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**Sickness and death: economic consequences and  
coping strategies of the urban poor in Bangladesh**

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## **Abstract**

This paper investigates the economic consequences of sickness and death and the manner in which poor urban households in Bangladesh respond to such events. Based on longitudinal data we assess the effects of morbidity and mortality episodes on household income, medical spending, labour supply and consumption. We find that despite maintaining household labour supply, a serious illness exerts a negative effect on household income for the poor. However, the estimates do not reject consumption smoothing. The most prominent response to finance current needs is to borrow from money lenders, which leads to an increase in household debt-to-income ratios with possible detrimental effects on future consumption.

## **Keywords**

Sickness, death, income, labour supply, coping strategies, Bangladesh.

**JEL codes:** O15, I15

## **I. Introduction**

In recent years, the economic consequences of episodes of morbidity and mortality in developing countries have received increasing academic and policy attention (for instance, Gertler and Gruber 2002, Asfaw and von Braun 2004, McIntyre et al. 2006, Wagstaff 2007, Gertler et al. 2009, Genoni 2012, Sparrow et al. 2013). In the absence of health and life insurance, serious illnesses or the death of a family member are likely to push vulnerable households who rely heavily on their labour, deeper into penury. Households experiencing unexpected bouts of illness or the death of a family member are likely to incur income losses to the extent that they rely on wage income and at the same time be forced to spend a larger fraction of their household budget on health care. To cope with such events and maintain consumption, households may liquidate assets, resort to intra-household labour substitution, borrow or withdraw children from school with potentially deleterious consequences for future household welfare.<sup>1</sup>

In one of the earliest studies to investigate the economic effects of illnesses, Townsend (1994), based on ICRISAT panel data from rural India, concluded that after controlling for village-level consumption, an idiosyncratic shock such as illness measured by the percentage of the year that an adult male was sick, had no effect on household consumption. Using the same data base Kochar (1995) found that the illness of a male household member especially during the peak period of the agricultural cycle was associated with a decline in

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<sup>1</sup> On the basis of their review of studies from low and middle-income countries McIntyre et al. (2006, p. 860) provide a useful illustration of the economic consequences and potential coping mechanisms available to households when faced by health shocks. Earlier reviews of the literature on income risk and coping strategies in developing countries are provided by Alderman and Paxson (1994), Townsend (1995), Morduch (1999), and Dercon (2002).

wage income and increased informal borrowing. Taken together, these two studies suggest that while households may be able to retain consumption at least in the short run, this may come at the risk of future impoverishment. It also highlights the importance of jointly analysing the effects of illnesses on income, consumption and coping strategies.

In general, the evidence on household ability to insure consumption against ill-health is mixed. In a nuanced analysis that supports a distinction between minor and more severe illnesses, Gertler and Gruber (2002) use a large panel data set from rural Indonesia to show that while households are able to insure consumption against 70 percent of high-frequency minor illnesses, they are able to protect themselves against only 30 percent of low-frequency illnesses that limit the physical functioning of family members. Also based on data from Indonesia, Gertler et al. (2009) and Nguyen and Mangyo (2010) conclude that households are unable to protect their consumption against large health shocks and chronic illnesses. In contrast, Genoni (2012) finds no evidence of imperfect consumption smoothing in Indonesia while Sparrow et al. (2013) report that it is only informal sector workers and the poor who are unable to protect their consumption. Studies for other countries that show that households are only partly able to smooth consumption, especially in the event of large infrequent shocks and chronic illness, include Dercon and Krishnan (2000) and Asfaw and Braun (2004) for Ethiopia, and Wagstaff (2007) for Vietnam, whereas Mohanan (2013) finds little evidence of imperfect smoothing in India and De Weerd and Dercon (2006) find evidence of consumption smoothing through networks in Tanzania. Pertinent to the current context, based on panel data from rural Bangladesh, Skoufias and Quisumbing (2005) find no effect of male or female

illnesses on household consumption. While, in a more recent paper, also based on panel data from rural Bangladesh, Islam and Maitra (2012) report that consumption smoothing is imperfect in the case of a large shock.

While there are several reasons for the differences in the degree of consumption smoothing reported across papers, of primary concern in the relatively recent papers in this genre (Wagstaff 2007; Genoni 2012, Mohanan 2013, Sparrow et al. 2013) are the transmission channels through which ill-health and mortality affect consumption and identification of the strategies adopted by households to maintain consumption. Indeed, the effects of mortality and morbidity on current consumption and the ability of households to (partially) maintain consumption may be a misleading indicator of the economic impacts of such events, especially if consumption is maintained through incurring high-cost debt (e.g. Mohanan 2013), selling assets (e.g. Islam and Maitra 2012) or foregoing human capital investments in children. Echoing this view, Chetty and Looney (2006) argue that focusing on the effect of a shock on consumption is not very informative without determining why and how households smooth consumption.

This paper uses data from urban Bangladesh to add to the relatively thin literature which explores the transmission channels, coping responses and economic consequences of mortality and morbidity episodes.<sup>2</sup> The paper relies on longitudinal data and examines the effect of serious illnesses and the recent death of a household member on medical expenditure, income, labour supply

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<sup>2</sup> In the Bangladeshi context, a number of papers (Carrin et al. 1998, Kabir et al. 2000, Begum and Sen 2004) have examined the effects of illnesses on the livelihoods of rickshaw pullers and more generally the urban poor. These studies suggest that ill-health is the single most important factor influencing the (downward) economic mobility of households. While these papers yield useful insights they do not use longitudinal data or rely on econometric analysis making it difficult to isolate the effects of health shocks as compared to other factors.

and consumption. An assessment of the effect of health shocks on these various outcomes, as opposed to focusing only on the overall effect on consumption, is likely to provide insights on the channels through which health shocks affect households. We also study the strategies adopted by households to deal with shocks and subsequently investigate the effect of the most commonly used coping strategy on future consumption. An additional novelty is the focus on urban households as compared to the bulk of the literature which deals with such issues in a rural context.<sup>3</sup> As argued by Wagstaff (2007) in the case of Vietnam and by Begum and Sen (2004) and BBS-UNICEF (2010) in the Bangladeshi context, given their occupational choices and the concentration of various government and NGO human development programmes in rural areas, the urban poor have lower access to basic services and might be more vulnerable to health shocks as compared to their rural counterparts.

