# **Counting the cost: assessing the full economic cost of ill-health in West Darfur, Sudan.**

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## Simon Levine and Agata Kusnierek

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## **Executive summary**

***Introduction***

During Valid Evaluation’s four year evaluation of multi-year humanitarian financing (MYHF), ill-health repeatedly emerged as an important factor maintaining people in poverty and vulnerability. Despite the importance of this issue, there is a lack of information on the economic cost of ill-health for households. Isolated studies have quantified direct costs of a visit to a clinic, but no studies are available for Sudan or DR Congo which aggregate the full economic impact of illness. This makes policy development in this area a real challenge. As a result, Valid Evaluations has undertaken two stand-alone studies on the subject: one in W Darfur – the subject of this paper; and, a separate study in North Kivu, DRC – to be published separately.

***Methodology and approach***

For this study, data was collected in the five villages where Valid Evaluations has conducted research for the overall MYHF evaluation. 331 households were randomly sampled, and quantitative data collected on household demographics, the prevalence of ill-health over the previous 12 months for all members of the household and health-care seeking behaviour in each case of ill-health. Interviews were conducted at the end of November and early December, 2017. Detailed costs were collected for all health care visits (western, traditional and spiritual/religious) for one episode of ill-health from the respondent and for one child in the household. Total costs for the households were extrapolated from the costs for one adult and one child. These costs included direct costs (for consultations, tests and drugs), the indirect costs of accessing health care (transport, food, accommodation, etc.), other miscellaneous costs (unofficial charges, gifts, special foods, etc) and the opportunity cost of labour lost to ill-health, whether as a patient or carer.

This paper differs from previous studies quantifying health costs in two ways. First, the cost of ill-health is defined more broadly than the usual definition of out of pocket expenditure (i.e. direct expenditure on health care). The costs of ill-health include these direct costs (for consultation, tests and drugs), but also the indirect costs of accessing health care (e.g. transport) and the income lost because of ill-health.

Secondly, the data are treated in non-standard ways. Health costs are highly skewed to large amounts, and so mean/average data do not present a picture of what most households would expect to pay for health. Alongside the standard statistical treatment based on means, this paper uses the data to construct more typical pictures, using hybrid calculations often including median values. Although based entirely on quantitative data, this paper aims to be easily accessible for those interested in livelihoods and health, even those without any familiarity with statistics.

***Findings***

The costs of health care varied greatly across the five villages, being three times higher in the worst village from the best. Cost were higher for three main reasons: direct costs per visit were higher; the cost of accessing treatment were higher; and disease incidence was higher, resulting in more health care being needed and a greater opportunity cost of lost labour. The third factor had the greatest economic impact.

Individuals typically fell sick between once and twice a year. In over 90% of cases, western health care was sought, either self-medication with purchased drugs or a visit to a clinic. A typical (median) household, with three adults and three children, made 5-6 trips outside the village a year from Dorti, Faiga and Nur al Huda villages and 9-10 trips a year from Haraza or Hasabona villages. Illness rates were 50% higher in the latter group of villages and availability of drugs for self-medication was lower, resulting in a higher percentage of cases of sickness requiring a trip to a clinic outside the village. Median households could expect to spend $40-50 p.a. directly on health care (‘out of pocket health expenditure’) in the first three villages, and $160-170 p.a. in the latter two.

In addition to these direct costs, there were also indirect costs (accessing health care, transport and food for patients and carers) of $60-90 p.a. in the first three villages and $180-210 in the latter two.

The third significant cost is due to lost income whilst unable to work, whether as a patient or as a carer. In those villages where disease prevalence was lower and access easier, the typical household lost around 5% of its total working capacity. However, where disease prevalence was higher and health care less accessible, around 14% of total working capacity was lost. Applying a monetary cost to those days lost due to illness requires reliable information on annual household income. As no publicly available document provides information on household income in Darfur over the past decade – a significant information gap – we used data from Valid Evaluation’s own longitudinal research. An estimate of $1,500 is fairly reliable as being within the range of a typical annual potential income, in the absence of ill-health, for a household of three adults.

The cost of lost income on households was similar in impact of direct expenditure and of indirect expenditure – around $75 in the village with the lowest burden and $210 in the village with the highest burden. The total economic cost of ill-health for a typical household, in the absence of any untypical (i.e. serious) ill-health, therefore totalled around $225 p.a. in the lowest cost village and over $600 in the highest cost village. This constituted the equivalent of a ‘sickness tax’ of between 15% and 40% of annual potential income.

The availability of health insurance has increased rapidly in the villages between 2013 and 2016. Around three-quarters of households were registered with health insurance schemes in the three villages with lower health costs, and around a third in the villages with higher health costs. The insurance system is currently financed by Ministry of Social Welfare and not by contributions from those registered, though it is anticipated that over time, there will be an incremental move to financing the insurance system from insurance premiums. Despite being free, the benefits of the scheme were limited. Insurance only brings cost reductions for direct (out-of-pocket) expenditure, and does not mitigate indirect costs or the costs of time off work. The data showed that the typical saving from health insurance for a registered household was around $20 p.a. in one of the higher cost villages, or just 3-4% of the total economic cost of ill-health.

Once premiums are levied, the benefits will be even more limited. Insurance is a mechanism for cost-sharing, but does not protect people from costs which are shared by almost everyone. To be sustainable, the average cost of insurance cannot be lower than the average cost of health care. This paper highlights the seriousness of median costs of being sick, which are well below the mean costs. Unless a high subsidy from Government remains, insurance premiums would therefore have to be considerably higher than the costs outlined in this paper.

Catastrophic health costs, which affected a small number of households only, were beyond the terms of reference of this study, and the number of cases in the overall sample is too small to make any analysis.

***Conclusions***

The economic burden of ill-health is extremely high in relation to annual income. Even where households have no particularly serious health problem, sickness costs them around $250-600 per year, depending on where they live – between 15% and 40% of their potential annual household income. Most households had to sell some assets (mainly crops and livestock) just to cover direct health expenditure.

Direct costs make up only around a third of the burden of ill-health. Policy and decision makers from both the health and livelihoods domains need to bear in mind the overall cost rather than focusing narrowly on out of pocket health expenditure. This has several implications. Free or subsidised health care only addresses one third of the economic burden. Making health care more accessible at village level would help address indirect health expenditure. Reducing sickness through preventative strategies would potentially reduce the cost of ill-heath by addressing all three components of the cost, including lost income.

The benefits of health insurance for most people from a cost perspective is very small, not more than around 5% of the economic cost of ill-health. Health insurance may have much greater benefits in sharing the costs of catastrophic charges, but these were not studied.

There are sizeable methodological challenges to painting an informative picture of the economic burden of health care. Because the distribution of costs is so skewed, average figures from quantitative research need to be treated with caution if presented as a picture of the reality affecting a majority of households. The approaches used in this paper offer an alternative which captures the impact of ill-health on the economic lives of ‘typical’ households.

