HPG Report

# Can't afford to be sick

## Assessing the cost of ill-health in North Kivu, Eastern Democratic Republic of Congo

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VALID EVALUATIONS

IDS Institute of Development Studies

ODI

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# Acronyms

| | |
|---|---|
| **DRC** | **Democratic Republic of Congo** |
| **IPL** | **International poverty line** |
| **MYHF** | **Multi-year humanitarian financing** |
| **OOP** | **Out-of-pocket** |
| **PPP** | **Purchasing power parity** |

# A note on terminology

### Western medicine/healthcare

Western medicine or Western healthcare refers to any consultation, tests or treatment provided by a practitioner offering healthcare that would be recognised by international medicinal practice. It includes the use of pharmaceutical drugs that would be recognised as medicines by the international medicinal practice, whether or not they were used in accordance with the advice of a professional. Nothing is implied about the quality of any care from 'Western' health institutions, and the use of pharmaceutical drugs would be considered as 'Western healthcare' whether or not they are correctly used or obtained from a licensed supplier, or whether they are genuine or fake. The findings of the survey only refer to healthcare in response to what participants defined as sickness. This excludes vaccinations and would usually exclude pregnancy, unless the respondent felt that pregnancy resulted in a condition that they considered to be sickness.

### Health centre

Although institutions offering Western healthcare exist at various levels with different formal designations, we use the term health centre to refer to all health posts, clinics or hospitals – i.e. any place offering Western healthcare.

### Treatment

Treatment includes all costs related to consultation, tests, medical equipment and drugs.

### Indigenous medicine/healthcare

Indigenous healthcare, sometimes called 'traditional' healthcare, uses diagnostic techniques and diagnoses not recognised by Western medicine, and is usually offered by practitioners who are not recognised as qualified in Western medicine. No implication is made about the quality or efficacy of indigenous treatment, which may involve treatments (such as the use of plants) that could be recognised as potentially helpful by Western medicine, or may work completely outside Western scientific paradigms (e.g. through the use of ceremonies, charms, etc.).

### Self-medication

Any treatment not prescribed or recommended by a health practitioner (Western or indigenous) is considered as self-medication. In this paper, it most commonly refers to the purchase of Western drugs from a pharmacy/shop without any prior consultation with a health professional.

### Out-of-pocket (OOP) expenditure

Household OOP expenditure is the direct outlay, including in-kind payments, made to health professionals or pharmaceutical suppliers for services, drugs or medical equipment. It excludes any costs paid to others that are necessary to obtain those goods or services. In this paper, it is used solely in reference to Western healthcare.

### Unofficial payments

Respondents could define for themselves which payments they felt were unofficial. They could cover any payment beyond those *officially* charged by the health centre (for consultation, tests, equipment or for drugs), whether it was offered freely or made in response to requests. No implication is made that the payment is corrupt or for private gain. Since indigenous healthcare does not have official fees in the Democratic Republic of Congo (DRC), the concept of an unofficial payment is not applicable.

# Executive summary

During Valid Evaluations' four-year study of multi-year humanitarian financing (MYHF), ill-health repeatedly emerged as a factor maintaining people in poverty and vulnerability. However, there is currently insufficient information about the economic cost of ill-health for households to inform policy, either for health or livelihoods. In the Democratic Republic of Congo (DRC), a national-level survey has established the level of direct expenditure on healthcare, often known as 'out-of-pocket' (OOP) health expenditure, but the scope of this information is restricted in two significant ways. The report only addresses direct costs, leaving out two potentially critical costs of ill-health: the indirect costs needed to access healthcare (transport, food, accommodation, etc. for patients and carers) and the cost of lost income due to ill-health, either as a patient or as a carer. Second, figures are only broken down to provincial-level averages. To develop informed policies, some understanding is needed of how and why costs differ across a province, and about the differences between the average figures and the likely costs faced by most households. As part of the overall evaluation programme into MYHF and resilience, Valid Evaluations has undertaken a stand-alone study to assess the full economic cost of ill-health in North Kivu, DRC. (A parallel study in Darfur, Sudan is covered in a separately published paper.)

The study collected data in two *territoires* where Valid Evaluations was conducting longitudinal research for the overall evaluation: Masisi (a more remote area) and Nyiragongo (where there is greater influence from the nearby town of Goma). From pre-selected villages, a total of 510 households were sampled randomly and interviews conducted in early August 2017. Quantitative data was collected on household demographics, the prevalence of ill-health over the previous half-year for all members of the household and healthcare-seeking behaviour for every case of ill-health. Costs were then collected in exhaustive detail for all healthcare (Western, indigenous and spiritual/religious) for one episode of ill-health from the respondent and for one child in the household.

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 OOP expenditure (i.e. direct expenditure on healthcare). The costs of ill-health include these direct costs (for consultation, tests and drugs), as well as the indirect costs of accessing healthcare (e.g. transport) and the potential income lost because of ill-health.

Second, the data are treated in non-standard ways. Average/mean health costs are highly skewed to large amounts, and so 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.

The overall expenditure on healthcare varied greatly across the two *territoires*. Expenditure was lower in Masisi, due to externally funded interventions providing some free or subsidised care, and because the greater access to care which patients had in Nyiragongo came at a cost.

Rates of sickness were very high across all villages. An average household (of 2.4 adults and 4.2 children) faced five episodes of adult sickness and five episodes of child sickness over a 12-month period. Most sickness required treatment, and in 86% of cases this involved Western medicine – either self-medication (i.e. purchasing drugs but without a medical consultation) or a visit to a health centre for a consultation. The median sized household, of two adults and four children, typically made seven to eight trips a year outside the village for Western healthcare.

Free treatment was available to 47% of patients in Masisi and 28% in Nyiragongo; even when not free, treatment was cheaper in Masisi because of donor-financed support. A household of six typically spent only around $20 in Masisi, but $100 in Nyiragongo for direct (OOP) expenditure on healthcare. The costs of accessing treatment were usually higher in Masisi than the costs of treatment itself. Transport and food alone, for a patient and carer, typically cost around $25 p.a. in Masisi, close to two weeks' total household income – the figure is relatively low,

because most people could not afford to pay and so walked or were carried. This cost falls almost entirely on the household itself, since very little assistance is received from family, neighbours or churches.