The paper is organised as follows: Section II outlines the setting and the data while section III lays out the empirical framework. Section IV discusses the results while section V summarizes and concludes the paper.

## **II. The setting, data and descriptive analysis**

### *II.1 The setting*

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<sup>3</sup> An exception is Wagstaff (2007) who analyses the effects of morbidity, mortality and changes in health status as measured by the body mass index (BMI) on income, medical expenditure and consumption in urban Vietnam. He finds that earned income is negatively affected by health shocks, especially the death of a working-age household member, with larger proportionate effects in urban areas. The effect of other health shocks on income is not as pronounced. While effects on labour supply are not directly analysed, Wagstaff argues that given their smaller size and less flexible working arrangements, urban households are more vulnerable to health shocks as they are unable to adjust labour supply as readily as their rural counterparts.



According to the latest available figures, Bangladesh is one of the most densely populated countries in the world (1111 individuals per square kilometre) with 27 percent of its 160 million population living in urban areas. Driven by the rapid inflow of rural migrants due to poverty and environmental reasons, urban population growth (3.5 percent per annum between 2005-2010) far outstrips the corresponding figure for rural areas (1 percent), contributing to the growth of slums. An estimated 60 percent of the urban population lives in slums.<sup>4</sup> At a national level, health facilities are limited with 0.6 hospital beds and 0.4 registered physicians per thousand persons in 2011 which is substantially lower than other developing countries.<sup>5</sup> Insurance coverage is almost non-existent and in 2011, out-of-pocket payments accounted for about 96.6 percent of private health expenditure.<sup>6</sup>

This study is set in the slums of Dinajpur, a city of about 270,000 residents located in the north-western region of Bangladesh, about 400 kilometres from Dhaka. The town consists of 80 communities of which 59 are classified as slum communities. The slum communities are integrated into the city and slum-dwellers are typically engaged in the informal sector and in occupations such as trading and hawking, domestic work, rickshaw pulling, brick breaking and construction. In terms of government health facilities, the town has a 500 bed public general hospital. In addition, there are a large number of pharmacies, private clinics and diagnostic centres as well as a range of religious and spiritual healers.

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<sup>4</sup> All figures in the preceding sentences are from <http://data.un.org> (accessed on June 11, 2011).

<sup>5</sup> For instance, corresponding figures for India in 2003 were 1 bed and 0.58 physicians per thousand persons. Source: <http://data.worldbank.org/indicator/> (accessed December 19, 2013).

<sup>6</sup> In 2011 public health expenditure amounted to 36.6 percent of total health expenditure while total health expenditure was 3.7 percent of GDP. Source: <http://data.worldbank.org/indicator/> (accessed December 19, 2013).

## *II.2 Data*

This study relies on data from the SHAHAR (Supporting Household Activities for Health, Assets, and Revenue) Dinajpur Survey which was conducted in slums and low-income settlements within the municipal areas of Dinajpur in 2002-2003 by CARE-Bangladesh and the International Food Policy Research Institute (IFPRI). Based on observed levels of poverty, social cohesion, community size, and environmental hazards, the 59 slum communities in Dinajpur were assigned a vulnerability score. Of these, fourteen slums with a high vulnerability score were selected for an intervention by CARE. Based on power calculations, a simple random sample of 614 households was drawn from the selected slums. The sample represents about 60 percent of the overall slum population of Dinajpur (for details, see Buttenheim 2008).<sup>7</sup>

Three survey rounds were conducted with the first round taking place in July-August 2002 followed by round 2 in March 2003 and round 3 in August-September 2003. In the first round, enumerators successfully contacted and interviewed 585 households or 95 percent of the desired sample of 614 households. In the second round, data were collected from 567 households (92% of original sample, 97% of the first round households) and in the final round 553 households (90% of the original sample, 95% of the first round households).<sup>8</sup>

These three survey rounds were combined to create a panel data set. The

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<sup>7</sup> The sample size for the survey was designed to support the detection of statistically significant changes in child stunting. Nutritional status was chosen as the key variable of interest as the objective of the program was to improve food and nutrition security (IFPRI 2009).

<sup>8</sup> A sample attrition rate of 5 percent is quite small suggesting that the data are unlikely to be afflicted by attrition bias. More formally, based on data from the first round, a probit regression with drop-out as the dependent variable indicates that except for household size there is no systematic difference in various observed characteristics between households who drop out from the sample and those who remain. Most notably there is no evidence that the incidence of morbidity or mortality is systematically linked to dropping out from the sample. See Table A1.

surveys gathered information on household composition, education, employment, savings and credit, household food and non-food consumption, assets, and most pertinently for this paper - on various shocks affecting households, their financial consequences and household responses to these shocks.

To complement the quantitative data, in July 2010, qualitative information was collected by the first author in six of Dinajpur's slum communities. The aim was to explore and understand household conceptualization of health shocks and the manner in which households deal with such events. Data gathering approaches included semi-structured interviews with 11 households (selected based on variation in terms of age, occupation, and gender) who had experienced a recent morbidity or mortality event, three focus group discussions of five to seven individuals and interviews with five key informants.<sup>9</sup>

### *II.3 Descriptive analysis – shocks and coping*

The survey solicited information on 26 different types of shocks that may affect households. Across the three survey rounds, about 32 percent of the total household-observations indicate the presence of a shock. While households face an array of shocks, by far the most common (49 percent) is a serious illness - an illness which prevents a household member from undertaking normal activities - in the last one year (Table 1). The death of a household member accounted for

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<sup>9</sup> The five informants were a traditional healer, an NGO official, hospital nurse, health worker and community leader.

