more in the household	2.280	0.009	1.232	4.218
There are people aged 5 or less in the household	0.876	0.708	0.439	1.746
Residence area (reference : urban area)				
location	0.689	0.382	0.299	1.586
Access to healthcare delivery (reference: household's is less than 30minutes far from health care facility)				
Access to healthcare	0.793	0.561	0.363	1.731
Hospitalization (reference : household has experienced at least one hospitalization during the last 12 months)				
Hospitalisation	16.642	0.000	6.768	40.919
Region of residence (reference : central region)				
Hauts-bassins	1.129	0.917	0.114	11.134
Boucle du Mouhoun	2.689	0.364	0.317	22.784
Sahel	2.646	0.342	0.356	19.689
Est	1.736	0.636	0.1769	17.029
Sud-ouest	14.697	0.006	2.121	101.814
Centre-nord	3.285	0.283	0.3747	28.787
Centre-ouest	5.512	0.115	0.660	45.993
Plateau central	9.628	0.041	1.092	84.864
Nord	6.173	0.062	0.912	41.798
Centre-est	1.141	0.902	0.139	9.327
Cascades	2.010	0.577	0.173	23.352
Centre-sud	6.990	0.056	0.948	51.536
Quintile (reference first quintile)				
Quintile 2	0.261	0.065	0.063	1.085
Quintile 3	0.293	0.130	0.060	1.435
Quintile 4	0.163	0.072	0.022	1.179
Quintile 5	0.119	0.058	0.0131	1.076
_cons	0.002	0.000	0.000	.021
Number of obs = 9,135	**Waldchi2 (23) = 197.97**	**Prob > chi2 = 0.0000**	**Pseudo R2 = 0.1763**	

Table 2 shows that the poorest households (quintile 1) are the most exposed to catastrophic health expenditures compared to other quintiles. For the second quintile, for example, the inverse of the Odd Ratio of 0.261 is 3.82, which indicates that a second quintile household runs 3.82 less risk of incurring catastrophic expenditure than a first quintile household. The fact of being a household in the fifth quintile reduces the risk of incurring a catastrophic expenditure by 8 times, compared to households in the first quintile.

Similarly, it may be stated that households headed by men are 2 times less likely to be exposed to catastrophic expenditures than those headed by women, and that the larger the size of a household, the more likely that it

Commenté [JA27]: Always refer to the table by name/caption.

Commenté [JA28]: Great. You see why your interpretation above regarding luxury goods may not be the case. The poor are still overburdened.

Commenté [JA29]: ? What is converse ?

will be exposed to catastrophic expenses. In fact, an additional person to the household increases the risk of the occurrence of catastrophic expenditures in the household by 4.6%.

2- ~~Health~~ impoverishment Health expenditures of households

Figure 2: Proportion of individuals who became poor as a result of health expenses (in %)

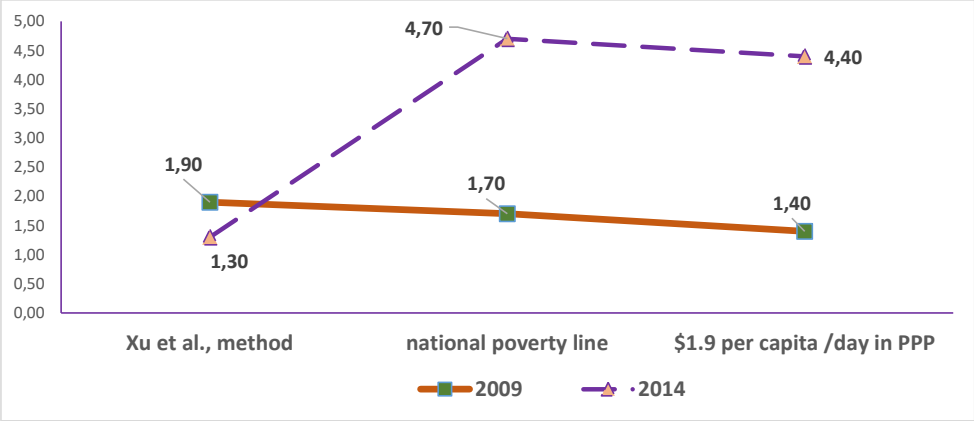


Figure 2~~Figure 2~~ ~~Figure 1~~ shows that the proportion of households falling into poverty after out-of-pocket health expenses decreased by 0.6 percentage points between 2009 and 2014. Indeed, the rate decreased from 1.9% to 1.3~~1~~% between the two periods if one considers the median household consumption level to be the poverty line.

