Article

The health care burden in rural Burkina Faso: Consequences and implications for insurance design

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ABSTRACT

This paper maps the health care burden of households in rural Burkina Faso. More specifically we investigate the financial burden of health shocks and the manner in which households respond. Our data allows us to differentiate the burden of chronic illness and handicap, more frequent and recurring illnesses and episodes of severe illness, accident and mortality. We find that the burden of health shocks and health spending is high, ranging from one third of monthly non-medical consumption for the treatment of common infectious illnesses to almost three times the monthly non-medical spending in case of death of a household member. To cope, households deplete savings, sell livestock or reduce consumption. In case of severe shocks they are also heavily reliant on transfers from outside. Looking at the economic consequences of health shocks we find that illness of whichever type – severe, chronic or more common – reduces household consumption. Furthermore, households which suffered from a severe illness show significantly lower livestock holdings. Many of the health insurance schemes implemented in developing countries are not yet taking note of the burden of severe and chronic illness. However, in light of the universal health insurance coverage objectives of the Sustainable Development Goals (SDGs) it should be considered an area for future expansion.

1. Introduction

Households in developing countries are faced with a myriad of risks and shocks on a day-to-day basis resulting in a high degree of income variability and uncertainty. To cope with this situation, households have developed a range of risk management strategies, for example, through informal and self-insurance (Sauerborn, Adams, & Hien, 1996). These mechanisms, however, tend to be incomplete. This applies not only to situations where households are suffering from covariate shocks such as drought or flooding (Deaton, 1991; Rosenzweig & Wolpin, 1993) but also to idiosyncratic shocks, e.g. in the case of communicable and non-communicable diseases where the costs and losses incurred as result are particularly high. For such cases more formal insurance mechanisms might be needed to mitigate the potential negative effects on asset holdings and the human capital of affected households (Dercon, 2002, 2008). For such formal insurance mechanisms to work effectively, it is pertinent to understand the risks and associated financial burden that the targeted households are facing.

Concentrating on ill health and health shocks, a growing strand in the literature looks at the economic consequences of health shocks, i.e. severe illness or death of a household member in developing countries (Amal & Mahal, 2014). The literature shows that households experiencing unexpected bouts of illness or the death of a family member are likely to incur income losses in cases where the affected person was a net-contributor to household income and/or the household spent a larger fraction of the household budget on health care. In the absence of formal insurance mechanisms, households may liquidate assets, resort to intra-household labour substitution, borrow money or withdraw children from school to cope with negative events and to maintain consumption. These coping mechanisms can have deleterious consequences for future household welfare. Furthermore, many households might not be able to maintain and smooth consumption in the first place and thus be pushed (further) into poverty when adverse events occur.

Empirically, there is no clear indication on the extent to which households are able to smooth consumption in response to health

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shocks. The evidence is mixed. In one of the earliest studies, Townsend (1994), for example, finds evidence of consumption smoothing. Using data from India, he shows that the percentage of a year an adult male was sick had no effect on household consumption. De Weerdt and Dercon (2006), Genoni (2012), Mohanan (2013) and Skoufias and Quisumbing (2005) reach similar conclusions when looking at consumption smoothing in their work from Tanzania, Indonesia, India and Bangladesh. On the other hand, there are also a number of studies which show that households are unable to smooth consumption particularly in case of large, infrequent shocks (Asfaw & Braun, 2004; Dercon & Krishnan, 2000; Gertler & Gruber, 2002; Gertler, Levine, & Moretti, 2009; Islam & Maitra, 2012; Nguyen & Mangyo, 2010; Wagstaff, 2007).