about 8 percent of the shocks.<sup>10</sup> Specifically with regard to sickness and death, 168 households report a health shock in round 1, while in rounds 2 and 3, the number of households reporting such events appears to decline sharply to 58 and 82 households (see Table 2). However, this is misleading. Since rounds 2 and 3 were conducted six months after the preceding surveys, in practice the responses to the mortality and morbidity questions in rounds 2 and 3 cover the six month period preceding the previous survey rather than the longer recall periods used for the first round. Overall, over a three year period, 308 households or about 55 percent of sampled households had to deal with mortality or serious morbidity. While the incidence of mortality/morbidity seems high, given the nature of the sample – urban slum dwellers and their often physically demanding occupations – this is probably not surprising. In their work on rickshaw pullers in Dhaka, Begum and Sen (2004) report a morbidity rate of 11.4 percent on the day of the survey and 39 percent over a period of one month.<sup>11</sup> Similarly, Kabir et al. (2000) in their analysis of slum dwellers in Dhaka find that 40 percent of sampled individuals reported some kind of illness in the past 14 days.

The survey then follows on by inquiring about the most important manner in which households react to the costs associated with morbidity and mortality. At 39 percent, the most prominent response is “none” (see Table 3). Since the measure of morbidity is any illness that prevents an individual from engaging in normal activities and is not sensitive to the duration of the event, no-

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<sup>10</sup> In the survey context, a household is defined as a group of people who live together and take food from the “same pot”. A household member is defined as an individual who has lived in the household for at least 12 months and at least half of the week in each week during the 12 month period.

<sup>11</sup> According to Begum and Sen (2004) both these rates are higher than those for the rural poor.

response may reflect illnesses of short duration which did not have particularly onerous financial implications. In terms of a more active response, the most common approach is to resort to borrowing from a money lender (about 31 percent) followed by depleting assets or savings (8.4 percent), borrowing from NGOs (6.8 percent) and taking help from their social network (5.8 percent).<sup>12</sup> The semi-structured interviews confirmed this pattern, with the respondents pointing out that while borrowing from money lenders at annual average interest rates ranging from 30 to 200 percent is not a preferred option, it is the most widely used response. The use of this potentially harmful coping option highlights the limited access to formal sources of credit and restricted social network, at least with regard to finance, of slum dwellers.

Table 4 presents the means and standard deviations of some of the key variables. The sampled households are relatively poor compared to national patterns. In the first survey round 60 percent of the households reported total expenditure that, per capita, falls below the 2000 urban poverty line.<sup>13</sup> To place this in a national perspective, Sen (2003) estimates an urban (rural) poverty headcount of 26 (44) percent in 2000.<sup>14</sup> A typical sample household is headed by a 43 year old male (87 percent) and has 4 to 5 members. Educational attainment is low with only about 16 percent of the heads having completed at least primary

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<sup>12</sup> Although they do not provide any figures, Kabir et al. (2000) also mention that taking a loan is the most common response to cope with illness-induced costs amongst slum dwellers in Dhaka. They argue that savings are limited and do not provide adequate support in case of a serious illness and sale of productive assets, if available, is rare.

<sup>13</sup> Based on the 2000 urban poverty line of 724.6 Bangladeshi Taka per person/month, calculated by Sen (2003) following the cost of basic needs method. This is equivalent to US\$12.18 on August 1, 2002. If we take a poverty line of US\$1 per day, then about 92 percent of the households in round 1 would classify as poor.

<sup>14</sup> The World Development Indicators estimate the urban and rural poverty headcount in 2000 at 35 and 52 percent, respectively. Source: <http://databank.worldbank.org/data/home.aspx> (accessed on December 6, 2013).

school. On average a household supplies 80-100 hours of labour per week or about 21 hours per capita. Depending on the survey round, unearned income contributes to between 6 to 11 percent of per capita total monthly income. The main sources of this unearned income are transfers, social assistance, leasing property or selling assets. Health expenditure accounts for 5 to 6 percent of total household spending. The bulk of household income is spent on food which accounts for between 50-56 percent of total non-medical spending. In the first round, loans amount to 54 percent of per capita annual income while in rounds 2 and 3, the debt-burden appears to have increased with loans amounting to 72-80 percent of per capita annual income. The unsustainability of borrowing from money lenders and the consequences of such a strategy were clearly amplified during field work. For instance, one of the key informants, a male 40 year old male community leader, reported that at times households flee in order to escape harassment from money lenders. Additionally, in one of the eleven case studies, a 45 year old male respondent stated:

“...after repaying monthly interest instalment I cannot afford my family. I have sent my daughter to her grandparent’s house to reduce food and education expenses. It is giving us so much pain and worries like a slow poisoning. I do not see any hope escaping from this vicious trap in near future. Sometimes I wish we head down together to the railway.” [Interview conducted on July 23, 2010].

In a number of the 11 case studies, while households mentioned that they were able to borrow to meet their immediate needs, this was followed by withdrawal of children from school and their induction into the labour force. For instance a 32 year female respondent narrated that her mother-in-law had been suffering from severe illnesses for one and a half years, which had led to a huge debt burden due to treatment costs. After meeting consumption expenses and repaying the monthly loan instalment, the earnings from her husband’s rickshaw

pulling are insufficient to pay for the medical expenses and education expenses for her son. Consequently, her nine year old son began working as a shop assistant. Similarly, the son of a 45 year old female respondent narrated,

“I cannot go to school regularly after my mother’s illness, because I have to cook and take care of her. Currently, I am working in a nearby mosque to clean and carry orders of *Imam* (religious leader) of the mosque where my father used to work.” [Interview conducted on July 24, 2010].

### **III. Methods**

Our empirical analysis assesses (i) the channels of economic risk of morbidity and mortality for households, (ii) the ability to smooth consumption when faced with these risks, (iii) the role of coping strategies for smoothing consumption, and (iv) the dynamic effects of using borrowing as a coping response.

