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Does health insurance mitigate inequities in non-communicable disease treatment? Evidence from 48 low- and middle-income countries

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Abstract

Non-communicable diseases (NCDs) are the greatest contributor to morbidity and mortality in low- and middle-income countries (LMICs). However, NCD care is limited in LMICs, particularly among the disadvantaged and rural. We explored the role of insurance in mitigating socioeconomic and urban-rural disparities in NCD treatment across 48 LMICs included in the 2002–2004 World Health Survey (WHS). We analyzed data about ever having received treatment for diagnosed high-burden NCDs (any diagnosis, angina, asthma, depression, arthritis, schizophrenia, or diabetes) or having sold or borrowed to pay for healthcare. We fit multivariable regression models of each outcome by the interaction between insurance coverage and household wealth (richest 20% vs. poorest 50%) and urbanicity, respectively. We found that insurance was associated with higher treatment likelihood for NCDs in LMICs, and helped mitigate socioeconomic and regional disparities in treatment likelihood. These influences were particularly strong among women. Insurance also predicted lower likelihood of borrowing or selling to pay for health services among the poorest women. Taken together, insurance coverage may serve as an important policy tool in promoting NCD treatment and in reducing inequities in NCD treatment by household wealth, urbanicity, and sex in LMICs.

Keywords

Health insurance; Non-communicable diseases; Low and middle income countries; Health disparities; Healthcare

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1. Introduction

Non-communicable diseases (NCDs) account for the greatest share of the worldwide burden of morbidity and mortality [1,2]. Upwards of 80% of that burden occurs in low- and middle-income countries (LMICs) [3]. Annually, nearly 8 million people die of NCDs before the age of 60 in LMICs [2], and the burden of NCDs is only expected to grow: estimates suggest a potential increase in the burden of NCDs in LMICs of nearly 17% overall, and up to 27% in some regions, including sub-Saharan Africa [4]. For example, a recent World Health Organization (WHO) report on NCD morbidity, mortality, and risk factors showed that in Nigeria, sub-Saharan Africa's most populous country, the number of deaths caused by NCDs increased by nearly 100,000 annually between the years 2000 and 2012 [4].

Addressing the burden of NCDs in LMICs has emerged as a major health policy target, as evidenced by the “25 × 25” initiative to reduce mortality to NCDs by 25% by the year 2025, as well as the prominent role that addressing NCD morbidity and mortality has taken in the WHO's Global Health Action plan, 2013–2020 [5,6]. Importantly, universal health coverage has been promoted as a mechanism to ensure equitable, high quality health services to address the growing burden and sequelae of NCDs in LMICs without overwhelming financial hardship for individuals or families [7–9].

Importantly, the burden of disease and disability due to NCDs is not borne equitably within LMICs [10–12]. Although NCDs in LMICs were once thought to be limited to urban and wealthy populations, emerging evidence suggests that socioeconomically disadvantaged groups have higher prevalence of these conditions and experience poorer outcomes relative to their more advantaged counterparts [13–16]. An important mechanism by which these health inequities may arise is via differences in access to preventive and curative health services. NCDs are often chronic, with long latency periods prior to the onset of symptoms, and slow natural histories after symptoms have developed. They therefore require regular access to healthcare to prevent clinical progression and treat complications.

However, a substantial proportion of people living in LMICs remain without access to health services, either because service facilities are lacking, or because residents lack the financial means to access them. When they do obtain care, they are often forced to borrow or sell scarce resources to pay for services [17–20]. This challenge is particularly acute in rural LMIC settings [18,20]. For example, one study representing 3.66 billion residents of LMICs, 58% of the global population, found that more than 1 in 4 households reported having to borrow money or sell household items to pay for health services—a substantial financial burden on these households [17].

Universal health coverage is defined by the WHO as “[ensuring] that all people obtain the health services they need without suffering financial hardship when paying for them” [21]. A recent Lancet commission stressed that universal health coverage will be an important mechanism to achieve a “grand convergence” in infectious, child, and maternal mortality between low and high-achieving middle-income countries and will be essential to addressing NCDs in LMICs, as well [7]. In particular, the commission recommended an essential package of clinical interventions that is largely financed through public health insurance to address the growing burden of NCDs [7].

However, while universal health coverage has been promoted as an important step toward improving uptake of prevention and treatment interventions in LMICs, there remains an important gap in the evidence for the role of insurance in reducing differences in treatment by wealth and urbanicity. In particular, little is known about the influence of health insurance coverage in addressing the systematic inequities in uptake of NCD treatment between rich and poor and urban and rural residents. We used data from 48 LMICs from the World Health Surveys (WHS) to consider the influence of insurance coverage on inequities in NCD treatment uptake by socioeconomic position and urbanicity among those with diagnosed NCDs.

2. Methods

2.1. Data

We used data from the 2002-2004 WHS which was conducted by WHO to compile comprehensive baseline population health information, monitor health outcomes, and inform future health system investments [22]. Seventy countries participated in the survey, representing all regions of the world and including low-, lower-middle, upper-middle, and high-income countries. Each country used complex sampling methods and provided sampling weights to allow national representation for country-level inference. Surveys were conducted at the household level. Households were included in the survey if an individual 18+ years was available for participation. The household survey assessed household characteristics, including insurance and wealth, and individual-level characteristics for the household's respondent, including sociodemographic information, health state descriptions, health care utilization, and health system responsiveness, among other data. Detailed descriptions of WHS design are available elsewhere [23].

From the full sample, the following exclusion criteria were applied for this analysis: we excluded participants from countries that were categorized as high-income by 2003 World Bank country income classifications ($n = 20$; Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, United Arab Emirates, and the United Kingdom) and 2 countries that either did not provide survey weights (Guatemala) or did not collect insurance data (Latvia), as our focus was on LMICs. Within the remaining 48 countries ($N = 253,864$ households), we further excluded households that had insufficient asset data to construct our household wealth measure ($n = 20,525$ households, 8.1%), were missing insurance data ($n = 41,340$, 16.3%), or were missing survey weights ($n = 1,611$, 0.6%), with some overlap. Overall, we excluded 55,950 (22.0%) participants from eligible countries due to missing data. These participants did not differ significantly by any outcomes or predictors in this analysis. The final analytic sample included 197,914 respondents from 22 low-income, 17 lower-middle, and 9 upper-middle countries, using World Bank 2003 income classifications (Table 1) [24]. We also report in Table 1 each country's gross domestic product (GDP) per capita and health insurance coverage type in 2003, classified as either government or private, where government describes countries where most or all health services, including primary care, are provided by the government (even if private or NGO sector services may exist in parallel and some out-of-pocket expenses may exist). Countries labeled private included any

countries with no or minimal services provided by the government, or where only limited health services were provided by the government (e.g., for maternal and child health, HIV/AIDS care, vaccinations, or for special groups such as children, elderly, impoverished). For these countries, most primary health care would have been paid for by private insurance or out-of-pocket [25].

