Does Health Insurance Coverage or Improved Quality Protect Better Against Out-of-Pocket Payments? Experimental Evidence from the Philippines

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Abstract

Using data from the QIDS randomized policy experiment in the Philippines, we found that interventions to expand insurance coverage and improve provider quality both had an impact on out-of-pocket payments. Compared to controls, the expanded insurance intervention and the performance-based provider payments to improve quality both resulted in a decline in out-of-pocket spending (21 percent decline, p=0.072; and 24 percent decline, p=0.028, respectively). With lower out-of-pocket payments, monthly spending on personal hygiene rose by 0.9 and 0.6 US$ under the expanded insurance and provider payment interventions, respectively, amounting to roughly a 40 to 60 percent increase relative to the controls.

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1. Introduction

Out-of-pocket payments for health care are still the major source of health care financing in most developing countries. Such medical expenses increase the burden of poverty (McIntyre et al., 2006). Annually, an estimated 150 million people fall into poverty due to catastrophic health care expenditures (van Doorslaer et al. 2006, Xu et al., 2007). To better protect against

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unexpected illness and unplanned health care expenditures, a range of health sector financing reforms are being implemented throughout developing countries with the aspiration of protecting poorer households. These public policy interventions range from the introduction of community-based health insurance (Jakab and Krishnan, 2001; Smith and Sulzbach, 2008; Mebratie et al., 2014) to health equity funds for the poor (Flores et al., 2011), to improved access to quality health care through set user fees (Litvack and Bodart, 1993), or the introduction of social health insurance programs for a large portion of the (so far uninsured) population (Limwattananon et al. 2015; Sparrow et al. 2013b; King et al., 2009; Thornton et al., 2010).

Existing research indicates that these financing reforms successfully increase access and utilization of health care services (Hou et al, 2013; Limwattananon et al., 2015). Financial protection—distinct from access—however, is not necessarily achieved by health care financing reforms (Xu et al., 2007; Wagstaff and Lindelow, 2008). While insurance expands access, the evidence does not demonstrate that these policies reduce out-of-pocket payments; indeed, they may even increase health expenditures among the poor. In Indonesia, while Health Insurance for the Poor (i.e., the Askeskin program) successfully increased access to health care it also *increased* out-of-pocket spending for new insurees who live in urban areas (Sparrow et al., 2013b). Likewise, the Chinese NCMS did not reduce out-of-pocket payments but in some cases even increased household spending (Lei and Lin, 2009; Liu and Tsegai, 2011; Wagstaff et al., 2009; Zhou et al., 2009). Possible explanations for these findings include overconsumption by the insured and overprovision of medical services by providers who are reimbursed by the insurance on a fee-for-service basis (Liu et al. 1999; Wagstaff and Lindelow, 2008). Despite this mixed evidence, during the last decade, most health policies to protect the poor have been insurance-based health reforms.

To determine if insurance confers financial protection, several aspects need to be considered. First, it needs to be determined what types of payments are affected by health financing reforms: is it financial support for hospitals, outpatients, provider services or medications? Second, what are the related out-of-pocket expenditures for and what is their impact on household payments including health-related goods such as water and sanitation as well as non-health items such as transportation and education, and other consumption goods? (Pannarunothai and Mills, 1997; Gustafsson and Li, 2004).

Beyond characterizing (the lack of) financial protection at the user level, there is the complementing question of how financial risk protection may be achieved through supply-side policy interventions, such as the provision of accessible care and incentivizing better

care. Established supply side policy interventions that provide direct care through public facilities primarily rely on fee-for-service payments that either place the burden of payment on the user or misalign the incentives of hospital staff due to inflexible public repayment schemes (Ellis and McGuire, 1993; McIntyre et al., 2006). Consequently, supply-side interventions are not necessarily efficiency enhancing and tend to be neglected when health care reforms are designed (Ellis and McGuire, 1993; Smith and Sulzbach, 2008). Newer policy approaches, which hope to overcome the inadequacy of supply-side interventions, incentivize providers to provide more or better care. The experience of Thailand's 2001 healthcare reform, "30 Baht." demonstrates that carefully designed supply-side interventions can increase access and utilization of health care services among the poor, induce a switch from private to public hospitals and reduce out-of-pocket payments (Gruber et al., 2014).

There is—not surprisingly—an important dearth in understanding and a lack of studies that contrast the impact of a demand-side, insurance-based reform versus a supply-side, provider payment reform; this further adds to policy uncertainty over how best to provide financial protection to the poor.

The randomized health policy experiment, known as the Quality Improvement Demonstration Study or QIDS collected household and, facility and provider data before and after two health policy reforms were introduced. Conducted in four central regions of the Philippines between 2003 to 2008, QIDS was a large-scale community level intervention carried out in 30 public hospitals. The hospitals were randomly assigned into a control site and two different policy intervention sites, one expanding access to health insurance and the other intervention incentivizing hospital staff through bonus payments. The overarching objective of QIDS was to evaluate the effects of these policies on the health status of children, through the utilization and quality channels. The focus was on children who were hospitalized due to pneumonia and diarrhea as these diseases are among the leading causes of morbidity and mortality among Filipino children (Department of Health, 2011). Previous reports on this large social experiment established that the two interventions both have significant health effects on the quality of hospital care and that these quality improvements could be linked to better outcomes (reduced wasting and improved self-reported health ratings) among children 4-10 weeks after hospital charge (Quimbo et al. 2011; Peabody et al. 2013; Peabody et al., 2011; Peabody et al. 2012).

In this paper we will estimate the impact of the QIDS demand-side insurance intervention compared to the supply-side incentive intervention on out-of-pocket payments for hospital services, the costs of medical treatment that were incurred inside and outside the

hospital, and on household spending for preventive care. To analyze expenditures we will look at overall household health expenditures, preventative care, as captured by personal hygiene, water and sanitation, and whether expenses for food, education and durable goods are reallocated with illness. This will allow investigation of preventive care spending along with the household expenditure pathway to health, namely, will freed-up household resources due to reduced out-of-pocket payments increase food consumption or expenditures on health-related items such as toiletries, clean water and improved sanitation?

The paper is organized as follows. The project background and experimental design are presented in Section 2. Section 3 introduces the study population by means of descriptive statistics. The conceptual framework is described in Section 4 and Section 5 provides the empirical specifications, which make use of the linear fixed effects and Poisson fixed effects model. Results are discussed in Section 6 and Section 7 summarizes the findings, provides some additional contextualization of the results and policy conclusions.

2. Background
2.1 Study setting and project background

In the Philippines, improving access to care has been a priority policy concern since the Health Sector Reform Agenda was launched in 1999 under the leadership of then Health Secretary Alberto Romualdez who did so through the National Health Insurance scheme, PhilHealth. PhilHealth's mandate is to provide universal health insurance coverage. The most recent reports indicate that PhilHealth covers 83 percent of the population (PhilHealth, 2013). Yet, the actual coverage rate could be smaller based on other national surveys. For example, the 2008 National Demographic and Health Survey indicates that 47.83 percent of surveyed households had at least one household member covered by PhilHealth revealing that about 58% of the poorest children with acute respiratory illness receive medical treatment and, similarly, only about 37% of the poorest children with symptoms of diarrhea get oral rehydration therapy (NDHS 2008).