In addition, Sparrow et al. (2014), for example, also alert to the case that there might be heterogeneity in the ability to smooth consumption. They show that, while the rich are unaffected, informal sector workers and the poor in Indonesia are unable to protect consumption in case of adverse health shocks. Using the same data as Townsend (1994), Kochar (1995) has been looking at the economic consequences of ill health beyond consumption, finding that the illness of a male member during the peak agricultural season is associated with a decline in wage income and an increase in informal borrowing. As already mentioned earlier, both these aspects can have negative implications for household welfare in the long-run. While there are several reasons for the differences in the degree of consumption smoothing reported across papers, of primary concern for assessing the potential contribution of a formal insurance mechanism is to understand the transmission channels through which ill-health and mortality affect consumption. Moreover, it is important to understand the strategies adopted by households to maintain consumption and the potential consequences of these mechanisms in the long-run. Thus, maintaining consumption may be a misleading indicator of the economic impacts of ill-health events, especially if consumption is maintained through selling assets or foregoing human capital investments in children (Islam & Maitra, 2012; Chetty & Looney, 2006). Hence, in order to assess the potential contribution of a formal insurance mechanism, it is important to look at the effects of ill-health, the coping mechanisms employed and the potential consequences jointly. Such an analysis is particularly valuable for the design of appropriate, formal insurance mechanisms, as it will help to understand the gaps and implications which such mechanism will have to fill.

This paper makes two contributions to the existing literature. The first lies in the focus on Burkina Faso, a country which is currently discussing the implementation of a national health insurance scheme. While a number of studies have been looking at the potential effects of community health insurance in Burkina Faso already (De Allegri, Sanon, & Sauerborn, 2006; Dong, Mugisha, Gbangou, Kouyate, & Sauerborn, 2004; Dong, Gbangou, De Allegri, Pokhrel, & Sauerborn, 2008; Gnawali et al., 2009) the health care burden and the associated economic consequences has not yet been investigated much in this context. The second contribution is the attempt to provide a more complete picture of the actual health care burden by exploiting information on ill-health within the household drawing on information from recent illnesses, chronic illness and severe health shocks. Thus far not many studies have been able to differentiate or single out the cost of chronic illness and its implications (for a systematic review see Jaspers, Colpani, & Chaker, 2015). Hence, our study provides new insights into this issue in the context of Burkina Faso and thus also allows to discuss the implications of chronic illness for insurance design. In order to draw conclusions for policy design, we describe the health care burden of households in rural Burkina Faso and their current coping mechanisms in the absence of a formal insurance mechanism. In order to obtain a more complete picture we, then, look at the economic consequences of the different health events that households are experiencing. More specifically, we investigate the extent to which households are able to smooth consumption and protect productive assets. Concerning this

latter point we are building on the existing literature and provide additional evidence to the debate on consumption smoothing.

The paper proceeds as follows: Section 2 gives a brief overview of the health insurance plans and the current situation in Burkina Faso. Section 3 presents the data and empirical strategy. Empirical estimates on the health care burden and consequences are presented in Section 4. Section 5 discusses the implications for insurance design and concludes.

2. Health insurance in Burkina Faso

Currently, less than 10% of the Burkinabe population is covered by some form of health insurance. Exceptions are community based schemes for employees in the public and private sector, the military and students. Private commercial health insurances cover less than 1% of the population (Zett & Bationo, 2011). In the past, the civil society voiced strong commitment to implement universal health insurance and on September 5, 2015, the National Assembly finally adopted the law on universal health insurance. The legislation establishes basic health protection based on a uniform service package for all citizens. Initially, the vision was to follow the Rwandan model using a bottom up approach, promoting the establishment of Community Based Health Insurance (CBHI) schemes, which will be unified and standardized in the course of the years. As part of this initiative a number of CBHIs have already been established. In addition to the promotion of local insurance schemes the government is also gradually expanding access to free health care for specific groups. A first impulse in April 2016 was to abolish user fees for children under five and pregnant women. In a next step, in 2018 government is expected to start registering civil servant. Despite the commitment and these early efforts on opening access to health care, many aspects around the organisation and implementation of the national health insurance scheme still remain open. This includes, for example, potential subsidies and the precise targeting of affiliates, the definition of the care package, the associated costs and the design of a procurement and provider payment system. At the same time, now presents a good moment to think about which services the care package should entail in light of the vulnerabilities that households are facing.

3. Data and analysis

3.1. Data

This study is based on household survey data collected in the rural community of Ziniaré, in the Central Plateau region of Burkina Faso, ca. 40 km north-east of the capital Ouagadougou. The rural community of Ziniaré comprises of 48 villages and just under 6,800 households. The community disposes of a decent public health infrastructure comprising of 47 local health centres (Centre de Santé et de Promotion Sociale (CSPS)) and a district hospital (Centre Médical avec antenne chirurgicale (CMA)). In addition, households are also served by private clinics, pharmacies and traditional healers.