For the present analysis, we were interested in the influence of insurance coverage on treatment uptake among those carrying NCD diagnoses as well as its financial consequences. For our treatment outcome variables, we used response to the question: “Have you ever been treated for X?” where X included angina, asthma, depression, arthritis, schizophrenia, or diabetes (this includes all NCD outcomes for which data were available in the WHS). Analyses for treatment seeking were restricted to those who reported having ever received a diagnosed of X. Additional treatment uptake outcomes included dental care (of those who had problems with mouth and/or teeth in the past 12 months, “did you receive any medical care or treatment from a dentist or other oral health specialist?”); and among female respondents, facility delivery (“where did you give birth to [name of youngest born child in the last 5 years]?”), categorized as “delivered in a facility” if a respondent reported hospital, maternities or other type of health facility). Lastly, we created one outcome to measure the financial consequences of treatment, using the question: “In the last 12 months, which of the following financial sources did your household use to pay for any health expenditures?” We compared households that either sold items (e.g., furniture, animals, jewelry, etc.) or borrowed from someone other than a friend or family to pay for health expenses to those that reported neither selling nor borrowing.

Insurance status of the household main respondent was determined by self-report, using the following question: “Is this person covered by any kind of health insurance plan?” We constructed country-specific relative household wealth indices using principal components analysis of a set of 15–20 household asset questions unique to each country, discussed in detail elsewhere [26]. Households in the bottom 50 percentile by household wealth index were compared with those in the top 20 percentile for socioeconomic difference assessments to compare the most advantaged to the ‘bottom half’ of the population. And those resident in rural contexts were compared to those resident in urban contexts. The following variables were included as potential confounders in multivariable analyses: sex, age (continuous), marital status (currently married or cohabiting vs. other), education (completed secondary or higher vs. other), and country-level fixed effects. These were selected on the basis of literature showing associations with health care utilization [27–29].

We analyzed secondary data in the public domain available from the WHO. This study was therefore exempt from IRB review requirements.

2.2. Analysis

We fit Poisson regression models, stratified by sex, to calculate the association between insurance, household wealth, urbanicity, and each outcome, both crude as well as adjusted for all relevant covariates and for country-level fixed effects (model 1) [26]. We also fit two additional models, stratified by sex, to consider interaction terms: The first featured an interaction term between insurance (uninsured relative to insured) and household wealth

(bottom 50% relative to top 20%) to explore the differential influence of insurance status across household wealth strata (model 2), and the second featured an interaction term between insurance (uninsured relative to insured) and urbanicity (rural vs urban) to explore the differential influence of insurance status across urbanicity strata (model 3). For each of these, we calculated the ratio of the adjusted probability ratios—a measure of the degree to which the influence of insurance was different across household wealth strata, as indicated by Knol and Vander-Wheele [30].

All models were twice weighted using country-specific survey weights based on each country's unique sampling design. We also weighted data from each country by the inverse proportion of its sample size relative to the over-all size of the sample included in the analysis to correct for imbalance in sample size across countries (i.e., all countries contributed equally to the final analysis irrespective of survey sample size). We used robust variances using Taylor series linearization and included dummy variables for each country to adjust for unobserved country-level factors, such as government health insurance, that may influence the outcome of individuals.

Next, we calculated the predicted probability (PP) of each of the treatment uptake outcomes, stratified by sex, conditional on insurance status, socioeconomic position, and urbanicity, using coefficients resulting from the regression models described above with significant interaction effects. We estimated PPs for a man as well as a woman of median age, unmarried status, with less than secondary education, with variable insurance status, household wealth (model 2), and urbanicity (model 3). Finally, using PP calculations, we calculated an 'attributable benefit to insurance' for each treatment uptake outcome stratified by socioeconomic position and urbanicity. Attributable benefit was here defined as the degree to which insurance coverage mitigated treatment gaps by household wealth (lowest 50% compared to highest 20%) or urbanicity (rural vs. urban) relative to 100% coverage where such gaps were observed (Eq. (1)).

$$\text{Attributable Benefit} = \frac{(\text{Treatment}_{\text{insured}} - \text{Treatment}_{\text{uninsured}})}{(1 - \text{Treatment}_{\text{uninsured}})} \quad (1)$$

All analyses were conducted using Stata v12 (StataCorp, College Station, TX), and survey weights were applied using the Complex Survey Weights function.

3. Results

Table 2 shows demographic predictors, insurance status, and treatment uptake among the 197,914 respondents included in our analysis. In bivariate analysis, older age, unmarried status, secondary education, urban residence, and greater household wealth predicted significantly higher likelihood of insurance. Insurance status was associated with significantly higher likelihood of diagnosis of any chronic condition, diabetes, and dental problems. More pertinently, uninsured status was associated with significantly lower likelihood of treatment for all outcomes save diabetes mellitus. Among women, uninsured status predicted higher likelihood of having delivered a child in the past 5 years, and a lower

likelihood of having delivered in a health facility among those who had delivered. In addition, uninsured patients were significantly more likely to have borrowed money or sold items to pay for health expenses in the past year.

Table 3 shows unadjusted and adjusted probability ratios (PRs) for selected treatment outcomes resulting from survey-weighted Poisson models of each outcome by insurance status, household wealth and urbanicity, adjusted for demographic covariates and country-level fixed effects and stratified by sex. In adjusted models among men, the uninsured had lower likelihood of treatment for depression (0.59, 95% CI 0.37–0.92), but higher likelihood of treatment for diabetes (1.22, 95% CI 1.05–1.42). The poorest 50% were significantly less likely to receive treatment for dental problems (0.77, 95% CI 0.69–0.87), and significantly more likely to sell or borrow to pay for health expenses (1.48, 95% CI 1.31–1.67). Those living in rural contexts were significantly more likely to have sold or borrowed to pay for health services (1.58, 95% CI 1.28–1.96). Among women, the uninsured were significantly less likely to receive treatment for asthma (0.92, 95% CI 0.86–0.98), schizophrenia (0.57, 95% CI 0.47–0.69), and dental problems (0.85, 95% CI 0.75–0.97). The poorest 50% were significantly less likely to receive treatment for angina (0.88, 95% CI 0.81–0.95), asthma (0.94, 95% CI 0.89–0.99), depression (0.81, 95% CI 0.72–0.92), dental problems (0.81, 95% CI 0.72–0.91), and to deliver in a health facility (0.78, 95% CI 0.67–0.92). The poorest 50% of women were also significantly more likely to sell or borrow to pay for health services (1.81, 95% CI 1.43–2.29). Those living in rural contexts were significantly less likely to deliver in a health facility (0.75, 95% CI 0.63–0.89), and significantly more likely to have sold or borrowed to pay for health services (1.37, 95% CI 1.15–1.63).

