THE PRICES IN THE CRISES:
WHAT WE ARE LEARNING FROM TWENTY YEARS OF HEALTH INSURANCE
IN LOW- AND MIDDLE-INCOME COUNTRIES

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ABSTRACT

Governments in many low- and middle-income countries are developing health insurance products as a complement to tax-funded, subsidized provision of health care through publicly operated facilities. This paper discusses two rationales for this transition. First, health insurance would boost fiscal revenues for health care, as post-treatment out-of-pocket payments to providers would be replaced by pre-treatment insurance premia to health ministries. Second, increased patient choice and carefully designed physician reimbursements would increase quality in the health care sector. This essay shows that, at best, these objectives have only been partially met. Despite evidence that health insurance has provided financial protection, consumers are not willing to pay for unsubsidized premia. Health outcomes have not improved despite an increase in utilization. We argue that this is not because there was no room to improve the quality of care but because behavioral responses among health care providers have systematically undermined the objectives of these insurance schemes.

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Introduction

By the late 1990s, health systems in most low-income countries provided subsidized care at public clinics funded through general taxation. Although there was wide variation in how often public clinics were used for primary care (ranging from very little in India to almost exclusively in many Latin American countries), for hospitalization and inpatient care, the public sector consistently accounted for 50-80 percent of health care provision across multiple countries, a share that has remained remarkably stable over time (World Health Organization 2020; Grépin 2016). Surprisingly, this wide availability of subsidized public clinics coexisted with high out-of-pocket expenditures. Indeed, at that time out-of-pocket expenses amounted to 50 percent of total health expenditure in low-income countries with households frequently unable to insure themselves against large health shocks and the related loss of income (Gertler and Gruber 2002). Summarizing the situation at the turn of the 21st century, Pauly et al. (2006) observed that: "Virtually every developing country with a functioning government uses publicly-funded and managed systems for third-party payment for medical care. …(but) in many developing countries, this system has failed to provide adequate financial protection for its citizens and adequate access to care. The gap shows up in the form of private out-of-pocket spending for services that "universal insurance" cannot or does not supply."

In response, governments in many low- and middle-income Countries (LMICs) have moved towards some form of dedicated health insurance, which they believed would provide them the instruments they needed to solve pressing problems related to the financing and provision of health care. To begin with, insurance premiums would provide a dedicated source of funding for health care, while at the same time, health insurance would reduce out-of-pocket expenditures and provide much-needed financial protection for citizens. Furthermore, governments postulated that insurance products would also improve health outcomes by altering the behavior of patients and providers. By subsidizing the cost of visiting private sector providers, health insurance would expand patient choice and increase visits to participating private sector clinics, where the quality was thought to be higher. By purposefully redesigning how public and private providers were reimbursed, health insurance would also increase the incentives to provide higher quality care, especially in the public sector. The transition in how providers were reimbursed, referred to as the shift from passive to "strategic purchasing" in the health literature (World Health Report 2000; Hanson et al. 2019), would then improve the quality and cost effectiveness of health service delivery (Londoño and Frenk 1997).

In this essay, we evaluate the experience with health insurance in LMICs over the last 20 years, where health insurance is provided by a specific scheme that is additional to the subsidized care available through public clinics. We start by documenting the transition to health insurance drawing on data from 100 Demographic and Health Surveys across 62 countries between 1989 and 2019. Then, using country-level examples and a review of existing evaluations, we describe how governments have structured their health insurance schemes and how these schemes have functioned in practice. Our conclusion from this review is that health insurance schemes have successfully increased financial protection and utilization but there is (yet) little evidence of improvements in health outcomes and little demand for health insurance among households, even when it is heavily subsidized.

Motivated by this review, we discuss—and rule-out—the possibility that health insurance has not improved health outcomes because of systemic constraints in the delivery of health care. Instead, we believe that health insurance triggered behavioral responses among providers that have systematically undermined the objectives of insurance schemes. These responses have led to prices that are higher than those mandated under the program, an increase in unnecessary care, and new sources of uncertainty as insured patients do not know whether the insurance will be honored or whether they will be correctly treated.

While such behavioral responses (sometimes called "provider moral hazard") are also a concern in high-income countries, health insurance schemes typically work with a variety of institutions that seek to curb these forms of physician excess, including review boards, professional norms, public reporting, and punitive enforcement through courts.[3] In LMICs however, non-price incentive systems are poorly developed and have not been used successfully in combination with health insurance schemes, often creating social tensions in which patients take matters into their own hands: as one example, there were an estimated 17,000 attacks and agitations against doctors in China in 2010 alone (Tussing, Wang, and Wang 2014).

We conclude that the first twenty years of experience with health insurance schemes in LMICs shows that it is impossible to divorce the quality of care that health insurance offers from the financial protection it

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[3] For examples of provider moral hazard in a US context, see Gruber and Owings (1996) on the use of C-sections, Baker (2010) on how doctors prescribe more magnetic resonance imaging after buying an MRI machine for their clinic and, Clemens and Gottlieb (2014) on how treatment choices depend on reimbursement rates.

affords. Insurance is realized as a subsidy to patients when they seek care and the flip side of that subsidy is a payment to providers. But providers respond to the financial incentives created by how those payments are structured and therefore the value of the insurance is critically tied to the nature of these responses. The lack of non-price mechanisms combined with the difficulties of structuring price incentives for appropriate care imply that health insurance could prove to be a very expensive tool for improving financial protection that actually *lowers* the quality of health care in LMICs. Ultimately, it is the prices in the crises that matter.

How Are Health Insurance Schemes Structured?

We start by mapping the overall coverage of health insurance across LMICs using data from the Demographic and Health Surveys, which are nationally representative health-related surveys that target women aged 15-49 and their children under the age of five in LMICs, with a traditional focus on maternal and child health. Questions on health insurance coverage were sporadically included in the late 1990s for some countries like Bolivia, Jordan, Peru, and Türkiye, and a standard question (v481) was introduced in 2003. As of April 2022, of 426 surveys ever fielded, 100 surveys in 62 countries have health insurance data available. We compiled all the health insurance questions to create a single database of just under 5 million observations, representative of countries with a total population of about 3.5 billion people; for additional details, see Appendix A available with this paper at the JEP website. When combined with OECD health insurance data (Scheil-Adlung 2014), our DHS-based data allow us to present a unified picture of health insurance coverage and its correlates across multiple countries, adding to previous studies that have focused on single or small groups of countries (for example, Amu et al. 2022; Barasa et al. 2021; Wang, Temsah, and Mallick 2014; National Population Commission NPC/Nigeria and ICF International 2014).

For LMICs where data was available from either the Demographic and Health Surveys or the OECD, close to half of the total population now reports that they have health insurance (Table 1). Coverage is near-universal for several countries in East and Central Asia and Latin America and middling in India and some Sub-Saharan African countries (Namibia, Sudan, Rwanda, Ghana). Other countries in Sub-Saharan Africa and South Asia are still below 5 percent coverage. Interestingly, most of the growth in coverage, when it occurred, is very recent. For instance, health insurance coverage in Rwanda increased from 41 percent in 2005 to 83 percent by 2019, from 56 percent in 1998 to 88 percent in 2013 in Türkiye and from 40 percent in 2012 to 61 percent in 2017 in Indonesia. In a historical context, this expansion is quite rapid as European

countries typically took 60-70 years to expand health insurance coverage from 10-20 percent around the turn of the 20th century to above 75 percent in 1975 (Tanzi and Schuknecht 2000; Ortiz-Ospina and Roser 2017).

The architecture of these health insurance schemes encompasses two distinct features: how this coverage is financed and how providers are reimbursed for their services.[4] We document that health insurance schemes that have emerged in LMICs during the last two decades are similar when it comes to financing but differ substantially in how they compensate physicians.