But if one takes the national poverty line (CFAF 130 735 for 2009 and CFAF 153 530 in 2014), the situation becomes the opposite. With this threshold, the proportion of persons who experienced impoverishment expenses increases from 1.7% to 4~~5~~.7~~2~~% over the same period.

Lastly, with the international poverty line ($ 1.9/person/day), the impoverishment of persons increases slightly from 1~~0~~.4% to 4~~1~~.4~~.8~~% between 2009 and 2014.

~~The last two figures confirm the Ke Xu et al methodology to the extent that impoverishment measures the proportion of people who move from a situation of non-poverty to that of poverty following a health expenditure.~~

Mis en forme : Numéros + Niveau : 1 + Style de numérotation : 1, 2, 3, … + Commencer à : 1 + Alignement : Gauche + Alignement : 0.63 cm + Retrait : 1.27 cm

Commenté [JA30]: What is this ? You noted $1.95 earlier. This must be changed to $1.90

Commenté [JA31]: Am not sure how the Xu et al methodology relates to poverty per se.

Table 43 : impoverishment headcount by stratifier in 2009 and 2014 (in %)

Equity stratifier	2009			2014		
	Household consumption level	National Poverty line	$1.9 international poverty line	Household consumption level	National Poverty line	$1.9 international poverty line
National Average	1.9	1.7	1.4	1.3	4.7	4.4
Location						
Rural	2.1	1.7	1.3	1.6	5.2	5.0
Urban	1.4	1.8	1.5	0.3	3.2	2.3
~~Socio-economic status~~						
~~Quintile 1~~	~~0.0~~	~~0.0~~	~~0.0~~	~~6.2~~	~~0.0~~	~~0.0~~
~~Quintile 2~~	~~8.3~~	~~0.0~~	~~0.0~~	~~0.4~~	~~15.0~~	~~15.8~~
~~Quintile 3~~	~~0.6~~	~~7.8~~	~~6.4~~	~~0.2~~	~~4.9~~	~~2.9~~
~~Quintile 4~~	~~0.0~~	~~0.7~~	~~0.7~~	~~0.0~~	~~1.2~~	~~0.8~~
~~Quintile 5~~	~~0.1~~	~~0.1~~	~~0.1~~	~~0.2~~	~~0.3~~	~~0.2~~
Region						
Boucle du Mouhoun	1.0	1.8	0.7	1.9	4.4	6.1
Cascades	1.8	0.8	2.4	0.6	6.3	5.4
Central	1.5	2.9	2.2	0.0	2.4	1.6
East Central	2.8	1.7	1.8	1.0	5.0	3.1
North-Central	0.9	1.2	0.7	2.2	2.8	2.8
West-Central	1.4	1.2	1.9	2.0	6.9	6.8
South Central	4.0	1.7	0.7	1.0	7.3	7.6
East	3.7	1.6	1.1	1.5	6.9	5.4
Upper Basins	2.8	1.9	1.1	1.5	5.8	5.4
North	0.9	1.1	1.1	2.3	4.1	5.7
Central Plateau	1.7	2.4	3.9	1.7	7.5	6.9
Sahel	1.1	1.6	0.7	0.0	2.4	1.5
South-West	2.1	0.6	0.9	1.5	2.9	1.9

~~The two figures also show that at the national poverty line and the international poverty line ($ 1.9/day) the rate of impoverishment grew markedly between 2008 and 2014 for quintiles 3, 4 and 5 with quintile 3 having the highest rates of impoverishment in both years.~~

The~~y comprise the~~ regions of the North (2.3%), North-Central (2.2%) and West-Central (2.0%) ~~which~~ have the highest rates of persons who have fallen into poverty following their health expenditure. Only the East-Central (1%), South-Central (1%), Cascades (0.6%), Sahel (0%) and Central (0%) Regions come below the national average.