Table 4a shows differences in the probability of treatment across insurance strata and household wealth strata. Where significant, the ratio of adjusted probability ratios specifies the difference in the influence of insurance on treatment likelihood among the wealthiest 20% compared to the poorest 50%. These were significant for asthma (0.78, 95% CI 0.68–0.89) and depression (0.49, 95% CI 0.32–0.75) among men. Among women, they were significant for any chronic condition (0.83, 95% CI 0.76–0.91), asthma (0.83, 95% CI 0.72–0.96), depression (0.74, 95% CI 0.66–0.84), arthritis (0.82, 95% CI 0.71–0.94), schizophrenia (0.76, 95% CI 0.62–0.93), diabetes (0.67, 95% CI 0.49–0.93), delivery in a health facility (0.59, 95% CI 0.46–0.75), and borrowing or selling to pay for health services (0.58, 95% CI 0.40–0.83).

Table 4b shows adjusted probability ratios of treatment uptake from the interaction between insurance status and household wealth. The ratios of adjusted probability ratios compared differences in insurance impact on treatment likelihood among rural compared to urban residents. Among men, these were significant for depression (0.65, 95% CI 0.45–0.94), arthritis (0.88, 95% CI 0.80–0.97) and dental problems (0.84, 95% CI 0.77–0.92). Among women, these were significant for any chronic condition (0.89, 95% CI 0.84–0.95), diabetes (0.69, 95% CI 0.55–0.88), dental problems (0.79, 95% CI 0.71–0.89) and delivery in a health facility (0.70, 95% CI 0.57–0.87).

Table 5 shows predicted probabilities of treatment uptake for various NCDs conditional on diagnosis by household wealth and urbanicity, as well as attributable benefit calculations

(defined as the degree to which insurance coverage mitigated treatment gaps relative to 100%) among the poorest 50% and rural residents where there were both significant gaps and significant evidence of interaction (statistically significant ratio of adjusted prevalence ratios). Among men, the attributable benefit of insurance among the poorest 50% was 26.1% for asthma and 53.1% for depression. Among women, the attributable benefit of insurance among the poorest 50% was 33.1% for any chronic condition, 39.9% for asthma, 24.7% for depression, 22.5% for arthritis, 94.8% for schizophrenia, 19.4% for diabetes, and 21.1% for delivery in a health facility. Among men, the attributable benefit of insurance among rural residents was 53.4% for depression, 30.5% for arthritis, and 3.6% for dental problems. Among women, the attributable benefit of insurance among rural residents was 34.5% for any chronic condition, 100% for diabetes, 24.6% for dental problems, and 20% for delivery in a health facility.

4. Discussion

Our study of 197,914 respondents from 48 LMICs in the WHS yielded several important findings regarding socioeconomic inequities in treatment uptake for NCDs in LMICs, as well as the role of insurance in addressing them in these contexts. First, there was a clear gender imbalance in socioeconomic inequities in NCD treatment, with poorer women having the lowest likelihood of receiving treatment for NCDs. Second, insurance mitigated household wealth and urbanicity inequalities in NCD treatment among both men and women, but more so among women. Third, insurance was associated with lower likelihood of borrowing and selling to pay for health services among poor women. Taken together, our findings suggest that insurance coverage may serve as an important policy tool in promoting NCD treatment and reducing household wealth and urbanicity-based differences in access to care for residents, particularly women, in LMICs.

Our findings compare to the literature about the role of insurance in mitigating both inequities in NCD treatment as well as financial hardship in paying for health care in LMIC contexts, providing a more nuanced picture of the role that insurance may play. The literature about the role of insurance in NCD treatment is limited. One study by Wagner and colleagues analyzed data from the WHS, demonstrating that adults in households where all members had health insurance coverage were 38% more likely to seek care for chronic diseases [19]. Another study explored the influence of a Vietnamese national health insurance program on primary care usage among households in Vietnam [31], demonstrating an increase in use of community health centers, particularly among the ill. A similar study of the Vietnamese program showed consistent results [32].

Our findings were highly heterogeneous by sex. We found that differences were substantially more common, as well as larger where observed, among women as compared to men. Furthermore, insurance was substantially more likely to be effective in addressing differences among women than men. This is highly consistent with what is known about gender equality globally, particularly in LMICs. For example, a study by the World Economic Forum demonstrated that LMICs had high levels of inequity by sex across five key markers, including economic participation, economic opportunity, political empowerment, educational attainment, and health and wellbeing [33]. Women have been

shown to have higher risk of onset of NCDs and poorer access to health services. For example, one study in Pakistan demonstrated that risk behaviors for NCDs were more common and more likely to co-occur together among women compared to men [34]. Furthermore, a study in Zambia demonstrated that women were more likely to suffer diagnostic delays with tuberculosis [35]. Many of these differences, both broadly as well as health-specific, are thought to be the product of inequitable household-level allocation of responsibilities and resources that occur throughout the life course [36,37]. In this respect, mothers and daughters often bear more of the health-compromising responsibilities within a household, while being allocated fewer resources than their male counterparts [36,37].

We found that insurance significantly reduced the probability of borrowing or selling to pay for health services among poorest 50% of women, but not men. This suggests that, in the context of intra-household differences in the allocation of disposable resources by sex, insurance may be particularly important in providing access to health services among women while protecting them from the acute financial consequences of borrowing or selling to pay for care. However, this finding must be considered within the context of the low access to insurance (31% in our sample) and generally low levels of healthcare benefits in LMICs. We compared differences in the likelihood of borrowing or selling to pay for healthcare by insurance status among those who were in the wealthiest 20% to those in the poorest 50%, and the likelihood of borrowing or selling to pay for health services was greater than 10% even among the insured who were among wealthiest 20% of our sample, suggesting a high level of poverty and/or only partial insurance coverage of health care costs, which limits our ability to find a meaningful contrast in the protective influence of insurance across socioeconomic position.

Broadly, our work demonstrates that insurance may be an important tool to increase NCD treatment and protect against the harmful financial consequences of illness, particularly among the socioeconomically disadvantaged, rural residents, and women. In that respect, insurance is likely to serve as an important mechanism toward addressing socioeconomic and urbanicity differences in access and uptake of health services. Insurance schemes may operate to increase NCD treatment in multiple ways, particularly across varying health system arrangements. Because of the chronic nature of NCDs, and the costs of care associated with exacerbations, insurers are incentivized to promote and provide regular care for chronic NCDs to prevent more costly acute exacerbations, provided beneficiaries remain with the insurer over the medium- to long-term, as would be the case in government-financed insurance. Moreover, insurance presents a financial risk protection mechanism, with small, regular investments over time to protect against the health costs associated with unexpected health problems in the future.