The household survey data used in this study covers 2,000 randomly selected households drawn from a random sample of 38 villages in the community. Households were interviewed twice in November and December 2013 and revisited in February and March 2016. From the first round we have complete information from 1,996 households. In the second round, 1,879 households were re-interviewed successfully. In total, the survey data used covers about 32% (14,164 individuals) of the total population living in the area.

The household survey collected detailed information on household composition, consumption and assets. Most pertinently for this paper, the survey also included detailed modules on severe shocks that have been affecting the household in the 12 months prior to the survey, their financial consequences and household response; chronic illness of household members and their monthly costs; and illnesses, treatment and costs that households have been experiencing in the four weeks

prior to the survey.

3.2. Analysis

Our empirical analysis proceeds in two parts. First, we characterize the health care burden of the households in our sample and the coping mechanisms employed. This is done descriptively using summary statistics on the prevalence, costs and coping mechanisms employed. Second, we look at the economic consequences of the more frequent illness episodes, chronic illness and more severe health shocks. For this second part we follow the existing literature and look at the effects on household per capita food and non-food consumption net of any medical spending and household livestock holding as outcomes. The following conversion factors were used for the calculation of livestock holdings in TLU: Cow = 0.7, goat = 0.1, sheep = 0.1, pig = 0.2, chicken & poultry = 0.01. For the currency conversion 1 EUR is equivalent 655 CFA F. The choice of outcome variables is also motivated by the coping mechanisms that households have reported to use. Depending on the type of health episode, reduced consumption and livestock sales are among the most popular. We discuss this in more detail in Section 4. The second part of the analysis uses a regression approach. Since, the consumption and livestock variables considered have a skewed and non-normal distribution censored at zero, it makes linear models such as OLS unsuitable. We therefore use a fixed effects Poisson model (FE Poisson) in order to deal with these distributions and also to avoid re-transformation problems of taking natural logs of the outcome variables (Manning & Mullahy, 2001; Buntin & Zaslavsky, 2004; Mihaylova, Briggs, O'Hagan, & Thompson, 2011; Sparrow et al., 2014). The advantage of using a FE Poisson model is that it yields a consistent estimator as long as the conditional mean is correctly specified. This is true even if the outcome does not actually follow a Poisson distribution, making it a quite general approach to deal with censored data of this type (Wooldridge, 2002).

For the purpose of our analysis the conditional mean is specified as:

$$E(y_{it} h_{it}, \ X_{it}, \ \mu_{vt}, \ \alpha_i,) = \exp\left(\beta h_{it} + X_{it}'\gamma + \mu_{vt} + \alpha_i\right) \quad (1)$$

where y_{it} represents the respective outcome variables under consideration, i.e. the per capita food consumption, non-medical consumption and livestock holdings of household i in period t. The variable of interest h_{it} represents the respective morbidity or mortality indicator, i.e. if the household suffered from a severe illness shock, the death of a household member, or a more regular illness and if the household has a member with a chronic illness. The β-coefficient is interpreted as a percentage change in the outcome when the morbidity and mortality indicators change by one unit, i.e. when a household experienced one of the four health events listed. μ_{vt} represent time-village interaction effects accounting for covariate trends in consumption spending. α_i represents household fixed effects. The household fixed effects control unobserved characteristics that might affect the outcome variable under consideration and the self-reported ill-health indicators, we are considering here. More precisely, an individual's perception of his or her health status might be affected by socio-economic factors and also affect self-reporting of health events. If this is the case, the estimated effect on our outcomes of interest might be biased. Since such a confounder is likely to be time invariant, the household fixed effects controls for this. In addition, we also include a vector of time variant household characteristics (X_{it}). The vector includes characteristics of the household head (gender, age, marital status, literacy), household size and composition, and a set of dummy variables on other, non-health related shocks, that the household might have experienced and could affect the respective outcome variables.