The third significant cost of ill-health is due to lost income while unable to work, whether as a patient or as a carer. Excluding cases where a prolonged period of convalescence was required, households in both *territoires* typically lost around 14% of their potential working days because an adult was either sick or caring for a patient.

No publicly available recent documentation analysing household income in North Kivu was available, and so the cost of lost working days is combined with cash expenditure by estimating annual household income from Valid Evaluations' own longitudinal interviewing in Masisi and Nyiragongo. Enough triangulated information is available on daily wages or profits from various activities to create a plausible estimate of $700–950 as within the range of typical annual potential income in Masisi and Nyiragongo, in the absence of ill-health, for a household with two economically active adults. The value of the labour lost to ill-health is therefore estimated at around $100 in Masisi and $130 in Nyiragongo. Adding other incidental expenditure, the typical total cost of ill-health was around $175 in Masisi (a quarter of potential household annual income) and $300 in Nyiragongo (a third of potential household annual income). Around 45%–65% of this cost was from income lost due to ill-health. Typically, direct (OOP) expenditure on healthcare was only 10% of the total cost of ill-heath in Masisi and a third in Nyiragongo. This means that conclusions based only on OOP expenses would massively underestimate the real cost of ill-health.

## Conclusions

1. The size of the economic burden of ill-health on households in North Kivu has not been recognised fully: no studies have attempted to assess the entire cost of ill-health. In Nyiragongo, the total cost to typical households was over $300 per annum. This is a conservative figure, removing the influence of high values, but it is still more than double the only previous average costing for North Kivu, which only computed OOP costs.
2. Typical households may be left with only around $550 in Masisi and $620 in Nyiragongo p.a. for all other expenses. Poor households or those suffering from high health costs will be much worse off than this. The international poverty line (IPL) for the average household is four times higher than this amount.
3. Free healthcare may save households around $50–100 p.a. There is pre-existing evidence that households are forced to ration their access to healthcare because of cost, which suggests that the total benefit (i.e. reduced expenditure plus more healthcare) might be greater.
4. The benefit of free healthcare is limited because OOP expenditure is a small part of the cost of ill-health. Reducing the prevalence of sickness would have a far greater economic impact on households because it would reduce all three of the main constituents of the costs of ill health: direct costs, indirect costs and lost income. The theoretical benefit of eradicating all sickness would be the equivalent of an increase in household income of around 50% in Nyiragongo (malaria and diarrhoea together made up 40% of all reported diagnoses).
5. This study did not investigate the quality of healthcare received. It is likely that some protracted conditions could be avoided if higher quality healthcare were available when people first seek treatment. There is a pressing economic necessity to investigate this possibility further.
6. Given the impact of ill-health on the household economy and the depth of poverty suffered by the majority in North Kivu, it is hard to imagine that economic resilience can be a realistic objective unless the health situation in North Kivu is radically altered.

The implications of this work, and of the parallel study in Sudan, will be explored further in the final report of Valid Evaluations' study of MYHF.

# 1 Introduction

Valid Evaluations is undertaking a four-year thematic study for DFID of the potential benefits of managing humanitarian funding over multi-year timeframes and, in particular, the possibility of addressing underlying causes of vulnerability and supporting resilience. The overall evaluation includes four separate studies focusing on issues identified by the main fieldwork. This paper, on the economic costs of ill-health, is one of those studies. A parallel study, conducted in West Darfur, Sudan, is published separately.

In DRC, from 2015–17 a Valid Evaluations team repeatedly interviewed a panel of 164 households about their lives, shocks they had faced and their resilience. Ill-health was a recurring theme in many of those interviews, and sickness was a strikingly large factor in keeping people in need. People reported the regular, if small, shocks of healthcare costs and the often larger costs of losing time in work. Very little evidence was available on the size of these shocks. Only one study quantifying healthcare spending in North Kivu could be found (MPSMRM et al., 2014), but it had two major limitations. First, as this was a national study, no breakdown of figures was available beyond the provincial level (North Kivu). Yet interviewing by Valid Evaluations established that some areas were benefiting from free healthcare provided from international assistance, and that expenses in remote areas were very different from those in peri-urban parts of the province. A more serious limitation was that the study only quantified the direct expenditure on healthcare, i.e. the charges made at health institutions for tests, consultations, drugs and any necessary medical equipment. The overall economic shock to the household, which included the costs of accessing the health facilities and from labour lost as a result of sickness, were unaccounted for. No study was found that had attempted to quantify the real economic burden of ill-health to households in Eastern DRC. This study was designed as a contribution to filling that evidence gap.

# 2 Methodology

The aim of this study was to quantify the overall cost of ill-health to households in the study area of Eastern DRC. The study was undertaken in two *territoires* in the province of North Kivu: Nyiragongo and Masisi, mainly in villages where Valid Evaluations had been conducting interviews over the preceding years (two additional villages in Nyiragongo were surveyed, chosen for logistical closeness to the existing study villages). Within those villages, a total of 510 interviews with respondents from randomly sampled households were conducted in the first half of August 2017: 261 in Masisi (a more remote *territoire*) and 249 in Nyiragongo (closer to an urban centre). The total population in the 510 households was 3,402.

There are two rainy seasons a year in North Kivu, and the seasonality of ill-health (from dry season to rainy season) broadly repeats itself every six months. In order to reduce errors from recall by asking about sickness over the previous 12 months, questions were asked about the previous half-year.[1] It is assumed that the prevalence of sickness and the costs of ill-health would be double over a full year. All household members were asked questions about the number of sickness episodes and all related healthcare-seeking behaviour. Detailed costs were then sought for one sickness episode for the adult respondent and for one child in their household. Annex 1, Note 2 explains this interviewing strategy further.