We therefore test whether morbidity and mortality have a causal effect on per capita household income (earned and unearned) and OOP (Out-of-pocket) health spending in the last month, per capita household food and non-food consumption net of medical spending, and the self-reported coping strategies for dealing with a health related shock. These coping strategies are grouped into depleting assets and savings, borrowing and other strategies. In addition, we consider adjusting labour supply (per capita hours worked by household members the in past seven days) as a coping response and the debt-to-income ratio (total outstanding debt at the time of the interview as a ratio of income in the last month) as measure of severity of indebtedness. Finally, to test for dynamic effects of incurring debt, we estimate the effect of a change in the one-period lagged debt-to-income ratio on per capita household consumption.

The consumption, income and OOP related outcome variables have a typically skewed and non-normal distribution censored at zero, which makes

linear models such as ordinary least squares unsuitable. We therefore use a fixed effects Poisson model (FEP) in order to deal with these distributions and also avoid retransformation problems of taking natural logs of the outcome variables (Manning and Mullahy 2001, Buntin and Zaslavsky 2004, Mihaylova et al. 2011, Sparrow et al. 2013).<sup>15</sup> An advantage of using a FEP model is that the outcome variable does not actually need to follow a Poisson distribution; the FEP estimator is consistent under the assumption that the conditional mean is correctly specified (Santos Silva and Tenreyro 2006, Wooldridge 2002). For the outcome variables per capita household income and expenditure we specify the conditional mean as:

$$E(y_{it}|h_{it}, x_{it}, \theta_{ct}, \alpha_i) = \exp(h'_{it}\beta + x_{it}'\gamma + \theta_{ct} + \alpha_i) \quad (1)$$

The vector of the main ill health variables of interest ( $h_{it}$ ) includes morbidity and mortality indicators for household  $i$  in survey wave  $t$ . Morbidity is defined as serious illness or injury of a household member, as it is reported in Table 1, while the mortality variable combines death of a main earners and that of any other household member. The  $\beta$  coefficients can be interpreted as a percentage change in  $y$  due to a unit change in the morbidity and mortality indicators. We further include time-community interacted fixed effects ( $\theta_{ct}$ ) to capture covariate trends in income and expenditure, and household fixed effects ( $\alpha_i$ ). The association between self-reported ill health and the outcome variables could be misleading as a causal effect if there are unobserved characteristics

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<sup>15</sup> We also estimate linear fixed effects models, which give qualitatively similar results. These results are reported in a supplemental appendix.



driving the relationship. For example, an individual's perception of one's health status will affect self-reporting of illness but might itself be affected by socio-economic factors. The households fixed effects control for such unobserved confounders since these are typically time invariant. In addition, a vector of household characteristics ( $x_{it}$ ) controls for important time variant characteristics, such as household size, the demographic profile and a set of non-health related yet potentially confounding self-reported shocks (loss of crops and livestock, loss of assets, bankruptcy and other shocks).

A number of the outcome variables are binary, in which case we use a linear probability model with household fixed effects. These variables include the self-reported coping strategies (depleting assets and savings, borrowing, other), as well as incidence of catastrophic OOP health care spending (indicating whether household spent more than 15percent of their budget on health care). The linear probability models include the same control variables and time-community interaction terms as the FEP models.

The questions for coping strategies depleting assets and savings, borrowing and other strategies are asked contingent on the respondent reporting a shock. For these variables we therefore restrict the sample to those households that reported any shock in the respective survey round, yielding an unbalanced panel.

Two empirical problems remain that are not explicitly addressed by the fixed effects strategy. First, the fixed effects estimates will be biased if the vulnerability to morbidity and mortality is directly affected by a change in consumption. However, such a relationship is typically a long run phenomena and unlikely to be observed over the relatively short intervals of the Dinajpur

survey waves. Moreover, this bias would cause the coefficients to overestimate the effects of morbidity and mortality and increase the probability that the null hypothesis of consumption smoothing will be rejected. As the next section will show, we do not observe this in the estimation results. A second potential problem is state dependence, which occurs when preferences are affected by changes in health status. In this case any observed correlation between morbidity and consumption could be due to shifting preference rather than the economic impacts of morbidity. Unfortunately we were not able to test for state dependence. However, other studies of ill health events that are able to test do not find evidence of state dependence (see, for example, Gertler and Gruber 2002, Gertler et al. 2009, Sparrow et al. 2013).<sup>16</sup>

#### **IV. Results**

The effects of morbidity and mortality of a household member on the channels of economic risk – medical spending and income loss – are shown in Table 5.

Serious illness increases per capita OOP health spending by 96 percent and OOP as a share of the household budget by 66 percent. This increase in average medical spending also includes some potentially impoverishing health spending events, as the incidence of catastrophic health spending increases by 13 percentage points. As expected, the death of a household member does not affect

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<sup>16</sup> We follow a test proposed by Gertler and Gruber (2002) and Gertler et al. (2009). Unfortunately the test was inconclusive as to whether state dependence is an issue for our analysis. The intuition behind this test is that if state dependence occurs, we expected it to affect the correlation between morbidity and consumption irrespective of whether a household is budget constrained in smoothing away morbidity events. This implies a test for state dependence, by comparing different subsamples with varying (expected) ability to self-insure. For our sample we looked at the poorest and wealthiest 50 percent of households in the sample. We rank households based on two separate measures: (i) per capita household (non-medical) expenditures in wave 1 of the survey, and (ii) the monetary value of asset holdings in wave 1. However, for both wealth measures we cannot reject the consumption smoothing for any of the subsamples, which renders the test ineffective.

OOP medical spending. We see a reverse pattern for income loss. On average, income is not affected by illness, while a recent death of a household member does reduce per capita earned income by about 30 percent.

Serious illness increases OOP health spending irrespective of the level of wealth, and these effects are similar in magnitude to the average effects for the full sample (Table 6). The effects on health spending and catastrophic spending incidence are slightly larger for the wealthiest half of the sample, but the differences between the groups are not statistically significant.