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Commenté [JA32]: Your results are suspect. Why do we just have them in the middle quntile??? Something is wrong somewhere.
Mis en forme : Paragraphes solidaires, Lignes solidaires
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Commenté [JA33]: Technically speaking, this does not make sense as poverty is actually using income or expenditure. You can omit this.
Mis en forme : Paragraphes solidaires, Lignes solidaires
Commenté [JA34]: Why do we have the N/A for the regions?
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Commenté [JA37]: Do not report these results for quntiles. Not informative at all…

Table 54 : Factors that are associated with impoverishment in Burkina Faso (2014)

Variables	Odds Ratio	P>z	[95% Conf,	Interval]
Gender of the household's head (reference : male)				
Gender of the Household's head	0.935	0.85	0.463	1.885
Size of the Household (continuous variable, no specific categorical reference)				
Household's size	1.014	0.705	0.943	1.09
Age				
There are people aged 60 or more in the household	1.955	0.006	1.216	3.143
There are people aged 5 or less in the household	1.443	0.224	0.799	2.607
Residence area (reference : urban area)				
location	1.456	0.405	0.602	3.521
Access to healthcare delivery (reference: household's is less than 30 minutes far from health care facility)				
Access to healthcare	1.107	0.734	0.618	1.982
Hospitalization (reference : household has experienced at least one hospitalization during the last 12 months)				
Hospitalisation	12.872	0.000	4.887	33.908
Region of residence (reference : central region)				
Hauts-bassins	33.883	0.003	3.431	334.57
Boucle du Mouhoun	3.288	0.426	0.176	61.541
Sahel	27.349	0.005	2.759	271.106
Est	31.997	0.002	3.441	297.506
Sud-ouest	71.976	0.001	6.277	825.319
Centre-nord	31.043	0.004	3.061	314.811
Centre-ouest	38.345	0.002	3.715	395.822
Plateau central	41.364	0.002	3.74	457.437
Nord	26.918	0.005	2.667	271.647
Centre-est	30.367	0.003	3.315	278.182
Cascades	19.046	0.011	1.949	186.117
Centre-sud	25.005	0.008	2.359	265.034
Quintile (reference first quintile)				
Quintile 2	0.046	0.065	0.017	0.123
Quintile 3	0.021	0.130	0.005	0.093
Quintile 4	0.001	0.072	0.000	0.009
Quintile 5	0.039	0.003	0.005	0.328
_cons	0.000	0.000	0.000	0.006
Number of obs = 9,135	**Waldchi2 (23) = 270.03**	**Prob > chi2 = 0.0000**	**Pseudo R2 = 0.2861**	

The occurrence of a case of hospitalization multiplies the risk of impoverishment by 13, compared to a household that recorded no hospitalization. Similarly, a person living in an urban area is 1.46 times more likely to be impoverished by out-of-pocket health expenditure compared to a person living in the rural area.

Discussion

Mis en forme : Normal

Commenté [JA38]: Things lacking in your discussion :

1.Comparing your results with those from other countries and studies. Currently, this is lacking.
2.Your first paragraph should summarise your results in a very simple way.
3.What are the suggestions for future research in this area.

strengths of the study

As we can see from the figures above, 2.96% of all households faced catastrophic health expenditure, and about 150,000 persons felt in poverty (i-e 1.3%) because of health expenditures in 2014. In kenya, around 6.29% of all households had to cope with catastrophic expenditure in 2013. The contribution of the government to health financing is high, but the poverty level of the households is so high that it is likely to inhibit the efforts of the government. From the foregoing, we note that the more health expenditures a household incurs, the greater its exposure to catastrophic spending. For example, the poorest quintile constitutes the lowest number of households with catastrophic expenses, while the less poor households have the highest incidence of catastrophic expenses. ~~Hence, health is a luxury good for Burkina Faso households.~~