The reader should interpret this work within the context of several limitations. Our work is observational, which has two important implications. First, it is plausible that those with chronic disease diagnoses may be more likely to purchase insurance as a result of a well-described adverse selection effect in the health insurance market [38], and therefore, some of the observation of higher levels of treatment uptake among the insured may reflect reverse causation. However, our findings demonstrating strong socioeconomic influences on insurance status suggest that this reverse causation is more likely to have occurred at the

upper household wealth strata, where the option to purchase insurance is more plausible. Second, although our analysis accounted for fundamental differences in socioeconomic position and urbanicity between insured and uninsured patients, and adjusted for other sociodemographic confounders, it remains possible that there may be residual confounding between insurance status and each of our outcomes. One important variable for which we were unable to adjust was the degree of morbidity or ‘need’ among respondents in our sample. We also lack reliable data about the nature (e.g., benefit package, reimbursement levels, and caps) of insurance coverage among our respondents, and there may be systematic differences in treatment uptake across different types of insurance and within different types of health systems for which we were unable to account here. Additionally, we restricted our analysis to individuals for whom full socioeconomic data was available, potentially inducing a small selection bias in our findings. However, given that the omitted respondents were not significantly different from other respondents on other variables and are more likely to have been poor and uninsured, this is likely to bias our findings toward the null, suggesting our findings are an underestimate of the true influences of insurance on treatment likelihood. Importantly, the data used here were collected in 2002–2004, and since then there have been important changes in the healthcare landscape in LMICs, including the advent of the 25 × 25 initiative, as well as the WHO’s Global Health Action Plan, 2013–2020. Nevertheless, these data are among the most recent, comprehensive global health surveys available, and continue to yield important insights into the dynamics of health service access in LMICs. Finally, it is important to note that we did not consider the influence of insurance status on mitigating inequities in health outcomes, but rather treatment uptake, even though treatment uptake may improve outcomes.

Nevertheless, our findings have several implications for research. First, investigators interested in the role of insurance in mitigating health inequities in LMICs may also consider differences in the outcomes explored here by insurance type, extent of coverage, and co-payment, as there are several reasons why these factors may influence the capacity of insurance to mitigate differences. For example, private insurance schemes, which rely on direct payments into insurance systems by the insured, may be unaffordable by the poor [39]. Similarly, co-payments involved in private insurance schemes, employed to prevent moral hazard issues in health insurance markets [40], are likely to be more arduous to pay for the poor, deterring care seeking in that group. Publicly financed health insurance with mandatory participation is a more promising avenue for promoting access to care and financial protection for the poor [7]. Second, although we assessed the role of insurance in mitigating inequities by socioeconomic position and urbanicity, we did not assess the role of insurance in influencing disparities in health outcomes among those with NCDs. Hence, future research could address the role of insurance coverage in mitigating socioeconomic and urban-rural differences in NCD outcomes, including NCD morbidity and mortality in LMICs. Third, future work may fruitfully explore the influence of health insurance on disparities in other healthcare metrics, including access to preventive services, disease screening, and patient satisfaction.

Ultimately, our findings suggest that improving insurance coverage, particularly among the disadvantaged, may help address inequities in treatment uptake among patients with NCDs in LMICs, and provide financial risk protection from the costs of illness. In that respect,

universal health coverage should continue to feature prominently in current efforts to address the growing burden of NCDs in LMICs. Taken together, our findings support the role of health insurance in mitigating the growing health and financial costs of NCDs in these contexts.

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Abbreviations

NCD	non-communicable diseases
LMICs	low- and middle-income countries
PP	predicted probability
AB	attributable benefit

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Table 1

List of low- and middle-income countries participating in the World Health Surveys, number of households included for analysis ($n = 197,914$), and the proportion of each country's population participating in the country survey, categorized by 2003 World Bank income classifications.

Low income					Lower-middle income					Upper-middle income				
Country	n^a	pop % ^b	GDP (USD) ^c	Insurance type	Country	n	pop %	GDP (USD) ^c	Insurance type	Country	n	pop %	GDP (USD) ^c	Insurance type
Bangladesh	2622	3.5	372	pvt	Bosnia and Herzegovina	1005	0.1	2148	gov't	Croatia	956	0.1	7806	gov't
Burkina Faso	4599	0.3	332	pvt						Czech Republic	849	0.3	9741	gov't
Chad	4052	0.2	294	pvt	Brazil	450	4.7	3040	gov't	Estonia	924	0.0	7166	gov't
Comoros	1647	0.0	557	pvt	China	3915	32.9	1274	gov't	Hungary	583	0.3	8365	gov't
Congo	1403	1.4	1039	pvt	Dominican Republic	4738	0.2	2345	gov't	Malaysia	5873	0.6	4427	gov't
Côte d'Ivoire	2496	0.4	812	pvt	Ecuador	1605	0.4	2442	pvt	Mauritius	3763	0.0	4588	gov't
Ethiopia	4425	1.7	120	pvt	Kazakhstan	4332	0.4	2068	gov't	Mexico	38,292	2.7	6601	gov't
Georgia	2692	0.1	922	gov't	Morocco	2113	0.8	1663	gov't	Slovakia	1613	0.1	8712	gov't
Ghana	3346	0.5	376	gov't	Namibia	3842	0.0	2489	pvt	Uruguay	2835	0.1	3622	gov't
India	7340	26.8	565	gov't	Paraguay	5221	0.2	1159	gov't					
Kenya	4067	0.8	440	pvt	Philippines	9913	2.2	1016	gov't					
Laos	4877	0.2	360	pvt	Russia	4233	3.7	2975	gov't					
Malawi	5226	0.3	198	gov't	South Africa	1849	1.1	3625	gov't					
Mali	4147	0.3	389	pvt	Sri Lanka	4751	0.5	985	gov't					
Mauritania	2583	0.1	433	pvt	Swaziland	1821	0.0	1704	pvt					
Myanmar	6032	1.1	255	pvt	Tunisia	4880	0.3	2790	gov't					
Nepal	305	0.7	258	gov't	Turkey	8303	1.7	4595	gov't					
Pakistan	4107	3.9	546	gov't	Ukraine	1080	1.2	1049	gov't					
Senegal	998	0.3	643	pvt										
Vietnam	3677	2.1	531	gov't										
Zambia	3914	0.3	450	pvt										
Zimbabwe	3620	0.3	452	pvt										

^a n is number of households included for analysis by country.

^b Pop % is the percentage of the total population of all countries included in the surveys comprised by that country's population in 2003 based on data from CIA World Factbook, which is used in survey response weighting.

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GDP per capita is expressed in US dollars (USD) and is based on World Bank 2003 income data.

This type describes the type of health insurance coverage in each country in 2003. Countries where most or all health services are covered by the government are labeled “gov’t”, even if private and NGO sector services may exist in parallel, and out-of-pocket payments may be required. Countries are either minimal to no health services provided by the government, or only limited health services are provided by the government (e.g., maternal and child health, HIV/AIDS care, vaccinations, or for special groups such as children, elderly, impoverished).

Table 2

Demographic predictors and treatment uptake for various non-communicable diseases by insurance status among a sample of 197,914 World Health Survey respondents ($n = 48$ countries), 2002–2004.