Financing

To provide a concrete example, we anchor our discussion around the federal health insurance scheme that India introduced in 2008 called the Rashtriya Swasthya Bima Yojana or RSBY ("National Health Insurance Scheme"). Before 2008, public health care for Indians was free or subsidized, but most people still chose to visit private sector facilities where, lacking health insurance, they were charged market-determined prices. Consequently, out-of-pocket expenditures were the main source of health financing and rising health care costs were identified as a key factor driving households into debt. The government subsequently introduced the RSBY, under which households below the poverty line could enroll in the scheme by paying the nominal amount of Rs.30 (about $0.40 in US dollars) for a maximum of five members per household (Palacios, Das, and Sun 2011). Once enrolled, they could use their insurance for a range of inpatient services free of charge in participating private or public hospitals up to an annual limit of Rs.30,000 per household, subsequently increased to Rs.500,000 ($6,500) in 2018, when the scheme was also renamed PM-JAY (The Prime Minister's People's Health Scheme). To administer the scheme, every participating state solicited bids annually from insurance companies in the form of a per-household premium and winning companies were paid according to the number of households that they enrolled by the federal and state governments in a 75/25 cost-sharing agreement. The per-household premium that emerged through the bidding process ranged from Rs.500 to Rs.600 ($6.60 to $8) in the initial years.

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[4] A third feature of health insurance schemes is what is covered and to what extent. A rich tradition going back to Spence and Zeckhauser (1971) discusses the optimal design of coverage schemes to trade off incentives against insurance. A large empirical literature in the US exploits features of these schemes to better understand the impact of deductibles and coverage limits. While the analysis of coverage determination and its consequences constitutes a research agenda on its own, we do not purse this line of enquiry here beyond acknowledging the wide heterogeneity across countries in coverage scale and scope. This partly reflects the state of the literature—we have not found studies that examine the consequences of coverage schemes on the outcomes we study, reflecting the early stages of health insurance. It also reflects our understanding that the questions of financing and reimbursement discussed here would be relevant if policy makers were to consider expanding the scope of insurance coverage.

Insurance companies contracted independently with participating hospitals and reimbursed them using administrative prices that were determined by the state.

India's RSBY program is similar to health insurance schemes that have emerged in other low- and middle-income countries in two important ways. First, by the time RSBY was implemented, it was clear from the experience of other countries as well as pilot insurance schemes within India that the demand for unsubsidized insurance among poor households was very low. Therefore, India's government subsidized the premium from the very beginning using funds collected through a variety of direct and indirect taxes. This reliance on taxes rather than premiums to fund health insurance is now common in most LMICs. For instance, in Colombia, Law 100 of 1993 led to universal health insurance financed through mandatory payroll contributions in a contributory regime and general taxation in a subsidized regime, with the beneficiaries in the latter identified through a proxy-means test (Escobar et al. 2010). Ghana's health insurance scheme is financed through a combination of value-added (70 percent) and social security taxes (23 percent), with premiums accounting for another 5 percent (Blanchet, Fink, and Osei-Akoto 2012). In Vietnam, the government tried at first to collect funds through premiums, but has since moved to financing based on general taxation or mandatory contributions (Somanathan et al. 2014). Kenya, where the National Health Insurance Fund established in 1966 was designed to provide coverage for formal sector workers financed by mandatory contributions, is now moving towards expanding coverage through a health insurance subsidy program for the poor (Barasa et al. 2018). In fact, across LMICs, voluntary purchases of private health insurance in 2012 covered less than 1 percent of the population in 49 of 138 countries and 1-5 percent in another 39 countries (Drechsler and Jütting 2005; Pettigrew and Mathauer 2016).[5]

Second, the RSBY was not new insurance. Instead, it was layered on top of existing access to free or highly subsidized care through public clinics themselves financed through general taxation. This new layer was designed to improve health care by reducing the cost of using private facilities, where quality was believed

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[5] The ubiquity of public subsidies for financing raises the important question of whether coverage differs by household characteristics. Household wealth and education are two widely-used markers of socioeconomic status in low- and middle-income countries, the former measured by an index of asset ownership and the latter by completion of different levels of schooling. We estimated correlations of insurance coverage and wealth, as well as insurance coverage and education for 61 countries using the latest available round of DHS data and plot these coefficients in Appendix Figure A1 with data and details available in the line index. In most countries, health insurance coverage is regressive, with higher coverage for those with greater education and more wealth. This pattern reflects both household demand for insurance and policy choices. In some countries, particularly those in Latin America, health insurance has always been available for government employees and was then extended to those in the formal sector with mandatory contributions, which explains the regressive pattern. In contrast, India's health insurance scheme is targeted to those below the poverty line, and the correlation of coverage with education and wealth is close to zero in the DHS data.

to be higher, and by moving to a system where money follows the patient, thereby providing incentives for quality improvements in both public and private health facilities. Both the fact that health insurance is layered on existing networks of subsidized public care and that it is used as a mechanism for improving quality, either by reducing the cost to the patient of care in the private sector or providing incentives for the public sector is again common across LMICs as no country has chosen to defund its publicly provided system as health insurance has grown. Of course, the relative importance of these two mechanisms depends on the context. In Latin America, for instance, the share of the private sector is smaller and insurance schemes tried to address differences in quality between clinics run by the social security system (accessible only to those employed in the public sector) and those run by the public health system, rather than between private and public care.

Provider Reimbursements

Interestingly, the convergence that we see across countries in how health insurance is financed breaks down when we look at how providers are reimbursed. The London School of Hygiene and Tropical Medicine's RESYST study documents 19 different purchasing mechanisms in 10 LMICs (Hanson et al. 2019). These include, inter alia, fee-for-service (the hospital is reimbursed for each service given as part of the stay), capitation (physicians agree to a fixed amount per patient under their care for a given duration), diagnostic-related groups (bundle all goods and services for one hospitalization episode into a single price depending on patient characteristics), line-item budgeting (health ministry pays for each item according to a budget) and global budgeting (a hospital signs a contract for a sum over a period to cater to the population in its catchment), used either by themselves or in combinations. Prices may be set through individual negotiations, group negotiations or administratively. Administrative prices themselves vary in their degree of sophistication, ranging from average accounting costs of procedures to more sophisticated, risk-adjusted marginal cost pricing. [6]

Reimbursement rates often seem to involve political processes and large discontinuous jumps. In Kenya, prices paid to hospitals for surgeries were revised upward by 50 to 100 percent in some cases in 2016 (Barasa et al. 2018). In Vietnam, hospitals are reimbursed according to a pre-determined fee-for-service schedule. Tien et. al (2011) noted that, at the time of their article, the price of services on the original list had not been updated since 1995, although an additional 992 services were added in 2006. In Ecuador, prices have not been updated since 2012, even in nominal terms. In Colombia, prices for

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[6] Barber, Lorenzoni and Ong (2019) document similar variation in remuneration schemes for providers in their study of OECD countries, Thailand and Malaysia.

essential services are determined administratively rather than by the market, but the government is required to cover procedures outside the essential group if mandated by a court. From 2005 to 2010, the reimbursements for these additional procedures increased from 0.1 trillion pesos to 2.4 trillion pesos (about $607 million in US dollars), leading to a financial emergency in 2011, following which "reference pricing" was introduced for medicines to reduce the fiscal burden (Romero 2014; Inter-American Development Bank 2015; Giedion and Uribe 2009).