In PhilHealth's aim to provide financial protection to the poor, the insurer targets selected population groups, i.e. the government-employees, indigent individuals, retirees, and overseas workers. To afford more financial protection, among these groups, the insurance premiums vary, for example, an average formally employed individual pays a premium of

3,370 pesos ($\approx$ 76.5 US$)[5] per person and year. For an average household with 4.6 members (2010 Census of Population and Housing) this amounts to a total cost of 15,502 pesos ($\approx$ 351.9 US$) per year. Indigent individuals are sponsored by the national and local governments and thus pay only 2,400 pesos ($\approx$ 54.4 US$) per household and year. The basic benefit package primarily covers inpatient care and not outpatient care or medications purchased outside of the hospital. Recently, to keep insurance pay-outs down, in-patient reimbursements have been switched to what are called "case rates" or bundled payments. When costs exceed the case rates for a given hospitalization, patients and their families have to shoulder the difference in the form of out-of-pocket payments.

PhilHealth finances only about 10 percent of the overall personal health care spending in the Philippines (NSCB 2013). Despite expanding coverage and subsidized premiums aimed towards the poor, the Philippine National Health Accounts (2011) indicate that out-of-pocket expenditures remain the most dominant form of health-care financing, accounting for 52.7% of total health-care expenditures in 2011 (NSCB 2013).

2.2 QIDS Experimental Design, Sample Frame and Data

The QIDS experiment, a 5-year project done jointly with PhilHealth, the Department of Health, the University of the Philippines and the University of California San Francisco was undertaken to potentially benefit an estimated one million people. Launched in 2001, community level randomization was applied to 30 public hospitals that were organized into matched blocks of three and randomly assigned to either one of two interventions and a control group. The matching was done based on demand and supply characteristics of the hospitals such as population, average household income, number of beds, average case load, PhilHealth accreditation and insurance coverage of the households.

Two interventions were implemented and financed by PhilHealth. The first is the demand side intervention. It is known as the "Access" intervention and consisted of increased enrollment of households in the PhilHealth program and zero copayments for PhilHealth-covered children under 5 years when using services in the participating district hospitals. The policy objective of the "Access" intervention was to increase existing PhilHealth coverage. A novel method was used for expanding insurance enrollment in this intervention: medical doctors were deployed as policy navigators and promoted PhilHealth enrollment through regular one-on-one meetings with heads of local government units to rigorously and

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[5] The peso-US$ conversions are based on the exchange rate of 0.0227, which was observed in January 2015.

systematically follow-up on PhilHealth premium sponsorships (Solon et al. 2009). The second intervention targets the supply side and is known as the "Bonus" intervention. It consisted of a scheme of quality measurement with pay-for-performance. District hospital staff usually received fixed salaries but under the "Bonus" intervention they could increase their incomes with bonus payments once the hospital was assessed to have met preset quality standards. These bonus payments were given quarterly from 2004 to 2007. Throughout this paper we refer to the "Access" intervention as "intervention A" and the "Bonus" intervention as "intervention B". The hospitals in the control group, referred to as "C sites", continued with the existing policies and practices. The three types of randomly selected hospitals in A, B, and C sites constitute the primary sampling unit for the evaluation of the QIDS interventions.

Data for this paper were obtained from two QIDS sources: (i) a patient exit survey and (ii) a follow-home survey 4-6 weeks after the child patient was discharged from the hospital. The patient exit and household surveys were conducted at baseline (2003/04) and at the end of the project (2007/08). By the time the second follow-up survey commenced, interventions had been in place for close to 2 years. The patient exit surveys were administered among the parents of child patients up to the age of 5 years. A total of 6,042 children were surveyed. Among those children, pneumonia and diarrhea patients were eligible for the follow home survey. Altogether, 3,183 children were revisited at home of whom we have complete information for 3,121 children[6]. The follow home surveys in both rounds provided a detailed socioeconomic profile of the household including information on spending patterns.

3. Study Population

The total study population consists of 3,121 household observations, each of which had a child-patient in one of the 30 QIDS hospitals either at baseline in 2003/04 or at the follow-up in 2007/08. The observations are equally split across the three types of sites: In the A sites we have information about 1,036 patients; B sites comprise 1,055 observations; and the remaining 1,030 patients frequented the C sites. In the first survey round, 1,393 child patients participated; the follow-up survey covered 1,728 patients.

Basic descriptive statistics illustrating the features of the sampled child patients and their households are presented in Table 1. Of the total number of children 43.5 percent are girls. The children are on average slightly older than one and a half years and stay 4 days in

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[6] Lost child observations due to partly missing information amount to less than 2 percent of the overall sample.

the hospital. By design, the sample is equally split among pneumonia and diarrhea patients. Every household has about six members on average and at least one child below the age of 14 for every working adult. On average, the households have a monthly per capita income of 1,054 pesos ($\approx$ 23.9 US$). As the primary sampling unit for the randomization is hospitals, we test for the balancing of the baseline child and household characteristics across the three hospital groups. Comparing child and household characteristics at baseline for each of the three cohorts, we find that the two intervention groups and the control site are comprised of children with statistically similar characteristics at the 5 percent significance level in all the 27 comparisons. Maternal education and per capita family income are slightly higher at baseline in the insurance expansion group compared to the control group (p-value=0.064 and 0.058, respectively). No significant differences can be found for the pay-for-performance group. Moreover, child characteristics such as age and gender and severity of disease are similar across all three (intervention and control) groups. Household size is also similar across sites. Yet, to account for child and household heterogeneity in the analysis, we jointly include these variables as controls in our empirical model.

The descriptive statistics for the outcome variables show that out-of-pocket payments for the hospitalization of the child patient amounted to 2,212 pesos ($\approx$ 50.2 US$) on average (See Table 2). Average out-of-pocket payments are slightly higher than total medical charges associated with the hospitalization because the former also cover transportation and food expenditures. Total charges are mainly made up of costs incurred inside the hospital, namely an average of 1,422 pesos ($\approx$ 32.3 US$). Charges for health services used outside the hospital amount to an average of 677 pesos ($\approx$ 15.4 US$).

For household level expenditures we did not only consider the costs of the hospitalization of the child patient but also at the costs of health expenditures incurred during the last six months prior to the survey (not including the costs of the child hospitalization under study). These household health expenditures are presented in per capita and per month terms; they include drugs and medicines, hospital room charges, medical and dental charges, and other medical goods and supplies. Per capita health expenditures are 88 pesos ($\approx$ 2.0 US$), accounting for 8.6 percent of the total monthly expenditure per individual. We observe that on average, per capita health expenditures are of similar range as the per capita costs for toiletries, water and sanitation that amount to 82 pesos ($\approx$ 1.9 US$).[7] Taken together, monthly health expenditures and those for personal hygiene make up for 16 percent of the total

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[7] The item toiletries, water and sanitation contains expenditures for the following components: (i) toilet/bath soap, body deodorants, lotion, tissue paper, (ii) drinking water, water used for bathing and washing and (iii) laundry and laundry soap.

monthly per capita expenditures. Relative to these 16 percent constituted by the regular health care and preventive care spending, the out-of-pocket payments for the child hospitalization amount to more than twice the monthly expenditures per household member.