	Unweighted N (weighted %) ^a				<i>p</i>
	Total	Uninsured	Insured		
N	197,914	135,645	62,269	(100%)	(100%)
Predictors					
Male	87,157	60,480	26,677	(48.2%)	(47.6%) 0.895
Age in years, mean (SD)	42.4	40.0	46.0	(0.2)	(0.4) 0.021
Married	122,463	88,067	34,396	(66.1%)	(53.1%) 0.012
Secondary education	88,203	46,261	41,942	(52.5%)	(74.1%) 0.001
Urban	99,054	54,197	44,857	(53.7%)	(78.6%) 0.000
Wealth quintiles					
Highest	40,544	23,416	17,128	(22.7%)	(28.6%) 0.005
High	38,446	24,413	14,033	(20.0%)	(20.6%)
Middle	39,456	26,717	12,739	(18.9%)	(18.1%)
Low	38,883	28,739	10,144	(18.9%)	(16.7%)
Lowest	40,585	32,360	8,225	(19.5%)	(16.0%)
Outcomes					
Any chronic condition ^b					
Diagnosis	44,645	29,240	15,405	(30.8%)	(37.2%) 0.003
Treatment	33,430	20,198	13,232	(80.8%)	(89.3%) 0.000
Angina					
Diagnosis	12,404	8,011	4,393	(10.3%)	(12.1%) 0.413
Treatment	9027	5097	3930	(80.7%)	(89.1%) 0.023
Asthma					
Diagnosis	8310	5562	2748	(5.6%)	(7.2%) 0.086
Treatment	6755	4307	2448	(85.3%)	(91.1%) 0.000
Depression					
Diagnosis	8762	5325	3437	(7.2%)	(10.6%) 0.065
Treatment	4893	2334	2559	(64.7%)	(82.2%) 0.000
Schizophrenia					
Diagnosis	1657	1297	360	(1.1%)	(1.1%) 0.919
Treatment	993	738	255	(66.5%)	(86.7%) 0.000
Arthritis					
Diagnosis	22,783	15,549	7234	(15.2%)	(16.3%) 0.518
Treatment	15,806	9869	5937	(76.6%)	(87.3%) 0.000
Diabetes					
Diagnosis	5018	2878	2140	(4.4%)	(6.8%) 0.002

		Unweighted N (weighted %) ^d		Insured		p
Total		Uninsured				
Dental problems ^c	Treatment	4252	(85.6%)	2402	(85.0%)	1850 (85.9%) 0.851
	Reported	54,611	(35.0%)	34,908	(31.3%)	19,703 (40.4%) 0.014
	Treatment	25,524	(54.5%)	13,592	(40.3%)	11,932 (70.9%) 0.000
Women who had a child in past 5 years		29,361	(11.6%)	23,303	(14.6%)	6058 (7.1%) 0.001
Delivered in a health facility ^d		19,260	(59.9%)	13,585	(47.9%)	5675 (96.7%) 0.000
Sold or borrowed items to pay for any health expenses in the past 12 months		34,108	(16.3%)	28,186	(22.7%)	5922 (7.1%) 0.000

^aNo. respondents (weighted % of total) reported for each predictor variable and non-communicable disease outcome variable, except where noted. Treatment for outcomes was conditional on being diagnosed with the outcome; weighted percent= [(N_{treatment}/N_{diagnosed}) * survey weight]. Totals may not equal 100% owing to missing data.

^bAny chronic condition" refers to treatment for any of the six chronic conditions assessed in the survey: angina, asthma, depression, arthritis, schizophrenia or diabetes, conditional on being diagnosed with at least one.

^cRespondents were asked to report if they had any problems with their mouth or teeth in the last 12 months, and if yes, whether they sought treatment for it.

^dMothers who gave birth in the 5 years preceding the survey were asked where they gave birth to their last child. Those who delivered in a hospital, maternity house, or other type of health facility were considered to have delivered in a health facility.

Table 3

Unadjusted and adjusted probability ratios (PRs) and 95% confidence intervals (CIs) for treatment uptake for various non-communicable disease outcomes, stratified by sex, from survey-weighted Poisson regression models^a: World Health Survey 2002–2004.

Outcome	n	Model 1–Main effects					Any secondary education (vs. less)
		Uninsured (vs. insured)	Poorest 50% (vs. wealthiest 20%)	Rural (vs. urban)	Age (+10 years)	Married (vs. unmarried)	
Stratum							
Males							
Unadjusted probability ratios (PRs) & 95% CI							
Treatment uptake for:							
Any chronic condition ^b	16,643	0.90 (0.83,0.98)	0.93(0.85,1.01)	0.96 (0.90,1.03)			
Angina	4497	0.97 (0.86,1.09)	0.99 (0.84,1.16)	0.96 (0.83,1.11)			
Asthma	3269	0.98 (0.87,1.10)	0.94 (0.80,1.11)	0.95 (0.81,1.11)			
Depression	2561	0.58 (0.38,0.89)	0.86 (0.66,1.11)	0.96 (0.79,1.18)			
Arthritis	8193	0.92 (0.87,0.97)	0.94 (0.87,1.01)	0.96 (0.90,1.02)			
Schizophrenia	690	0.68 (0.47,1.00)	0.92 (0.66,1.27)	1.05 (0.81,1.35)			
Diabetes	2013	1.18(1.05,1.33)	0.97 (0.91,1.02)	1.04 (0.95,1.13)			
Dental problems ^c	22,847	0.94 (0.74,1.18)	0.70 (0.62,0.79)	0.87 (0.79,0.95)			
Sold or borrowed items to pay for any health expenses in the past 12 months	81,005	1.51 (1.02,2.23)	1.98 (1.74,2.26)	1.83(1.57,2.14)			
Adjusted probability ratios (aPRs) & 95% CI							
Treatment uptake for:							
Any chronic condition ^b		0.92 (0.85,1.01)	0.93 (0.84,1.02)	0.98 (0.90,1.06)	1.03 (1.01,1.05)	1.01 (0.93,1.09)	0.99 (0.93,1.04)
Angina		0.99 (0.84,1.16)	1.01 (0.82,1.23)	0.96 (0.82,1.13)	1.06 (1.00,1.12)	1.06 (0.95,1.18)	1.06 (0.95,1.17)
Asthma		1.00 (0.89,1.11)	0.95 (0.77,1.18)	0.97 (0.80,1.18)	1.03 (1.01,1.05)	0.91 (0.85,0.97)	1.04 (0.94,1.14)
Depression		0.59 (0.37,0.92)	0.89 (0.72,1.09)	1.04 (0.84,1.27)	1.01 (0.97,1.06)	0.91 (0.77,1.08)	1.06 (0.84,1.34)
Arthritis		0.95 (0.89,1.01)	0.95 (0.88,1.02)	0.98 (0.92,1.04)	1.02 (0.98,1.06)	0.98 (0.91,1.05)	1.02 (0.94,1.11)
Schizophrenia		0.75 (0.51,1.11)	0.95 (0.71,1.26)	1.16 (0.93,1.45)	1.08 (0.99,1.18)	0.78 (0.52,1.18)	1.44 (1.14,1.82)
Diabetes		1.22 (1.05,1.42)	0.92 (0.85,1.01)	1.06 (0.96,1.17)	1.02 (1.00,1.04)	0.90 (0.82,0.99)	1.03 (0.95,1.11)
Dental problems ^c		1.04 (0.89,1.23)	0.77 (0.69,0.87)	0.95 (0.87,1.04)	1.00 (0.97,1.02)	1.08 (1.01,1.15)	1.33 (1.18,1.51)
Sold or borrowed items to pay for any health expenses in the past 12 months		1.20 (0.83,1.74)	1.48 (1.31,1.67)	1.58 (1.28,1.96)	0.98 (0.94,1.02)	1.17 (1.01,1.35)	0.81 (0.69,0.94)