The implications of these conclusions will be analysed further in Valid Evaluations’ final report for the multi-country thematic evaluation of MYHF.

# **Counting the cost: assessing the full economic cost of ill-health in West Darfur, Sudan.**

# Introduction

VALID Evaluations is undertaking a four-year thematic study for DFID of the potential benefits of managing humanitarian funding over multi-year time-frames. In particular, the study is examining how multi-year humanitarian financing can help address underlying causes of vulnerability and so help to build resilience in Sudan, Pakistan, Ethiopia and DR Congo. Within this overall piece of work are separate studies that focus more narrowly on particular themes thrown up by the main fieldwork. This paper, on the economic costs of ill-health, is one of those studies. A parallel study is being conducted in North Kivu, DR Congo, and will be published separately.

The role of ill-health in maintaining people in poverty has been seen in several countries. However, the economic cost of ill-health has rarely been studied. No publicly available documents were available which made any attempt to quantify the economic burden of sickness in Sudan, or in the other countries studied. Such information is essential to inform health policy as well as policy on tackling poverty and vulnerability, and promoting resilience. This paper is a contribution to filling that information gap.

The paper quantifies the total economic burden for households brought by ill-health. The Government of Sudan has progressively been rolling out a national health insurance programme (NHI) across the country since 1995. It is compulsory for workers in the formal sector to enrol, but the Government has been extending voluntary enrolment of those outside the formal sector. Registration covers all members of the household. Employees and employers in the formal sector pay an insurance levy, but NHI is currently financed by Ministry of Social Welfare for those outside formal employment in Darfur. It is anticipated that over time there will be an incremental move to financing the insurance system from insurance premiums. Those registered can receive free consultations in clinics covered by the scheme (‘insurance clinics’), where they can also receive subsidised laboratory investigations. The scheme also sells drugs for 25% of the retail price through specific outlets, covering a wide list of medical conditions,  investigations and drugs. This study also looks at the potential role of health insurance to mitigating the overall economic cost of ill-health, but did not examine the workings of the insurance scheme or its costs to the State.

The study also did not look at the quality of health care available. It is not an attempt to evaluate health care or health insurance in West Darfur. Its purpose is narrowly defined as quantifying the cost of ill-health.

# Methodology

The study is based on quantitative analysis of health care spending of randomly sampled households. Data on household health care spending was collected in face to face interviews using a tablet-implemented questionnaire in November-December 2017. Households were randomly sampled from the five villages in West Darfur where panel interviewing was being conducted by VALID International for the overall thematic evaluation. Although household selection was randomised within villages, the sample population does not constitute a random sample of the entire West Darfur population.

Respondents from 331 households were interviewed. Villages were chosen to represent a range of situations. Two villages less affected by conflict and regarded as having higher economic potential (Haraza and Hasabona, with 160 respondents) and three villages are from border areas, more greatly affected by conflict (Faiga B, Nur al Huda, a village with a greater urban influence and Dorti, a more purely rural village, with 171 respondents between them). The analysis that follows is largely carried out at village level, though some sample level analysis is conducted where there were no statistically significant differences between villages.

**The study villages**

**Nur Al Huda**

An old village near Habila, the Locality capital. Proximity to the urban centre provides them with good access to the market but has resulted in some loss of farm land. The village was affected by the conflict, but the population was not all displaced.

**Dorti**

A village created in 1950s, lying 20km from Habila, towards the border with Chad, about 20 km away. Significant fruit and vegetable production, with good access to the market in Habila.

The village was much affected by the conflict. The population was displaced to Habila, but has since returned gradually. There are hand pumps in the village, but people prefer water from hand-dug wells the valley. In 2017, there was a severe outbreak of cholera.

**Faiga B**

The three Faiga villages are the three most remote villages in Habila locality; they are the last settlements before the border with Chad. Faiga B is the middle in size.

The population was very badly hit by conflict. The agro-pastoralists lost all their livestock, and were displaced to Habila city. They were returning gradually, but in 2016 they faced conflict with a pastoral tribe nearby (originally from Chad) that resulted in new displacement, and they lost a farming season.

They have no valley nearby for dryland vegetable farming, and so they depend much on firewood and charcoal sales.

**Hasabona and Haraza**

The population in these villages, north east of Habila in Mornei locality, were affected by the conflict, but not displaced. After the first days of the conflict, they lost their sizeable cattle holdings and the village was partially burned, but they reached an agreement with the leaders of the pastoral tribes and suffered no further attacks.

The area around, including the two villages, is famous for tobacco farming. Dry season farming of vegetables (as a cash crop) in the valley is now expanding.

Respondents were asked in detail about all the episodes of ill-health suffered by all the members of their households since the previous harvest, a year previously. They were also asked about the health-care seeking behaviour in each case. It was not possible to use the survey instrument to collect detailed data on the costs for each trip for health care for two reasons. No one member of the household would necessarily have this information; and detailed questioning about all the costs related to every trip for health care in a household would have taken over two hours, far too long to expect answers to be reliable[[1]](#footnote-1). Instead, detailed costs were taken for the adult respondent and for one child in the household. 64% of respondents were women, and the data was disaggregated between men and women (and boys and girls). It was assumed that these would be broadly representative of the costs of health-care trips taken respectively by all men and women, and all boys and girls, in the household. The household costs of ill-health can therefore be established with reasonable accuracy by combining the detailed costs from one adult and one child member of the household with the data on the prevalence of ill-health and the number of trips for health care made for all adults and all children.

Respondents were left to define for themselves which household members were adults or children and they were given no definitions of ill-health. It was found that the differences between sexes or between children over/under 5 did not justify a separate analysis[[2]](#footnote-2), and so the analysis that follows does not include gender disaggregation or disaggregation between children under and over 5.

The study distinguishes between *expenditure* and *costs*. For the purposes of this paper, *expenditure* refers to money or in-kind payments made as a result of ill-health; *costs* refer to the economic burden of ill-health, and comprised expenditure plus opportunity costs incurred by being sick. The detailed expenditure included costs of transport for the patient and any companion, any overnight accommodation, food taken while away, etc. In order to establish the overall costs of ill-health, data was collected on the time lost to productive work by patients, anyone accompanying someone sick to a clinic and anyone caring for a sick patient at home.

There were (statistically significant) differences between respondents’ rates of sickness and that of other members of their households. The section *Prevalence of Ill-health* presents this data for respondents and for other members of the respondents’ households. It is possible that the discrepancy is because the people interviewed at home during the day were more likely to be sick than those absent from the house. This possible bias in the sample of respondents is removed in the sections which calculate the costs of ill-health by taking the data on the costs of health care for each sickness episode from respondents and combining it with the data on the prevalence of ill-health and on health seeking behaviour only from other adults in the house[[3]](#footnote-3).