Many studies on out-of-pocket payments in Burkina Faso have been conducted showing the role of out of pocket payments as a financial barrier to utilizing health services but fell short of demonstrating the extent of catastrophic health expenditure and impoverishment resulting from them[8]. Other studies provide interesting statistics for estimating household health expenditure albeit at a localized level since they do not cover the entire country[9]. Apart from the paper of Su TT, Kouyate B, Flessa S. « Catastrophic household expenditure for health care in a low-income society : a study from Nouna District, Burkina Faso » (2006) and the study conducted by WHO (2009), figures concerning households consumption, and ~~provides some estimates for Burkina Faso although figures on household consumption and~~the weight of health expenses in the total consumption of the households does not explicitly appear in these studies.

~~It is important to note that T~~the study conducted by WHO in 2009 used a methodology in which the indicators were calculated at household level and not on an individual basis, which ~~had~~ is an inherent limitation that this study sets out to remedy. It reproduces the 2009 data and those of 2014 and analyses them using an improved methodology. Thus, the Impoverishment analysis is done at the individual level while the analysis catastrophic health expenditure is done at the households' level. ~~basic data are calculated for the households, but always related to the size of the household for ease of understanding and interpretation.~~ However, some statistics were calculated at household level, such as the proportion of household that incurred both impoverishment expenses and catastrophic expenditure, to establish the links between the two configurations.

The hospitalization of a household member significantly increases the risk of impoverishing the household and raising the likelihood of the occurrence of catastrophic expenditure in the household. Indeed, the risk of incurring a catastrophic health expenditure is multiplied by 10 when the household experiences the hospitalization of one of its members compared to a household that has not had a case of hospitalization. Similarly, the larger the size of a household, the higher the probability of it incurring catastrophic expenses. Indeed, according to the study findings, an additional person in a household increases by 4.7% the risk of the occurrence of a catastrophic expenditure in that household. Therefore, policies like the national proposed health insurance scheme should promote subsidization of in-patient costs and promote contribution at the household rather than individual level to help reduce the incidence of catastrophic spending.

Apart from these two factors, it was noted that persons aged 60 years or more are generally affected by noncommunicable diseases (cardiovascular diseases, diabetes, etc.)[10]. These diseases are managed in hospitals and the medicines prescribed are mostly specialties, which contribute to increase the cost of treatment; hence,

Commenté [JA39]: Avoid discussing your results. You do this under the discussion section.

It is important to keep in mind that your results may not just mean that health is a luxury good. It may meen that there are several access barriers the poor have to overcome to use health services.

Commenté [JA40]: What do you mean by weight of health?

Commenté [JA41]: What do you mean here? Impoverishment analysis is done at the individual level while catastophe is done at the HH level. This is standard. You need to understand this as well.

Commenté [JA42]: What do you mean by an improved methodology. I do not see anything new about the methods. So avoid making these kinds of statements.

Commenté [JA43]: Mixed up. Impoverishment is at the individual level and not HH. Catastrophe is at the HH level.

Commenté [JA44]: Did you show this in your results ? If not, provide a reference to this.

[8] J. E. GIRARD and V. RIDDE (2000), ~~*«L'équité* « *L'équité* d'accès aux services de santé pour les indigents dans un contexte africain de mise en œuvre de l'Initiative de Bamako

[9] Su TT, Kouyate B, Flessa S. "Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso" (2006~~dis N~~
)

[10] Omar Galárraga, Sandra G. Sosa-Rubí, Aarón Salinas, Sergio Sesma, the impact of universal health insurance on catastrophic and out-of-pocket health expenditures in mexico: a model with an endogeneous treatment variable, (2008),

Mis en forme : Anglais (États-Unis)

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households with persons aged 60 years or more have twice the risk of exposure to catastrophic expenditure. The results of the 2014 survey indicate for example that the ages of 10.5% of hypertensive patients ranged between 55 and 64 years. Therefore, the design and allocation of resources for the essential services package should prioritize preventive and curative services targeting noncommunicable diseases so as to ameliorate the impoverishing effects of these diseases.