Stratum	Females		
	Unadjusted probability ratios (PRs) & 95% CI		
Treatment uptake for:			
Any chronic condition ^b	27,758	0.94 (0.91,0.97)	0.94 (0.88,1.01) 0.94 (0.89,0.99)
Angina	7774	0.93 (0.89,0.98)	0.89 (0.81,0.97) 0.97 (0.92,1.02)
Asthma	4964	0.90 (0.84,0.97)	0.93 (0.88,0.98) 0.96 (0.92,1.01)
Depression	6117	0.89 (0.89,0.89)	0.83 (0.74,0.93) 0.88 (0.64,1.21)
Arthritis	14,372	0.92 (0.92,0.92)	0.90 (0.83,0.98) 0.94 (0.88,1.00)
Schizophrenia	928	0.55 (0.43,0.71)	0.82 (0.63,1.06) 0.83 (0.60,1.17)
Diabetes	2984	1.24 (0.94,1.65)	1.07 (0.88,1.29) 1.20 (1.02,1.42)
Dental problems ^c	31,642	0.77 (0.69,0.86)	0.74 (0.67,0.81) 0.87 (0.79,0.96)
Delivered in a health facility ^d	29,296	0.84 (0.77,0.91)	0.69 (0.55,0.86) 0.68 (0.56,0.83)
Sold or borrowed items to pay for any health expenses in the past 12 months	98,713	1.62(1.17,2.25)	2.08(1.81,2.40) 1.59(1.33,1.90)
Adjusted probability ratios (aPRs) & 95% CI			
Treatment uptake for:			
Any chronic condition ^b	0.96 (0.92,1.00)	0.94 (0.88,1.00)	0.95 (0.90,1.00) 1.03 (1.01,1.04) 1.01 (0.98,1.05) 1.00 (0.94,1.06)
Angina	0.94 (0.88,1.01)	0.88 (0.81,0.95)	0.99 (0.95,1.04) 1.04 (1.02,1.05) 1.02 (0.98,1.05) 1.06 (1.00,1.12)
Asthma	0.92 (0.86,0.98)	0.94 (0.89,0.99)	0.99 (0.94,1.04) 1.01 (0.98,1.03) 0.94 (0.90,0.97) 1.01 (0.96,1.06)
Depression	0.93 (0.80,1.08)	0.81 (0.72,0.92)	0.91 (0.65,1.27) 1.02 (0.99,1.05) 1.12 (1.04,1.20) 0.94 (0.86,1.02)
Arthritis	0.97 (0.91,1.04)	0.92 (0.84,1.01)	0.97 (0.91,1.03) 1.03 (1.01,1.05) 1.00 (0.97,1.04) 1.09 (0.96,1.23)
Schizophrenia	0.57 (0.47,0.69)	0.86 (0.70,1.04)	0.90 (0.67,1.20) 1.00 (0.93,1.07) 1.07 (0.95,1.20) 0.94 (0.65,1.35)
Diabetes	1.13 (0.87,1.47)	0.95 (0.74,1.21)	1.19 (0.97,1.46) 1.03 (0.95,1.11) 0.93 (0.74,1.16) 0.93 (0.80,1.08)
Dental problems ^c	0.85 (0.75,0.97)	0.81 (0.72,0.91)	0.93 (0.85,1.02) 0.96 (0.92,1.01) 1.03 (0.98,1.08) 1.13 (1.07,1.20)
Delivered in a health facility ^d	0.98 (0.90,1.06)	0.78 (0.67,0.92)	0.75 (0.63,0.89) 0.96 (0.92,0.99) 0.95 (0.91,0.98) 1.15 (1.00,1.31)
Sold or borrowed items to pay for any health expenses in the past 12 months	1.31 (0.94,1.84)	1.81 (1.43, 2.29)	1.37 (1.15,1.63) 0.99 (0.95,1.02) 1.04 (0.89,1.21) 0.99 (0.87,1.12)

^a Adjusted probability ratios were mutually adjusted for other covariates in the model, and additionally for country-level fixed effects.

^b "Treatment uptake for any chronic condition" refers to treatment for any of the six chronic conditions assessed in the survey: angina, asthma, depression, arthritis, schizophrenia or diabetes, conditional on being diagnosed with at least one.

^c Respondents were asked if they had received treatment for problems with their mouth or teeth if they had reporting having any problems in the last 12 months.

^d Mothers who gave birth in the 5 years preceding the survey were asked where they gave birth to their last child. Those who delivered in a hospital, maternity house, or other type of health facility were considered to have delivered in a health facility.

Table 4a

Adjusted probability ratios (aPRs) and 95% confidence intervals (CIs) for treatment uptake for various non-communicable disease outcomes, stratified by sex, from survey-weighted Poisson regression models^a with household wealth $\times$ insurance interaction terms: World Health Survey 2002–2004.