Thus, while the paths that countries have taken to reach this point have been very different, LMICs have now emerged at a point where most subsidize their health insurance schemes and recognize that reimbursements for health care providers are integral to the scheme, even if there is no consensus on how these should be structured. We stress that multiple features of these schemes are different from what economists typically think of as a textbook insurance system. First, these schemes complement pre-existing and heavily subsidized public systems, which, paradoxically, are not referred to as health insurance even though the financing is identical. Second, an important implication of the fact that the premiums are now publicly financed is that the issue of adverse selection in health insurance is less relevant. Private insurance companies must make positive profits from the insurance product and thus are not viable if only the sickest patients subscribe. Such concerns do not apply with publicly subsidized insurance as the government can always cover any financing gap in the insurance scheme through taxes. In the Indian RSBY for instance, for a given premium, the scheme is cheaper for the government when only the sickest patients participate. Third, the health insurance schemes often cover preventive care, which is not risky and therefore unrelated to the "insurance" part of health insurance. These differences lead us to believe that it may be better to think of health insurance schemes in LMICs as contracting mechanisms that modify reimbursement schemes for public providers and expand existing networks to private providers. Nevertheless, in the interest of maintaining current convention, we continue to label these schemes as health insurance. Our caution is that intuition about "insurance" can be misleading in this context to the extent that it leads us down the path of demand-side failures and adverse selection rather than supply-side questions of contracting and provider incentives.

How Have Health Insurance Schemes Performed?

To study the impacts of the expansion in health insurance, we now review the research that examines the link between health insurance coverage, financial protection, utilization, and, ultimately, health

outcomes. We then discuss whether these findings are consistent with what we know of the demand for health insurance among households.

The main methodological challenge that studies of health insurance face is that the demand for health insurance and the benefits that accrue to households are likely to be correlated with underlying health status: patients with higher expected demand for health care should also be the ones most likely to take up the insurance product, use it and benefit from it (Wagstaff et al. 2016, Thornton 2021, Spenkuch 2012). The studies that we discuss all take exceptional care in addressing this fundamental identification challenge, either by using randomized experiments that incentivize take-up or by exploiting natural experiments that generate variation in eligibility across space and over time. As specific examples, King et al. (2009) choose a random sample of communities in Mexico to implement a health insurance scheme a year earlier than expected, Fink et. al (2013) randomize the rollout of a community-based social health insurance scheme in Burkina-Faso and Sood and Wagner (2018) leverage a staggered rollout of a social insurance scheme in the Indian state of Karnataka.[7]

Financial Protection

Does health insurance achieve its primary stated goal of reducing household out-of-pocket expenses? The answer is an unambiguous yes: out-of-pocket health care expenditures decline with health insurance in LMICs, as does the variability of such expenditures. This robust result holds across studies that use different measures of financial protection and across countries where insurance products differ in terms of coverage and benefits.

Bauhoff, Hotchkiss, and Smith (2011) document that Georgia's Medical Insurance Program for the poor led to a 50 percent decline in out-of-pocket expenses over a 30-day recall period, which the authors attribute to a 20 percent lower likelihood of incurring any health expenditure at all. The declines are quite remarkable as the program does not cover the cost of medicines, which account for 50 percent of

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[7] We exclude several observational studies that use difference-in-differences approaches as recent work highlights the importance of weighting and functional form in such studies and the literature precedes these econometric developments, making it harder for us to assess the validity of the estimates (Roth et al. 2022). Unfortunately, this includes results concerning India's RSBY program and China's New Cooperative Medical Scheme. As these are important programs and cover close to half of the world's LMIC population, we mention the findings from relevant studies here. For India, Karan, Yip and Mahal (2017) show that the RSBY had zero impact on financial protection, a null result that has also been shown for state-level samples from the state of Chattisgarh (Garg, Bebarta, and Tripathi 2020) and for the three Southern states of Andhra Pradesh, Karnataka and Tamil Nadu (Garg, Chowdhury, and Sundararaman 2019). For China, several studies have looked at the impact of the New Cooperative Medical Scheme that provides health insurance to the rural population. There is little consensus in this literature and results seem sensitive to the exact specification, controls and estimation techniques used. As Liang et. al (2012) highlight in their systematic review: "individual studies indicated that NCMS had positive, negative, or no effect on health outcomes and/or the incidence of catastrophic health payments."

total health care expenditures. Powell-Jackson et al. (2014) report a 27 percent decline in total health expenditures for the insured in Ghana, again using a four-week recall period. The insurance scheme in Ghana covers basic care (preventive care and medicines) as well as secondary care procedures, all of which adds to the free care already available in public facilities. King et al. (2009) study *Seguro Popular,* Mexico's universal coverage insurance scheme, which covers 266 health interventions, 312 medicines, and a federal fund for catastrophic health expenditures for certain diseases. Using a 10-month recall period, the authors find an 85 percent decline in out-of-pocket expenditures and a 75 percent lower probability of catastrophic expenditures, the latter defined as cases where out-of-pocket expenditures exceeded 30 percent of a subsistence income level.

Defining catastrophic expenditures as a fraction of household income rather than a standard subsistence income level yields similar results. Celhay et al. (2019) report a 15 percent decline in the likelihood of such events in the Philippines when catastrophic events are defined as those where expenditures exceeded 10 percent of income; Fink et al. (2013) find a 30 percent decreased likelihood when the cutoff is defined at 5 percent in Burkina Faso. Yet another metric, adopted by Levine, Polimeni, and Ramage (2016), focuses on absolute thresholds of annual expenditures above US$250 or more than US$100 paid for a single event as well as instances of indebtedness due to health care payment obligations. They find a 20 percent decline in the likelihood of catastrophic out-of-pocket health expenditures. The authors attribute this to the free health services and drugs at made available by the insurance scheme at public facilities, suggesting that the public sector is used as an alternative to the private sector for large expenditures, especially when these involve taking on debt.

Utilization and Health Outcomes

Access to health insurance also seems to increase utilization for a variety of health services. Evidence of increased utilization has been documented for preventive care (in Colombia, Camacho and Conover 2013; in India, Malani et al. 2021; in Peru, Bernal, Carpio, and Klein 2017), outpatient visits for acute or chronic diseases (in Nigeria, Fitzpatrick and Thornton 2019), and inpatient visits including surgeries (in India in both Sood and Wagner 2018; Malani et al. 2021).[8] Consistent with the idea that health insurance can lead patients to choose higher quality facilities, Thornton et al.'s (2010) study in Nicaragua and Levine, Polimeni, and Ramage's (2016) study in Cambodia do find that patients substituted away from public and

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[8] A few studies do not find that health insurance increases utilization: for example, King et al. (2009) in a study of Mexico; Raza et al. (2016) in rural India; and Bauhoff, Hotchkiss, and Smith (2011) in Georgia. Of course, this finding would also explain why health insurance in these countries does not improve health outcomes.

non-networked private facilities towards networked hospitals. Moreover, Powell-Jackson et al. (2014) using data from Ghana, Sood and Wagner (2018) from India, and Celhay et al. (2019) from Argentina document that these kinds of substitutions can increase the quality of care. No study to date looks at the impact of health insurance using facility-specific measures of quality: thus, it is possible that the studies that do not find any change in aggregate utilization are still missing changes on this margin.

In contrast to the widespread evidence of increased health care utilization, the impacts of health insurance on health outcomes have been mixed at best. Even when a comprehensive benefit package is offered as in Mexico with the *Seguro Popular* program, King et al. (2009) fail to detect differences in health outcomes as measured by nine different self-assessments.[9] This basic result of zero to small impact resonates across a number of studies. Levine, Polimeni, and Ramage (2016) report zero impacts from Cambodia; Bauhoff, Hotchkiss, and Smith (2011) report zero results from Georgia; and Fink et al. (2013) from Burkina Faso. Similarly, Powell-Jackson et al. (2014) do not find any health impacts in Ghana and Miller, Pinto, and Vera-Hernández (2013) did not find significant effects of insurance on health outcomes in Colombia, whether these are self-reported health assessments, symptoms (fever, cough, diarrhea, blood pressure), or summary outcomes such as weight (including low birthweight), height, and mortality.