Average values do not always represent a useful picture of the reality that most people can expect to face, especially where the distribution of values does not follow a normal curve, but is highly skewed to one side – in this case, to higher values. Rather than simply presenting the average data on costs, this paper therefore uses the data to reconstruct what it considers to be a typical situation for families. In all cases this has been done conservatively, in order that costs expressed should be the least that families would expect to pay. Various techniques have been used, and these are explained in the report in each case. In some cases, median costs are used instead of averages, in order to remove excessive influence from rare but very costly cases. [[4]](#footnote-4)

Ideally, the study would have collected data to establish the entire cost of ill-health for each household, and an overall median cost of ill-health could then be presented. This was impossible, because respondents could not be asked about the details of costs for all the sickness episodes which occurred in the household (see above). Hybrid calculations have therefore been used in this paper to reflect a similar picture to this overall median cost. These calculations are explained in each case. Such calculations are not standard practice in quantitative studies, but this paper has preferred to present a picture which instead is a more accurate portrayal of the normal costs faced by most households, who are fortunate enough to need more serious medical attention.

The lost income from sickness was calculated by establishing the total number of days that patients and carers were unable to work, to arrive a total number of lost days’ work per household for the year. The overall monetary value of the time lost is established from the percentage of the working year lost and the total annual income for the household. In the absence of any relevant secondary data on income for the Province, this was established independently from previous primary research by Valid Evaluations from 2015-17 in the same villages.

# Findings

## Demographics

Most households were of between three and eight people, with both a mean and median size of 6 - three adults and three children.

**Table 1: Household sizes in sampled population**

|  |  |
| --- | --- |
| Household size | % of households in sample |
| 1 - 2 people | 8% |
| 3 - 4 people | 24% |
| 5 - 6 people | 30% |
| 7 - 8 people | 22% |
| 9 - 10 people | 12% |
| more than 10 people | 4% |

The adult/child categorisation was according to the respondents’ own criteria: no definition of children or adults was offered. The median age of the sample was 16. Since respondents identified 48% of the population as children, this indicates that 16 is locally perceived as roughly the age of transition to adulthood. Since this age is not a cut-off point for data in most population pyramids (see for example table 2), it suggests that they do not quite correspond to way age groups would be constructed locally. The average age of the sample was 17.

**Table 2: Breakdown of sampled population by age, compared to national population of Sudan.**

|  |  |  |
| --- | --- | --- |
| Age | % of sampled population | % of national populationa |
| 0- 4 | 16% | 14.5% |
| 5 - 9 | 18% | 13% |
| 10-14 | 12% | 12% |
| 15 – 19 | 10% | 11% |
| 20 - 29 | 14% | 17% |
| 30 - 39 | 10% | 13% |
| 40 - 49 | 8% | 9% |
| 50 - 79 | 11% | 11% |
| 80 + | 1.1% | 0.5% |

a source: [www.populationpyramid.net/sudan/2017/](http://www.populationpyramid.net/sudan/2017/)

Table 2 shows that the population in the study area is somewhat younger than the national population: specifically, though there are as many older people, there are more under 10s but fewer in the 20-40 age range. Such an effect has often been found in conflict situations, including in Darfur[[5]](#footnote-5). The female: male ratio in the 20-40 age group was around 1.2:1, although age recall was not exact enough to give a precise figure[[6]](#footnote-6). This figure corresponds to what we would expect from the population in Darfur (Guha-Sapir and D’Aoust, op cit). Overall, the demographic details are in line with what we expected to find in Darfur, giving grounds for believing that the demographic of the sampled population is reasonably representative of the population in the sampled villages as a whole.

14% of adults were physically limited in the work they were able to do, and this was ascribed fairly equally to old age, disability and chronic sickness. Most of those unable to work, or only partially able to work, were living in households with other able-bodied adults, but 3% of sampled households had no fully able-bodied adult.

## Insurance prevalence

The five villages fell into two distinct groups for insurance coverage. In Haraza and Hasabona, insurance coverage was much lower (39% and 23% respectively) whereas in the other three villages it was between 69% (Nur al Huda) and 75% (Faiga). Table 3 gives the prevalence of health insurance in each village over time, and it can be seen that significant enrolment began much earlier in Faiga, and to a lesser extent in Nur al Huda.

**Table 3: % of households enrolled in health insurance, by village by year of enrolment.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Faiga** | **Haraza** | **Hasabona** | **Dorti** | **Nur alhuda** |
| **2011** | **4%** | **0%** | **1%** | **0%** | **3%** |
| **2012** | **13%** | **2%** | **1%** | **2%** | **7%** |
| **2013** | **21%** | **5%** | **3%** | **2%** | **7%** |
| **2014** | **45%** | **7%** | **3%** | **6%** | **25%** |
| **2015** | **60%** | **8%** | **9%** | **26%** | **37%** |
| **2016** | **70%** | **31%** | **19%** | **60%** | **63%** |
| **2017** | **75%** | **39%** | **23%** | **72%** | **69%** |

The demographics of households with insurance showed no significant differences from those without insurance with two exceptions: households without children were less likely to be insured than those with children; and households with no fully able-bodied adults were also less likely to be insured. There were no differences in insurance rates for other households with chronically sick, elderly or disabled members.

## Prevalence of ill-health

Three-quarters of the population had been ill in the previous 12 months. Sickness was more common among respondents (81%) than was reported for other adults (68%) or for children (75%), probably at least in part because of bias in the sample of those who were at home during the day. Just over half of those who had been sick during the year had suffered more than one episode of ill-health. Taking the population as a whole (i.e. including those who had never been sick), the average number of episodes of ill-health was 1.4 and the median 1. Rates of sickness were significantly higher in Haraza and Harabona (86% had been sick at least once) than the other villages (60%-66%), and the average number of episodes of ill-health was 1.7, compared to 1.0-1.2 for the other three villages.

The majority of sickness in every village except Faiga was caused by malaria (see table 4)[[7]](#footnote-7).

**Table 4: cause of ill-health, by village**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **cause of illness** | Faiga | Haraza | Hasabona | Dorti | Nur alhuda |
| Malaria | 38% | 64% | 80% | 67% | 65% |
| infections | 33% | 20% | 9% | 16% | 21% |
| stomach | 2% | 3% | 2% | 6% | 5% |
| gastric problems | 14% | 3% | 7% | 11% | 6% |
| injuries | 5% | 4% | 8% | 3% | 1% |
| hypertension | 0% | 1% | 0% | 0% | 1% |
| complications with maternity | 3% | 1% | 1% | 5% | 1% |
| other | 15% | 9% | 14% | 6% | 13% |

*Shaded cells indicate that differences between villages are statistically significant at p= 0.05 (lighter shading) or p=0.01 (darker shading).*

Over half the population had last been sick during the rainy season (June-October). Reported sickness was greater for women than for men. Women were slightly more likely to have been sick: among respondents84% of women and 76% of men had been ill at least once) and among other adults, 76% of women compared to 60% of men. Women were also more likely to have been sick more often, averaging 1.91 sickness episodes a year compared to men’s 1.51 for respondents and 1.38 compared to 1.05 for non-respondent adults. The relative prevalence of different sickness was the same, with the exception of complications from pregnancy.