Despite its numerous advantages, the fixed effects approach does still have a number of shortcomings: First, our estimates will be biased if there is reverse causality, i.e. if the vulnerability of a health event is directly affected by a change in consumption (We are unable to identify a suitable instrument in order to address this issue.). Such a relationship

would typically only manifest itself in the long run. However, given the two-year lag between our survey waves we cannot ignore this bias. If present, the bias would cause our coefficient estimates to overestimate the effect of health events and increase the probability to reject consumption smoothing. Second, the fixed effects approach does not control for potential state dependence, i.e. a situation where preferences are affected by changes in the health status. In this case any observed change might be due to preferences rather than the ill health on consumption. However, a number of studies have tested for state dependence and do not find any evidence of this (Gertler & Gruber, 2002; Gertler et al., 2009; Sparrow et al., 2014).

In a second step we look at the persistence of the economic consequences, i.e. we are investigating whether households that have been experiencing a severe morbidity shock at the first time of interview are more likely to be poor in the follow-up period. For this we estimate a standard linear probability model of the following form:

$$\Pr(p_i) = f\left(\beta s_{it-1} + X_i'\gamma + \varepsilon_i\right) \quad (2)$$

where p_i represents a binary variable equal to one if household i is part of the poorest 50% of households in the sample. For the estimation we restrict our sample to households re-interviewed in the second wave only. Hence, we rank households based on their per capita household (non-medical) expenditures in wave 2 of the survey. s_{it-1}, the variable of interest, represents a dummy variable equivalent to one if the household reported a severe morbidity shock in the first survey wave. X_i is a vector of household characteristics including characteristics of the household head (gender, age, marital status, literacy), household size and composition, and a set of dummy variables on shocks, that the household experienced in the current period.

4. Results

4.1. Descriptive statistics of the health burden and coping

The survey information allows us to differentiate three different types of health events: Severe shocks that have affected the household in the course of the year, chronic illness which are present throughout the year and more recent and potentially more frequent health events, mostly in form of infectious diseases, in the past four weeks. The survey solicited information on 13 different types of shocks ranging from agricultural shocks to theft and health shocks such as severe illness, accident or death of a household member. Households were asked if they have been experiencing a severe negative event in the twelve months prior to the survey. However, what constitutes 'severe' has been left to the respondent. On average four out of ten households reported to have experienced at least one severe shock in the twelve months prior to the survey. Most households only recall one shock, 10% of households experiencing a shock have reported more than one shock, with the maximum number of shocks reported in a given year amounting to five (Table 1). While households faced an array of shocks by far the most common shock reported is serious illness or injury of a household member (34%). Death of a household member accounts for

Table 1
Incidence of a severe shock in the past 12 months.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Survey wave				Total	
	1		2			
	Mean	SD	Mean	SD	Mean	SD
Shock (=1)	0.361		0.439		0.399	
# of shocks reported (past 12 months)	1.133	0.400	1.083	0.280	1.106	0.342
N (Households)	1,996		1,879		3,875	

Table 2
Households experiencing a severe negative event in the past 12 months.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

| Type of shock | Survey wave | | Total | % |
	1	2		of total
Death of HH member	115	110	225	13.9
Serious injury/illness of HH member	301	249	550	34.0
Agricultural shock (drought, flooding, harvest loss, etc.)	136	313	449	27.8
Asset loss (theft, housing damage, etc.)	116	67	183	11.3
Other shock	91	120	211	13.0
Total	759	859	1,618	100.0

14% of the shocks reported (see Table 2). Together the two events account for almost half (47%) of the shocks reported. It is typically assumed that in poor contexts agricultural shocks are the main concern of households in poor, agrarian settings. In our context, given the reported frequency (and associated losses), health shocks seem more important.

The survey inquired into the costs associated with each shock reported and the respective coping mechanisms used. Multiple responses were possible. Yet, most households resort to one mechanism. In Table 3 we report the main coping mechanism used. We note that the costs associated with the death or severe illness of a household member are substantial and equivalent to almost three respectively five months of the non-medical consumption of the average household. The coping mechanisms to death or severe illness are rather similar. At 47% respectively 48% households most commonly rely on transfers from the extended family and friends to cope with severe health shocks. Furthermore, households also deplete savings and sell livestock to cover the losses associated with the shocks. Reducing consumption is rather rare in response to these shocks which might be due to the costs associated, which cannot be covered by lowering consumption. Also, in 8% respectively 14% of the cases households have not used any active coping mechanism. We cannot say whether this is due to inability or choice.