In the handful of studies that do find a positive causal impact on health outcomes, it is usually associated with the increased utilization of higher quality, especially preventive care. Sood and Wagner (2018) investigate the impact of a social health insurance program for the poor in the Indian state of Karnataka and find that it reduced mortality from heart conditions and cancer; they argue that insurance coverage led patients to seek early diagnosis. Likewise, in Camacho and Conover (2013), Balsa and Triunfo (2021), and Celhay et al. (2019), health insurance schemes in Colombia, Uruguay, and Mexico, respectively, are found to lead to reduced infant mortality, which is mostly attributable to increased use of preventive prenatal care.

The Demand for Health Insurance

The result that health insurance increases utilization but not outcomes is troubling because it suggests that spending is increasing without anything to show for it. That drastic conclusion, though, must be modified both because the statistical power to detect impacts for rare outcomes like mortality requires very large sample sizes that are often unavailable, and because studies to date may have not measured

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[9] King et al.'s (2009) assessment was 10 months after the inception of *Seguro Popular*, which may be too short a time period for impacts on health outcomes to emerge. Although their study cannot exploit the original randomization, Cohen and Dechezleprêtre (2022) find that 3-4 years after the insurance scheme was introduced mortality rates appear to have reduced.

the health outcomes that improved, such as mental health. An alternative approach is to focus on demand and ask whether households are willing to purchase health insurance in the first place. Interestingly, and to the extent that demand is an appropriate measure of value in this case, households appear not to value health insurance very highly.

Several studies recover the demand for health insurance by experimentally varying financial and non-financial incentives for enrollment. The studies show that insurance take-up is low in the first place and large financial subsidies are required to increase enrollments significantly. Only in studies that offer government health insurance for free, and on a continuing basis, do we see significant increases in enrollments. However, even these steep discounts fail to achieve 100 percent enrollment rates and enrollment drops as soon as subsidies cease. In an early example, Thornton et al. (2010) conducted a randomized controlled trial in Nicaragua that incentivizes informal sector workers to enroll in the Nicaraguan Social Security Institute's health insurance program, varying information on the program, the premium subsidy and the type of insurance sales agents. Thornton et al. (2010) reported a 20 percent increase in enrollment when the premium is fully subsidized, followed by a 90 percent dropout rate at the end of the subsidy period. In the Philippines, Capuno et al. (2016) encouraged enrollment in a social health insurance program by experimentally varying information on the scheme, a financial incentive (up to a 50 percent premium subsidy), and administrative assistance. They find a 3 percentage-point increase in enrollment when a subsidy of 50 percent was offered, from a baseline rate of 8 percent. Subsequent interventions have been similar in spirit with some variations. For instance, Banerjee et al. (2021) offer full and partial subsidies for insurance premiums in Indonesia to examine whether household behavior changes when the price is a small positive amount rather than an exact zero. They find that a full premium subsidy increases enrollment to 19 percent from a baseline of 8 percent with retention rates 4.6 and 3.9 percentage points higher in the subsidized group at 3 and 8 months after the subsidies ended. Other studies find similar results : Levine, Polimeni, and Ramage (2016) in rural Cambodia ; Wagstaff et al. (2016) for informal sector workers in Vietnam, and Banerjee, Duflo, and Hornbeck (2014) among microfinance borrowers in India.

All these studies suggest that households do not value health insurance highly, which is consistent with the lack of evidence on the link between health insurance and health outcomes. The wrinkle that remains is that it is not automatically consistent with the evidence that health insurance improves financial protection. If *other* constraints hold back demand, it becomes difficult to interpret the price-elasticity as a measure of value. Poor information is one possibility, but interventions that include an information

component typically find little impact on take-up (Capuno et al. 2016; Wagstaff et al. 2016; Thornton et al. 2010; Banerjee et al. 2021; Malani et al. 2021; Das et al. 2016). A second possibility is that there are non-price barriers to take-up such as administrative burdens arising from eligibility requirements. Interventions that offer administrative assistance with enrolling in health insurance indeed find that take-up increases, with an effect size equivalent to that of premium subsidies for six months (Capuno et al. 2016; Thornton et al. 2010; Banerjee et al. 2021; Malani et al. 2021). This is sufficiently large that a simple explanation rooted in the opportunity cost of time is unlikely. But so far, no consensus has emerged on the extent to which low demand reflects low expected value rather than administrative burdens; this remains very much at the frontier of the research on health insurance.

Why Has Health Insurance Not Improved Health Outcomes? Supply Constraints

The most obvious explanation for why health insurance has not improved health outcomes is that there is little capacity for quality improvement to begin with—doctors are overworked, do not have the right equipment, and may not have the right skills. In this section we will show that, in contrast to this view and despite severe deficits in quality, there is in fact considerable room for improvement. In the next section, we then consider what we view as a more likely possibility—that government health insurance in LMICs has had an adverse effect on provider incentives, ultimately undermining the objectives of these schemes in a way that can *worsen* the quality of health care.

Quality of Care in LMICs

That the quality of care in LMICs can be very poor is not in dispute. Das et al. (2012) present one example of how standardized patients—healthy people recruited from the local community and then extensively trained to present the same case to multiple providers—are treated in the Indian state of Madhya Pradesh when they present with crushing chest pain the night before and extreme anxiety. [10] After appropriate questioning, the doctor should refer this patient to a hospital, suggest an electrocardiogram (ECG) and

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[10] Like "audit studies" in the economics of discrimination, the standardized patient approach is frequently regarded as the gold standard for measuring quality, at least for primary outpatient care. It allows researchers to abstract from omitted variable bias due to unobserved patient and case-mix across providers and mitigates the possibility that health care providers act differently when they know they are being observed (Leonard and Melkiory 2006). Most importantly, researchers can compare the physician's treatment with evidence-based clinical guidelines and evaluate the accuracy of treatment decisions even in cases where the condition is misdiagnosed, a task that is difficult to accomplish even with well-maintained patient charts as researchers do not know the true underlying illness of the patient. Studies across multiple countries and tracer conditions have shown that standardized patients can be deployed in large samples, leading to valid and reliable results with low detection rates and provider behavior consistent with the belief that they were dealing with a real patient. See Das et al. (2012) and Kwan et al. (2019).

give the patient aspirin. Das et al. (2012) show that the average interaction for this standardized patient lasts 3.5 minutes, with doctors asking 3 questions and completing 1.5 examinations. Das et al. (2012) suggest that a minimally correct treatment would require the doctor to complete at least one of these actions but would not penalize the doctor for additional unnecessary tests and medicines, even if they are contraindicated or harmful. Standardized patients in their study receive such a minimally correct treatment in 31.2 percent of interactions and unnecessary or harmful treatment in 55.2 percent.

Figure 1 shows that the significant deficits in care uncovered in Das et al. (2012) hold for multiple conditions and study sites. For each study, the top bar shows the share of patients receiving the minimally correct treatment and the bottom bar the share who received an antibiotic, which was inappropriate for all the conditions represented in the figure and is therefore a measure of an unnecessary and potentially harmful treatment. Across these studies, 40-90 percent of standardized patients are incorrectly treated, which means that they are treated for entirely the *wrong thing*—for instance, asthma or pneumonia instead of a heart attack. More stringent definitions that penalize the use of unnecessary medicines or require providers to administer *all* the required components of the treatment reduce the fraction correctly treated to less than 5 percent (and for many conditions 0-1 percent). Banerjee et al. (2023) use data from five standardized patient studies to show that one consequence of these deficits in care is that 70-85 percent of all out-of-pocket expenditures can be attributed to incorrect care or overtreatment. Interestingly, 52-78 percent of this avoidable medical expenditure is due to misdiagnosis and incorrect care rather than over-treatment based on a correct diagnosis—a conclusion that holds equally for health care providers in the salaried public sector and in the fee-for-service private sector.