We also looked at other expenditure groups in the household (see Table 2). Monthly per capita expenditures for food consumption including beverages amount to 552 pesos ($\approx$ 12.5 US$). This rather moderate amount relative to overall costs is consistent with spending by the poor who rely on home production (rather than market goods) to cover their basic nutritional needs (Folbre, 1984; Bardhan and Udry, 1999; de Janvry and Sadoulet, 2002). The poverty level of these households is further demonstrated by the low per capita spending for education [8] and durable goods such as clothing, furnishing, dinnerware and house maintenance, amounting to 28 and 59 pesos ($\approx$0.6 and 1.3 US$) on a per capita and month basis, respectively. For comparison, per capita monthly costs for transport and communication amount to 56 pesos being similar to the ones for durable goods.

To assess the impact of the A and B interventions on outcome variables, we compared the two treatment and the control groups after the implementation of the intervention testing for differences in means (see Table 2). Three findings stood out. First, the direct comparison of means reveals that out-of-pocket payments are roughly 450 pesos ($\approx$ 10.2 US$) lower in both the A and B intervention sites compared to the controls. Second, the OOP spending levels inside and outside of the hospital differ systematically across the three types of sites. In the control sites, charges outside the hospital are significantly larger (p=0.000) whereas patients in either intervention sites spend more on services inside the hospital. The latter result is mainly driven by the B intervention. Third, overall health expenditures at the household level are lower for families residing in the intervention sites (p<0.01). However, these lower health expenditures do not seem to be linked to changes in the expenditures for per capita monthly food consumption. Food consumption is on average, at the same level for households residing in all three sites given a significance level of 1 percent. At the 5 percent significance level we fail to reject the equality of means in food consumption for B and C sites. However, per capita monthly education expenditures and those for transport and communication are identical when comparing average levels in the two intervention areas with those in the control group. In summary, the descriptive analysis points to: lower out-of-pocket payments and direct overall health expenditures, which are derived from reduced charges incurred outside the hospital due to both interventions. These lower out-of-pocket expenditures barely

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[8] Education expenditures comprise matriculation fees, allowance for family members studying away from home, books and school supplies.

affect food spending in the households. This may be due to home production of foodstuffs discussed above. Spending on education and transportation is not affected.

Before proceeding to the statistical analysis we develop a conceptual framework assessing potential impacts of the two interventions from a theoretical perspective and linking the different household level expenditures.

4. Conceptual Framework

To motivate our empirical analysis we start with a simple model of household utility maximization when health insurance and provider-based incentives for improved quality of care are provided. Utility is derived from a composite consumption good $'C'$ and the health stock $'H'$, which is produced according to $H = H(M(p), h)$. Health production depends on a vector M of health-related expenditure items, including medical goods and services when ill, preventive care, and water and sanitation. Their associated prices are denoted by p, and the initial health stock by h. Households maximize their utility $U = H(C,H)$ by choosing to consume $C^* = C(Y, p, h)$ and $M^* = M(Y, p, h)$ subject to the budget constraint $Y = C + pM$, where Y is total household income and the price of the composite consumption good is normalized to 1. Thus, the optimal health stock is a function of income Y, the prices of medical services p and the initial health stock h.

If the household is insured, the budget constraint can be re-defined as follows:

$$Y + I = k + C + pM,$$

where I is the insurance claim contingent on illness and k is the routinely paid insurance premium. We define out-of-pocket payments for health, $'O'$, as the amount of illness-related spending that is not covered by the insurance claims and are shouldered by the household directly[9]:

$$O = pM - I$$

In the case of QIDS, we observe out-of-pocket expenditures resulting from the hospitalization of children under 5 years. In the basic setting, expanded health insurance coverage necessarily reduces illness-related out-of-pocket payments. Thus, given a fixed

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[9] We define out-of-pocket payments as those expenses that the insuree pays directly to the health care provider or for prescribed drugs and medication.

household budget, $\partial O/\partial I = -1$. In this simple case where M refers solely to illness-related spending and p is fixed, then the budget constraint directly implies $\partial C/\partial I > 0$.

However, in the more realistic scenario where health expenditures include those health expenditures, such as water and sanitation, which are not conditioned on illness, we can distinguish other possible outcomes of increased insurance coverage and increased health spending. If we use M to denote health spending directly related to illness such as hospital charges and introduce M^P to denote health spending that is not directly conditioned on illness, we distinguish the following cases, all with reduced out-of-pocket expenses due to expanded insurance coverage and fixed M (or $\partial M/\partial I = 0$):

(i) $\partial C/\partial I > 0$ and $\partial M^P/\partial I > 0$

(ii) $\partial C/\partial I > 0$ and $\partial M^P/\partial I \leq 0$

(iii) $\partial C/\partial I \leq 0$ and $\partial M^P/\partial I > 0$

Case (i) is where all non-health (i.e., C) and indirect health spendings are increased, case (ii) is where non-health expenditures are increased, possibly at the expense of indirect health spending that is not contingent on illness, while case (iii) is where non-contingent health spending is increased, while possibly trading off consumption.

Additionally, there are cases for which increased insurance coverage could result in increased M: $\partial M/\partial I > 0$. This means that if I is subject to fixed peso ceilings, as it is the case in the Philippines, then out-of-pocket payments, O, could increase.

We now examine how these cases arise in various settings.

4.1 Improved Quality

We now introduce quality, q, into the analysis, through the health production function:

$$H = H(M(p, q), h)$$

We assume that quality of care impacts on the cost of providing health care, and thus, M. Peabody et al. (2010) found a U-shaped relationship between total costs and quality. At low levels of initial quality, improved quality means a more rational amount of services prescribed by physicians as captured by $\partial M/\partial q < 0$. This implies that doctors have better diagnostic skills, reduce unnecessary medical prescriptions and tests, and aim at shortening the length of

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hospital stays. Bodenheimer and Fernandez (2005) citing evidence from the U.S. argued for reducing costs through improved quality or "error reduction." To date, evidence from developing countries is limited: In Rwanda, the effectiveness of pay-for-performance schemes in increasing the quality of maternal care without inducing higher costs has been reported (Soeters et al., 2006). The study found a 144 percent increase in institutional deliveries attended by skilled health personnel that was accompanied by a decrease in out-of-pocket health expenditures by 62 percent. In the QIDS experiment, improved quality was also achieved through pay-for-performance payments to the hospital staff once predefined quality levels had been reached (Peabody et al, 2011). Thus, initiatives to improve quality in resource-poor settings, can result in reduced out-of-pocket payments $\partial O/\partial q<0$.

To assess the potential of pay-for-performance payments in reducing out-of-pocket spending we will contrast this scheme with the impact of insurance on out-of-pocket payments.