## Health care seeking behaviour

There were no significant differences in health-care seeking behaviour between men and women, and figures are therefore aggregated across both sexes. Patterns were also strikingly similar across adults, children over 5 and children under 5. Some form of treatment was sought in 97% of all cases of ill-health – which presumably indicates that the (perceived) need for treatment plays a large role in people defining themselves as sick. It is impossible to analyse health-care seeking behaviour by sickness type for two reasons: first, because reported diagnoses may not be accurate and without detailed interviewing could not establish the pattern of symptoms to which patients and their families were responding; and secondly, because the sub-samples of sickness type in each village are too small for analysis.

In almost all cases (94%), this included western medicine, either buying drugs from a pharmacy (22%) or attending a health clinic (72%). In 7% of sickness cases traditional medicine was used, most often buying medicine without visiting a healer. Religious healing (from a Shehe) was sought in 4% of cases. Patients in Haraza and Harabona were more likely to attend a clinic (79% and 86% respectively) compared to the other three villages (45%-67%) and less likely to rely on self-medication from pharmacies. In Dorti and Faiga, the use of a pharmacy was much more common (37%), at least in part because of the better availability of drugs within the village. Many patients preferred to forego a consultation in order to avoid the travel into Habila.

Health seeking behaviour was largely the same whether or not the household was registered for health insurance, with no differences in the overall rates of those seeking western, traditional or religious healing. Insurance only covered western health care at clinics.

In around a quarter of cases, people had to make more than one journey for health care. Including all kinds of health care (western, traditional and spiritual/religious), people made an average of 1.4 trips per episode of ill-health. A small number of people (<2.5%) had to make 5 or more visits. Excluding these outliers, the average number of trips out of the village of health care was 1.2 per episode of sickness, for adults and for children. Table 5 shows how often a typical household would expect to travel outside the village for western health care each year. The calculation uses the conservative value of just one trip per episode of ill-health: mean values give a slightly higher number of trips.

**Table 5: calculation of typical frequency of visits outside village for health-care, by village.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Faiga | Haraza | Hasabona | Dorti | Nur al Huda |
| No of times sick, per person per year | 1.1 | 1.7 | 1.6 | 1.2 | 1 |
| Times sought health care, per episode of sickness | 1.3 | 1.3 | 1.2 | 1.2 | 1.4 |
| % health care outside the village | 80% | 97% | 90% | 81% | 87% |
| Trips outside village per episode | 1 | 1.3 | 1.1 | 1 | 1.2 |
| No of episodes for which trips made outside village (per household, per year.) | 5 | 10 | 9 | 6 | 5 |

This means that a household of three adults and three children would expect to make between 5 and 10 trips out of the village for western health care each year.

## Costs

### Direct costs of healthcare

Although payments or gifts were sometimes offered for traditional or spiritual healing, it was used so rarely, that the following discussion of expenditure and costs relates only to western medicine and treatment. (Typical household expenditure on non-Western medicine is summarised in table 14 below.) Direct costs of health care are understood as all fees (formal and informal) for consultations and tests, and any charges for buying drugs or related medical supplies (bandages, syringes, etc.). Unofficial charges were rare (in 2% of cases): respondents were able to define for themselves which charges they felt were ‘unofficial’.

As one would expect, the costs of health care varied enormously from case to case. In many cases, consultations were free, especially for those with insurance and in insurance clinics (see table H). However, even without insurance and in non-insurance clinics, a third of patients did not have to pay for consultations. On the other hand, in five episodes of sickness (out of 537 investigated), costs for consultation were over 1,500 SDG (c. $225). In insurance clinics, the cost of consultations did not go beyond 200 SDG ($30). If people had to pay anything, the median cost was between 20 SDG ($3) and 35 SDG ($5), depending on the insurance situation (see table 6). Drugs typically cost 40-100 SDG ($6-15)

**Table 6: Cost of consultations and drugs, per visit, in insurance and non-insurance facilities (in SDG).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | insurance clinics | | non-insurance clinics | |
| with insurance | without insurance | with insurance | without insurance |
| *n =* | *57* | *22* | *191* | *259* |
| did you pay for consultation | 25% | 41% | 54% | 68% |
| median cost of consultation\* | 20 | 25 | 35 | 23 |
| median cost of drugs\* | 40 | 100 | 70 | 100 |

\* This is the median where costs were paid, i.e. the median of non-zero values.

$1 = 6.6 SDG

Direct health care costs vary enormously from household to household, because of differences in the make-up of the household, the number of times people fall sick, the severity of their sickness and the cost of different treatments. To this variability must be added the differences between insurance and non-insurance clinics, and the fact that different villages had access to health care of different kinds: for example, Haraza and Harabona had less availability of drugs within the village, and patients had to go to Shalaya or Hajar Tama. Most patients in the other villages went to Habila, their locality capital which was relatively close. However, this variability is not distributed normally around the mean, but is highly skewed to the higher values. The average values (for sickness incidence, costs, household expenditure on health) would therefore be much higher than those values for an *average household,* i.e. the median value, which most people would expect to face. A more realistic picture of the costs that most people would expect to pay is a conservative way to calculate expenditure and costs. There are different ways to approach this calculation and Tables 7 and 8 present two approaches. Table 7 uses average (mean) values, but removes the highest 5% of values in each village. Table 8 is based on median values[[8]](#footnote-8). Neither value is intended to serve as a baseline or for further statistical analysis, but it is believed that they provide the most informative picture to give policy or decision makers the best possible understanding of how health care expenditure affects households in the study villages. False precision is swapped for a more meaningful range. All calculations are based on the median household composition of 3 adults and 3 children.