Capacity Constraints

Three types of capacity constraints have been evoked to explain these deficits-- *overcrowding, lack of equipment* and *lack of adequate medical training*. We consider each in turn.

Overcrowding. The World Health Organization (2016) raises frequent alarms about doctor shortages resulting in an excessive workload for health care providers in LMICs. We are sympathetic to this explanation for certain conditions and contexts. For instance, Andrew and Vera-Hernandez (2022) show that in areas with low capacity in India, demand-side incentives for women to deliver in health facilities *increased* infant mortality, because the resulting congestion worsened outcomes for women with high-risk pregnancies. But taken as a whole, the utilization and capacity numbers simply do not add up to a picture of massive overcrowding.

Figure 2 shows the cumulative density functions of outpatient capacity utilization among providers in 12 LMICs. In the country with the highest capacity utilization (Vietnam), the bottom 50 percent of providers in the patient-load distribution still see fewer than 10 patients each day. In five of 12 countries, half of all providers see fewer than five patients per working day; in Nigeria, 75 percent of health care providers see fewer than *two* patients a day. In none of these countries do more than 25 percent of health care providers work an estimated full day. It would take unreasonably high estimates of the amount of time spent with each patient, or of the number of administrative and inpatient duties providers also must do to significantly reduce estimates of idle outpatient capacity. Not surprisingly, studies that have directly examined the link between patient load and quality of care all find zero impact (Maestad, Torsvik, and Aakvik 2010, Kovacs and Lagarde 2022 and Kwan et al. 2019).[11] Indeed, given the overall data on staffing and patient loads, the real challenge here would be to explain how there could *possibly* be a causal impact of patent load when even the busiest doctors spend less than half a day (most spend less than a couple of hours in the day) seeing patients.

Lack of equipment. A second potential explanation is the lack of infrastructure in the form of adequate facilities or medical equipment. Clearly, certain types of equipment are necessary to perform key medical functions—doctors cannot listen to a patient's heartbeat without a stethoscope. However, there have been substantial improvements in infrastructure and the availability of medical equipment in the past two decades, and it is now increasingly clear that structural improvements are necessary for better quality care but are far from sufficient. Multiple studies find that the correlation between the availability of medical equipment/infrastructure and quality of care is either zero or strikingly low across a range of quality measurements and in different settings. Examples include Leslie, Sun and Kruk (2017) who find very low correlations between observed clinical quality with real patients and facility infrastructure for family planning, antenatal care, sick-child care and labor and delivery for Haiti and seven countries in Sub-Saharan Africa; Bedoya et al. (2017) report similarly low correlations for patient safety and Das et al. (2012) for clinical quality in a standardized patient study.

Lack of medical knowledge. The third potential explanation for the poor quality of care is that health care providers do not have the knowledge they need to accurately diagnose and treat the conditions presented to them. This is the most powerful of the three explanations as studies consistently find a positive

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[11] To address the problem that demand is likely correlated with quality, Maestad, Torsvik, and Aakvik (2010) use the size of the catchment area in Tanzania as an instrument for the clinics' caseloads, while Kovacs and Lagarde (2022) and Kwan et al. (2019) combine standardized patients with within-facility variation in caseload.

association between a doctor's quality of clinical practice and their knowledge of the case. Early contributions showed that knowing what questions to ask and examinations to perform increased the likelihood of completing these items in the clinic by 20-25 percent (Das and Hammer 2007; Das and Hammer 2014 Leonard, Masatu, and Vialou 2007; Das, Hammer, and Leonard 2008). Banerjee et al. (2023) then combined tests of knowledge with standardized patients to show that knowing how to correctly manage a patient increased the likelihood of actually doing so by 22-40 percent, depending on the sample and after accounting for measurement error in measures of knowledge. At the level of associations, increasing medical knowledge improves clinical performance, but a coefficient significantly below 1 implies that only about a third to a half of improvements in clinical knowledge are then reflected in improved clinical practice. Thus, medical knowledge may not be *the* binding constraint on quality of clinical care.

Provider Behavior and Market Allocation

Instead of capacity constraints in terms of patient load, poor equipment, or low clinical knowledge, two sources of inefficiency stand out as the leading explanations for poor health care quality LMICs. These are that doctors do not do the right thing *despite* knowing what to do and the distribution of doctors and patterns of provider choice are such that patients do not visit the doctors who could provide them with better quality care.

The know-do gap. Das, Hammer and Leonard (2008) first asked whether doctors practiced at their knowledge frontier and found that they did not, a phenomenon they labeled the "know-do" gap. In Figure 3, we present the accumulated evidence from more recent studies where researchers have sent a standardized patient and later assessed the provider's knowledge of the same case. Every study (except for pneumonia in Bihar) finds large know-do gaps ranging from 5 to 80 percent, confirming the original findings of Das, Hammer and Leonard (2008) across multiple countries and tracer conditions. Providers who know how to correctly treat a patient are less likely to do so in practice, and providers who (correctly) say they would avoid prescribing antibiotics (as an example of unnecessary care) are more likely to do so in practice. The know-do gap increases with medical knowledge, implying that closing the gap would offer an opportunity to significantly improve quality without investing in expensive training.

As economists would predict, the know-do gap is larger in the salaried public sector where price-incentives to provide effort are minimal. Indeed, the gaps in the public health care sector in India are so large that health care providers without formal training in the private sector provided similar care to fully trained doctors in the public sector, and the same doctor working in a private clinic is 42 percent more likely to

treat a standardized patient correctly compared to when they are working in their public clinic (Das et al. 2016). Despite the importance of incentives, whether pay-for-performance can reduce the know-do gap remains unclear; while there were promising early results from Rwanda (Basinga et al. 2011), these have failed to replicate in a broader set of countries (See Diaconu et al. 2021 for an overview of 59 studies). In addition, research into the "know-do" gap is new, with open questions regarding the relative importance of financial incentives versus patient expectations (Currie, Lin and Meng, 2014), doctors' beliefs about patients (Banerjee et al. 2021) and/or behavioral biases among physicians (Groopman 2007; Mullainathan and Obermeyer 2022; Kovacs, Lagarde, and Cairns 2020) in contributing to this gap.

Patient-doctor mismatch. A second subtle source of inefficiency arises from the misallocation of patients to doctors. If there is considerable variation in quality but a low correlation between market share and quality, then the average quality received by patients will increase by inducing more visits to higher quality providers. This possibility has been explored by Daniels, Das and Gatti (2022) for 11 Sub-Saharan African countries and by Das et al. (2020) for Indian states using tests of medical knowledge (which understates the variation in clinical practice).

Two results stand out. First, there is indeed considerable variation in medical knowledge as measured by clinical vignettes. A general pattern is that a one standard deviation increase in a standardized index of medical knowledge increases the likelihood of knowing how to correctly treat any given vignette scenario by 10 percentage points. Thus, the difference in the general knowledge of correct treatment between a provider at the 5th percentile of the quality distribution and the 95th percentile is 40 percentage points. About 80 percent of this variation in competence is within-country or within-state. Second, the correlation between workload and clinical competence is weak. Across 11 countries in Sub-Saharan Africa, against a mean of seven patients per provider per day, higher-knowledge providers have higher caseloads only in Tanzania (two additional patients per standard deviation in competence) and in Kenya and Sierra Leone (one additional patient). In Mozambique and Malawi, each additional standard deviation of provider competence is associated with two *fewer* patients per day. The remaining countries all exhibit effectively no relationship between provider knowledge and outpatient caseload.