Respondents were left to define for themselves which household members were adults or children. No significant differences were found between sexes or between children over five and under five. The quantitative analysis in this paper does not therefore disaggregate by gender or between children under and over five. The study distinguishes between *expenditure* and costs. *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 these are comprised of expenditure plus opportunity costs (e.g. the value of lost days' work) incurred by being sick.

Demographic data collected included the number, sex and age of adults and children in the household, how many of the adults in the household were able to work and the reasons for any inability to work. Respondents defined ill-health in their own terms and were asked about all healthcare-seeking behaviour, to establish whether they had used drugs or indigenous medicines, whether they needed a consultation (with a practitioner of indigenous medicine or in a health centre/hospital) and where they had to travel to access this care. The detailed breakdown of expenditure related to ill-health included any costs for consultations, tests, equipment or medicines, transport expenditure for patients and anyone accompanying them, and any expenditure on food and accommodation. It also detailed time lost from work for patients and carers, including establishing whether the patient and carer normally worked. A final section of the questionnaire asked about the support people received towards any of the costs and burdens of ill-health, including both cash and in-kind contributions from all possible sources.[2]

Average values do not always represent a useful picture of the reality that most people can expect to face, so rather than presenting the average findings on costs, this paper uses the data to reconstruct what it considers to be the most typical situations for families. In all cases this has been done conservatively, and 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[3] costs are used instead of means to remove excessive influence from rare but very costly cases. It was not possible to establish an overall median cost of health expenditure for a household, because it was not possible to ask respondents about every sickness episode that occurred there (see Annex 1, Note 2). Instead, some hybrid calculations have been used in this paper where, for example, an average value for the number of visits to a health centre is

1 See Annex 1, Note 1.

2 The survey instrument was administered by tablet using ODK Collect. A link to the tablet version of the questionnaire is available on request from the authors.

3 The median is the middle value. By definition, half of all values are greater than the median and half are smaller.

multiplied by the median value for costs. For other calculations, the most expensive 5% of charges have been removed from a calculation of a mean cost, again to remove the influence of the highest charges. It is believed that by presenting costs for households in this way, a picture is given that most households would recognise as normal if they were not unfortunate enough to need more serious medical attention. Because costs in the two *territoires* were so different, all analysis of costs is presented separately for Nyiragongo and for Masisi, except where there were no statistically significant differences between the *territoires*.

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. This loss is converted into a percentage of the potential working days in a year. The overall monetary value of the time lost is then established by using information from previous panel interviewing in the two *territoires* to create an estimate for the total annual income for the household.[4] 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 Masisi and Nyiragongo.

4 The survey for this study did not include questions on income, only on which household members normally worked.

# 3 Findings

## 3.1 Demographics

Households were typically between five and eight people (average 6.7) with more than half having between three and six children,[5] and only 5% having no children. Although no up-to-date census data for DRC is available, these findings broadly reflect other surveys conducted in Eastern DRC. For example, the households in Valid Evaluations' sample are slightly larger than MPSMRM et al. (2014) found nationally for rural areas,[6] but correspond almost exactly with the findings from Ferf et al. (2016) in South Kivu. Half of the population is under 13, which accords with the findings of MPSMRM et al. (2014) nationally for rural populations, and there were equal numbers of males and females. There are reasonable grounds, then, for believing that in terms of basic demographics, the sampled population was representative of the villages sampled. The sample deviates from the national (rural) population in one respect: only 2.5% of Valid Evaluations' sample were aged over 60, whereas MPSMRM et al. (Ibid.) found that 4.4% of the rural population nationally were aged over 60. Given the history of conflict in the area, there are plausible reasons to explain this.

## 3.2 Chronic sickness and inability to work

One sixth of all adults were unable to work normally[7] because of old age (5%), disability (3%) or chronic ill-health (9%). More than one in five households had an adult who was unable to work, normally because of chronic ill-health. All households had at least one able-bodied adult, presumably representing a pattern of assistance whereby someone unable to work would more usually be taken into a household of family members to be looked after, rather than maintained in a separate household. Just three women (out of more than 600 adult women in the sampled households) were reported to have been unable to work during the recall period because of pregnancy or childbirth.

## 3.3 Prevalence of ill-health

As expected from the previous qualitative evidence from the interviews from the Valid Evaluations study team, rates of episodes of ill-health were high. Most respondents (68%) had been sick at least twice in the previous six months[8] and only 10% had not been sick at all. Excluding chronic sickness and episodes which had begun in 2016, respondents had an average of 3.4 sickness episodes a year and other adults in the household two episodes a year (see Annex 1, Note 2). There were no significant differences in sickness rates among males or females, nor adults or children, and the very small difference in the means disappears when incidents of ill-health related to pregnancy are subtracted. Because it appears that respondents were more likely to be sick than others in their households, perhaps because people well enough to be out of the house were less likely to be interviewed, sickness rates are established by calculating an average per adult based on non-respondents only. The average household (with 2.4 adults) suffered an average of five adult sickness episodes p.a. and a median household with two adults had four sickness episodes p.a. Self-diagnosis of the causes of sickness is unreliable, but almost a third of the reported problems included either malaria or fever, 14% involved stomach symptoms (including diarrhoea) and 6% chest pains and coughing. Six per cent of women had sickness related to pregnancy or childbirth during the recall period. Sickness among respondents was less seasonal than had been expected: 15% reported sickness in July, but rates in all other months (January–June) were between 12–13%.

Children were sick less often than adults (though since questions about children were asked later, this may

5 As defined by the respondent.

6 No breakdown by province is available.

7 This includes people who could not work at all and people who 'could only work a little'.

8 No definition of sickness was offered to respondents, and so prevalence figures relate to their own definition of themselves or other household members as being sick.

be due to respondent fatigue, see Annex 1, Note 2). Over half of children (55%) were reported not to have been sick since the beginning of the year, and most of the rest had been sick only once in the previous six months. On average, children were sick just 1.2 times a year. There was no statistically significant difference in reported sickness rates between children under five and children over five, or between boys and girls. An average household with 4.2 children faced five episodes of childhood sickness in a year. Just over a quarter of episodes were reported as due to stomach/intestinal problems, including cholera and diarrhoea, and a third were for malaria or with symptoms including fever. Thirty per cent of adults and 22% of children were still sick at the time of the survey.