Services utilization

Mis en forme : Titre 3

On the other hand, the decrease of catastrophic health expenditures can be explained by the decline of morbidity (from 15.3% in 2009 to 12.8% in 2014) due to improvements in the strengthening of prevention actions, in the treatment of pathologies within risky groups like children under five.

Catastrophic and impoverishment health expenditures

As the results of the household living conditions survey indicate in Burkina-Faso, ~~medication~~ drugs ~~constitutes~~represent ~~over~~ about 68.2% (in 2014) of the household health basket. ~~Given the fact that~~As expenditures on medicines account for the largest share of household health expenditure, it is critical that the government reviews policies on access to medicines that reduce the costs of medicines including rational prescribing of drugs, local manufacturing of drugs for high morbidity and high mortality diseases, rationalization of drug pricing, and more. Furthermore, large expenditure in care and treatment relate to the purchase of medicines, laboratory tests and radiology mostly provided by the private sector. There is therefore need for better public engagement of the private sector to ensure better pricing and rationalization of service provision.

Commenté [JA46]: ? what?

With the increase in early attendance of health facilities induced by awareness campaigns and implementation of various reforms on the improved financial access to services (free care, subsidies for specific services, etc.), there has been a decline in the fatality of malaria (number of deaths fell from 5 985 in 2009 to 5 632 in 2014). Indeed, it is when the illness worsens that its management and therefore out-of-pocket payments increase. Hence early consultation in a health facility could also explain the decline in catastrophic expenditure.

In logistic regression with endogenous variables, the likelihood of a catastrophic expenditure (or impoverishment expenditure) occurring, we could have used the household dependency ratio instead of the household size, or introduced both variables if this does not violate any regression hypothesis. Notwithstanding, the results could not be more robust and significant than those obtained with household size as an exogenous variable. For example, when the dependency ratio is used in the logistic regression, the factor of the dependency ratio is 1.03, with a p-value of 0.780 instead of 1.05 and 0.096 respectively with respect to the household size. In contrast, by introducing the two variables in the model, the factors are virtually identical, apart from the fact that the p-value of the household size still improves. We have therefore maintained household size instead of the dependency ratio since the statistical properties of the model would improve.

Limitations of the study

Admittedly, the study did not analyse the link between chronic diseases and the impoverishment of households, but we can bolster the assertion that long periods of hospitalization (i.e. seven days or more) that typify cases of severe malaria, chronic diseases (cancer, diabetes, hypertension, sickle cell anaemia, …) and traffic accidents are some of the factors that contribute to the occurrence of catastrophic and impoverishment health expenditures. In the Sahelian and South-Central regions for example, the consultation of a health facility is often motivated by the worsening of an illness, which causes health expenditure to escalate and increases the risk for households of incurring catastrophic and impoverishment expenditures.

for future surveys of this kind, it would be good to collect data both for the prevalence of chronic diseases (diabetes, hypertension, renal insufficiency, drepanocytosis ...), but also to take into account the health expenditure caused by these chronic diseases, because these expenses are generally enormous and are likely to incur catastrophic expenses of health, as well as expenses of impoverishment. not taking it into account in surveys, as is the case with our survey, minimizes the incidence of catastrophic health and depletion expenses.

in addition to that, future surveys should also analyse the effect of mutual insurance on the reduction of catastrophic household expenses.