**Table 7: calculation of annual household direct expenditure on health care, using means excluding highest values**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Faiga | Haraza | Hasabona | Dorti | Nur al Huda |
| no of episodes per person per year | 1.1 | 1.7 | 1.6 | 1.2 | 1.0 |
| % treatment drugs only | 36% | 8% | 20% | 46% | 23% |
| cost of drugs | 105 | 118 | 157 | 38 | 50 |
| % treatment in clinic | 45% | 79% | 86% | 58% | 67% |
| average cost of consultation *(includes zero values)* | 31 | 28 | 28 | 10 | 30 |
| cost of drugs per episode | 92 | 152 | 167 | 41 | 68 |
| total annual direct expenditure on western health care, per household | 617 | 1562 | 1910 | 339 | 462 |
| total direct expenditure , USD | $ 94 | $ 237 | $ 289 | $ 51 | $ 70 |

**Table 8: calculation of annual household direct expenditure on health care, using median values**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| no of episodes per person per year | 1.1 | 1.7 | 1.6 | 1.2 | 1.0 |
| % treatment drugs only | 37% | 16% | 13% | 36% | 25% |
| cost of drugs | 55 | 60 | 70 | 30 | 40 |
| % treatment in clinic | 45% | 79% | 86% | 58% | 67% |
| % who paid for consultation | 53% | 55% | 69% | 44% | 53% |
| cost of consultation *(excludes zero values)* | 25 | 40 | 25 | 20 | 20 |
| cost of drugs per episode *(excludes zero values)* | 55 | 105 | 100 | 30 | 50 |
| total annual direct expenditure on western health care, per household | 340 | 1127 | 1052 | 240 | 304 |
| total direct expenditure , USD | $ 52 | $ 171 | $ 159 | $ 36 | $ 46 |
|  |  |  |  |  |  |

The two approaches to calculating annual direct health care costs show the same pattern across the villages, with the mean values (excluding outliers) giving results consistently 40-80% higher than using medians. A household of 6 would expect to pay $150-300 on direct expenditure for health care in Haraza and Hasabona, $50-$100 in Faiga and Nur al Huda, and $30-60 in Dorti.

## Total expenditure to access health care

### Accessing health care: Transport, food and accommodation

Most sick people who left the village for health care needed some form of transport. Even in the villages closest to the health facility, only 20% were able to walk there. The most common form of transport was by horse/donkey and cart. Only in Dorti did some people (9%) say they had use of an ambulance. In Haraza and Hasabona, 12% of people reported having to use air travel to reach their health care. In Dorti and Nur al Huda, transport was usually free, whereas the majority (52%-61%) had to pay in the other villages. In most cases,patients had to be accompanied(60% of adults and almost all children), so costs had to be paid for two people. If the 5% most expensive journeys are removed as atypical, the average journey cost (for patient and companion) for those who had to pay ranged from 75 SDGin Dorti to 157 SDGin Haraza. Where transport costs had to be paid, median journey costs in different villages ranged from 38 to 150 SP. In most cases (75%), there were additional food costs, either for the journey or at the destination, and these had to be paid for both the patient and companion. Food typically cost 40-50 SP, but almost double that if food had to be paid for on the journey as well.

Table 9 shows what households (of three adults and three children) might expect to have to pay to for transport and food in order to access health care, using the same kind of calculation with median values as in table Y. Transport costs ranged from 12 SDG ($1.80) from Dorti) to 58 SDG ($8.80) from Hasabona). The costs of food on the journey and food at the health facility was more consistent across the villages, ranging from 37 SDG ($5.60) from Nur al Huda to 48 SDG ($6.30) from Hasabona. The cost of a home-cooked meal, which would have been eaten had no journey for health-care been necessary, would be around 2 SDG ($0.30) per main meal, and is ignored in these calculations.

**Table 9: ‘typical’ costs of transport and food to access health care, by village**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| village | Cost per trip | | no trips outside village per year\* | *typical* cost per household per year | | *average* cost per household per year |
| SDG | USD |  | SDG | USD | *USD* |
| Faiga | 66 | 10 | 5.3 | 348 | 53 | *153* |
| Haraza | 95 | 15 | 9.9 | 944 | 143 | *264* |
| Hasabona | 106 | 16 | 8.6 | 915 | 139 | *201* |
| Dorti | 58 | 9 | 5.8 | 337 | 51 | *96* |
| Nur al Huda | 85 | 13 | 5.2 | 444 | 67 | *111* |

\* See table 5 above. Calculation assumes only one trip for health care per episode of ill-health. $1 = 6.6 SDG

In a quarter of cases, patients were not able to return the same day. Some had to stay away for a long time, but the median stay away was 4 nights. This too had to be paid for in most cases (59%), with no statistically significant difference between those with or without insurance. Typical charges per stay were around 250-500 SDG (c.$40-75). People from Haraza and Hasabona faced the largest expenditure. They were no less likely to need to stay overnight or to stay longer, but much more likely to have to pay for accommodation (presumably because they do not have the same connections to people in town where they can be accommodated as guests) and because where they had to pay, charges were much higher.

Table 10 shows the total expenditure on health care, combining both the cost of treatment and the costs of accessing that treatment. Unofficial charges are ignored, as they were only reported by very few people, mainly in Haraza. Other charges (e.g. for laboratory tests, cost of telephone calls) are also ignored, because they were reported by a small minority of people.

**Table 10 Typical indirect and direct costs of accessing health-care, by village (in USD)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Faiga | Haraza | Hasabona | Dorti | Nur al Huda |
| direct health expenditure | 52 | 171 | 159 | 36 | 46 |
| food and transport | 53 | 143 | 139 | 51 | 67 |
| accommodation | 5 | 39 | 71 | 13 | 27 |
| **total** | **$ 110** | **$ 353** | **$ 369** | **$ 100** | **$ 141** |
| direct expenditure as % of total expenditure | 47% | 48% | 43% | 36% | 33% |

Table 10 shows that direct expenditure typically only constituted from a third to almost a half of households’ expenditure on health care over the year.

## Full economic burden of ill-health: additional expenditure and lost income

Expenditure on accessing health care is only one element of the economic cost to households of ill-health. Ill-health brings a further economic burden: time lost from working, either as a patient or when caring for someone else who is sick; and other expenditure, including on non-western health care. This section looks in detail at these costs.

### Lost income

Almost everyone needed to be accompanied if they had to seek health care outside the village. Most also needed some care while sick – especially in the case of child sickness. 6% of cases needed care lasting over two months and 1% of cases for over 6 months. Where a carer was needed, the median care burden was six days, and in most cases (88%) the carers normally worked, and so there was an opportunity cost. The median reported time off-work for the patients themselves was 11 days. In some cases, two numbers of the same household may fall sick at the same time, but they would presumably need only one carer. In order to remain conservative in all calculations, it is assumed that in half the cases of sickness, two people are sick at the same time. The overall care burden is therefore reduced by one third. Table 11 below shows the number of days’ work lost to sickness in Nur al Huda and Haraza, being respectively the villages with the lowest and highest rates of sickness. The overall mean from the survey data (again, assuming that two people are sick at the same time in half of all sickness episodes) for Nur al Huda and for Haraza is included for comparison, and as expected, it is considerably higher.

The calculation combines data for insured and non-insured households. There is no evidence of any reduced morbidity with insurance or of any change in health-seeking behaviour, and no credible patterns can be found for any differences between days lost for insured or non-insured households.