## 3.4 Healthcare-seeking behaviour

Most cases (90%) of the sickness episodes reported needed some form of healthcare: a perceived need for healthcare possibly plays a role in people's definition of being sick. Most people preferred 'Western' medicine (88% in Masisi and 82% in Nyiragongo). More people used health centres in the more remote Masisi (72%) than in Nyiragongo, an urban hinterland (50%), because more people self-medicated with purchased Western drugs in Nyiragongo (32%) than in Masisi (16%), where they are less available. Patients were also more likely to seek indigenous healthcare in Nyiragongo (24%) than in Masisi (14%). Differences may be partly explained by the comparative price of treatment at health facilities in the two *territoires*, which was much lower in Masisi and more likely to be free (see below). Overall, the high use of medical facilities contrasts with reports that 80% (Bird, 2012) or 70% (USAID, 2018) of the population of the country do not have access to healthcare, though it is not clear from either of these sources how 'having access to healthcare' is defined. There is no implication in this study about the adequacy of any healthcare received.

A third of all treatments to health facilities needed more than one visit, and 2% needed five visits or more. Children were more likely to need only one healthcare visit. Table 1 shows the total number of visits made by the average household in the two *territoires*. To remove the excessive influence on the means of very high values, we have removed the highest 5% of values relating to repeat visits to healthcare for the same sickness episode. The table aggregates the data from both *territoires* in the first three rows (demography of the household, sickness prevalence and health-seeking behaviour), since the differences between them were so small.

Households made eight to nine trips a year to a health centre in Masisi and five trips a year in Nyiragongo. This compares with 5.3 visits to health centres found by Ferf et al. (2016) in South Kivu. It is sometimes easier to think in terms of a median household, here composed of two adults and four children, rather than an average household containing fractions of people. Such a household made seven to eight trips in Masisi and four to five trips in Nyiragongo.

**Table 1: Visits to health centres for children and adults**

| | Masisi | | Nyiragongo | |
|---|---|---|---|---|
| | Child | Adult | Child | Adult |
| Number of people in household* | 4.2 | 2.4 | 4.2 | 2.4 |
| Average sickness episodes p.a.* | 1.2 | 2.0 | 1.2 | 2.0 |
| % episodes requiring treatment* | 89% | 92% | 89% | 92% |
| % of treatment in health centre | 69% | 76% | 48% | 52% |
| Visits per episode (excluding highest 5%) | 1.23 | 1.38 | 1.03 | 1.16 |
| Trips to health centre per person p.a. | 0.9 | 2.0 | 0.5 | 1.1 |
| Trips to health centre per average household p.a. | | 8.6 | | 5.0 |

** Average across both* territoires.

## 3.5 Expenditure on health care

### 3.5.1 Direct expenditure on healthcare

Although consultation charges for indigenous medicine were not always cheaper, households spent far less on indigenous than on Western healthcare because they used it much less frequently. The following discussion of expenditure and costs relates only to Western medicine. Direct health expenditure is understood as all fees (official and unofficial) for consultations and tests, and any charges for buying drugs or related medical supplies (bandages, syringes, etc.). In many cases, there were no fees: 47% of patients in Masisi, and 28% of patients in Nyiragongo received free healthcare. Where patients had to pay, fees were many times higher in Nyiragongo than in Masisi (see Tables 2 and 3). Unofficial payments were rare in both *territoires* (4% of visits) and any payment was usually low (a median of less than $1). These costs are therefore disregarded in the rest of the analysis.

Table 2 presents calculations for annual spending on healthcare, including self-medication and visits to health centres. This uses mean values, including those where healthcare was free, but the highest 5% of values are excluded to obtain a more typical picture. Figures are for an average household.

In each *territoire*, the mean becomes several times higher when the highest 5% of values were included, an indication of how far high values can skew averages. Table 3 gives the average annual direct expenditure for Western healthcare per household, including cost of all drugs and all treatments.

The only previous attempt to quantify direct health expenditure in North Kivu gave a provincial average of $140. This study's findings on the population averages (including extreme values) are broadly in line with this finding, but also reveal two things: the huge differences that exist across the province; and how far average health expenditure is from what most people would expect to pay.

However, high as these figures are, they represent only a part of the full economic cost of ill-health. The calculation on expenditure so far ignores two critical elements. No account has been taken of the non-medical costs of accessing healthcare, or of income lost due to sickness. The next section looks at the evidence for this wider economic burden.

### 3.5.2 Indirect expenditure on healthcare: transport, food and accommodation

Just over a third of all episodes of ill-health required patients (adults and children alike) to seek care that was unavailable in their village. To obtain healthcare outside of the village, several costs often had to be borne: transport to the health facility; food for the return journey; and, where return the same day was not possible, overnight accommodation. Additionally, most patients (almost all children and 77% of adults) needed to be accompanied to find healthcare, so these costs were usually paid for two people.

Transport was less widely available – or was unaffordable – in Masisi, where the majority of people had to walk (80%) or were carried on someone's back (8%), with costs paid by only 12% of patients. In Nyiragongo patients often used motorbike taxis (54%), with most others walking (33%), presumably to avoid costs. However, because of the greater distances involved in finding healthcare in Masisi, when costs had to be paid for transport, they were higher. The average transport cost for one patient and any companion was CDF 9,300 ($6.60) for one trip, and the median cost was CDF 8,000 ($5.70) – significantly higher than the costs of treatment. Where transport was paid, costs (mean/median) in Nyiragongo were CDF 3,500/2,500 ($2.50/$1.80). Averaged out across all visits to health centres, including those where patients walked, the costs were $0.80 in Masisi and $1.25 in Nyiragongo.