~~Admittedly, the study did not analyse the link between chronic diseases and impoverishment of households, but the results bolster the assertion that long periods of hospitalization (i.e. over seven days) that typify cases of severe malaria, chronic diseases (cancer, diabetes, hypertension, sickle cell anaemia) and traffic accidents are the main factors that contribute to the occurrence of catastrophic and impoverishment health expenditures. In the Sahel and South-Central regions for example, the consultation of a health facility is often motivated by the worsening of an illness, which causes health expenditure to escalate and increases the risk for households of incurring catastrophic and impoverishment expenditures (Reference).~~

Another limitation is inherent to the impoverishment expenditure, since to identify households that have become poor as a result of their health expenses the latter is deducted from its total expenditure or its out-of-pocket payments depending on the method used; the resultant value is then compared with the current threshold. In view of the fact that the poverty line encapsulates all the minimum needs of a household, it would have been preferable to deduct from the poverty threshold the portion relating to health, before making fresh comparison with the household's health expenditure. The current procedure systematically introduces a bias by overestimating the impoverishment rate of households because if, at the same time as consumption is deprived of its health dimension, the threshold was also deprived of its health aspect, the consistency would be maintained and the rates observed certainly be reduced and become more realistic. Another study could eventually analyse the effects of this option.

Chronic diseases are sources of immense expenditure for households but this was not considered in the study. Even in the absence of figures backing the claim that a household with one of its members suffering from a chronic disease is likely to be prone to catastrophic/impoverishment expenditure, the link between chronic diseases and catastrophic/impoverishment expenditures is generally accepted in the community of practitioners. But this study does not quantify the weight of chronic diseases in catastrophic/impoverishment expenditure, much less the order of comparison between a household without any chronic disease and a household that has one.

~~In logistic regression with endogenous variables, the likelihood of a catastrophic expenditure (or impoverishment expenditure) occurring, we could have used the household dependency ratio instead of the household size, or introduced both variables if this does not violate any regression hypothesis. Notwithstanding, the results could not be more robust and significant than those obtained with household size as an exogenous variable. For example, when the dependency ratio is used in the logistic regression, the factor of the dependency ratio is 1.03, with a p-value of 0.780 instead of 1.05 and 0.096 respectively with respect to the household size. In contrast, by introducing the two variables in the model, the factors are virtually identical, apart from the fact that the p-value~~

~~ofthehouseholdsizesdlimprovesWehavetherefomaintainedhouseholdsizeinsteadofthedependenyatioinesthestatistialpropertiesofthemodelwouldimprove~~
classified since they did not make out-of-pocket health payments in 2014. Hence, these were households whose situation could not be clarified in terms of whether or not they incurred catastrophic/impoverishment expenses. Of these individuals, 88 376 (namely 61%) are poor in the monetary sense, and that corresponds to 15 321 poor households among the 27 767 unclassified households nationally. This limitation is inherent to the method of identification of households that make catastrophic health expenditure. because, to be able to make a catastrophic or impoverishment expenditure, it is necessary to have spent. therefore, all those who have spent nothing cannot be classified.

This observation stems from the fact that, to make a catastrophic expenditure, a health expenditure would have to be incurred. And it is on the basis of the weight of out-of-pocket health payments in relation to the capacity to pay that catastrophes or impoverishments may be identified. In the configuration where a household does not make out-of-pocket health payments as a result of its indigence, or because it already benefits from full coverage of its health care, the latter does not make out-of-pocket payments and is therefore not eligible for the ~~implementation~~ methodology.

For example, in some regions of Burkina Faso (South-Central), there are many poor households which use herbal tea, tree barks and wild roots as treatment without consulting a modern care provider throughout the year. For these kinds of households, for example, health expenditure and the amount of out-of-pocket health payments disclosed by households are insignificant, if not nil. These households are therefore not classified in the ~~impoverishment~~ catastrophic or impoverishment category, even though many of them are extremely poor and should therefore be potential targets of the universal health insurance.

Three proposals ensue from these observations. The first suggests that a per capita health expenditure threshold should be found in each subpopulation (quintile for example) and an analysis of the different household groups made. We believe that the statistics which will emerge from this configuration would be more robust than those provided in the current state of knowledge. For example, consider the average food consumption of the median household within each quintile to be subsistence expenditure and assess households of the poorest quintiles on that basis. For those of the rich quintiles, (4^{th} and 5^{th} quintiles), for which out-of-pocket payments are nil, they would be classified as not having incurred any catastrophic expenditures or impoverishment expenses since they are fully covered by the health insurance.