In addition to severe morbidity and mortality, 6% of the individuals

Table 3
Loss and coping mechanisms employed by households affected by severe morbidity and mortality in the past 12 months.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Mean	SD
A) Death of HH member (N=225)		
Revenue loss (EUR)	84.60	167.48
Total loss (revenue & assets, EUR)	159.26	222.44
Main coping mechanism used		
Transfer from family/friends (=1)	0.480	
Savings/cash (=1)	0.138	
Reduced consumption (=1)	0.027	
Livestock sale (=1)	0.111	
Other asset sale (harvest, land, etc.) (=1)	0.036	
None (=1)	0.142	
Other mechanism (add. employment, fostering, etc.) (=1)	0.018	
B) Serious injury/illness of HH member (N=550)		
Revenue loss (EUR)	90.31	168.85
Total loss (revenue & assets, EUR)	137.30	203.45
Main coping mechanism used		
Transfer from family/friends (=1)	0.471	
Savings/cash (=1)	0.175	
Reduced consumption (=1)	0.013	
Livestock sale (=1)	0.109	
Other asset sale (harvest, land, etc.) (=1)	0.024	
None (=1)	0.082	
Other mechanism (add. employment, fostering, etc.) (=1)	0.018	
Monthly non-medical consumption (EUR, full sample)	*59.13*	*65.45*

Table 4
Incidence of chronic illness/handicap.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

| | Survey wave | | Total |
	1 Mean	2 Mean	Mean
Chronic illness/handicap (=1)	0.065	0.062	0.064
N (Individuals)	14,164	13,632	27,796

Table 5
Individuals experiencing chronic illness/handicap.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

| Type of chronic illness/handicap | Survey wave | | Total | % |
	1	2		of total
Physical handicap	134	137	271	15.3
Hearing/vision impaired	155	175	330	18.7
Arthritis/chronic pain	188	182	370	20.9
Epilepsy	11	13	24	1.4
Hypertension	53	52	105	5.9
Diabetes	6	2	8	0.5
Mental health	54	45	99	5.6
Other	319	241	560	31.7
Total	920	847	1,767	100.0

in our sample suffer from a chronic illness or physical handicap (Table 4). These 6% are living in about one third of the households. Treatment of chronic illnesses requires more regular health spending (see Tables 1 and 3). The most common chronic conditions are arthritis or chronic pain (21%), hearing or visual impairment (19%) or other physical handicaps (15%). Hypertension and diabetes are still less diagnosed (6 respectively 0.5%) (see Table 5). However, diabetes together with physical handicaps and hypertension report the highest average monthly expenses, ranging between 48.85 and 85.50 EUR (not reported in Table 6). Across all types the average monthly spending for chronic illness amounts to about 47% of the average non-medical consumption, whereas the largest share of these expenses are for medicine (77%); less than a quarter is spent on consultations.

More regular, mostly infectious diseases - typically malaria and diarrhoea (see Table 8) - add further to the health burden of households. In contrast to the expenses incurred for severe health shocks and chronic illnesses, the average spending is lower amounting to about 35% of the average non-medical consumption of a household (see Table 9). However, the incidence is higher with 15% of all individuals or 55% of the households experiencing at least one illness episode in the four weeks prior to the survey (Tables 7 and 9). In contrast to severe health shocks, households cope with these more common health episodes mostly through lowering consumption (45%) but also dissaving (24%) and livestock sales (14%). Loan or transfers from family or friends are less common. In case of severe health shocks, households reported to rely on transfers from outside to cope. For more frequent and potentially less severe health events, households seem to be using

Table 6
Incidence and cost of chronic illness/handicap by household.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Mean	SD
A) All HH (N=3,875)		
HH has at least one member with chronic illness/handicap (=1)	0.319	
# of members with chronic illness/handicap	0.454	0.787
B) HH with at least one member with chronic illness/handicap (N=1, 236)		
Monthly expenditure for chronic illness/handicap (EUR)	28.12	97
Monthly non-medical consumption (EUR, full sample)	*59.13*	*65.45*