However, we do see considerable differences for the poorest and wealthiest halves of the sample with regard to income loss. For households among the poorest 50 percent, serious illness leads to a loss of monthly earned income of 11 percent. A death of a household member is associated with a negative coefficient for earned income, translating to an 11 percent reduction, although this estimate is not precise. In contrast, unearned income for this group increases by 133 percent as a result of the death of a household member, possibly due to sales of assets or receiving remittances and informal transfers through social networks. There is some evidence of this from the qualitative interviews, which also feature anecdotes of local communities and family members collecting donations from local markets, a nearby railway station and bus stops, and local mosques for funeral assistance. For instance, a neighbour of a 12 year old girl who lives with her two younger brothers and who had lost her mother a month before the interview stated,

“Her father is physically disabled. He begs on the street and sleeps on railway platform. Her mother was the only earning member in the house. At the time of her death, she left almost nothing - no money; no foods - except a small shanty. We collected some donation for her funerals and gave it to her (the girl) for their livelihoods.”[Interview conducted on July 23, 2010].

For the wealthiest half of the sample we see that a death in the household reduces earned income by 41 percent and total income by 40 percent, but we find no effects of serious illness on income. Many of the households in this subsample are involved in small trading, such as street peddlers with a fixed location and petty trade. These mostly informal trade practices operate with the help of household members, which may also provide income protection in case of serious illness of other household member. A small fraction of households also rely on income from formal sector employment, such as low-grade employees with government and semi-government organisations, which provide some income protection.

We find that households manage to smooth their food and non-food consumption when faced with serious illness and the associated increase in OOP medical spending (Table 5), irrespective of wealth level (Table 6). Consumption levels for the poor are not affected by the lost earned income when a productive household member dies, most likely due to the offsetting effects of (informal) transfers (Table 6). Interestingly, we see that the death of a household member actually increases per capita non-food consumption for the wealthiest half of the sample, presumably because household non-food consumption is not easily reduced in the short term, while the number of household members is reduced.

Borrowing and drawing on assets and savings are key coping strategies for the poorest in dealing with the economic risk of ill health (Table 7). Incidence of serious illness among poor households increases the probability of borrowing by 76 percentage point and the debt-to-income by 62 percent. The death of a family member increases both the probability of borrowing, by 54 percentage points, and depleting assets and savings, by 38 percentage points. However,

there is no discernible increase in the debt-to-income ratio. For the wealthiest half, we find no clear evidence of borrowing or depleting assets and savings as coping strategy. There is a negative effect of mortality on labour supply, which can be explained by the loss of an economically active household member.

While borrowing may seem a successful coping strategy for the poor to smooth consumption, there may be long term implications of incurring debt. We find indirect evidence suggesting that these long term effects of health related borrowing are indeed relevant. Table 8 shows estimates of the effects of a change in the debt-to-income ratio on future consumption. Per capita non-food and total consumption decrease by about 1 percent if total outstanding debt 6 months earlier increases by an amount equal to monthly per capita income. The coefficients for the subsamples are of similar size and signs, but not statistically significant.

## **V. Conclusion**

This paper investigates the economic consequences of morbidity and mortality for the poor in urban slums of Bangladesh, the manner in which these households respond to such events, and how their most common coping strategy – borrowing – affects future consumption.

Both medical spending and income loss are substantial sources of economic risk from illness. We find that a serious illness of a household member sharply increases OOP health spending and the incidence of catastrophic spending. Moreover, a serious illness exerts a negative effect on household income for the poorest half of the sample. A death among economically active household members also leads to income loss, by reducing labour supply.

Nevertheless, our results do not reject consumption smoothing; at least not in the short term. The most prominent response to finance current needs is to borrow from money lenders, which leads to an increase in household debt-to-income ratios with detrimental effects on future consumption.

Public health policy in Bangladesh over the last decade has focussed mainly on improving nutritional status, child malnutrition, maternity health and family-planning services, but has been notably absent on issues regarding health care need and affordability for the urban poor (e.g. Osman 2009, Rashid 2009). Our findings suggest that policies geared at providing financial protection from ill health for urban poor, such as subsidized health coverage or insurance (e.g. Hamid et al. 2011) and access to affordable credit (e.g. Islam and Maitra 2012) could contribute to reducing impoverishment and the risk of poverty traps for the urban poor due to morbidity and mortality.

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## Tables

Table 1 Household reporting to experience unexpected negative events

| Type of shock (recall period)                      | Survey round |           |            | Total      | %            |
|--|--------------|-----------|------------|------------|--------------|
|  | 1            | 2         | 3          |            |              |
| Death of main earner in household <sup>a</sup>     | 2            | 5         | 3          | 10         | 1.8          |
| Death of other household member <sup>a</sup>       | 19           | 8         | 4          | 31         | 5.7          |
| Serious injury or illness <sup>b</sup>             | 147          | 45        | 75         | 267        | 48.8         |
| Loss of a regular job <sup>b</sup>                 | 7            | 2         | 6          | 15         | 2.7          |
| Eviction from previous residence <sup>b</sup>      | 44           | 4         | 0          | 48         | 8.8          |
| Divorce or abandonment <sup>b</sup>                | 9            | 1         | 3          | 13         | 2.4          |
| Major loss of crops <sup>b</sup>                   | 2            | 1         | 0          | 3          | 0.5          |
| Loss of livestock <sup>b</sup>                     | 13           | 5         | 9          | 27         | 4.9          |
| Loss of productive assets <sup>b</sup>             | 3            | 4         | 5          | 12         | 2.2          |
| Loss of consumption assets <sup>b</sup>            | 17           | 1         | 2          | 20         | 3.7          |
| Dowry payment <sup>b</sup>                         | 5            | 3         | 6          | 14         | 2.6          |
| Failure or bankruptcy of business <sup>b</sup>     | 1            | 9         | 16         | 26         | 4.8          |
| Extortion by <i>mastans</i> /hoodlums <sup>c</sup> | 5            | 2         | 0          | 7          | 1.3          |
| Police confiscated assets <sup>c</sup>             | 1            | 0         | 4          | 5          | 0.9          |
| Household member arrested <sup>c</sup>             | 3            | 1         | 5          | 9          | 1.6          |
| Paid a large bribe <sup>c</sup>                    | 4            | 4         | 0          | 8          | 1.5          |
| Long duration <i>hartals</i> /strikes <sup>c</sup> | 5            | 0         | 0          | 5          | 0.9          |
| Rickshaw broken by picketers <sup>c</sup>          | 2            | 0         | 0          | 2          | 0.4          |
| Other  | 5            | 2         | 18         | 25         | 4.6          |
| <b>Total</b>                                       | <b>294</b>   | <b>97</b> | <b>156</b> | <b>547</b> | <b>100.0</b> |

*Notes:* Recall periods in the first year are <sup>(a)</sup> 2 years, <sup>(b)</sup> 1 year, and <sup>(c)</sup> 6 months. In the second and third survey rounds the recall period for all variables is the six months preceding the surveys.