**Table 11: Calculation of typical lost days’ work p.a. due to ill-health in Nur al Huda and Haraza villages**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Nur al Huda | Haraza |  |
| a | % children needing accompaniment to clinic | 100% | 100% |  |
| b | % adults needing accompaniment to clinic | 61% | 80% |  |
| c | days lost while accompanying patient | 2 | 2 | *median, all values* |
| d | % patients needing carer | 62% | 81% |  |
| e | % carers who normally work | 87% | 89% |  |
| f | number of days lost by carers | 6 | 7 | *median, non-zero values* |
| g | @ 67% | 4.0 | 4.7 | *f x 2/3* |
| h | number of days off-work by patients (adults only) | 7 | 14 | *median, non-zero values* |
| i | days' work lost for 1 child's sickness | 4 | 5 | *c + (d x e x g)* |
| j | days' work lost for 1 adult's sickness | 10 | 19 | *h + (b x c) + (d x e x g)* |
| k | no. of episodes per year | 1.1 | 1.7 |  |
| l | typical days lost per household p.a. (3 adults + 3 children) | 47 | 125 | *= (3 x j x k) + (3 x i x k)* |
| m | average days lost per household p.a.  (3 adults + 3 children) | 121 | 211 | *as l), but using mean village data* |

Note: Because there are no significant differences between the overall mean for children and adults, but highly significant differences between villages, the data is disaggregated by village but not by age.

Table 12 puts this burden into a household economic context. It is assumed that when reporting days lost from sickness or from caring for a patient in the household, respondents did not consider how many of those were actually non-working days, i.e. Fridays and holidays will be included in the figure of ‘lost days’. To calculate the percentage of the total working year that has been lost, the same basis must be used, i.e. including Fridays and holidays among the working days. The calculation therefore uses 365 as the denominator. The total household loss is arrived at by multiplying this figure by three adults in a household, multiplied by the percentage of those adults who normally work taken from village level data.

**Table 12. Impact lost days of work on household economy**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **how calculated** | **number of days lost** | **% of adults normally working** | **% of household earning power lost** |
| typical days lost per household p.a., Nur al Huda | *hybrid calc, see table 11 row l* | 47 | 89% | 5% |
| average days lost per household p.a., Nur al huda | *sample mean, Nur al Huda only* | 121 | 12% |
| typical days lost per household p.a., Haraza | *hybrid calc, see table 11 row l* | 125 | 83% | 14% |
| average days lost p.a., Haraza | *sample mean, Haraza village only* | 211 | 23% |

Depending on the village and the method of calculation, households who do not have serious health problems still lose anywhere from 5% to 23% of their potential earning power as a result of the burden of ill-health.

### Full economic burden of ill-health to households

In order to establish a full economic cost of ill-health, it is necessary to combine data on the lost working days and monetary costs. This cannot be done without reliable information on household incomes. Unfortunately, there is no recent published study which offers any estimate of household incomes in any part of Darfur.

In the absence of such data, this paper relies on information from the panel interviews carried out by the Valid Evaluations team in the same villages. These interviews had not attempted to quantify annual household income but do contain enough reliable, if imprecise, information about income levels. Daily or monthly income can be seen in three bands. People with formal employment (eg police) or a reasonable local business (eg a butcher) were earning 800-1,000 SDG per month (then worth $120-150, at the prevailing rate of $1 = 6.6 SDG). This would only be a small minority of people. Income from charcoal making (hard work and therefore usually relatively well remunerated) or hard agricultural labour was around 20-30 SDG ($3-$4.50) per day. Lighter work, such as selling in a market (i.e. for a stall with little capital behind it) or women’s agricultural labour (often a shorter day) would bring in around 10-15 SDG/day ($1.50-$2.25) . If it is assumed that people depending on daily labour can find work at that same rate for around 18 days a month (over 4 days a week), and for 11 months in the year, then higher earners (25 SDG/day, $3.80/day) might earn $750 p.a. and lower earners (13 SDG/day, $2/day) around $400 p.a. Optimistically assuming that a household has three adults all bringing in some money, one at the higher rate and two at the lower rate, then the potential annual household income (in the absence of time lost from ill-health) would be around $1,550 p.a. This figure is used in the calculations below is offered as a reliable estimate of a value within the range of a typical household income in West Darfur.

**Table 13: Impact of ill-health on the household economy (using conservative values)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | USD | | % of potential income | |
| Nur al Huda | Haraza | Nur al Huda | Haraza |
| typical potential annual household income | $ 1,550 | $ 1,550 | 100% | 100% |
| direct health expenditure (western only) | $ 46 | $ 171 | 3% | 11% |
| indirect health expenditure (for western only) | $ 94 | $ 182 | 6% | 12% |
| % lost income from ill-health | $ 75 | $ 213 | 5% | 14% |
| expenditure on non-Western health care | $ 10 | $ 70 | 1% | 5% |
| total cost of ill-health | $ 225 | $ 636 | 15% | 41% |
| income, net of health expenditure | $ 1,325 | $ 914 | 85% | 59% |

Table 14 presents the overall cost of ill-health in the same way, but using mean values from the village sampled households. This adds a worrying dimension. The *average* overall burden of ill-health in Nur al Huda was 76% of potential annual household income, and in Haraza it was 175% of potential annual income – meaning that a typical household, whose income was described above, could simply not have accessed the health care implied by average costs.

**Table14: Impact of ill-health on household economy (using sample means)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | USD | | % of potential income | |
| Nur al Huda | Haraza | Nur al Huda | Haraza |
| typical potential annual household income | $ 1,550 | $ 1,550 | 100% | 100% |
| direct health expenditure (western only) | $ 365 | $ 908 | 24% | 59% |
| indirect health expenditure (for western only) | $ 372 | $ 1,056 | 24% | 68% |
| % lost income from ill-health | $ 431 | $ 682 | 28% | 44% |
| expenditure on non-Western health care | $ 10 | $ 70 | 1% | 5% |
| total cost of ill-health | $ 1,177 | $ 2,716 | 76% | 175% |
| income, net of health expenditure | $ 373 | -$ 1,166 | 24% | -75% |

## Paying for health costs

Most people had very little assistance in coping with the expenditure of ill-health or with the difficulty of lost labour. Just 7% reported receiving money as assistance, all by friends or relatives, but sums were limited. The median sum offered as assistance was 200 SDG ($30). A small number reported other assistance – 8% received some food, 1% help with caring for someone sick, 2% help in cultivating a field. But a large majority (80%) reported receiving no help – even though when asked a general question, just over half said it was ‘common for other people to help a household to pay health care costs’. The difference between the generalised and idealised reply and the specific and personal experience should not be surprising, and the evidence for the existence of this difference is a warning for those involved in assessments, research or evaluations. Group discussions in particular are often asked general questions (e.g. “do people help…?”) and yet the answers given cannot necessarily be relied on as evidence of actual practice. Although there are various mechanisms for social solidarity in the village, they do not function to help people with cost such as medical expenses.

Left largely to pay for health care costs from their own household’s means, in only a third of case were households able to pay for health care from normal income streams, i.e. from savings (24%) or from income (11%), which sometimes involved undertaking extra work in order to raise enough money. The rest either had to borrow money (9%) or to sell assets (56%).