Table 7
Incidence of illness in past 4 weeks.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Survey wave		Total
	1 Mean	2 Mean	Mean
Illness in past 28 days (=1)	0.197	0.105	0.151
N (Individuals)	14,164	13,632	27,796

Table 8
Individuals experiencing illness in the past 4 weeks.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Survey wave		Total	%
Type of illness	1	2		of total
Fever/Malaria	1,824	567	2,391	56.8
Diarrhoea/Stomach pain	197	231	428	10.2
Eye/dental problem	48	33	81	1.9
Heart problem	28	22	50	1.2
Back pain	52	19	71	1.7
Wound/fracture	62	46	108	2.6
Chronic illness	98	135	233	5.5
Other	474	374	848	20.1
Total	2,783	1,427	4,210	100.0

Table 9
Loss and coping mechanisms employed by households affected by illness in the past 28 days.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Mean	SD
A) All HH (N=3,875)		
HH has at least one member sick in past 28 days (=1)	0.554	
# of HH members sick in the past 28 days (=1)	1.082	1.398
B) HH with at least one member with illness in the past 28 days (N=2,148)		
Total health expenditure (direct & indirect, EUR)	20.82	47.92
Labour days lost	7.462	12.471
Revenue lost (EUR)	0.93	6.94
Main mechanism used to pay for health expenses (individual level, N=3,547)		
Loan/transfer from family/friends (=1)	0.053	
Savings/cash (=1)	0.239	
Reduced consumption (=1)	0.449	
Livestock sale (=1)	0.135	
Harvest sale (=1)	0.103	
Other mechanism (add. employment, fostering, etc.) (=1)	0.022	
Average monthly non-medical consumption (EUR, full sample)	*59.13*	*65.45*

less support from outside and rather cope through reducing household own consumption and assets.

Dissaving and livestock sales which are especially common for severe morbidity and mortality but also for less severe health issues, can have lasting consequences for the economic wellbeing of households affected by these events. This will be analysed in the following.

4.2. Economic consequences of health burden

Table 10 presents the means and standard deviation of the variables used in the following analysis. A typical sample household is headed by a male with an average age of 49 years. 62% of the heads are married monogamously, 32% in polygamous relation, the remainder is unmarried or widowed. Literacy in the sample is low with 76% of the household heads being illiterate. The average household has seven members comprising of three adults and four children under the age of 18.

Households in the sample are mainly engaged in subsistence agriculture and rather poor. The average food consumption spending over three days amounts to 0.29 EUR per person. The average monthly non-medical consumption per capita amounts to 9.29 EUR. Households have an average livestock holding of 3.5 tropical livestock units (TLU). This is equivalent to five cows or 35 goats.

The effects of the different health events on economic outcomes, i.e. food and non-medical consumption and livestock holding are shown in Table 11. We find that households are not able to smooth consumption in consequence of morbidity. In case of severe illness or an accident experienced by a household member, the monthly non-medical consumption per person drops by 4.3%. The presence of a member with chronic illness has even stronger implications and reduces per capita consumption by 13.8%. We have already seen that households cope with the costs of the more frequent, mostly infectious illnesses with reduced consumption. Our estimates do confirm this. We find that short-term three-day food expenses decline by 9.6% and more generally monthly consumption drops by 3.8%. Interestingly, we find that the death of a household member does not reduce but actually increases per capita non-medical consumption. This suggests, that consumption levels are maintained while the number of household members is reduced. This may either imply that the loss in income was overcompensated by a reduction in consumption, i.e. the household member was a net consumer in the household (Grimm, 2010), or that the loss in income was overcompensated by the transfers received from outside. Taking a closer look at the transfers received in case of a death of a household member, the latter seems unlikely. First, in less than half the cases (39%) does the transfer surpass the total reported losses. Second, the average amount transferred represents only 36% of the average associated losses.