Table 2 Households experiencing morbidity and mortality

| Morbidity and mortality               | Survey round  |              |              | Total |
|---------------------------------------|---------------|--------------|--------------|-------|
|                                       | 1             | 2            | 3            |       |
| Death of a household member           | 21<br>(3.6)   | 13<br>(2.3)  | 7<br>(1.3)   | 41    |
| Serious illness of a household member | 147<br>(25.1) | 45<br>(7.9)  | 75<br>(13.6) | 267   |
| Total                                 | 168<br>(28.7) | 58<br>(10.2) | 82<br>(14.8) | 308   |
| Number of households                  | 585           | 567          | 553          | 1706  |

*Notes:* Figures in parentheses indicate percentage of households. Recall periods in the first year are 2 years for a death and 1 year for serious illness of a household member. In the second and third survey rounds the recall period for both variables is the six months preceding the surveys.

Table 3 Main coping response of households affected by morbidity and mortality

| Coping strategy                             | Frequency | Percent |
|---|-----------|---------|
| Deplete assets and savings                  |           |         |
| Sold/mortgaged productive asset             | 10        | 3.2     |
| Sold/mortgaged consumption asset            | 8         | 2.6     |
| Used savings                                | 8         | 2.6     |
| Borrowing                                   |           |         |
| Took loan from NGOs/institution/employer    | 22        | 7.1     |
| Took loan from <i>mahajan</i> (moneylender) | 94        | 30.5    |
| Other strategies                            |           |         |
| Reduced food consumption                    | 10        | 3.2     |
| Sent non-working household member to work   | 3         | 1.0     |
| Took help from others                       | 18        | 5.8     |
| Other (non-specified)                       | 14        | 4.5     |
| None  | 121       | 39.3    |
| Total                                       | 308       | 100.0   |

Notes: Reported frequencies are conditional on households reporting a shock.

Table 4 Descriptive statistics of main variables

| Variable  | Round 1 |          | Round 2 |          | Round 3 |          |
|---|---------|----------|---------|----------|---------|----------|
|   | Mean    | SD       | Mean    | SD       | Mean    | SD       |
| Per capita earned income in last month*                   | 735.65  | 476.37   | 686.60  | 493.09   | 709.99  | 588.46   |
| Per capita unearned income in last month*                 | 54.31   | 158.39   | 51.11   | 221.66   | 57.47   | 169.46   |
| Per capita food consumption in last week*                 | 89.13   | 64.17    | 79.92   | 89.05    | 99.95   | 57.39    |
| Per capita non-food consumption in last week*             | 85.29   | 136.64   | 78.67   | 130.86   | 94.54   | 324.12   |
| Per capita health expenses in last week*                  | 10.92   | 33.47    | 11.22   | 31.90    | 13.15   | 44.31    |
| Budget share of OOP health expenses                       | 0.05    | 0.08     | 0.06    | 0.10     | 0.05    | 0.10     |
| Incidence of catastrophic health spending (OOP share>15%) | 0.11    | 0.32     | 0.12    | 0.32     | 0.11    | 0.31     |
| Per capita hours worked in last week                      | 21.51   | 13.95    | 20.34   | 13.87    | 20.61   | 12.80    |
| Outstanding loans*  | 5135.02 | 13274.56 | 6394.13 | 22513.61 | 7437.33 | 17431.87 |
| Age of household head                                     | 42.48   | 12.62    | 43.02   | 12.39    | 43.36   | 12.37    |
| Male household head                                       | 0.86    | 0.35     | 0.86    | 0.34     | 0.87    | 0.34     |
| Household size  | 4.26    | 1.77     | 4.47    | 1.82     | 4.61    | 1.86     |
| Head completed primary school                             | 0.10    | 0.30     | 0.09    | 0.29     | 0.10    | 0.29     |
| Head completed secondary school                           | 0.05    | 0.21     | 0.05    | 0.21     | 0.05    | 0.21     |
| Head completed higher secondary school                    | 0.01    | 0.12     | 0.01    | 0.11     | 0.01    | 0.11     |
| Observations  | 585     |          | 567     |          | 553     |          |

Notes: (\*) Figures are in Bangladeshi Taka (BDT); 1 Euro = 58.18 BDT on August 1, 2002.

Table 5 Effects of serious illness and death of household members on per capita household consumption and income

|                 | OOP health spending |                    |                    | Income             |                  | Consumption        |                   |                    |                   |
|-----------------|---------------------|--------------------|--------------------|--------------------|------------------|--------------------|-------------------|--------------------|-------------------|
|                 | Total               | Share              | CHS 15%            | Earned             | Unearned         | Total              | Food              | Non food           | Total             |
| Serious illness | 0.961<br>(0.160)**  | 0.660<br>(0.120)** | 0.135<br>(0.034)** | -0.040<br>(0.045)  | 0.058<br>(0.200) | -0.034<br>(0.048)  | 0.048<br>(0.044)  | 0.076<br>(0.090)   | 0.056<br>(0.051)  |
| Death           | -0.286<br>(0.468)   | -0.419<br>(0.358)  | -0.104<br>(0.070)  | -0.301<br>(0.130)* | 0.069<br>(0.434) | -0.288<br>(0.133)* | -0.009<br>(0.112) | 0.867<br>(0.281)** | 0.382<br>(0.175)* |
| Observations    | 1608                | 1579               | 1694               | 1659               | 1180             | 1659               | 1627              | 1658               | 1626              |
| Households      | 540                 | 534                | 592                | 557                | 396              | 557                | 550               | 557                | 550               |
| Model           | FE Poisson          | FE Poisson         | Linear FE          | FE Poisson         | FE Poisson       | FE Poisson         | FE Poisson        | FE Poisson         | FE Poisson        |

Notes: Table shows coefficients from Poisson models with household fixed effects and linear fixed effects models. Other covariates that are omitted from the table include indicator variables for other shocks, household size, demographic composition of the household and time-community interaction terms.