4.2 Health spending inside and outside the hospital

In the Philippines, like most countries, services and goods needed by a patient may not be completely available within a single facility. Referrals to other facilities, say, for diagnostic procedures or services of a specialist, are frequent. The same is true for purchases of drugs, which can be done outside the hospital if the prescribed drugs are not available in the hospital pharmacy. Poorly funded hospitals may not be equipped with basic diagnostic machines such as x-rays and tend to have pharmacies that are not well stocked. Arguably then, expanded insurance coverage, which means increased resources at the hospital, would imply increased availability of goods and services and thus, the reduced need for patients to purchase goods and services outside the hospital. This is particularly true for PhilHealth accredited facilities.

Of course, there could be other reasons for patients preferring to purchase goods and services outside the facility. Prices inside the facility could be higher even with insurance or doctors could prescribe drugs that are not available inside the hospital but rather in a pharmacy outside the hospital where they have a financial interest (Peabody et al. 2009). Most insurance claims against PhilHealth are, however, for purchases inside the hospital, rather than outside the hospital.

Therefore, we can now distinguish between two types of illness-related medical spending: those incurred inside the hospital, M^{in}, and those outside the hospital, M^{out}. The health production function can be reformulated in a similar way as in the previous subsection

(assuming away, for simplicity, M'): $H = H(M^{in}(p^{in}, q), M^{out}(p^{out}, q), h)$ with q denoting again the quality of services inside the hospital, and p^{in} and p^{out} referring to the prices of health care in and outside the hospital, respectively. Further, we assume substitution between inside and outside medical services $\partial M^{out}/\partial M^{in} \leq 0$. Given the above possible explanations for purchases outside the hospital facility, with increased insurance coverage, we should expect $\partial M^{in}/\partial I \geq 0$ and $\partial M^{in}/\partial q \geq 0$.

Following Gertler and Solon (2009), another possible explanation for increased inside hospital spending accompanying expanded insurance is insurance-based price discrimination or provider-initiated moral hazard. The idea is that expanded insurance coverage makes demand more price inelastic. If health care providers have market power, they extract all additional insurance payments through increased mark-ups or over-prescription and none of the insurance benefit is accrued to the patient (Hsiao, 2008; Yip and Hsiao, 2009; Dutta and Husain, 2012).

In a similar vein, an improvement in the quality of care in public hospitals and therefore, an increased demand for services inside the hospital (Eichler et al. 2007; Akin et al., 1995) reduces the need for additional tests and treatments outside $\partial M^{out}/\partial q < 0$. Given increases in M^{in}, decreases in M^{out}, and overall reductions in M would imply increased M^P and/or C.

4.3 Preventive vs. Curative Care

In our notation, M is essentially curative hospital care whereas M^P is preventive care including health goods such as water and sanitation. As is typically assumed, we expect substitution possibilities for curative and preventive care. That is, to achieve the same level of health stock, either an individual faces illness and pays for curative care M in order to restore health, or tries to avoid illness by investing in prevention M^P. Thus, the health production function includes the possibility of investing in preventive care: $H = H(M(p), M^P(p^P), h)$ with $\partial M/\partial M^P < 0$. This is analogous to the Grossman model of health production where health is considered a form of capital that depreciates over time if no investments are undertaken (Grossman, 1972). In this context, preventive care can be interpreted as a form of investment in health, which slows down the depreciation of the health stock that is manifested in the form of illness. Thus, preventive care can reduce illness-related spending. An empirical validation of the Grossman model using Philippine data was undertaken by the Cebu Study Team (1992).

If insurance reduces out-of-pocket payments for *M*, it will concomitantly free resources for preventive care, $\partial M^P/\partial I>0$. Thus, insured households could spend more on illness-prevention such as clean water and products of personal and household hygiene.

4.4 Propositions to be Tested Empirically

The conceptual framework identifies four different patterns of out-of-pocket health expenditures as responses to expanded health insurance and quality improvements in resource-poor settings. We empirically analyze these in the context of the Philippine's QIDS interventions and test the following propositions:

Proposition 1:	We hypothesize that the Access intervention (expanded insurance coverage) reduces out-of-pocket payments: $\partial O/\partial I<0$ for direct medical costs.
Proposition 2:	We hypothesize that the Bonus intervention, through improvements on quality of care induced by increased provider payments, lowers overall health care spending including out-of-pocket payments. Provider payments, based on quality, reduce costs and therefore out-of-pocket payments: $\partial O/\partial q<0$ for direct medical costs.
Proposition 3:	We hypothesize that expanded insurance coverage and/or quality improvement increase inside hospital spending but concomitantly reduce expenditures outside the hospital: $\partial M^{in}/\partial I\geq 0$ and $\partial M^{out}/\partial I<0$.
Proposition 4:	We hypothesize that there is a household spending trade-off between curative and preventive health spending that potentially affects consumption: Two options are possible:

1) Investment in preventive care: $\partial M/\partial I<0$ and $\partial M^P/\partial I>0$ and $\partial C/\partial I\leq 0$.

2) Investment in curative care: $\partial M/\partial I>0$ and $\partial M^P/\partial I<0$ and $\partial C/\partial I\leq 0$.

We will estimate the impact of the two interventions on household spending on other health goods that prevent the onset of infectious diseases, e.g., water and sanitation. We will further test whether other household expenditures for the daily consumption of food, for

education, and for durable goods [10] are affected by the two interventions.

5. Empirical Specification

The hypotheses derived in the conceptual framework are assessed for four sets of spending outcomes: (i) out-of-pocket expenditures, (ii) inside and outside hospital charges associated with the child hospitalization, (iii) family health expenses (independent of the hospitalization) and expenses for preventive health care such as water and sanitation as well as (iv) non-health items including food and other household consumption expenditures.

We perform multivariate analysis to understand comparative statistics further and to identify the impact of the two QIDS interventions on the identified expenditure categories. The effects of the two interventions are estimated in a difference-in-difference specification that compares the changes in the costs of care in intervention sites with the corresponding changes in control sites over the two rounds of data collection. We employ a fixed effects model that allows us to control for the unobserved heterogeneity at the hospital level such as location and stable regional conditions. We specify the model in terms of its conditional mean:

$$E(Y_{iht}|A_{iht}, B_{iht}, X_{jiht}, \lambda_h) = \alpha_0 + \alpha_1 A_{iht} + \alpha_2 B_{iht} + \sum_j \theta_j X_{jiht} + \lambda_h \qquad (1)$$

The variable Y_{iht} represents the household spending on health care for child i in hospital h and period t as measured by any of the following: total out-of-pocket payments for the child hospitalization; inside and outside hospital charges for this single hospital admission; family health and preventive health care spending denoted in per capita and month terms. In addition, we also consider expenses on different consumption items, which are also denoted in per capita and month terms. The four sets of outcome variables are all measured in terms of pesos spent. We aim at identifying the impact of the two treatment variables α_1 and α_2 for the A intervention A_{iht} and the B intervention B_{iht}, respectively. C sites C_{iht} constitute the excluded category. The model is completed by individual child, mother and household characteristics, which are confounding factors. These variables are collected in the vector X_{jiht} and contain the child's age and gender, duration of stay at the hospital and

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[10] The variable durable goods contains expenditures on clothing, footwear and other wear, durable furnishings such as refrigerators and TVs, non-durable furnishings such as dinnerware and kitchen utensils, and house maintenance and repair.

diagnosis, maternal education, per capita household income, household size and composition. We opted for this particular set of covariates to make the empirical specification comparable to other studies that analyze the impact of QIDS on quality of care and health outcomes (Quimbo et al. 2011; Peabody et al., 2011; Peabody et al. 2012). The hospital specific fixed effect is captured by λ_h. We allow the error term to be clustered across individuals that are treated at the same hospital.