Outcome	n	Household wealth × insurance interaction				Ratio of aPR ^b (95% CI)
		Insured aPR (95% CI)	Uninsured aPR (95% CI)	aPR (95% CI) for uninsured within wealth strata		
Stratum						
Males (%)						
Treatment uptake for:						
Any chronic condition ^c	15,960	Wealthiest 20 Poorest 50	(reference) 0.98 (0.89,1.08)	0.98 (0.88,1.10) 0.85 (0.60,1.19)	1.01 (0.86,1.19) 0.84 (0.74,0.96)	0.88 (0.77,1.00)
Angina	4190	Wealthiest 20 Poorest 50	(reference) 1.10(0.83,1.46)	1.10(0.86,1.41) 1.00 (0.45,2.22)	0.88 (0.69,1.13) 0.87 (0.80,0.94)	0.83 (0.63,1.08)
Asthma	3141	Wealthiest 20 Poorest 50	(reference) 1.05 (0.89,1.23)	1.17(1.03,1.31) 0.96 (0.62,1.43)	0.99 (0.92,1.08) 0.85 (0.71,1.02)	0.78 (0.68,0.89)
Depression	2410	Wealthiest 20 Poorest 50	(reference) 1.10(0.93,1.31)	0.89 (0.66,1.21) 0.48 (0.20,1.19)	0.93 (0.80,1.09) 0.43 (0.22,0.85)	0.49 (0.32,0.75)
Arthritis	7981	Wealthiest 20 Poorest 50	(reference) 0.98 (0.89,1.07)	1.00 (0.89,1.12) 0.92 (0.63,1.32)	0.96 (0.82,1.12) 0.96 (0.86,1.07)	0.94 (0.80,1.10)
Schizophrenia	687	Wealthiest 20 Poorest 50	(reference) 1.11 (0.84,1.47)	0.78 (0.49,1.24) 0.62 (0.19,1.99)	1.39(0.49,3.94) 1.06(0.79,1.43)	0.72 (0.47,1.09)
Diabetes	2008	Wealthiest 20 Poorest 50	(reference) 0.97 (0.86,1.09)	1.26(1.09,1.46) 1.08 (0.71,1.62)	1.35(1.05,1.75) 0.94(0.84,1.04)	0.88 (0.76,1.02)
Dental problems ^d	21,304	Wealthiest 20 Poorest 50	(reference) 0.79 (0.69,0.90)	1.13(0.97,1.31) 0.83 (0.49,1.38)	0.82(0.71,0.95) 1.30(0.95,1.78)	0.93 (0.73,1.17)
Sold or borrowed to pay for healthcare in past 12 months	77,329	Wealthiest 20 Poorest 50	(reference) 1.97(1.49,2.60)	1.40(1.09,1.81) 1.93 (0.78,4.89)	1.41 (0.86,2.29) 1.15 (0.65,2.03)	0.70 (0.48,1.04)
Females						
Treatment uptake for:						
Any chronic condition ^c	26,371	Wealthiest 20 Poorest 50	(reference) 1.02 (0.99,1.06)	1.08(1.00,1.16) 0.91 (0.75,1.12)	0.98 (0.93,1.04) 0.94(0.86,1.02)	0.83 (0.76,0.91)
Angina	7462	Wealthiest 20 Poorest 50	(reference) 0.94 (0.84,1.05)	1.01 (0.87,1.17) 0.84 (0.56,1.27)	0.97(0.82,1.13) 0.91 (0.84,0.98)	0.89 (0.76,1.03)
Asthma	4724	Wealthiest 20 Poorest 50	(reference) 1.00(0.95,1.05)	1.07 (0.99,1.16) 0.89 (0.68,1.17)	0.95 (0.90,1.00) 0.90(0.79,1.03)	0.83 (0.72,0.96)
Depression	5554	Wealthiest 20 Poorest 50	(reference) 0.86 (0.78,0.96)	1.13(0.93,1.37) 0.72(0.48,1.10)	1.17(0.69,1.96) 0.71 (0.44,1.16)	0.74 (0.66,0.84)
Arthritis	13,731	Wealthiest 20 Poorest 50	(reference) 1.04 (0.93,1.16)	1.10(0.98,1.23) 0.94 (0.65,1.34)	0.95 (0.85,1.07) 0.94(0.85,1.05)	0.82 (0.71,0.94)

Outcome	n	Household wealth × insurance interaction			Ratio of aPRs ^b (95% CI)
		Insured aPR (95% CI)	Uninsured aPR (95% CI)	aPR (95% CI) for uninsured within wealth strata	
Schizophrenia	924	Wealthiest 20	(reference)	0.69 (0.51,0.95)	0.91 (0.39,2.10)
		Poorest 50	0.96 (0.86,1.08)	0.50 (0.27,0.95)	
Diabetes	2977	Wealthiest 20	(reference)	1.45(1.19,1.76)	1.34(1.05,1.73)
		Poorest 50	1.10(0.82,1.48)	1.07 (0.48,2.42)	
Dental problems ^d	29,574	Wealthiest 20	(reference)	0.95 (0.76,1.19)	0.95(0.74,1.21)
		Poorest 50	0.84 (0.77,0.91)	0.72(0.42,1.25)	
Delivered in a health facility ^e	29,223	Wealthiest 20	(reference)	1.28(1.09,1.50)	1.01 (0.97,1.05)
		Poorest 50	1.07(1.02,1.14)	0.81 (0.51,1.28)	
Sold or borrowed to pay for healthcare in past 12 months	93,940	Wealthiest 20	(reference)	1.72(1.03,2.86)	2.10(0.87,5.11)
		Poorest 50	2.79 (2.03,3.83)	2.78 (0.84,9.09)	

Table 4b

Adjusted probability ratios (aPRs) and 95% confidence intervals (CIs) for treatment uptake for various non-communicable disease outcomes, stratified by sex, from survey-weighted Poisson regression models^a with urbanicity $\times$ insurance interaction terms: World Health Survey 2002–2004.

Outcome	n	Urbanicity × insurance interaction			Ratio of aPR ^b (95% CI)	
		Insured aPR (95% CI)	Uninsured aPR (95% CI)	aPR (95% CI) for uninsured within wealth strata (95% CI)		
Males						
Treatment uptake for:						
Any chronic condition ^c	15,960	Urban Rural	(reference) 1.00 (0.87,1.14)	0.94 (0.84,1.06) 0.90 (0.61,1.32)	0.94 (0.84,1.06) 0.86 (0.77,0.97)	0.96 (0.84,1.09)
Angina	4190	Urban Rural	(reference) 0.94 (0.72,1.22)	0.96 (0.75,1.23) 0.95 (0.44,2.01)	0.96 (0.75,1.23) 1.03 (0.93,1.14)	1.05 (0.82,1.34)
Asthma	3141	Urban Rural	(reference) 0.87 (0.66,1.14)	0.92 (0.77,1.10) 0.97 (0.48,1.96)	0.92 (0.77,1.10) 0.98 (0.83,1.14)	1.21 (0.94,1.56)
Depression	2410	Urban Rural	(reference) 1.23 (0.99,1.54)	0.72(0.48,1.08) 0.58(0.21,1.56)	0.72 (0.48,1.08) 0.49 (0.26,0.93)	0.65 (0.45,0.94)
Arthritis	7981	Urban Rural	(reference) 1.04 (1.00,1.08)	1.00 (0.92,1.09) 0.92 (0.74,1.14)	1.00 (0.92,1.09) 0.90 (0.81,1.00)	0.88 (0.80,0.97)
Schizophrenia	687	Urban Rural	(reference) 1.02 (0.82,1.28)	0.69 (0.44,1.07) 0.89 (0.35,2.29)	0.69 (0.44,1.07) 1.25 (0.60,2.62)	1.27 (0.96,1.67)
Diabetes	2008	Urban Rural	(reference) 1.09 (0.96,1.23)	1.24(1.04,1.49) 1.28 (0.80,2.05)	1.24(1.04,1.49) 1.32(1.14,1.52)	0.95 (0.80,1.12)
Dental problems ^d	21,304	Urban Rural	(reference) 1.04 (0.94,1.14)	1.12(0.94,1.33) 0.98 (0.68,1.39)	1.12(0.94,1.33) 1.07 (0.87,1.31)	0.84 (0.77,0.92)
Sold or borrowed to pay for healthcare in past 12 months	77,329	Urban Rural	(reference) 1.69 (1.21,2.37)	1.25 (0.89,1.76) 1.94 (0.76,5.01)	1.25 (0.89,1.76) 1.14(0.73,1.79)	0.92 (0.71,1.20)
Females						
Treatment uptake for:						
Any chronic condition ^c	26,371	Urban Rural	(reference) 1.02 (0.99,1.04)	1.00 (0.95,1.05) 0.91 (0.79,1.04)	1.00 (0.95,1.05) 0.95 (0.90,1.00)	0.89 (0.84,0.95)
Angina	7462	Urban Rural	(reference) 1.01 (0.97,1.06)	0.96 (0.87,1.05) 0.93 (0.74,1.16)	0.96 (0.87,1.05) 0.95 (0.87,1.05)	0.96 (0.88,1.04)
Asthma	4724	Urban Rural	(reference) 0.99 (0.92,1.06)	0.92 (0.84,1.00) 0.91 (0.70,1.17)	0.92 (0.84,1.00) 0.97 (0.91,1.03)	1.00 (0.90,1.10)
Depression	5554	Urban Rural	(reference) 1.06 (0.77,1.48)	1.02 (0.86,1.22) 0.81 (0.34,1.93)	1.02 (0.86,1.22) 1.15(0.73,1.81)	0.75 (0.52,1.07)
Arthritis	13,731	Urban Rural	(reference) 1.00 (0.95,1.05)	0.99 (0.93,1.06) 0.94 (0.77,1.15)	0.99 (0.93,1.06) 0.99 (0.85,1.15)	0.95 (0.87,1.03)