Daniels, Das and Gatti (2022) use the data from Sub-Saharan Africa and India to present a mechanical calculation of the potential gains from relocating doctors, whereby the highest quality doctors are posted to the busiest clinics, the 2nd highest to the 2nd busiest and so on, always ensuring that the relocations are within country (or state in India) and sector. They find that patient-weighted quality could increase by 0.75 standard deviations in the Sub-Saharan Africa sample and by 0.5sd in the Indian sample, which

corresponds to increases between 5 and 8 percentage points in the likelihood of correctly treating cases. To put the potential gains in context, they are similar to the difference in correct treatment rates for providers with and without formal training in India (3-7 percentage points) and statistically indistinguishable from a range of successful and well-powered behavioral interventions reported in Rowe et al.'s (2018) systematic review of quality improvement interventions in LMICs.[12]

In conclusion, despite the considerable evidence that quality of care is poor, the evidence that supply constraints are the fundamental barrier to improved health outcomes is less conclusive. Quality deficits reflect providers practicing below the knowledge frontier and allocations that result in high-quality providers being underused, to the extent that they may be seeing only two to three patients a day.[13]

Why Has Health Insurance Not Improved Health Outcomes? Provider Responses

Instead of limited capacity, we believe that the keys to understanding the uneven performance of health insurance in LMICs is the provider side of health care.[14] Two sorts of problems arise. The first, like fraud and dispute, arise in all insurance schemes (not just health) because there are multiple transactions, each of which comes with its own potential problem. Patients must be diagnosed and treated correctly, hospitals need to submit claims and be reimbursed. Hospitals may charge false bills or overcharge for what was provided, and insurance companies may then refuse to honor the claim. In a cascading effect, insurance payment delays may lead to hospitals denying care to patients, lowering the value of insurance in the first place.

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[12] For high-income countries, Chandra et al. (2016), show that reallocation towards higher quality hospitals was responsible for one-third of the decline in heart attack mortality in the U.S. and Dahlstrand (2022) shows that telemedicine allows doctors who are skilled at triaging to see more patients at high risk of avoidable hospitalizations in Sweden, leading to a 20 percent reduction in avoidable hospitalizations.

[13] Sparse data on hospital quality has restricted our focus to primary care, but the data that do exist suggest similar patterns. In terms of quality deficits, post-operative infections are 2-3 times higher in LMICs compared to OECD countries (GlobalSurg collaborative) and, a short while after a cataract operation, patients were legally blind in 36 percent of cases (Singh, Garner, and Floyd 2000). In terms of quality variation, a study of hospital maternity wards within the single geographic area of Nairobi, Kenya, found wide variations (Siam et al. 2019). And, in terms of low capacity utilization, Colombia's National Hospitals Study in 1986 showed that the occupancy rate was 74.8 percent among Level 3 hospitals, but only 40.4 percent among Level 1 hospitals (Glasman et al. 2009).

[14] A stated objective of health insurance schemes in some countries was to allow patients to choose higher quality providers, often in the private sector. We have documented above the existing evidence on substitution towards the private sector. However, in the light of substantial variation in quality within public and private providers, any claim on reallocation towards higher quality providers requires facility-based measures of quality which are so far absent in the literature.

A second set of problems arises because, while physicians and hospitals may correctly charge for what they actually do, they might not perform or recommend the appropriate procedure, despite knowing what that is: the know-do gap. Health insurance alters the relative price of different procedures, potentially influencing provider behavior in a way that could result in lower health care quality.

Insurance Fraud and Administration

Health Insurance fraud ranges from 3-15 percent of program costs in OECD countries and 3-10 percent in the United States (Morris 2009). It probably accounts for a larger fraction of program costs in LMICs, as periodic reports (Ngetich 2021; Begue 2018) and audits suggest, but program-wide estimates are difficult to come by. Most countries have not made their health insurance claims data public.

Two problems that may be more salient in LMICs are denial of care and "surprise" or double billing. Denial of care refers to a situation where insurance cards are not honored at participating hospitals. Dercon, Gunning and Zeitlin (2019), who were the first to study this issue, show that denial of care is frequent in their setting in Kenya. Denial of care has two important implications. First, the decision to participate in the health insurance scheme depends on trust in the insurance system. Second, since denial introduces a new risk of the insurance not being honored, the overall risk with insurance may be higher than without. There is a state of the world in which the individual has paid the premium without receiving compensation in the bad state. If individuals are forward-looking, this implies that less risk averse individuals will be *more* likely to take the insurance. By combining lab measures of trust and risk aversion with take-up decisions for an insurance product, Dercon, Gunning and Zeitlin (2019) show that both predictions hold in their data.

Surprise or double billing is a situation whereby health care providers charge the insurance company the reimbursable amount, but then levy additional (and illegal) top-ups from patients. Rather than providing an administratively mandated price for a procedure, insurance reimbursements are then better regarded as a partial subsidy for the service, with pricing determined both through the usual considerations of supply and demand elasticities, but also possibly price discrimination and the special characteristics of health care markets. Again, there are no nation-level studies of double-billing, since it requires surveys of insurance beneficiaries in addition to claims data. One of the few studies to combine administrative data and household surveys is Jain (2021) who studies double-billing in the Indian state of Rajasthan. We will discuss this study further below.

Health Insurance and the Know-Do Gap

Do health insurance schemes affect the know-do gap? We are not aware of any studies to date in LMICs that causally link health insurance to supply responses among providers, at least for inpatient care, where the bulk of the money is spent. It is difficult to use administrative claims data to come to any conclusion regarding quality in these settings; see Morton et al. (2016) on how claims data are recorded. Nevertheless, we will offer an educated guess based on a collage of evidence from newspaper reports, audits, and related studies on how doctors respond to price changes in LMICs.

As one example, media reports and field investigations from the Indian states of Andhra Pradesh, Gujarat and Chattisgarh, shortly after the introduction of the national health insurance program RSBY, showed that many women were getting hysterectomies based on rudimentary diagnostics and for conditions such as heavy menstrual bleeding that could be medically managed. As reported by Averill and Dransfield (2013):

> A study by a non-profit organization, AP Mahila Samatha Society, in 2009 of over 1,000 women in Andhra Pradesh found an increase of 20 percent in hysterectomy cases since July 2008. They also reported that doctors had told 30 percent of the women that they would die if they did not have the operation. A few months ago, the Chhattisgarh State Health Department initiated action against 22 nursing homes, which were carrying out hysterectomies without legitimate medical reasons in order to claim money from the national health insurance scheme, Rashtriya Swasthya Bima Yojana (RSBY).

Subsequent research indeed confirms much higher rates of hysterectomies in the states of Gujarat, Bihar and Andhra Pradesh, but also cautions that causal claims on the impact of insurance are harder to establish (Desai, Sinha, and Mahal 2011; Desai et al. 2019).

Cataract surgery seems to be another area with sharp increases after the arrival of health insurance. For instance, Rana (2017) reports that in the Indian state of West Bengal:

> Private facilities were found to concentrate mainly on easy-to-handle services, like cataract surgery, and commission agents recruited patients for this surgery, often without indication that the patient even needed the surgery. From the 1,090 procedures performed under RSBY, I found that the actual treatment done by the private hospitals occurred not to provide health care for patients, but instead to profit for health care facilities. It also involved a huge informational

asymmetry, as it seemed to be impossible for the patient to keep track of as to which of the 1,090 procedures covered by RSBY was performed on him or her".