If the two interventions reduce health care spending, we expect the coefficient estimates associated with the access (A_{iht}) and bonus (B_{iht}) treatment to be negative and statistically significant. As derived in the theoretical model, households with either access to health insurance or access to high quality hospitals should incur less out-of-pocket payments. In this way we expect the similar results for incurred outside hospital charges, and increases in either preventive health expenditures or consumption.

While the linear fixed effects model is our benchmark model, we also employ a fixed effects Poisson model with cluster-bootstrapped standard errors as robustness test. The Poisson model better encompasses our expenditure variables, which do not follow a normal distribution but are censored at zero and skewed to the right due to some severe cases where large health spending occurred (Sparrow et al. 2013a). Although our dependent variables are not count data in the strict sense, the Poisson model has shown to be well suited for consistent estimation in the context of health costs (Buntin and Zaslavsky, 2004). An important advantage of the Poisson model is that it can be directly applied to the raw data without imposing a transformation (Mihaylova et al., 2011). For consistent estimation we only have to impose that the conditional mean is correctly specified (Manning and Mullahy, 2001; Wooldridge, 2002). The conditional mean, therefore, is defined as follows:

$$E(Y_{iht}|A_{iht}, B_{iht}, X_{jiht}, \lambda_h) = exp(\beta_0 + \beta_1 A_{iht} + \beta_2 B_{iht} + \sum_j \theta_j X_{jiht} + \lambda_h) \quad (2)$$

where the variables are the same as described above and we aim at estimating the coefficients β_1 and β_2 that are associated with the two treatments.

The regression results for both the fixed effects linear and Poisson models are presented in the next section.

6. Results

The findings from the linear fixed effects model show that intervention A reduces out-of-pocket payments by 558 pesos ($\approx$ 12.7 US$). Intervention B, which appears to be more effective, reduces out-of-pocket payments on average by 638 pesos ($\approx$ 14.5 US$) compared to C sites. Interestingly, the coefficient estimates associated with Interventions A compared to Intervention B are not statistically different from each other indicating that both interventions are similarly effective in reducing out-of-pocket payments (p-value=0.781) (See Table 3).

These fixed-effects estimates are consistent with the Poisson regression results (Table 3, Column 2). While the magnitude of the coefficient estimates from the Poisson model is not directly comparable with that of the linear model, we observe a similar statistically significant and negative relationship between the two interventions and out-of-pocket payments. Calculating the incidence rate ratio, which is obtained by applying the exponential function to the Poisson coefficient (exp(coefficient)), we see that the out-of-pocket payments are lower (<1) for patients residing in the intervention areas. For intervention A, the incidence rate ratio is 0.79 (=exp(–0.241)) indicating that expanded health insurance reduces out-of-pocket payments by 21 percent ((1 – 0.79)*100; p=0.066). Intervention B reduces out-of-pocket payments by about 24 percent (=(1 – exp(–0.274))*100; p=0.017). We note that the magnitudes of the Poisson incidence rate ratios are in line with the coefficient estimates from the linear model and the average out-of-pocket spending across the three sites (See Table 2). Comparing the average out-of-pocket payments of 2,212 pesos ($\approx$ 50.2 US$) to the reduction in out-of-pocket payments of 558 pesos ($\approx$ 12.7 US$) induced by intervention A, this corresponds to a 30 percent decline in OOP spending. The reduction of 638 pesos ($\approx$ 14.5 US$) in out-of-pocket payments for intervention B corresponds to a 29 percent decline relative to the average OOP expenditures. These findings provide support for propositions 1 and 2. First, we present evidence that in the Philippines out-of-pocket spending declined due to increased insurance coverage. Second, we show that provider-based incentives leading to increased hospital quality can similarly reduce the economic burden of OOP spending for poor households.

The total medical charges resulting from the child hospitalization are also lower in intervention areas with the point estimates significant at 9.6 and 10.5 percent for interventions A and B, respectively. From the Poisson regressions, we obtain more precise estimates confirming that patients who utilized intervention A and B hospitals face lower overall charges. Although, we cannot determine which intervention is overall less costly because the coefficient estimates are statistically identical (*p*-value= 0.637), we can say that the QIDS supply side intervention, which improves the quality of care through a pay-for-performance

scheme, reduces OOP and total medical charges as much as the expanded health insurance policy.

To further disentangle the cost structure associated with the hospitalization, we separately looked at expenditures incurred inside and outside the hospital. Results show that the reductions in charges are driven by lower charges outside the hospital (See Table 3, Columns 3 to 8). Charges inside the hospital are not significantly affected by the interventions; the coefficient associated with intervention A is negative (p=0.696) whereas the coefficient associated with intervention B is positive (p=0. 573). It is not possible to say, from this analysis, whether this suggests that there is no insurance-based discrimination or even that that there is no unmet demand. Other QIDS studies such as Quimbo et al. (2011) indicate improved health status in intervention A sites, suggesting that unmet needs is not a concern. However, charges incurred outside the hospital decrease by 436 pesos ($\approx$ 9.9 US$) for intervention A and 565 pesos ($\approx$ 12.8 US$) for intervention B. Consistent with the findings for OOP, outside hospital charges are similarly affected by the two interventions. The coefficient estimates associated with interventions A and B are similar (p=0.436). Further support for this finding comes again from the Poisson model. For intervention A, we observe an incidence rate ratio of 0.56 (=exp(–0.578)) indicating that expanded health insurance decreased outside hospital charges by 44 percent (=(1 – 0.56)*100). Similarly, for intervention B outside hospital charges decrease by 55 percent (=(1 – exp(–0.799))*100). Again, the coefficient estimates are not significantly different from each other (p=0.441). We note that this reduction in outside hospital charges does not necessarily indicate a decline in the prices of medical services outside the hospital but rather shows a reduction in demand as more services are now directly utilized within the hospital. The combined findings about inside and outside hospital charges clarify Proposition 3, which hypothesized that the two interventions would increase inside hospital spending—they did not—but concomitantly reduce expenditures outside the hospital—they did.