In more than 10% of the cases households respond to severe morbidity, mortality and more common illnesses with livestock sales. Our estimates suggest, that only severe morbidity leads to a more permanent reduction in livestock holdings with an estimated reduction of 9.3%. In case of more frequent illness events, we also obtain a negative though statistically insignificant coefficient.

Table 12 shows the estimation results investigating if there is a persistent effect of severe morbidity shocks on household poverty. The estimates suggest that households that have been experiencing a health shock in 2013 are more likely to fall within the poorest half of our sample and are also having lower livestock holdings. However, these correlations are not statistically significant.

5. Discussion

This paper explores the health care burden of rural households in Burkina Faso. Our data allows to consider different illnesses and health problems, including common illnesses which households experienced in the past 28 days, chronic illnesses and severe health shocks, i.e. a sudden severe illness or an accident of a household member in the past 12 months. For each of these we have detailed information on the costs incurred including forgone income and depleted assets.

The findings show that households are frequently exposed to severe illness and death of household members. A number of other studies also report a high incidence of health shocks (Asfaw & von Braun, 2004; De Weerdt & Dercon, 2006; Wagstaff, 2007; Genoni, 2012; Sparrow et al., 2014; Wagstaff & Lindelow, 2014).

Yet, really striking is that households also have to accommodate substantial health expenses for household members with chronic illnesses and physical handicaps as well as expenses for repetitive infectious diseases. The costs of ill-health represent up to almost two months of non-medical consumption. Thus, spending for medication to treat chronic diseases represent a substantial source of economic risk from illness.

With respect to the economic implications we find that households suffering from illness of whichever type – severe, chronic or more common – are unable to smooth consumption. Moreover, we also find

Table 10
Descriptive statistics of main variables.
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	Survey wave				Total	
	1		2			
	Mean	SD	Mean	SD	Mean	SD
Characteristics of the HH head						
Male (=1)	0.933		0.931		0.932	
Age (yrs.)	48.364	15.049	51.551	15.761	49.910	15.478
Married monogamous (=1)	0.625		0.621		0.623	
Married polygamous (=1)	0.322		0.317		0.319	
Unmarried (=1)	0.054		0.062		0.058	
Moslem (=1)	0.583		0.583		0.583	
Illiterate (=1)	0.773		0.748		0.761	
HH composition						
# of HH members	7.106	3.597	7.189	3.346	7.146	3.477
# of HH members under 5 yrs.	1.314	1.160	1.178	1.069	1.248	1.119
# of HH members 6–18 yrs.	2.660	2.122	2.726	2.011	2.692	2.069
# of HH members 65 yrs. +	0.344	0.606	0.449	0.718	0.395	0.665
HH has member with chronic illness (=1)	0.304		0.335		0.319	
HH has member with illness in past 28 days (=1)	0.628		0.476		0.554	
Shock in 12 months prior to survey						
Death of HH member (=1)	0.058		0.059		0.058	
Serious injury/illness of HH member (=1)	0.151		0.133		0.142	
Agricultural shock (drought, flooding, harvest loss, etc.) (=1)	0.068		0.167		0.116	
Asset loss (theft, housing damage, etc.) (=1)	0.058		0.036		0.047	
Other shock (=1)	0.046		0.064		0.054	
Outcome variables						
Per capita food consumption expenditure (past 3 days, EUR)	0.26	0.71	0.32	0.66	0.29	0.69
Per capita non-medical consumption/month (EUR)	7.51	9.80	11.18	12.56	9.29	11.37
Livestock (TLU)	3.526	7.086	3.491	5.510	3.509	6.370
N	1,996		1,897		3,875	

Table 11
Effects of morbidity and mortality of a household member on per capita consumption, non-medical consumption and livestock holding (FE Poisson).
Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	(1) P.c. 3-day food consumption (CFA F)	(2) P.c. monthly consumption (CFA F)	(3) Livestock holding (in TLU)
Serious injury/illness of HH member (=1)		−0.0430***	−0.0930**
		(0.001)	(0.039)
Death of HH member (=1)		0.138***	0.0513
		(0.001)	(0.064)
HH has at least one member with chronic illness/handicap (=1)		−0.137***	0.0197
		(0.001)	(0.033)
HH has at least one member sick in past 28 days (=1)	-0.0969***	−0.0381***	−0.0421
	(0.004)	(0.001)	(0.030)
N	3,588	3,588	3,588