Almost half (42%) of people in Masisi had to buy food on the journey to healthcare facilities, significantly more than in Nyiragongo (20%), because they were making longer journeys by foot. Many

**Table 2: Average direct expenditure on Western healthcare per household per annum, by *territoire* (excluding most expensive 5% of visits)**

| | Masisi | | Nyiragongo | |
|---|---|---|---|---|
| Number of times seeking healthcare p.a. | | 10.5 | | 8.2 |
| | **CDF** | **US$** | **CDF** | **US$** |
| Cost per visit | 2,223 | 1.60 | 16,885 | 12.10 |
| **Annual direct expenditure** | **23,340** | **17.00** | **138,460** | **99.00** |

** Average exchange rate during the period of recall was $1 = 1,400 CDF.*

### Table 3: Average (mean) direct expenditure on Western healthcare per household per annum, by *territoire* (including most expensive visits)

| Masisi | | Nyiragongo | |
|---|---|---|---|
| CDF | US$ | CDF | US$ |
| 111,000 | 79 | 506,000 | 361 |

also had to pay for food while staying at the facility. Almost half of all trips for healthcare (41%) involved an overnight stay. This could become expensive, as almost a quarter of those who could not return the same day stayed for over a week, during which food and accommodation had to be paid for, usually for two people. The cost of food eaten at home is relatively insignificant and so is discounted in calculating the additional cost of meals purchased while travelling.[9] (Out of the total sample of 510 households, there were 43 cases over the six months where households had to pay more than CDF 10,000 ($7) on food during an extended stay.)

Tables 4 and 5 present calculations for indirect costs to access healthcare in two ways. Table 4 uses the overall means, which also consider the many people who had no transport costs (e.g. walking to a clinic). Table 5 presents the reality for those who could not access healthcare without having to pay for transport, but it uses median values to present the reality for most people in this situation.

Table 6 combines direct and indirect expenditure to give a picture of total expenditure on healthcare in the two *territoires*. These figures remain well below actual sample means, which were $80 in Masisi and $361 in Nyiragongo, because the highest 5% of values were excluded (see above). In Masisi, where there was more subsidised or free healthcare, indirect expenditure was greater than direct expenditure. In Nyiragongo, indirect expenditure made up a smaller – though still significant – proportion of total health expenditure because charges by health centres were much higher and many indirect costs were avoided by relying on self-medication from drugs obtained in the village.

#### 3.5.3 Additional expenditure

In 30% of cases of ill-health, households had to incur additional expenditure, mainly related to buying special foods. This was more common in the cases of adult ill-health (40%) than in children (20%) and was

### Table 4: Average (mean) indirect expenditure on accessing healthcare, by *territoire*

| | Masisi | | Nyiragongo | |
|---|---|---|---|---|
| **Expenditure item** | **CDF** | **US$** | **CDF** | **US$** |
| Transport costs, per visit | 1,100 | 0.80 | 1,760 | 1.30 |
| Food costs, per visit | 3,000 | 2.10 | 4,660 | 3.30 |
| Total transport, annual per household | 9,800 | 7.00 | 8,800 | 6.30 |
| Total food, annual per household | 25,500 | 18.25 | 23,300 | 16.65 |
| **(Mean) annual indirect access costs** | **1.23** | **1.38** | **1.03** | **1.16** |

*Note: Totals may not add up due to rounding.*

### Table 5: Median indirect expenditure on accessing healthcare, where free transport not available

| | Masisi | | Nyiragongo | |
|---|---|---|---|---|
| **Expenditure item** | **CDF** | **US$** | **CDF** | **US$** |
| Transport costs, per visit | 8,000 | 5.70 | 2,500 | 1.80 |
| Food costs, per visit | 2,970 | 2.10 | 4,660 | 3.30 |
| **Annual indirect access costs per household** | **94,500** | **67.50** | **35,500** | **25.50** |

*Note: Totals may not add up due to rounding.*

9 The total cost of food for a whole day, at 2,100 kcal per day and based on actual food expenditure patterns, is around $0.40 per person. This estimate is based on income estimations in this paper and using figures from FEWSNet (2017) for the percentage of total expenditure spent on food in the area (Livelihood Zone 09) and the percentage of annual household calories purchased with that amount.

**Table 6: Breakdown of annual expenditure on healthcare per household, by *territoire***

| | Masisi | | Nyiragongo | |
|---|---|---|---|---|
| **Expenditure item** | **CDF** | **US$** | **CDF** | **US$** |
| Annual direct expenditure (mean, excluding highest 5% of values) | 23,342 | 17 | 138,457 | 99 |
| Annual indirect expenditure | 35,401 | 25 | 31,986 | 23 |
| Total annual expenditure on healthcare, per household | 58,743 | 42 | 170,443 | 122 |
| Direct expenditure as % of total expenditure | | 40% | | 81% |

consistent across the two *territoires*. The typical cost for each episode of ill-health was CDF 3,000 in Masisi and CDF 5,000 in Nyiragongo, and the average across the whole sample was CDF 2,100 in Masisi and CDF 4,000 in Nyiragongo. Over the year, these costs become significant, averaging CDF 35,000 ($25) in Masisi and CDF 66,000 ($47) in Nyiragongo – or an additional 60% and 39% on top of total healthcare expenditure in Masisi and Nyiragongo respectively.

## 3.6 Lost income[10]

The largest economic loss to households when someone was ill was the time that they and their carers lost from earning money.

Each time that adults were sick, they typically had one to two weeks off work, and 11% were unable to work for more than a month for one episode of ill-health. During the half-year recall period, survey respondents reported losing a median of four weeks' work, and an average of seven weeks' work, due to their own ill-health (slightly higher for women than for men). For half of the time that they were unable to work because of ill-health, adults reported having to be cared for, further increasing the cost of lost income.[11] Over 90% of these carers were adults who normally worked.

There were some extreme cases of long convalescence periods, which also required extended periods of care. To understand a more typical situation, these cases are removed from analysis by using median values. The typical lost labour from a single episode of ill-health was one to two weeks for the patient and one week for a carer, totalling two to three weeks of lost labour. The reported burden of care for children of all ages was similar to that of adults.