Finally, to test Proposition 4, we examined to what extent the reduced out-of-pocket payments resulting from intervention A and B induced changes in other household expenditures. We find that per capita health expenditures that are not linked to the hospitalization under study are lower in intervention sites (See Table 4, Columns 3 and 4). Expanded insurance reduces per capita monthly health expenditures by 75 pesos ($\approx$ 1.7 US$) compared with the bonus intervention, which reduces per capita health expenditures by 47 pesos per month ($\approx$ 1.1 US$). This difference is statistically significant at the 10 percent level (p=0.056). Again, the Poisson model supports these results and indicates a reduction in

overall OOP expenditures by almost 60 percent as a consequence of Intervention A. Intervention B similarly reduces OOP expenditures namely by 42 percent. The results are statistically different indicating a larger protection by the expanded insurance mechanism (p=0.047).[11]

We also looked at the impacts of the expanded insurance and pay-for-performance on spending on preventive care, which is measured as the combined costs for toiletries, water and sanitation (See Table 4, Columns 5 and 6). We find that households benefitting from interventions A and B spend more on personal hygiene with per capita monthly spending on these products rising by 41 ($\approx$ 0.9 US$) and 27 pesos ($\approx$ 0.6 US$), respectively. While these increases in spending on hygiene appear small, in our study sites they are sufficient to purchase additional clean water. Moreover, they are measured on a monthly per capita basis and represent thus a substantial improvement for poor and marginalized households. With an incidence rate ratio between 1.40 and 1.61, the Poisson model confirms these findings revealing that the expanded health insurance intervention and the quality-performance intervention increase spending on water and hygiene and underscoring that these increases amount to roughly a 40 to 60 percent increase in hygiene spending relative to the control group. The results are statistically significant at the 10 percent level and equality of the coefficient estimates cannot be rejected (p=0.341) indicating that interventions A and B similarly trigger a resource reallocation towards preventive care.

We further considered the impact of the interventions on household expenditures for items such as food consumption, education, and durable goods (See Table 5). Across specifications and expenditure categories we do not find significant intervention effects. Thus, the freed up resources from reduced out-of-pocket payments do not appear to be re-allocated to these other expenditure groups. The results support Proposition 4 that suggested a trade-off between curative and preventive health spending and consumption spending: We do not find any impact on consumption spending, instead, a reallocation between preventive and curative care.

Concerning the role of co-variates in the empirical specifications, we observe the expected patterns. The gender of the child patient does not influence the amounts spent on hospital care. However, the age variable expectedly shows that there are higher out-of-pocket payments made for younger children. The treatment of pneumonia is more costly than diarrhea (excluded category). While household size and composition have negligible impacts

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[11] The impact of intervention A is calculated based on the coefficient estimates reported in Column 4 of Table 3: (1–exp(–0.885))*100. Similarly the impact of intervention B is derived as (1–exp(–0.546))*100.

on the out-of-pocket expenditures in the acute case, the larger the household the lower per capita spending on health and preventive health care. Similarly, the more young dependents there are in the household, the lower the per capita health care expenditures. Expectedly, maternal education increases investments in health and prevention, as does income.

Overall, our results clearly show that the insurance as well as the bonus intervention are expenditure-reducing for the patient in both the short- and long-run, as out-of-pocket payments decline, less outside hospital charges are incurred, and resources are freed up for preventive health care. These finding hint at new avenues for inclusive health care and financial protection of the poor in developing countries—while demand side interventions to reduce financial burden appear to be more familiar in the current debate about inclusive public health care schemes, supply side interventions such as QIDS' bonus scheme have the important advantage that targeting providers is easier than households.

7. Conclusion

The QIDS experiment provided a unique opportunity to contrast the effectiveness of a demand- and supply-side intervention in providing financial risk protection to poor households. Both the expanded insurance and quality incentive intervention groups had lower out-of-pocket payments compared to the controls. There was a 21 percent decline in OOP spending (p=0.072) due to intervention A and a 24 percent decline in OOP spending (p=0.028) due to intervention B with no statistical difference between intervention A and B. Similarly, total medical charges were lower in intervention areas compared to controls and not different between intervention sites. These reductions in medical charges were driven by lower charges outside the hospital (no differences seen in inside hospital charges comparing interventions to control). The considerable reductions in total medical resulting from the two interventions suggest that all services can be obtained inside the hospitals without incurring additional OOP payments outside the hospital.

Moreover, intervention households reported lower overall curative health expenditures over the preceding six months indicating that the households may be more aware of preventive measures and more inclined to employ preventive care when they are financially protected against adverse health events. This was further supported by increased spending on preventive health care as captured by purchase of clean water and hygiene-related expenditures. Although, we do not find any significant changes in food expenditures, nor are expenditures for education and durable goods affected, the redistribution of resources

suggests that freed-up household resources due to reduced out-of-pocket payments may have long-term implications on household health as households seem to spend these resources on health goods that prevent infectious diseases, namely, water, sanitation, and toiletry articles.

The implications of this study are important since health care expenditures continue to contribute to poverty across the world (van Doorslaer et al. 2006, Xu et al., 2007). Coping mechanisms, which help households deal with the costs of illness, are strikingly similar across countries: households rely on intra-household reallocations, loans and the sale of productive assets and buffer stocks. In Burkina Faso, for example, households cope with medical expenses by selling livestock and with the labor loss by intra-household labor substitution (Sauerborn et al. 1996). With illness, a household's economic burden is exacerbated because the loss of productive assets reduces the household's resilience to risk and the substituted labor cannot fully replace the ill member as production losses mount. In Thailand, when households face a disease episode and resulting health expenditures, they are able to smooth consumption, and avoid pecuniary debt by drawing on buffers such as savings and liquidating assets (Sparrow et al. 2013a). Both cases exemplify the huge economic burden faced by the poor when incurring health care expenditures. Therefore, it is high time to assess and compare effective social policies to mitigate further impoverishment of poor and marginalized households in developing countries.

One of the biggest advantages of the study at hand is the ability to experimentally compare two different social policy interventions to protect the poor from high health care expenditures. Interestingly, we found similar impacts from both the demand- and the supply-side health care intervention with no significant differences between the two policies. As hypothesized, the insurance scheme reduces out-of-pocket payments. The finding highlights that it is possible to implement health insurance reforms in developing countries that lead to increased financial protection of the insured. This is a particularly important finding as existing research about out-of-pocket payments shows that health insurance does not necessarily lead to lower health spending at the household level due to moral hazard by the doctors and hospitals (Dutta and Husain, 2012; Yip and Hsiao, 2009; Hsiao, 2008). In addition, we also find evidence indicating that insurance-based health reforms are not the only way to financially protect patients in developing countries. It appears that improved quality due to provider-based incentives also protects households from the financial risk of illness. It appears that the QIDS pay-for-performance scheme improves the clinical skills of doctors thereby reducing unnecessary prescriptions of drugs and medical tests and thus reducing out-of-pocket payments. The quality intervention, by reducing spending outside the hospital,

arguably, also increases hospital accountability for service and health outcomes. The pathway for the provider-based intervention is improved quality for in and outpatient care.

With both interventions implemented and financed by the National Health Insurance Program, the study at hand challenges the current surge for health insurance expansion in developing countries and suggests paying increased attention to supply-side interventions will have similar impacts with operational simplicity and greater provider accountability.

We hope that an improved understanding of the impacts of both demand-side, insurance-based reforms and supply-side, provider payment reforms helps quell the uncertainty over how to provide financial protection to the poor.