Jain (2021) is the first study from an LMIC that looks at hospital pricing and coding systematically in the context of an insurance scheme. She combines administrative claims data with a large household survey for the Indian state of Rajasthan, which allows her to better understand how hospitals react to changes in administrative prices. Without the household survey, for instance, it would have been impossible to determine how much households are asked to pay out-of-pocket because the practice is illegal and therefore off the books. She finds that providers do not respect administrative prices: 41 percent of patients paid for their treatment even though the care was supposed to be free and the average payments were $35, which is a large sum for poor households and represents a 37 percent increase over the insurance reimbursement rate.

Moreover, hospitals react rapidly to adjustments in reimbursement rates. Jain (2021) finds that with every additional Rs.100 in reimbursements, prices charged to patients decreased—but only by Rs.55. She also uses an event-study to show that when the relative reimbursement rates within a category change (for instance, childbirth with and without an episiotomy), so do the reported procedures. Within a week of a price change, a 1 percent increase in the reimbursement rate induced a 0.4 percent increase in its claim volume. She suggests that this reflects up-coding, whereby health care providers submit codes for more expensive care than actually provided, but a bigger worry, which she does not rule out, is that hospitals changed the treatments that patients received.

Other studies provide systematic evidence on differences in quality of care by insurance status, at least for outpatient care. One set of studies finds that when patients get health insurance, their satisfaction remains the same or worsens (Bauhoff, Hotchkiss, and Smith 2011 and Robyn et al. 2013). Two studies have used standardized patients, varying their insurance status across visits. In South Africa, Sripathy (2020) shows that clinical effort is higher for standardized patients with insurance, but the proportion correctly treated does not change and the extent of unnecessary and more expensive treatments increases. In China, Lu (2014) finds a similar result, with the greater use of unnecessary antibiotics for insured patients, but only when doctors have a direct financial incentive associated with the purchase of the medicine. In the Philippines, Gertler and Solon (2000) find that because hospitals do not charge the mandated administrative price, insured patients pay 86 percent of what the uninsured would pay, sharply limiting any financial protection offered by the scheme. Finally, in Burkina Faso, Fink et al. (2013) find that

in the context of a capitation-based payment system, quality of care was significantly lower for insured patients in participating health facilities compared to those who were not insured.

These studies are not cherry-picked; they constitute the full corpus of what we have found in the literature on provider behavior in response to insurance in LMICs. The existence of so few studies on this key subject is itself a cause for concern. The fact that every study showed that provider behavior undermined the objectives of the scheme and contributed to an increase in the know-do gap is an even bigger worry.

Discussion and Conclusion

A considerable literature from LMICs over the last two decades highlights several noteworthy features of health insurance schemes. In terms of the structure, governments have converged on using public subsidies for health insurance premia, which are now nominally priced or free in most countries. On the other hand, governments have diverged in how they reimburse providers for services, using a wide range of payment mechanisms that are frequently revised and overhauled. In terms of outcomes, the schemes have provided financial protection with a decline in out-of-pocket expenditures, but these gains have not translated into demand for unsubsidized health insurance. Furthermore, these schemes tend to increase utilization without a concomitant improvement in health outcomes. Finally, the lack of consistent improvements in outcomes is not because of supply constraints in terms of workload, equipment, or knowledge but instead due to behavioral responses on the part of providers. Health insurance does not systematically improve the quality of existing providers, and often, it seems to make it worse. There is also little evidence to show that health insurance allows patients to visit higher quality providers.

The phenomena of low demand, poor health outcomes and adverse behavioral responses, while seemingly disparate, are consistent with an underlying framework that recognizes the special features of health care as a commodity. While adverse selection is traditionally regarded as the defining unique feature of health insurance, once premia are tax funded, it is less of a concern. What is instead germane here is the credence good aspect of health care, whereby physicians know what patients need but patients (and health insurance companies) do not. This informational asymmetry leads to over-treatment if patients are treated for serious problems when their condition is mild, and under-treatment or incorrect treatment if patients are treated for a mild condition when their condition is serious. Both are inefficient, as insurance pays for unnecessary treatment in the case of over-treatment and patients lose the surplus from good health in the case of under-treatment. Since physicians enjoy considerable latitude in choosing

the treatment, they may distort treatment decisions in a manner that is beneficial to themselves rather than to the patient.

Theoretically, the dual inefficiencies of over- and under-treatment can be alleviated through a combination of price and non-price incentives. The latter include enhancing altruistic motives, professionalism, peer reviews and a host of norms and principles. Interestingly, even in the absence of non-price mechanisms, price incentives alone can deliver efficient outcomes in markets with credence goods under certain conditions (Dulleck and Kerschbamer 2006).[15] In practice however, accurate price setting requires a high degree of transaction and physician-specific information, which is unlikely to be available for administrators in any insurance scheme. Consequently, we see countries adjusting their pricing mechanisms as providers exploit deficiencies in existing purchasing agreements, we see little improvement in health outcomes despite increased utilization because of increasing unnecessary care (cataracts, hysterectomies) and a possible decline in the quality of each interaction and we see systematic changes in provider behavior that undermine the stated objectives of the insurance scheme.

This idea—that health insurance affects both demand for and supply of quality health care is not new: for example, Arrow's 1963 article on health care dealt with the doctor-patient relationship and the problem of trust or credence (Arrow 1963). More recently, Newhouse (2014) considers the role of provider moral hazard in explaining why the US-based Rand Health Insurance experiment showed that more insurance led to increased utilization, but not improved health outcomes—a result similar to what we have documented here. Newhouse wrote: "[T]he odds that a service at the margin helped them were probably offset by the odds that it hurt them. I have felt more confidence in this explanation over time as evidence of medical error and poor quality of care has piled up (…)." Indeed, our review uncovered multiple papers that sought to explain why insurance does not improve health outcomes by pointing to the poor administration of the scheme or unexpected departures from what the scheme was supposed to do.

Moving forward, in terms of the research, future studies using demand-side data can still be insightful for several open questions. Does financial protection alone provide sufficient justification for expanding health insurance (Finkelstein, Hendren, and Luttmer 2019)? Does low demand reflect an actuarial calculation or administrative burdens or other costs, perhaps linked to behavioral issues? Does health

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[15] What disciplines doctors in this case is physician-specific pricing that equalizes the markups from different treatments. This is because posted prices reveal information about the doctors' strategy: if costs are known, patients correctly infer that a physician will always choose the treatment plan that offers a higher profit. This predictability in turn implies that there is no further information asymmetry and therefore no incentive for the doctor to distort her behavior in order to extract surplus from the patient.

insurance lead to improved health outcomes in studies with sufficiently large sample sizes and a broad set of indicators?

While these are important questions, where we desperately need new evidence is instead on the supply side of the market where the major failures are concentrated. If our diagnosis of the problems of health insurance in low- and middle-income countries is correct, the key questions are (a) whether the arrival of health insurance allows households to visit higher-quality facilities and (b) whether the arrival of health insurance increases the quality of clinical interactions among existing providers. We have not found any studies that causally link health insurance to objectively measured higher quality choices (as opposed to proxy measures, such as private or public) or documented supply responses to the arrival of health insurance. Providing this evidence is admittedly not easy: for example, data on post-hospitalization outcomes requires teams to track hospital users to their homes months after their procedure. Yet, this is where we will likely see the largest gains in our understanding of how (and whether) health insurance can improve the health of populations in LMICs.

We cannot separate health insurance from the quality of care, nor can we separate quality of care from specific reimbursement mechanisms. Consequently, the issue at heart is *not* whether government subsidies should be channeled through health insurance premiums or direct subsidies to public facilities. Instead, the question is what specific payment structures and non-price mechanisms can alter provider behavior and patient choice to improve quality under any administrative regime.