The second proposal stems from the observation that, in the specific case of Burkina Faso, the Xu method yields relatively low catastrophic expenditure (1.3% in 2009 and 0 .78% in 2014). This is due to the fact that, as defined in the Xu et al methodology that we have applied in this study, a household's capacity to pay is unduly high. To calculate the capacity to pay, it is assumed that once the "theoretical" food expenditure of the household is met, the remaining household expenditure can be assigned to health, whereas, as seen above, in addition to the food and health functions, there are 10 consumption functions to be met by a household. In view of the fact that the survey data indicates that the share of health in total household expenditure ranges from 3%, 5.6% to 17.1% respectively in the last three quintiles of households that allocate the most money to their health, it would perhaps be worth considering a relatively reasonable proportion, i-e between 2.3% and 17.1% of the capacity to pay as calculated currently, before identifying, on this new basis, households in situations of catastrophic expenditure. By considering for example 2.3% of the current capacity, we arrive at 68.7% (standard deviation = 0.464) of persons in a situation of catastrophic expenditure. But with a cut-off value of 5.6%, the rate reduces to 50% (standard deviation = 0.500) of persons in catastrophic expenditure situation, and lastly, with a cut-off value of 17.1%, the proportion of catastrophic expenditures is 18% (standard deviation = 0.384). But by taking the cut-off value of 15% of the current capacity to pay as though ~~transposing the~~transposing the Abuja declaration to the household level, it is 20.3% (standard deviation = 0.4022) of persons who are then in a catastrophic situation. We would arbitrarily consider 17.1% of the total capacity to pay to be the capacity to pay for health in the household, and this value would therefore be called **capacity to pay** or **~~–~~partial capacity to pay** and not **total capacity to pay** of the household.

The third proposal derives from the fact that the current methodology analyses health expenditure from a microeconomic perspective, namely it operates solely at the household or individual level. However, the history of insurance schemes in neighbouring countries indicates that the authorities are also facing serious challenges in the implementation of their health policies. The methodology helps to determine whether or not a household is able to cover its catastrophic expenditure. But it would be useful to know whether or not the entire country is in a catastrophic situation. Either one deems the country to be in a catastrophic situation, if at least 40 households incur catastrophic expenditures, or it is in a situation of catastrophic expenditure if the weight of the health sector is 40% of the national budget (or another threshold), or if the total out-of-pocket payments of households represent over 40% of the current expenditure of the health sector (in 2014 it was 32.2%). In 2009, the aggregate weight of health expenditure in total household consumption was about 2.4% and 5.9% in 2014. WHO could therefore propose a budget threshold factor similar to the subsistence threshold that would help classify countries or propose an absolute limit for the share of the public budget spent in out-of-pocket health payments, for if a household can meet catastrophic expenditure then the country may as well finance catastrophic health expenditures or be in a situation of impoverishment expenditure. This could help implement public decisions on behalf of the beneficiaries and flesh out the content of research, in a context in which the demand for health care outstrips supply and that deficit of health supply vis à vis to the demand is never assessed prior to the implementation of programmes of protection against health financial risks.

Conclusion

Commenté [JA48]: Your conclusion should be more concise. Do not reharsh your results. Just provide a quick conclusion and where possible, policy directions for the government or any other policy maker of interest.

In view of the above results, Attendance of health facilities increased along that of household incomes and the budgetary factor of health in household basket increased from 2.4% to 5.9% between 2009 and 2014.

The increase in the amount of annual out-of-pocket health payments per person from XOF 3 568 to XOF 4 914 between 2009 and 2014, coupled with the fact that individual capacity to pay rose from XOF 77 680 to XOF 132 216 resulted, at the economic level, in a reduction in the percentage of individuals incurring catastrophic health expenditure from 1.3% to 0.8%.