Outcome	n	Urbanicity × insurance interaction			Ratio of aPR ^b (95% CI)
		Insured aPR (95% CI)	Uninsured aPR (95% CI)	aPR (95% CI) for uninsured within wealth strata	
Schizophrenia	924	Urban Rural (reference) 0.92 (0.69,1.23)	0.57(0.47,0.71) 0.51 (0.22,1.22)	0.57(0.47,0.71) 0.80 (0.54,1.18)	0.97 (0.67,1.40)
Diabetes	2977	Urban Rural (reference) 1.47 (1.20,1.79)	1.26 (0.97,1.63) 1.28 (0.64,2.57)	1.26 (0.97,1.63) 0.83 (0.68,1.03)	0.69 (0.55,0.88)
Dental problems ^d	29,574	Urban Rural (reference) 1.05 (0.96,1.15)	0.93 (0.83,1.04) 0.77 (0.57,1.06)	0.93 (0.83,1.04) 0.83 (0.66,1.05)	0.79 (0.71,0.89)
Delivered in a health facility ^e	29,227	Urban Rural (reference) 0.97 (0.92,1.02)	1.11 (1.00,1.24) 0.75 (0.52,1.10)	1.11 (1.00,1.24) 0.96 (0.87,1.05)	0.70 (0.57,0.87)
Sold or borrowed to pay for healthcare in past 12 months	93,940	Urban Rural (reference) 1.55(1.20,2.02)	1.42(1.01,2.01) 1.89 (0.80,4.55)	1.42(1.01,2.01) 1.28 (0.91,1.82)	0.86 (0.66,1.12)

^a All probability ratios were mutually adjusted for other covariates in the model, and additionally for country-level fixed effects.

^b Ratio of aPRs measures effect modification on the multiplicative scale (departures from 1 indicate presence of interaction), as calculated by: $aPR_{1j}/(aPR_{10} \times aPR_{01})$, where aPR_{ij} is the adjusted probability ratio of insurance group i and household wealth or urbanicity group j , compared to reference group aPR_{00} (insured AND either wealthy or urban)

^c "Treatment uptake for any chronic condition" refers to treatment for any of the six chronic conditions assessed in the survey: angina, asthma, depression, arthritis, schizophrenia or diabetes, conditional on being diagnosed with at least one.

^d Respondents were asked if they had received treatment for problems with their mouth or teeth if they had reporting having any problems in the last 12 months.

^e Mothers who gave birth in the 5 years preceding the survey were asked where they gave birth to their last child. Those who delivered in a hospital, maternity house, or other type of health facility were considered to have delivered in a health facility.

Table 5

Predicted probabilities^a (PP) and attributable benefit (AB) of insurance coverage for treatment uptake for non-communicable disease outcomes from survey-weighted Poisson regression models with significant household wealth $\times$ insurance and urbanicity $\times$ insurance interaction terms: World Health Survey 2002-2004.

Stratum	Poor $\times$ uninsured interaction, poorest 50% respondents only					
	Male			Female		
	PP	PP	Attributable benefit ^b (%)	PP	PP	Attributable benefit (%)
Treatment uptake for:	Uninsured (%)		Insured (%)	Uninsured (%)		Insured (%)
Any chronic condition ^c				73.3	82.2	33.1
Asthma	71.1		26.1	75.9	85.5	39.9
Depression	37.7		53.1	56.4	67.2	24.7
Arthritis				65.8	73.5	22.5
Schizophrenia				51.2	97.4	94.8
Diabetes				88.8	90.9	19.4%
Delivered in a health facility ^d				39.1	51.9	21.1
Sold or borrowed to pay for healthcare in past 12 months				22.6	22.6	
Stratum	Urban $\times$ uninsured interaction, rural respondents only					
	Male			Female		
	PP	PP	Attributable benefit ^b (%)	PP	PP	Attributable benefit (%)
Treatment uptake for:	Uninsured (%)		Insured (%)	Uninsured (%)		Insured (%)
Any chronic condition ^c				74.5	83.3	34.5
Depression	31.9		53.4			
Arthritis	70.1		30.5			
Diabetes				87.4	100.0	100.0
Dental problems	37.6		3.6	40.9	55.5	24.6
Delivered in a health facility ^d				41.3	53.1	20.0

^aPredicted probabilities (PP) of treatment uptake are estimated for those outcomes with significant household wealth $\times$ insurance or urbanicity $\times$ insurance interaction terms from survey-weighted Poisson regression models. PPs and AB are each estimated for uninsured and insured persons, for an individual of median age, unmarried status, with less than secondary education, and is either residing in rural settings (model 2) or in the poorest 50% household wealth stratum (model 3).

^bAttributable benefit (AB) was calculated as the difference in the PP of treatment uptake between the uninsured and the insured as a proportion of the PP of treatment uptake failure among the uninsured. For example: $[PP_{\text{treatment (Insured, Rural)}} - PP_{\text{treatment (Uninsured, Rural)}}] / 1 - PP_{\text{treatment (Uninsured, Rural)}}$. This AB translates to the gap in treatment uptake among the uninsured relative to the insured that is attributable to insurance.

^c"Treatment uptake for any chronic condition" refers to treatment for any of the six chronic conditions assessed in the survey: angina, asthma, depression, arthritis, schizophrenia or diabetes, conditional on being diagnosed with at least one.

^dRespondents were asked if they had received treatment for problems with their mouth or teeth if they had reporting having any problems in the last 12 months.