Table 7 breaks down a conservative calculation of the impact of lost labour from ill-health on household food security during the year. Median costs are used in place of means for those parameters where values are most skewed to very high values, as indicated in the table for each value. The calculation is for an average household of 2.44 adults and 4.23 children. Of the adults, 84% were able-bodied and a further 8% could work 'a little', so it can be considered that 88% of adults can work and 12% are unable to work. (The calculation of the percentage of the working year lost is explained in Annex 1, Note 6.)

Table 7 shows that the typical household loses over 14% of its earning power annually to ill-health, as a result of the dual burden of missing work from sickness and having to care for sick people.

## 3.7 Assistance with health costs

Of those interviewed, 44% reported that there are organisations in their villages that assist people when they have emergencies, and two-thirds of all respondents said that they were members of such organisations. However, in reality the majority of people (86%) received no help at all from such organisations. Of those who received help, under half received cash: food was the most common help, but still received in only 7% of cases. Nearly all help was from relatives (45%) or friends (38%), a picture that was consistent across the two *territoires*.

Levels of assistance were extremely limited. Of those who received cash (i.e. for just 6% of all cases of sickness), the median amount received was CDF 2,000 ($1.50) in Masisi and CDF 10,000 ($7) in Nyiragongo. Average annual support from these contributions for all the sickness episodes in

10 There was no significant difference in the time off work for ill-health in Masisi and Nyiragongo and this section therefore analyses the aggregated data.

11 Although carers may in some cases be relatives from a different household, this can be ignored in quantifying the total lost income per household, since as much care is given as is received.

**Table 7: Impact on household income of lost days of work as a consequence of ill-health**

| | | How calculated | Child | Working adult | Non-working adult |
|---|---|---|---|---|---|
| | Number of people in average household | average | 4.23 | 2.15 | 0.29 |
| a | # episodes of ill health in 12-month period | average | 1.2 | 2 | 2 |
| b | # visits for healthcare per episode | average | 1.4 | 1.5 | 1.5 |
| c | % accompanied to healthcare | average | 97% | 80% | 80% |
| d | # days off work (accompanier) | median | 3 | 3 | 3 |
| e | % needing carer when sick | average | 60% | 59% | 59% |
| f | # days of work (carer) | median | 6 | 7 | 7 |
| g | % carers who normally work | average | 92% | 92% | 92% |
| h | # days work lost per episode, carers | (g x b x c x d) + (g x e x f) | 7.1 | 7.1 | 7.1 |
| i | # days off work (adult patient) | median | – | 8.5 | – |
| j | # days work lost per episode, total | h + i | 7.1 | 15.6 | 7.1 |
| k | # days work lost per 12 months | j x a | 8.5 | 31.2 | 14.2 |
| l | # days lost work per household p.a. | | 36 | 67 | 4 |
| | **Total lost working days per household p.a.** | | | | **107** |
| | **% working year lost to ill-health** | | | | **14.3%** |

a household was just $0.82 in Masisi and $4 in Nyiragongo. These contributions are included in Table 8.

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

It is difficult to combine expenditure with lost days' work into a single overall cost of ill-health because reliable information about income in the study area is needed. The last accessible comprehensive assessment of household income in either North or South Kivu was conducted in 2003. An estimate of annual household income is therefore based on information from Valid Evaluations' own interviewing in North Kivu and specifically in Masisi and Nyiragongo *territoires*, from 2015–17. Although interviewing was not designed to quantify total annual household income, enough triangulated information is available to create reliable estimates for the two *territoires*. $1–1.50/day was a typical rate for unskilled daily labour in Masisi and $1.50–2.25/day in Nyiragongo, with women (especially those breastfeeding) tending towards the lower figure and men tending towards the higher figure.[12] Paid work was not available every day and could not be found all year round, but if an adult did not fall sick, and if (optimistically) they found paid work five days a week for around 48 weeks in the year, they would earn around $350–400 in Masisi and $400–550 in Nyiragongo. When people spent time farming their own fields, they forwent a daily cash income in return for a future harvest. Returns per day are a little higher for farming than for selling labour, but are less reliable (because yields are uncertain). It is reasonable to consider them as broadly within the same range, so that those with larger fields would earn at the upper end of the ranges, combining cash income with the cash value of food produced. On average, households had just over two able-bodied adults,[13] so a potential annual household income can be estimated at around $700–750 in Masisi and $900–950 in Nyiragongo, taking one person (usually the man) working at the higher end of the range and another (usually the woman) working at the lower end of the range. The potential income assumes that there is no ill-health in the household during the year. (The impact of ill-health on income is calculated below.) Assumptions

12 Many earn less than this. Most households also engage in some agricultural production, for which returns to labour are similar. The figure quoted converts agricultural production into its cash value.

13 An average of 2.4 adults of whom 84% were able to work normally.

regarding the availability of paid work are generous, consistent with the study's intention to be conservative in its estimation of poverty and the cost of ill-health. Using these estimates of potential annual household income of $725 in Masisi and $925 in Nyiragongo, the lost income from sickness on 14% of working days was worth around $105 in Masisi and $135 in Nyiragongo. This leaves the actual typical annual income at around $600–645 in Masisi and $770–815 in Nyiragongo.

Direct spending on healthcare is consuming an average of only 4% of household income in Masisi, but 12% in Nyiragongo. This range of estimates is not exceptional, given other studies in DRC. Wang et al. (2016) report studies showing that OOP health expenditure consumed from 5% to 32% of household income. However, this is only a small part of the economic cost of ill-health as Tables 8 and 9 demonstrate. Even excluding the economic cost of chronic ill-health, direct health expenditure was 10% of the full economic cost of ill-health in Masisi and 33% in Nyiragongo.

Table 8 shows the full breakdown of that net cost, deducting any material support received from outside the household (family, neighbours, church, etc.). The total cost of ill-health was $170 per household in Masisi and $297 in Nyiragongo. Of this cost, lost labour is the largest component.

Table 9 shows the cost of ill-health in relation to actual household income.