Loans were entirely given by friends and relatives, but the amount which people could borrow was limited. The median sum varied across the villages but was always between 250 SDG ($38) and 500 SDG ($46).

69% of households who sold assets used crops to meet the expenses (i.e. in 39% of episodes of sickness). 26% of those who sold assets (or in 15% of sickness episodes) had to sell livestock, and 1% had to sell land.

## Impact of insurance

It is not possible to use standard statistical analysis alone to understand the impact of insurance on the economic burden to households of ill-health. Ill-health and costs are very dependent on which village people live in, and the number of sickness episodes for the sub-samples of insured or non-insured households in each village were small in some villages. More confusingly, some statistically significant differences do not have any obviously rational explanation and are probably examples of the truism that 5% of statistically significant differences at p=0.05 are nonetheless meaningless. There were several instances in the data from this study, including in comparison between insured and non-insured households. For example, food costs while travelling to access health care were 8 times higher for non-insured households than for insured households in one village. Such differences cannot plausibly be linked to a lack of insurance. A simple overall comparison of total costs incurred by insured and non-insured households would risk being influenced by data for which there is no plausible logic model.

It is plausible to imagine that households with insurance seek health care more effectively and, as a result, enjoy better health: however, there was no evidence for such an assumption.

It is also plausible to imagine that households with insurance would be more likely to use western health care, and possibly more likely to be cured more quickly, but the data showed no evidence for differences in health-care or in time lost from work. Insured and non-insured patients usually went to the same clinics, with the difference being how much patients were charged for consultation and for drugs. It is reasonable to conclude that the only discernible impact of health insurance on the household economy was the reduction in direct health costs (i.e. for medical consultations, tests and drugs). [[9]](#footnote-9)

Data reveal that there are no clear patterns regarding the costs of consultations for insured and non-insured households. Insured households were more likely to receive free consultations in insurance clinics (75%) than the non-insured – though the majority of the non-insured (59%) still received free consultations. However, the insured were also more likely to receive free consultations in non-insurance clinics (46% compared to 31%). Furthermore, when they had to pay, the insured paid slightly more for consultations at insurance clinics than non-insured people (an average of 40 SDG, $6, compared to 30 SDG, $4.50). This finding is surprising and hard to explain, but has also been found a previous study of NHI in Sudan[[10]](#footnote-10) (Witter 2011, who described the finding as ‘unexpected and worrying’) The overall expectation of payment (the probability of having to pay multiplied by the average amount paid) is almost the same for the insured and non-insured, whether they went to insurance and non-insurance clinics. The insured can expect to save just 3 SDG ($0.45) per visit in an insurance clinic and 9 SDG ($1.35) in a non-insurance clinic. There are clearer savings from insurance on the costs of drugs, even if these are also modest. Insured patients are supposed to get access to drugs for 25% of the retail cost. Our data showed insured households paid around one third of the amount that non-insured people paid in insurance pharmacies/clinics (using either the mean or median for comparison), though these varied across the villages.

**Table 15: Costs of western medicine, for one treatment, where charges were made**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | HHs with insurance | HHs without insurance | HHs with insurance | HHs without insurance |
| Mean | 50 | 181 | 160 | 271 |
| Median | 35 | 100 | 75 | 100 |

The average costs of drugs were the same for insured and non-insured in Hasabona, but there were savings for the insured in all other villages, ranging from 33% in Nur al Huda to 65% in Faiga. There were no significant differences in prices paid by insured and non-insured people for (western) drugs without a consultation, as these were usually bought within the village. Cost for self-prescribed drugs ranged from 38/30 SDG (mean/median) in Doti to 157/70 in Hasabona.

It is perhaps more relevant to look for insurance to protect households from catastrophic costs. Here too the evidence appears clear at first sight: the highest charge paid for drugs for one sickness episode in an insurance clinic by the insured was 200 SDG ($30), whereas costs reached over 3,000 SDG ($450) otherwise. However, the picture again becomes less clear on closer analysis. 19% of insured people were still paying more than 200 SDG ($30), because the majority of insured people went to non-insurance clinics. This is slightly less than the 23% of non-insured people who paid over 200 SDG ($30) for drugs, but the protection offered by insurance from high charges is clearly less than might have been expected.

Table 16 shows the possible benefits that a household might receive from insurance in Hasabona village, chosen because the population there visit clinics more often than from any other village in the sample, and so potential savings from insurance should be higher than in the other sampled villages[[11]](#footnote-11). The savings from insurance are based on the fact that households are currently not paying for insurance cover by NHI. Patterns in the data are not clear enough for any precise calculations to be meaningful, and instead median figures from the sample as a whole are used to make less precise, but more reliable, estimates. On this basis, savings from each visit could be 65 SDG ($9.85), of which 60 SDG ($9.09) is the saving in drugs and 5 SDG ($0.76) the saving on the consultation. (See table 15). Households from Hasabona typically make 8 trips to clinics a year – but across the sample as a whole, households with insurance only use insurance clinics for a quarter of their clinic visits. The overall saving is thus probably under $20/year.   
  
**Table 16 Possible savings from health insurance in Hasabona village**

|  |  |
| --- | --- |
| clinic visits per year | 8 |
| saving per visit to clinic | 65 |
| % health care at insurance clinics (by insured households) | 24% |
| total saving SDG | 125 |
| total saving (USD) | $ 19 |

Insurance is a system designed for sharing costs (or losses) amongst all those registered for insurance. If it is self-financing, then it does not reduce the overall cost burden to those registered, but will rather increase it as a result of the costs of running the insurance itself. Health insurance can provide protection for households against the catastrophic health costs of serious illness for which treatment is particularly expensive. This was not the subject of this study. The cost quantified by this study are those for which insurance cannot be a solution. A health insurance system which is financed by the users of heath care cannot help households with the normal costs of ill-heath. IN fact, since the figures used in this paper are conservative and based largely on median figures, they are considerably lower than average costs. The situation for the majority of people in this sample, where they have to make several visits for health care every year, would be higher with self-financed insurance, because the insurance premiums would have to be based upon average costs per household – plus, of course, the administrative cost of running the system. When everyone has similar costs, there is no benefit from the registered households *sharing* those costs among themselves. The economic burden described in this paper is precisely that burden faced by the majority of households for which sharing, through insurance, cannot help.