Statistical significance: +,\* and \*\* indicate significance at the 10%, 5% and 1% respectively. Robust standard errors in brackets.



Table 6 Effects of serious illness and death of household members on per capita household consumption and income for the poorest and wealthiest 50% of the sample

|                    | OOP health spending |            |           | Earned     | Income     |            | Total      | Consumption |            |
|--------------------|---------------------|------------|-----------|------------|------------|------------|------------|-------------|------------|
|                    | Total               | Share      | CHS 15%   |            | Unearned   | Food       |            | Non food    | Total      |
| <b>Poorest 50%</b> |                     |            |           |            |            |            |            |             |            |
| Serious illness    | 0.859               | 0.703      | 0.115     | -0.106     | 0.026      | -0.103     | 0.058      | 0.028       | 0.042      |
|                    | (0.192)**           | (0.173)**  | (0.048)*  | (0.051)*   | (0.269)    | (0.052)*   | (0.060)    | (0.097)     | (0.055)    |
| Death              | -0.516              | -0.223     | 0.005     | -0.107     | 1.329      | -0.040     | 0.002      | 0.074       | -0.002     |
|                    | (0.642)             | (0.437)    | (0.077)   | (0.145)    | (0.467)**  | (0.131)    | (0.105)    | (0.162)     | (0.091)    |
| Observations       | 785                 | 777        | 832       | 821        | 584        | 821        | 813        | 820         | 812        |
| Households         | 263                 | 262        | 286       | 275        | 196        | 275        | 274        | 275         | 274        |
| <b>Richest 50%</b> |                     |            |           |            |            |            |            |             |            |
| Serious illness    | 1.003               | 0.682      | 0.183     | 0.004      | 0.098      | 0.011      | -0.020     | 0.003       | -0.014     |
|                    | (0.202)**           | (0.167)**  | (0.046)** | (0.063)    | (0.305)    | (0.071)    | (0.058)    | (0.128)     | (0.072)    |
| Death              | 0.077               | -0.295     | -0.153    | -0.406     | -0.684     | -0.397     | -0.016     | 1.030       | 0.522      |
|                    | (0.511)             | (0.421)    | (0.107)   | (0.181)*   | (0.734)    | (0.186)*   | (0.154)    | (0.298)**   | (0.206)*   |
| Observations       | 794                 | 788        | 822       | 806        | 575        | 806        | 800        | 806         | 800        |
| Households         | 267                 | 265        | 287       | 271        | 193        | 271        | 269        | 271         | 269        |
| Model              | FE Poisson          | FE Poisson | Linear FE | FE Poisson | FE Poisson | FE Poisson | FE Poisson | FE Poisson  | FE Poisson |

*Notes:* Table shows coefficients from Poisson models with household fixed effects and linear fixed effects models. Other covariates that are omitted from the table include indicator variables for other shocks, household size, demographic composition of the household and time-community interaction terms. The sample is divided into the poorest and wealthiest 50% based on per capita household (non-medical) expenditures in wave 1 of the survey.

*Statistical significance:* +, \* and \*\* indicate significance at the 10%, 5% and 1% respectively. Robust standard errors in brackets.

Table 7 Coping strategies for serious illness and death of household members

|                 | Deplete<br>assets/<br>savings | Borrowing          | Other             | Increase<br>labour<br>supply | Debt to<br>income<br>ratio |
|-----------------|-------------------------------|--------------------|-------------------|------------------------------|----------------------------|
| Serious illness | 0.268<br>(0.104)*             | 0.613<br>(0.129)** | -0.084<br>(0.115) | -0.075<br>(0.041)            | 0.382<br>(0.164)*          |
| Death           | 0.230<br>(0.101)*             | 0.258<br>(0.211)   | -0.038<br>(0.147) | -0.175<br>(0.100)            | 0.016<br>(0.303)           |
| Observations    | 477                           | 477                | 477               | 1653                         | 1427                       |
| Households      | 345                           | 345                | 345               | 555                          | 484                        |
| Poorest 50%     |                               |                    |                   |                              |                            |
| Serious illness | 0.246<br>(0.172)              | 0.763<br>(0.156)** | 0.250<br>(0.209)  | -0.107<br>(0.060)            | 0.624<br>(0.250)*          |
| Death           | 0.375<br>(0.182)*             | 0.543<br>(0.240)*  | -0.255<br>(0.335) | -0.076<br>(0.166)            | -0.200<br>(0.425)          |
| Observations    | 239                           | 239                | 239               | 818                          | 710                        |
| Households      | 171                           | 171                | 171               | 274                          | 241                        |
| Richest 50%     |                               |                    |                   |                              |                            |
| Serious illness | 0.107<br>(0.170)              | 0.453<br>(0.297)   | -0.136<br>(0.201) | -0.086<br>(0.062)            | 0.154<br>(0.199)           |
| Death           | -0.164<br>(0.182)             | -0.235<br>(0.344)  | 0.140<br>(0.221)  | -0.257<br>(0.118)*           | 0.319<br>(0.300)           |
| Observations    | 229                           | 229                | 229               | 803                          | 707                        |
| Households      | 167                           | 167                | 167               | 270                          | 239                        |
| Model           | Linear FE                     | Linear FE          | Linear FE         | FE Poisson                   | FE Poisson                 |

*Notes:* Table shows coefficients from Poisson models with household fixed effects and fixed effects linear probability models. Other covariates that are omitted from the table include indicator variables for other shocks, household size, demographic composition of the household and time-community interaction terms. For depleting assets, borrowing and other coping strategies the sample is restricted to those households that reported to have experienced a shock in the respective survey round, yielding an unbalanced panel.