The cost of lost labour robs households of 14% of their potential income, but then health expenditure consumes 11% and 21% of what remains in Masisi and Nyiragongo respectively. After paying for health expenditure, an average household with 2.4 adults is typically left with around $525–575 p.a. in Masisi and $600–650 p.a. in Nyiragongo for all their needs. Table 10 shows how this income compares with the

## Table 8: Typical annual full economic cost to households of ill-health (for average household of 2.4 adults)

| | Masisi | | | Nyiragongo | | |
|---|---|---|---|---|---|---|
| | CDF | US$ | % of total cost* | CDF | US$ | % of total cost* |
| Potential annual income | 1,015,000 | 725 | – | 1,295,000 | 925 | – |
| Total direct expenditure on healthcare (excluding highest 5% of values) | 23,300 | 17 | 10 | 138,500 | 99 | 33 |
| Total indirect expenditure on healthcare | 35,400 | 25 | 15 | 32,000 | 23 | 8 |
| Other expenditure | 34,900 | 25 | 15 | 66,400 | 47 | 16 |
| Cost of lost labour (@14.3%) | 145,145 | 104 | 61 | 185,185 | 132 | 44 |
| Value of assistance* received towards cost | -1150 | - 1 | 0 | -5,760 | -4 | 0.01 |
| **Total economic cost to households of ill-health** | **237,595** | **170** | **100** | **416,325** | **297** | **100** |

** Calculated as the median value of assistance per episode where it was given ($1.50 in Masisi, $7 in Nyiragongo) x the likelihood of receiving any assistance (6%) x average number of sickness episodes per household p.a.*
*Note: Totals may not add up to 100% due to rounding.*

## Table 9: Residual annual household income after costs of ill-health, by *territoire*

| | Masisi | Nyiragongo |
|---|---|---|
| Potential annual income | $725 | $925 |
| Actual annual income | $621 | $793 |
| Residual annual income after expenditure from ill-health* | $554 | $624 |
| Expenditure from ill-health* as % of actual income | 11% | 21% |
| Residual income, net of health expenditure, as % of potential income | 76% | 67% |

** Includes direct and indirect costs plus any additional spending because of sickness, e.g. special foods (see Table 8).*

IPL. (See Annex 1, Note 5 for explanation of annual poverty line and exchange rates.)

## 3.9 Healthcare rationing?

This study did not attempt to quantify the costs caused by healthcare being economically rationed. There are several reports that costs prevent some households from accessing the healthcare that they need (e.g. Emmanuel, 2016, which does not quantify the problem, and Gerstl et al., 2013, which found that in Province Orientale, 13% of sick people were prevented from accessing healthcare because of cost). However, Maini et al. (2014) found that although there was a 19% increase in visits to health centres when free healthcare was introduced, this increase was not sustained and after a year there were no statistical differences resulting from the experiment. No conclusions can therefore be drawn about the impact on households of a lack of healthcare as a result of the costs detailed in this paper.

**Table 10: Typical household income as a percentage of international poverty line (IPL), with and without impacts of ill-health**

| | Masisi | Nyiragongo |
|---|---|---|
| Annual household income in USD needed to meet IPL, household of 6.67 @ $1.90/person/day | $4,626 | $4,626 |
| Annual household income in CDF to meet IPL (@ PPP conversion rate, $1 = 710 LCU) | CDF 3,284,208 | CDF 3,284,208 |
| Annual household income needed to meet IPL (3.3m CDF to $ @ $1 = CDF 1,400) | $2,346 | $2,346 |
| Potential annual income as % of IPL (@ $2,346) | 31% | 39% |
| Actual annual income as % IPL (@ $2,346) | 26% | 34% |
| Income after health expenditure as % of IPL (@ $2,346) | 24% | 27% |

# 4 Conclusions

1. It was clear from household interviews over the past three years that ill-health is an enormous burden on households in the study area. This exercise in quantifying those costs has exposed just how serious that burden is. There is no documentation available on DRC that discusses, or attempts to quantify, the full economic burden to households of ill-heath. This cost is much higher than has been previously calculated for North Kivu based solely on an examination of direct expenditure on healthcare.
2. Using the estimate of potential annual household income of $725 in Masisi and $925 in Nyiragongo, this study has shown that a typical household would expect to lose between a quarter and a third of that potential income because of sickness, either to pay for accessing healthcare and other related expenditure, or from an inability to work because of being sick or caring for a patient. These estimates are conservative, as they exclude cases with the highest costs for more serious illness. This is the figure that most households would anticipate losing on an annual basis if they are fortunate enough to avoid serious illness. Ill-health leaves typical households with around $550 in Masisi and $625 in Nyiragongo to cover all their needs for a year. The IPL is four times higher than this amount and so many households live well below this level.
3. Families clearly feel the benefit where free healthcare is available. However, most households would not benefit by more than $50–100 p.a., or around 8% of their potential annual household income in Nyiragongo. There is pre-existing evidence that households are forced to ration their access to healthcare because of cost, which suggests that free healthcare might enable households to access more healthcare, increasing the total benefit, though there are doubts whether such an increase in the use of healthcare would be sustained.
4. The economic benefit of free health is limited because direct costs of healthcare make up the minority of the economic burden of ill-health for households. Reducing the prevalence of sickness would have a far greater economic impact on households, because it would reduce all three of the main constituents of the costs of ill health: direct costs, indirect costs and lost income. Even excluding the highest values, the theoretical benefit of eradicating all sickness would be the equivalent of an increase in typical household income of around a third in Masisi and a half in Nyiragongo. (Malaria and diarrhoea together made up 40% of all reported diagnoses.)
5. This study did not investigate the quality of healthcare received, or the impact of free healthcare on the overall health of the population. Reports from interviewees over the previous three years raise a strong suspicion that many of the repeated visits to healthcare facilities are for the same complaint. Potentially, some protracted illnesses could be reduced if higher quality healthcare were available. There is a pressing economic necessity to investigate this possibility further.
6. Given the overall cost of sickness (25–33% of annual income), and the depth of poverty suffered by the majority, it is hard to imagine that economic resilience can be a realistic objective unless the health situation in North Kivu is radically altered.