### Conclusions

1. The economic burden of ill-health is high. Even where households have no particularly serious health problem, sickness is costing them around $250-600 per year, depending on where they live: this is equivalent to between 15% and 40% of their potential annual household income.
2. Insufficient attention has been given to this overall economic burden, for which calculations are not available for Sudan or for many other countries.
3. The cost of ill-health is three times higher in some villages than in others. This surely offers potential insights for decision makers: the economic cost of ill-health can potentially be reduced in the villages with the highest burden by addressing the factors that differentiate them, e.g. high rates of malaria and higher costs of accessing health care.
4. The estimates of typical direct costs of health care were lower than the estimates for either the indirect costs of health care or the cost of lost labour. Although the figures are not precise enough to draw firm conclusions about the relative sizes of these costs, it is reasonable to conclude that for most people, direct health care costs constitute a minority of the total economic cost of ill-health. This has several implications. Any measures to offer free health care will reduce, but not remove, the economic burden of ill-health. Making health care more accessible at village level, and thus removing the indirect costs of accessing care and reducing the labour lost in seeking health care, would have a far greater economic benefit, if this can be done without reducing the quality of health care. Preventing or reducing ill-health would potentially have a much more significant impact, since it would reduce all three components of the total economic cost.
5. The current benefits of free health insurance for most people from a cost perspective is very small, not more than around 5% of the total cost of ill-health. Health insurance may have much greater benefits in sharing the costs of catastrophic charges, but these were not studied.
6. This paper has dealt in some detail on the methodological challenges of painting an informative picture of the economic burden of health care. The authors offer two conclusions in this regard:
7. The difficulties of quantifying this burden in a way that reflects the lives of the majority of people mean that great care is needed in the use of any figures. Even where credible and reliable, they are inevitably very imprecise. This has implications for hypothesis testing for policy development, and for monitoring/evaluation.
8. It is possible to create credible estimates of the economic burden of ill-health. These estimates are essential for decision makers in the fields both of health and of food security/livelihoods. There is currently far too little information of this type available.

The implications of these conclusions will be analysed further in Valid Evaluations’ final report for the multi-country thematic evaluation of MYHF.

**References**

Guha-Sapir D and O D’Aoust 2010, *Demographic and Health Consequences Of Civil Conflict*. World Development Report 2011 Background Paper (Washington DC; World Bank.)

Witter, S 2011. *Summary Report: Review of Free Care Policy (Pregnant Women and Under-fives) in Northern Sudan.* Khartoum; Federal Ministry of Health.

**Annex 1 Methodological note**

Ideally, information would be collected from every household member relating to every episode of ill-health. However, this was impossible for two reasons. Most importantly, the resulting interview would have been too long to be useful. Establishing all the costs of ill-health requires long and systematic questioning to establish all the health seeking behaviour associated with each bout of sickness; all the costs for each visit to every kind of health care; establishing the number of people travelling and eating in each case; and the number of lost days’ work for patients and for carers. This long list of questions needs to be repeated for every visit to every kind of health care for every sickness episode for every member of the household. Field tests of the questionnaire showed that asking in detail about all of the costs related to every sickness episode of every member of the household resulted in an interview that was so long that there was a very low likelihood that respondents would give correct information as they grew tired and bored. Secondly, even if they had been willing to answer all the questions accurately, respondents were also often unsure of the exact expenditure incurred by other household members.

Following field testing, the survey instrument was shortened to ask about the number of sickness episodes and the number of visits for health care in each episode for every member of the household. However, detailed costs were only established for one sickness episode for the respondent and for one child. Although no assumption is made that sickness rates are the same for respondents and for other household members (see below), an assumption is made that the costs associated with any visit to a health care facility are similar. Costs were originally disaggregated for men and for women, and for children by sex and separately for those below the age of five, and those above the age of five. The types of sickness were also established, in order to verify that cost comparisons were being made for similar sickness patterns.

There were statistically significant differences between respondents’ reports of their own ill-health and that of other members of their households. This is may in part have been caused by survey fatigue, with respondents tempted to under-report sickness episodes for subsequent household members in order to reduce the number of questions. It is also possible that people interviewed at home during the day were more likely to be sick than those absent from the house. This possible bias is removed from the analysis by using data on prevalence of ill-health and on health seeking behaviour only for other adults in the house. (Although removing the respondents from this calculation may over-correct the sample, this paper prefers at all times to estimate costs as conservatively as possible.) Data for the cost of each visit is taken from respondents’ own health-care.

Median values portray a more realistic picture of the expenditure that most households were faced with in cases where distributions are highly skewed from the normal. However, household median expenditure cannot be established because this would have necessitated asking about all the costs for all the episodes of ill-health health in the household, which was impossible, as explained in detail above. This study therefore has to reconstruct a value to serve as an annual household median in two stages.

It was not possible simply to use the median values for all the cost parameters to calculate an overall median. For some parameters, there was no cost in over half the episodes of ill-health, making the median value zero. However, this median value could not be multiplied by the number of episodes of ill-health, because it may be unlikely for a household to have a zero cost in *every* trip during the year. Instead, the study uses the median value for those values above zero, and multiplies this by the % of cases where costs were incurred. So, for example, if transport was free in 60% of cases but the median cost for those who paid was $1, the actual median cost for one visit was $0. However, over 6 trips, the median cost would not be 6 trips x $0/trip = $0. We use a value of $1 x 40% of cases with payment = $0.40 per trip, to arrive at a typical annual cost of 6 trips x $0.40 per trip = $2.40 per year.

1. See annex for further explanation of the methodology, including the way in which typical values were reconstructed. Collecting data which a researcher suspects would be unreliable may sometimes be done, but is nonetheless a dangerous mistake. It is better to know where there are evidence gaps than to falsely believe that one had filled them and draw conclusions from wrong data. Once respondents become tired and bored, there is no reason to have any confidence in answers that they give. [↑](#footnote-ref-1)
2. There were no statistically significant differences in rates of sickness between boys and girls, or the kind of health care sought for them. Complications with pregnancy accounted for 2% of all reported ill-health. [↑](#footnote-ref-2)
3. By removing data from the respondents in this way, the bias may be over-corrected. However, this is consistent with the approach of this paper to estimate costs as conservatively as possible. [↑](#footnote-ref-3)
4. The median is the middle value. Half of all cases are higher than the median and half are lower, but the value of the median is not influenced by how much higher or lower the other values are. [↑](#footnote-ref-4)
5. See for example Guha-Sapir and O D’Aoust 2010. [↑](#footnote-ref-5)
6. According to reported ages, no one in the sampled households was aged 31-34 or 41-44 ! [↑](#footnote-ref-6)
7. The breakdown of ill-health by cause cannot be used to analyse the different health-care seeking behaviour for different diseases or the differences in their costs to households, partly because we do not have a proper diagnosis and also because (apart from malaria) the sub-samples of each disease in each village are too small. [↑](#footnote-ref-7)
8. See annex for further explanation of the calculation [↑](#footnote-ref-8)
9. On average, transport costs were more than twice as high for non-insured households, but this was due to lower insurance coverage in villages from where transport cost were higher. [↑](#footnote-ref-9)
10. Witter 2011 did not include data from Darfur. The study covered Khartoum, Red Sea, Kassala, Blue Nile and S Kordofan. [↑](#footnote-ref-10)
11. 86% of all identified case of ill-health resulted in a visit to a health clinic in Hasabona. The average across the sample was 72%. [↑](#footnote-ref-11)