Notes: Standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01. Covariates that are omitted from the table include indicator variables for the household head, household composition, other shocks, and time-village interaction terms.

that for households that have experienced severe illness or an accident of a household member livestock holdings decline by about 9% in the aftermath of this event. Despite the inability to smooth consumption and the negative effects on livestock, however, we do not find evidence that households that have experienced a severe health shock previous to the first survey round are more likely to be poor in the follow-up

survey, i.e. two years later, suggesting that health shocks do, at least, not have systematically lasting effects on households – at least not over the two-year period of observation here.

The high costs of ill-health documented in this study lead to a number of implications for insurance design. More specifically they point to aspects which should be considered for the definition of the care package. This is particularly relevant for Burkina Faso but potentially also for other countries in the region which are planning to introduce or have already introduced (national) health insurance schemes.

One of the aspects that is really striking in our analysis is the high costs of chronic illness. Costs to treat chronic diseases amount to 47% of household's monthly expenditure. Chronic health problems affecting about one third of the households in our sample. Thus far, particularly in small, local health insurance schemes, chronic illnesses and their treatment are not yet considered. Particularly small scale schemes often concentrate on the coverage of common infectious illnesses at local health centres. Given the high costs incurred, however, chronic illnesses, and here particularly the medication, pose a considerable burden to households. Even if in our survey, chronic illness such as hypertension and diabetes do not seem to be very prevalent, the prevalence of hypertension is high in Burkina Faso with roughly one person in five affected (Soubeiga, Millogo, Bicaba, Doulougou, & Kouanda, 2017). Furthermore, they are clearly on the rise and are be expected to overtake infectious illnesses as major cause of death by 2030 (WHO, 2014; World Economic Forum, 2010)

At the macro level, low and middle-income countries are expected to lose USD 7.3 trillion in output by 2025 due to chronic illnesses (World Economic Forum, 2010). On the micro level, similar to our study, other data from recent household surveys in the region also shows that the financial burden of chronic illnesses, particularly in poor households is already high. Estimates range between 10% to 20% of the household's per capita consumption (Counts & Skordis-Worrall, 2016;

Table 12

Likelihood of being poor when experiencing a shock in the previous survey round (Linear probability model).

Source: Own data, collected in Ziniaré in 2013/14 and 2016.

	(1) Household among poorest 50% acc. p.c. non-medical consumption	(2) Livestock holding (in TLU)
Household experienced a severe illness shock in wave 1 (=1)	0.0203 (0.032)	-0.266 (0.355)
N	1,877	1,877

Notes: Standard errors in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01. Covariates that are omitted from the table include indicator variables for the household head, household composition, and other shocks.

Wang et al., 2015). The increasing burden of chronic illness, both, on the macro but also the micro level, will require changes to the health care system and in health insurances schemes. Integrating the treatment of chronic illnesses and potentially also the treatment of more severe illnesses such as cancer in the benefits package will raise the costs of the care package. Hence, it does raise the tension between affordability and the financial viability of the scheme overall. This does require to think of ways of financing the national insurance scheme without being discriminatory against certain groups.

One way of accommodating health care expenditures to treat chronic diseases is to reduce the coverage of 'day-to-day' medication for minor health problems. In many health insurance schemes these expenses are covered, although they are neither necessary, nor very expensive. The argument typically is, that covering these items helps to show beneficiaries that they get something out of their insurance. Yet, these are usually only small benefits for the insured but they imply huge costs for the insurance. However, it would be better for the insured and the insurance, if these expenses would have to be borne by the insured - also to reduce overuse - and instead to include treatment and medication for chronic illnesses in the insurance package. Making this kind of move, requires making prospective members of the insurance aware of the risk of chronic illnesses and the associated financial burden and that an insurance will typically pay back in the medium-term even if in a given year the benefits might be well below the insurance premium.

Many of the health insurance schemes implemented in developing countries are not yet taking note of the burden of severe and chronic illness. However, in light of the universal health insurance coverage objectives of the Sustainable Development Goals (SDGs) it should be considered an area for future expansion.

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