The implications of this work and of the parallel study in Darfur, Sudan, will be explored further in Valid Evaluations' final report for the multi-country thematic evaluation of MYHF.

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# Annex 1 Methodological notes

**Table A: Number of interviewed households in each sampled village**

| *Territoire* | Village | n |
|---|---|---|
| Nyiragongo | Bugeregere | 11 |
| Nyiragongo | Kanyati | 15 |
| Nyiragongo | Mutaho | 12 |
| Nyiragongo | Muja | 14 |
| Nyiragongo | Kanyaruchinya | 118 |
| Nyiragongo | Kibati | 79 |
| Masisi | Bulwa | 157 |
| Masisi | Mafuo | 104 |

### Note 1

The intended sample size was 500 households, split equally between Masisi and Nyiragongo and spread equally across five villages in each *territoire*. This plan had to be abandoned because heavy rains and mudslides made some villages inaccessible and others only accessible by motorbike, limiting interviewing in Masisi to two villages, and concentrating interviewing in six villages in Nyiragongo (see details in Table A). The sample is not assumed to be representative of the province as a whole. Although the sample is not random at *territoire* level, it is treated as a representative *territoire* sample for the purposes of presenting a realistic picture of people's lives, which has been lacking until now.

### Note 2

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 healthcare; establishing the number of people travelling and eating in each case; and the number of lost days' work for patients and carers. This long list of questions needs to be repeated for every visit to every kind of health centre for every sickness episode for every member of the household. Field tests of the questionnaire showed that asking in detail about all costs related to every sickness episode of each member of the household resulted in an interview that was so long that there was a high likelihood that respondents would give incorrect information as they grew tired and bored. In addition to this, even if they were willing to answer all questions accurately, respondents were 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 healthcare visits for every member of the household but establishing detailed costs only for one sickness episode for the respondent and for one child. No assumption was made that sickness rates are the same for respondents and for other household members, but an assumption was made that the costs associated with any visit to a healthcare facility are similar, if disaggregated for men and for women, and for children below and above the age of five. Types of sickness were also established 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 be due to survey fatigue, with respondents tempted to under-report sickness episodes for subsequent household members 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.) From the non-respondent members of the household, an average (or median) figure for adults is found for sickness prevalence and healthcare visits. This figure is then used in calculations of household health expenditure by multiplying by the total number of adults in households, including respondents.

### Note 3

To further minimise the recall problems from fixing a starting date in the past, the survey covered costs since the start of the calendar year, a time that most people would easily remember. This gave a recall period of seven months. Respondents were asked about the months for each sickness episode, and all sickness reported in January was removed from the analysis, to leave a recall period of six months. This is believed to give fewer errors than directly asking respondents about sickness from February.

### Note 4

Median values portray a more realistic picture of the expenditure that most households faced in cases where distributions are highly skewed from the normal. However, it was impossible to collect data to establish household median expenditure for two reasons. First, this would have required investigating in detail all the costs for every visit for healthcare made by every member of the household for every sickness episode and would have required an interview of well over two hours, making the information collected highly unreliable. Second, although it is reasonable to expect reports from informants to be accurate regarding other household members' episodes of sickness, they would be unlikely to know detailed costs where they themselves had not been present. This study therefore has to reconstruct a value to serve as an annual household median in two stages. If a simple median value for one trip were multiplied by the number of trips, this would often mislead: where costs were only paid in less than half of all trips, the median value was zero, but it would be highly unlikely for a household to have a zero cost for every trip during the year. Instead, the study uses the median value where a cost was incurred and multiplies this by the percentage of cases where costs were incurred. For example, if healthcare visits were 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 11 trips, the median cost would not be 11 x $0 = $0. Instead, a value of $1 x 40% = $0.40 per trip is used to reconstruct a typical annual expenditure of (in this example) 11 x $0.40 = $4.40 for 11 trips.

### Note 5

The IPL is $1.90 per person per day, or $4,161 p.a. for a household of six. However, this is measured using purchasing power parity (PPP) with the local currency, rather than with normal exchange rates. The PPP exchange rate went from 690 to 730 local currency units to the US dollar during the period from February to August 2017 (www.quandl.com). The average actual exchange rate during the period was 1,400 CDF = $1. Using normal exchange rates, the IPL was therefore US$2,100 for a household of six, or $2,320 for a household of the average size of 6.67.

### Note 6

In calculating the percentage of a household's labour power that is lost to ill-health, we recognised that it was impossible to expect people to recall how many actual working days they lost due to ill-health. Their reports of losing 'five days' or '14 days' would relate to the length of time that was lost (from sickness or caring), and would include non-working days (Sundays, holidays, etc.) and days on which a person would not have found work even had they been available. If the study calculated a total number of working days lost and attempted to estimate the impact of ill-health on earnings by multiplying the number of days lost by a typical daily income, this would overestimate the loss of income. Instead, the study calculates typical income loss by calculating the percentage of the working year that was lost due to ill-health (including time caring for other patients).

We assume that periods of lost labour are randomly spread throughout the working week, so that the percentage of non-working days during these periods is the same as for the overall year (in other words, people are as likely, but no more likely, to be sick or caring for someone sick on a Sunday as on any other day). Because episodes of ill-health were spread fairly evenly throughout the months studied, we can also assume that the percentage of days when work was available for people is the same whether or not people were available for work. (Had sickness been very concentrated in one or two months, we would have had to consider whether these were months in which the demand for labour was higher or lower than average for the year.) Therefore, if someone was unavailable for work due to ill-health for 36 days during a year, this does not mean that they lost 36 days' income, but rather that because they were unavailable on 10% of the days in the year (36/365), we can say that they lost 10% of their annual income to ill-health. (This is why the denominator in the calculation in the report is 365, the total number of days in the year, and not a lower number, to take account of weekends, holidays, periods without work, etc.) A typical annual income was separately calculated from other research in the study areas, as explained in the report. The household-level calculation is based on the average number of able-bodied adults in a household from the sample.

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Cover photo: Augustin, a double amputee from Masisi territory, at a physical rehabilitation centre in Goma, North Kivu.
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