Acknowledgments

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Appendix: Tables

	Overall Sample		Access		Bonus		Control		Difference in means (A-C) p-value	Difference in means (B-C) p-value	Difference in means (A-B) p-value
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.			
Dependents 0-14 years (ratio)	1.178	0.636	1.175	0.605	1.149	0.579	1.173	0.657	0.952	0.550	0.494
Dependents 65+ (ratio)	0.046	0.141	0.048	0.130	0.036	0.103	0.048	0.157	0.980	0.149	0.111
Duration of stay	4.306	3.640	4.251	1.803	4.200	2.054	4.094	1.969	0.211	0.417	0.694
Child had pneumonia	0.494	0.500	0.472	0.500	0.501	0.501	0.497	0.501	0.455	0.896	0.378
Child had diarrhea	0.506	0.500	0.528	0.500	0.499	0.501	0.503	0.501	0.455	0.896	0.378
Child is female	0.435	0.496	0.412	0.493	0.445	0.497	0.430	0.496	0.566	0.659	0.311
Age of the child (in months)	19.930	12.282	19.978	12.810	19.367	12.079	19.916	12.586	0.942	0.494	0.456
Maternal education	8.841	3.219	8.975	3.167	8.846	3.324	8.576	3.340	0.064	0.214	0.544
Per capita monthly income	1,054.819	1,360.710	1,048.707	1,023.989	999.141	1,065.924	890.948	1,444.100	0.058	0.189	0.471
Household size	5.790	2.197	5.727	2.308	5.816	2.301	5.668	2.098	0.686	0.301	0.556

Baseline characteristics

Table 1: Descriptive statistics of control variables, the total number of observations is 3,121. Balancing of baseline characteristics across the two interventions and the control group are presented in Columns 3 to 8. The last three columns present the *p*-value of the associated difference in means tests. The number of baseline observations in Access/Bonus/Control are 447/479/467 child patients, respectively.

| | Overall Sample | | Comparison of means after the intervention | | | | | | Difference in means (A-C) p-value | Difference in means (B-C) p-value | Difference in means (A-B) p-value |
| | | | Access | | Bonus | | Control | | | | |
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.			
OOP	2,212.428	1,654.859	2,249.550	1,679.152	2,188.876	1,599.459	2,667.899	1,774.829	0.000	0.000	0.528
Total medical charges	2,099.620	1,596.704	2,250.008	1,542.618	2,384.375	1,778.317	2,455.374	1,630.074	0.028	0.483	0.168
Charges inside the hospital	1,422.550	1,271.020	1,562.851	1,279.145	1,873.651	1,662.934	1,459.436	1,221.331	0.161	0.000	0.000
Charges outside the hospital	677.070	833.604	687.157	652.763	510.725	517.493	995.938	1,090.877	0.000	0.000	0.000
Health expenditures pc/m	88.242	113.547	79.977	92.674	104.572	117.190	128.111	172.952	0.000	0.008	0.000
Hygiene, water and sanitation expenditures pc/m	81.959	118.649	98.124	228.364	75.758	71.792	74.205	69.836	0.018	0.712	0.026
Food consumption pc/m	551.733	351.359	563.035	402.413	545.669	302.817	590.765	384.375	0.234	0.032	0.419
Expenditures for durable goods pc/m	58.823	296.892	69.430	494.010	32.148	114.892	65.414	185.153	0.856	0.000	0.078
Education expenditures pc/m	28.392	87.095	31.905	96.334	27.817	123.094	36.563	87.394	0.392	0.169	0.528
Transport and communication expenditures pc/m	56.467	91.977	66.449	101.776	55.033	83.873	64.801	116.679	0.799	0.106	0.038

Table 2: Descriptive statistics of the outcome variables, the maximum total number of observations is 3,121. "pc/m" refers to per capita and month at the household level. For the variables "Health expenditures pc/m" and "Hygiene, water and sanitation expenditures pc/m" only 3,073 and 3,064 observations are available, respectively. Similarly, for the variables "Food consumption pc/m", "Education expenditures pc/m" and "Expenditures for transport and communication pc/m" only 3,044, 3,073 and 3,082 observations are available, respectively. Comparison of means across the three groups after the interventions are put in place are presented in Columns 3 to 8. The last three columns present the *p*-value of the associated difference in means tests.

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	OOP		Total medical charges associated with the hospitalization		Charges inside the hospital		Charges outside the hospital	
	OLS	Poisson	OLS	Poisson	OLS	Poisson	OLS	Poisson
Access intervention	-558.043+	-0.241+	-559.629+	-0.289*	-123.365	-0.131	-436.264+	-0.578*
	(298.547)	(0.128)	(328.237)	(0.141)	(335.488)	(0.241)	(221.636)	(0.282)
Bonus intervention	-638.483*	-0.274*	-413.067	-0.223*	151.866	0.026	-564.932*	-0.799**
	(276.763)	(0.115)	(255.464)	(0.101)	(240.078)	(0.165)	(211.426)	(0.277)
Child is female	-26.931	-0.014	18.300	0.007	29.076	0.019	-10.776	-0.016
	(45.583)	(0.021)	(33.386)	(0.015)	(32.549)	(0.023)	(30.978)	(0.046)
Age of the child (in months)	-6.632**	-0.003**	-0.226	-0.001	0.638	0.000	-0.864	-0.002
	(2.135)	(0.001)	(1.985)	(0.001)	(1.773)	(0.001)	(1.173)	(0.002)
Duration of stay	69.994	0.011	86.128	0.013	68.961	0.014	17.168	0.011
	(66.329)	(0.037)	(71.081)	(0.041)	(54.677)	(0.043)	(16.696)	(0.037)
Child had pneumonia	493.804**	0.234**	601.553**	0.300**	397.725**	0.296**	203.828**	0.310**
	(75.040)	(0.030)	(77.192)	(0.034)	(46.303)	(0.036)	(44.971)	(0.055)
Maternal education	12.774	0.005	28.683*	0.012*	13.128+	0.009	15.555*	0.021*
	(9.572)	(0.005)	(11.074)	(0.006)	(7.658)	(0.006)	(5.850)	(0.009)
Per capita monthly income	0.044	0.000	0.052*	0.000*	0.056**	0.000**	-0.004	-0.000
	(0.030)	(0.000)	(0.022)	(0.000)	(0.018)	(0.000)	(0.012)	(0.000)
Household size	-7.750	-0.004	11.558	0.005	11.283	0.007	0.275	-0.001
	(10.053)	(0.005)	(7.923)	(0.004)	(8.044)	(0.005)	(4.875)	(0.007)
Dependents 0-14 years (ratio)	-56.323	-0.024	101.413*	0.046*	100.866**	0.071**	0.546	-0.002
	(41.394)	(0.018)	(39.766)	(0.018)	(31.587)	(0.021)	(19.170)	(0.029)
Dependents 65+ (ratio)	382.890+	0.148*	441.828*	0.171**	268.446**	0.176*	173.382	0.158
	(204.397)	(0.068)	(166.762)	(0.053)	(95.933)	(0.077)	(167.997)	(0.133)
Round dummy	731.222**	0.323**	876.928**	0.445**	430.403*	0.356*	446.525*	0.591**
	(188.255)	(0.056)	(207.396)	(0.079)	(192.473)	(0.145)	(183.749)	(0.187)
Observations	3,121	3,121	3,121	3,121	3,121	3,121	3,121	3,121
Hospitals	30	30	30	30	30	30	30	30
FE	yes	yes	yes	yes	yes	yes	yes	yes