The demand for health is highly elastic in Burkina Faso (elasticity=12.2) in relation to incomes. Whereas household annual income increased by 3% on average, health expenditure on the other hand saw an annual average growth of 23% over the 2009-2014 period. Total household expenditure increased by 179.4% in five years while total household expenditure only grew by 14.8% over the same period. Even though the poverty rate decreased significantly from 46.7% to 40.1% between 2009 and 2014, health expenses contributed considerably to the poverty of households in 2014.

Despite the programmes and projects facilitating financial access to health care put in place by the government, the country's households continue to devote a sizable portion of their incomes to health care expenses. The issue of access to health care remains more marked in rural areas where the purchasing power of the population is weak. The authorities must put in place mechanisms for achieving universal health coverage in order to reduce the lack of equity in access to health care and related financial risks, with a particular emphasis on poor and vulnerable population groups.

MTEF	:	medium term expenditure framework
HH	:	head of household
CSPS	:	Health and Social Promotion Centre
EICVM	:	Comprehensive Survey on household Living Conditions
EMC	:	Multisectoral Survey on Household Living Conditions
IEC	:	Information Education Communication
INSD	:	Institut National de la Statistique et de la Démographie
EGM	:	Essential generic medicine
SDG	:	Sustainable Development Goals
MDG	:	Millennium Development Goals
PNDES	:	National Economic and Social Development Plan
TFP	:	technical and financial partner
RAMU	:	Universal Health Insurance Scheme
HIV	:	Human immunodeficiency virus
ZD	:	census zone

Declaration

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Non applicable

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Availability of data and materials
All the data, and syntaxes used to calculate indicators as well Excel files are available in the supplementary data.

Authors' contributions
Mr. GUENE Hervé undertook the calculations using STATA and the logistic regressions using logistics on the 2014 data. He contributed significantly to the preparation of the document and incorporated the amendments made at the validation workshop.

Mr OUEDRAOGO Boureima has followed the overall process of integration of the comments from reviewers

Mr. DOAMBA Odilon supported the team in the formulation of programmes based on the 2009 data and undertook the overall packaging of the document. He provided support in the tabulation of the data and review of the final document.

Mr. NASSA Simon provided macroeconomic data and information on the national health accounts of Burkina Faso and reviewed the portions on the use of health services.

Dr ZAMPALIGRE Fatimata coordinated the study and provided information on government and TFP interventions. She matched the results obtained with the current health policy of the country.

Dr COULIBALY Seydou helped organize the study in three workshop sessions and guided the team in the selection of relevant WHO policies for calculating household health expenditures and supervising the sessions throughout.

Ethics approval and consent to participate

Non applicable.

Consent for publication

Non applicable.

Competing interests

The authors declare that they do not have any conflict of interest

Author's information (optional)

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Omar Galárraga, Sandra G. Sosa-Rubí, Aarón Salinas, Sergio Sesma (2008), the impact of universal health insurance on catastrophic and out-of-pocket health expenditures in mexico: a model with an endogeneous treatment variable, HEDG Working Paper 08/12

Profile poverty 2014 of Burkina Faso

Mis en forme : Anglais (États-Unis)

Commenté [CS49]: Pas de lien entre les documents ici référencés et le texte. Par exemple dans quel passage de l'article a – t-on utilisé les résultats de Berman, P & Bhandari ?

Poverty profile 2009 of Burkina Faso

Priyanka Saksena, Adélio Fernandes Antunes, Ke Xu, Laurent Musango & Guy Carrin (2010) Impact of mutual health insurance on access to health care and financial risk protection in Rwanda. Background Paper, 6

Su TT, Kouyaté B, Flessa S. (2006) catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso.

Tableau de bord social 2014 du Burkina

Tableau de bord social 2009 du Burkina

Valéry Ridde, Loubna Belaid, Oumar Mallé Samb, Adama Faye (2014), les modalités de collecte du financement de la santé au Burkina Faso de 1980 à 2012.

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