*Statistical significance:* +, \* and \*\* indicate significance at the 10%, 5% and 1% respectively. Robust standard errors in brackets.

Table 8 Effects of lagged debt to income ratio on per capita household consumption

|                | Food             | Non food           | Total              |
|----------------|------------------|--------------------|--------------------|
| Full sample    | 0.003<br>(0.004) | -0.015<br>(0.007)* | -0.009<br>(0.004)* |
| Observations   | 1056             | 1078               | 1054               |
| Households     | 528              | 539                | 527                |
| Poorest 50%    | 0.013<br>(0.019) | -0.025<br>(0.028)  | -0.006<br>(0.017)  |
| Observations   | 524              | 534                | 522                |
| Households     | 262              | 267                | 261                |
| Wealthiest 50% | 0.001<br>(0.003) | -0.013<br>(0.008)  | -0.007<br>(0.005)  |
| Observations   | 520              | 524                | 520                |
| Households     | 260              | 262                | 260                |

*Notes:* Table shows coefficients from Poisson models with household fixed effects. Other covariates that are omitted from the table include indicator variables for other shocks, household size, demographic composition of the household and time-community interaction terms.

*Statistical significance:* +,\* and \*\* indicate significance at the 10%, 5% and 1% respectively. Robust standard errors in brackets.

## Supplemental appendix

Table A1 Test for attrition bias: probability of dropping out of the sample

|                         | (1)                | (2)                | (3)                | (4)                  | (5)               |
|-------------------------|--------------------|--------------------|--------------------|----------------------|-------------------|
| Age household head      | -0.004<br>(0.007)  | -0.004<br>(0.007)  | -0.005<br>(0.007)  | -0.005<br>(0.007)    | -0.012<br>(0.007) |
| Male household head     | -0.171<br>(0.224)  | -0.174<br>(0.225)  | -0.175<br>(0.226)  | -0.221<br>(0.219)    | -0.184<br>(0.237) |
| Head completed          | 0.413<br>(0.264)   | 0.407<br>(0.263)   | 0.418<br>(0.264)   | 0.408<br>(0.267)     | 0.407<br>(0.265)  |
| Primary school          | 0.252<br>(0.371)   | 0.263<br>(0.377)   | 0.245<br>(0.376)   | 0.168<br>(0.367)     | 0.244<br>(0.363)  |
| Secondary school        | 0.451<br>(0.580)   | 0.439<br>(0.613)   | 0.416<br>(0.594)   | 0.349<br>(0.567)     | 0.468<br>(0.585)  |
| Higher secondary school | -0.145*<br>(0.070) | -0.153*<br>(0.069) | -0.145*<br>(0.069) | -0.121<br>(0.067)    | -0.117<br>(0.070) |
| Household size          |                    | 0.199<br>(0.189)   |                    |                      |                   |
| Serious illness         |                    | 0.298<br>(0.439)   |                    |                      |                   |
| Death                   |                    |                    | 0.001<br>(0.002)   |                      |                   |
| OOP health spending     |                    |                    |                    | 0.0002<br>(0.0002)   |                   |
| Earned income           |                    |                    |                    | -0.00003<br>(0.0004) |                   |
| Unearned income         |                    |                    |                    |                      | 0.001<br>(0.001)  |
| Food spending           |                    |                    |                    |                      | -0.001<br>(0.001) |
| Non-food spending       |                    |                    |                    |                      | -0.677<br>(0.001) |
| Constant                | -0.766*<br>(0.364) | -0.821*<br>(0.378) | -0.770*<br>(0.365) | -0.938*<br>(0.395)   | -0.677<br>(0.418) |
|                         | -0.004             | -0.004             | -0.005             | -0.005               | -0.012            |
| Pseudo R-squared        | 0.048              | 0.055              | 0.050              | 0.054                | 0.054             |
| Observations            | 585                | 585                | 585                | 585                  | 573               |

*Notes:* Probit estimates. The explanatory variables are taken for the first survey wave only. The outcome variable is a dummy variable that takes value one if a household is not observed in all three survey waves.

*Statistical significance:* +,\* and \*\* indicate significance at the 10%, 5% and 1% respectively. Robust standard errors in brackets.

Table A2 Effects of serious illness and death of household members on per capita household consumption and income, household fixed effects regressions

|                 | OOP health spending |                    | Income                |                   | Consumption            |                   |                     |                    |
|-----------------|---------------------|--------------------|-----------------------|-------------------|------------------------|-------------------|---------------------|--------------------|
|                 | Total               | Share              | Earned                | Unearned          | Total                  | Food              | Non food            | Total              |
| Serious illness | 16.618<br>(5.000)** | 0.051<br>(0.011)** | -30.579<br>(33.868)   | 5.712<br>(14.612) | -27.259<br>(39.233)    | 4.170<br>(3.672)  | 6.402<br>(7.692)    | 10.454<br>(8.917)  |
| Death           | -6.080<br>(11.399)  | -0.032<br>(0.026)  | -215.511<br>(94.288)* | 6.298<br>(27.466) | -225.195<br>(108.404)* | -4.313<br>(9.515) | 69.085<br>(31.953)* | 65.326<br>(35.366) |
| Observations    | 1608                | 1579               | 1659                  | 1180              | 1659                   | 1627              | 1658                | 1626               |
| Households      | 540                 | 534                | 557                   | 396               | 557                    | 550               | 557                 | 550                |

*Notes:* Table shows coefficients from linear fixed effects models. Other covariates that are omitted from the table include indicator variables for other shocks, household size, demographic composition of the household and time-community interaction terms. Statistical significance: +,\* and \*\* indicate significance at the 10%, 5% and 1% respectively. Robust standard errors in brackets.