Table 3: Regression results for out-of-pocket expenditures, the total medical charges associated with the hospitalization, charges inside and outside the hospital. The standard errors of the linear regression model are clustered at the hospital level, the standard errors of the Poisson model are cluster-bootstrapped at the hospital level with 500 replications. +/*/** indicates significance at the 10/5/1 percent level, respectively

	OOP		Health expenditures per capita/month		Hygiene, water and sanitation expenditures per capita/month	
	OLS	Poisson	OLS	Poisson	OLS	Poisson
Access intervention	-558.043+	-0.241+	-75.377**	-0.885**	41.472*	0.474*
	(298.547)	(0.128)	(25.697)	(0.235)	(17.674)	(0.211)
Bonus intervention	-638.483*	-0.274*	-46.810+	-0.546*	27.413+	0.333+
	(276.763)	(0.115)	(26.400)	(0.238)	(16.018)	(0.199)
Child is female	-26.931	-0.014	0.462	0.004	-0.522	-0.011
	(45.583)	(0.021)	(2.956)	(0.031)	(3.263)	(0.037)
Age of the child (in months)	-6.632**	-0.003**	0.264	0.003	-0.319*	-0.004**
	(2.135)	(0.001)	(0.183)	(0.002)	(0.131)	(0.001)
Duration of stay	69.994	0.011	0.954	0.005	0.515	0.006
	(66.329)	(0.037)	(1.001)	(0.022)	(0.510)	(0.011)
Child had pneumonia	493.804**	0.234**	16.490**	0.186**	-2.099	-0.027
	(75.040)	(0.030)	(4.562)	(0.044)	(4.546)	(0.055)
Maternal education	12.774	0.005	2.776**	0.038**	4.950**	0.074**
	(9.572)	(0.005)	(0.626)	(0.007)	(0.629)	(0.007)
Per capita monthly income	0.044	0.000	0.007*	0.000**	0.014**	0.000**
	(0.030)	(0.000)	(0.003)	(0.000)	(0.004)	(0.000)
Household size	-7.750	-0.004	-9.225**	-0.132**	-5.293**	-0.085**
	(10.053)	(0.005)	(0.799)	(0.009)	(1.238)	(0.014)
Dependents 0-14 years (ratio)	-56.323	-0.024	-6.441*	-0.073*	-7.731*	-0.110*
	(41.394)	(0.018)	(2.526)	(0.029)	(3.752)	(0.056)
Dependents 65+ (ratio)	382.890+	0.148*	18.619	0.109	0.227	0.016
	(204.397)	(0.068)	(13.620)	(0.146)	(8.959)	(0.100)
Round dummy	731.222**	0.323**	76.466**	0.908**	-22.374	-0.245
	(188.255)	(0.056)	(24.012)	(0.198)	(14.373)	(0.176)
Observations	3,121	3,121	3,073	3,073	3,064	3,064
Hospitals	30	30	30	30	30	30
FE	yes	yes	yes	yes	yes	yes

Table 4: Regression results for out-of-pocket expenditures, health expenditures per capita/ month at the household level, and hygiene, water and sanitation expenditures per capita/ month. The standard errors of the linear regression model are clustered at the hospital level, the standard errors of the Poisson model are cluster-bootstrapped at the hospital level with 500 replications. +/*/** indicates significance at the 10/5/1 percent level, respectively.

	OOP		Food consumption		Education expenditures		Expenditures for durable goods	
	OLS	Poisson	OLS	Poisson	OLS	Poisson	OLS	Poisson
Access intervention	-558.043+	-0.241+	-58.646	-0.122	-2.026	-0.145	11.131	-0.041
	(298.547)	(0.128)	(60.324)	(0.123)	(9.109)	(0.315)	(29.239)	(0.521)
Bonus intervention	-638.483*	-0.274*	-91.507	-0.177	-0.075	0.052	-40.553	-0.786
	(276.763)	(0.115)	(64.342)	(0.119)	(7.461)	(0.282)	(35.133)	(0.633)
Child is female	-26.931	-0.014	3.524	0.008	-10.501**	-0.382**	0.139	-0.018
	(45.583)	(0.021)	(12.971)	(0.023)	(3.315)	(0.110)	(11.810)	(0.196)
Age of the child (in months)	-6.632**	-0.003**	0.336	0.001	0.322*	0.012**	0.523	0.007
	(2.135)	(0.001)	(0.316)	(0.001)	(0.151)	(0.005)	(0.575)	(0.007)
Duration of stay	69.994	0.011	-0.885	-0.001	-0.153	-0.006	1.183	0.013
	(66.329)	(0.037)	(0.984)	(0.004)	(0.150)	(0.019)	(1.875)	(0.054)
Child had pneumonia	493.804**	0.234**	7.756	0.012	4.238	0.145	1.831	0.011
	(75.040)	(0.030)	(11.409)	(0.020)	(3.611)	(0.108)	(9.706)	(0.141)
Maternal education	12.774	0.005	15.339**	0.033**	3.128**	0.142**	6.754**	0.183**
	(9.572)	(0.005)	(2.470)	(0.004)	(0.629)	(0.019)	(2.112)	(0.035)
Per capita monthly income	0.044	0.000	0.060**	0.000**	0.011**	0.000**	0.038**	0.000**
	(0.030)	(0.000)	(0.009)	(0.000)	(0.004)	(0.000)	(0.010)	(0.000)
Household size	-7.750	-0.004	-27.299**	-0.058**	7.441**	0.207**	1.844	-0.028
	(10.053)	(0.005)	(3.086)	(0.006)	(0.836)	(0.018)	(2.017)	(0.034)
Dependents 0-14 years (ratio)	-56.323	-0.024	-27.779*	-0.057*	-8.080*	-0.227**	-11.381+	-0.287*
	(41.394)	(0.018)	(13.008)	(0.025)	(2.970)	(0.082)	(5.602)	(0.115)
Dependents 65+ (ratio)	382.890+	0.148*	43.595	0.067	-7.591	-0.360	-66.371*	-1.306*
	(204.397)	(0.068)	(54.054)	(0.091)	(9.990)	(0.384)	(25.314)	(0.519)
Round dummy	731.222**	0.323**	71.358	0.145+	7.110	0.314	-4.035	0.066
	(188.255)	(0.056)	(43.801)	(0.082)	(5.989)	(0.220)	(21.932)	(0.397)
Observations	3,121	3,121	3,044	3,044	3,073	3,073	3,121	3,121
Hospitals	30	30	30	30	30	30	30	30
FE	yes	yes	yes	yes	yes	yes	yes	yes

Table 5: Regression results for out-of-pocket expenditures, food consumption per capita/month, and expenditure for education and durable goods both in per capita/month terms. The standard errors of the linear regression model are clustered at the hospital level, the standard errors of the Poisson model are cluster-bootstrapped at the hospital level with 500 replications. +/*/** indicates significance at the 10/5/1 percent level, respectively.