Tables and Figures

Table 1: Health insurance coverage across countries and over time

Country (1)	First measured coverage rate (%), Year (2)	Latest measured coverage rate (%), Year (3)
Afghanistan		0.11 (2015)
Albania	23.31 (2008)	29.88 (2017)
Angola		5.32 (2015)
Armenia	0.76 (2010)	7.82 (2015)
Azerbaijan		1.17 (2006)
Bangladesh		0.18 (2017)
Benin	1.4 (2011)	1.09 (2017)
Bolivia	20.07 (1989)	26.57 (2008)
Burkina Faso		0.51 (2010)
Burundi	13.63 (2010)	23.18 (2016)
Cambodia	13.61 (2010)	14.57 (2014)
Cameroon	1.64 (2011)	2.17 (2018)
Chad		0.3 (2014)
Comoros		5.4 (2012)
Congo		2.01 (2011)
Congo, Dem. Rep.		4.13 (2013)
Côte d'Ivoire		2.82 (2011)
Dominican Republic		56.5 (2013)
Egypt, Arab Rep.	11.78 (2005)	9.88 (2014)
Ethiopia	0.89 (2010)	4.2 (2016)
Gabon		54.03 (2012)
Gambia, The	2.13 (2013)	2.17 (2019)
Ghana	41.7 (2008)	65.95 (2014)
Guatemala		12.5 (2014)
Guinea		1.44 (2018)
Guyana		16.33 (2009)
Haiti	1.59 (2005)	2.24 (2016)
Honduras	8.19 (2005)	7.66 (2011)
India	5.9 (2005)	17.86 (2015)
Indonesia	40.71 (2012)	61.36 (2017)
Jordan		70.32 (2017)
Kenya	7.15 (2008)	7.21 (2014)
Kyrgyz Republic		88.28 (2012)
Lesotho	8.74 (2009)	1.65 (2014)
Liberia	3.58 (2013)	3.69 (2019)
Madagascar		1.88 (2008)
Malawi		1.37 (2015)
Maldives		4.86 (2016)
Mali	2.51 (2012)	4.76 (2018)
Moldova		54.91 (2005)
Mozambique	3.08 (2011)	2.97 (2015)
Myanmar		0.96 (2015)
Namibia	15.77 (2006)	17.73 (2013)
Niger		3.58 (2012)
Nigeria	1.79 (2008)	2.67 (2018)
Pakistan		2.57 (2017)
Papua New Guinea		3.93 (2016)
Peru	26.57 (2003)	58.05 (2012)

Rwanda	41.04 (2005)	83.22 (2019)
São Tomé and Príncipe		1.8 (2008)
Senegal	5.11 (2010)	5.7 (2016)
Sierra Leone	2.12 (2008)	3.47 (2019)
South Africa		6.31 (2016)
Eswatini		5.31 (2006)
Tanzania	4.9 (2009)	8.13 (2015)
Togo		4.55 (2013)
Türkiye	56.23 (1998)	88.58 (2013)
Uganda	1.61 (2011)	1.29 (2016)
Yemen, Rep.		1.77 (2013)
Zambia	7.16 (2007)	1.86 (2018)
Zimbabwe	8.77 (2005)	12.21 (2015)

Figure 1: Correct management proportions across standardized patient studies
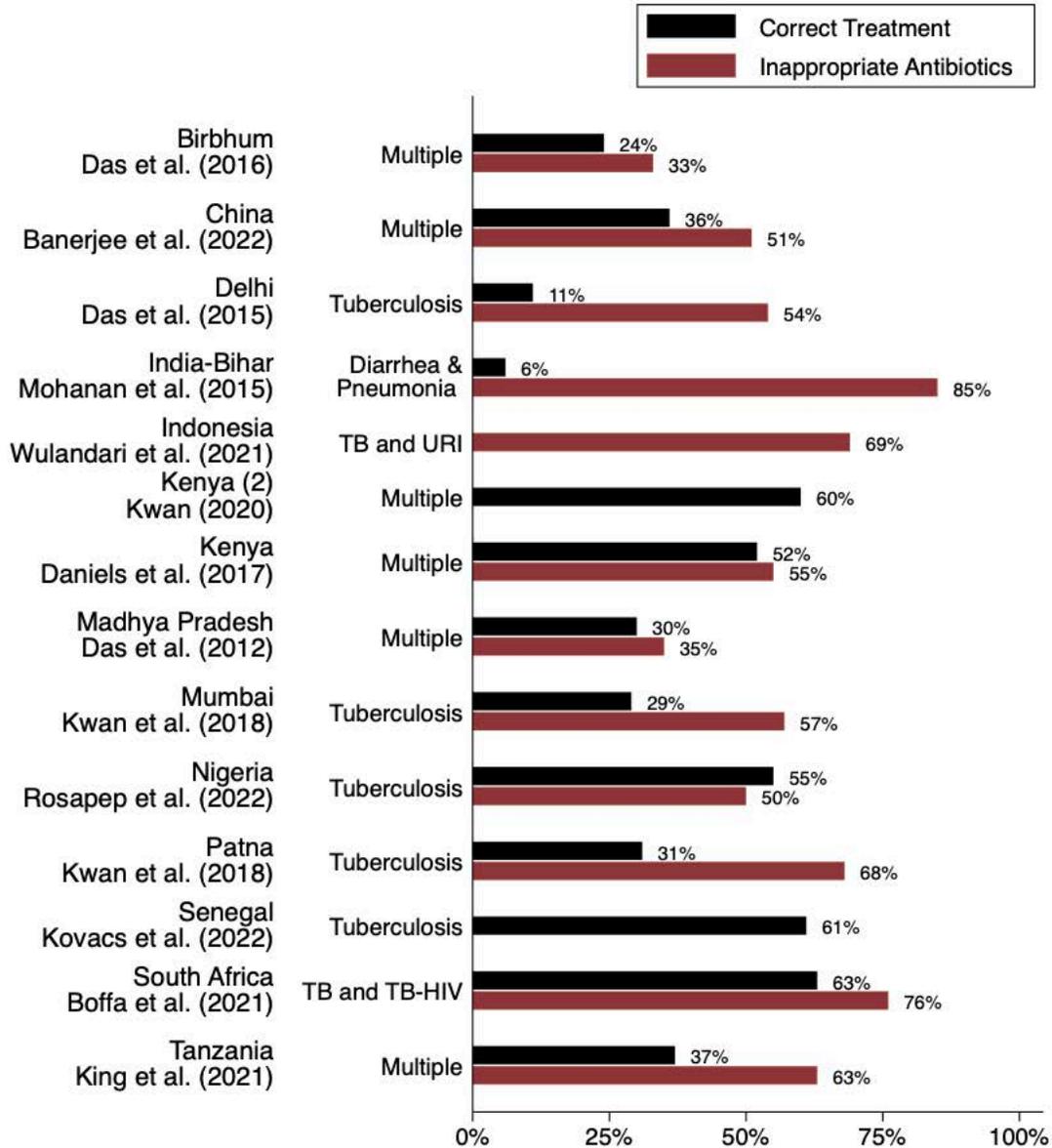
Notes: This figure shows the average share of standardized patients in each of 14 study sites who either (a) received at least minimal correct treatment according to study definitions; or (b) received an unnecessary antibiotic. Correct treatment was generally defined as at least one medication or test that would manage the case or advance an accurate diagnosis, regardless of whether it was completed and regardless of whether additional unnecessary or harmful tests or medications were also offered. Antibiotics are inappropriate in all cases, with the exception of diarrhea in a child (generally not measured) and a standard HRZE anti-TB antibiotic regime in a diagnosed TB case (all other antibiotics are still considered inappropriate). Bar labels show proportions of interactions with the indicated management outcome. Data sources listed in Appendix C.

Figure 2: Outpatient capacity utilization in 12 low- and middle-income countries
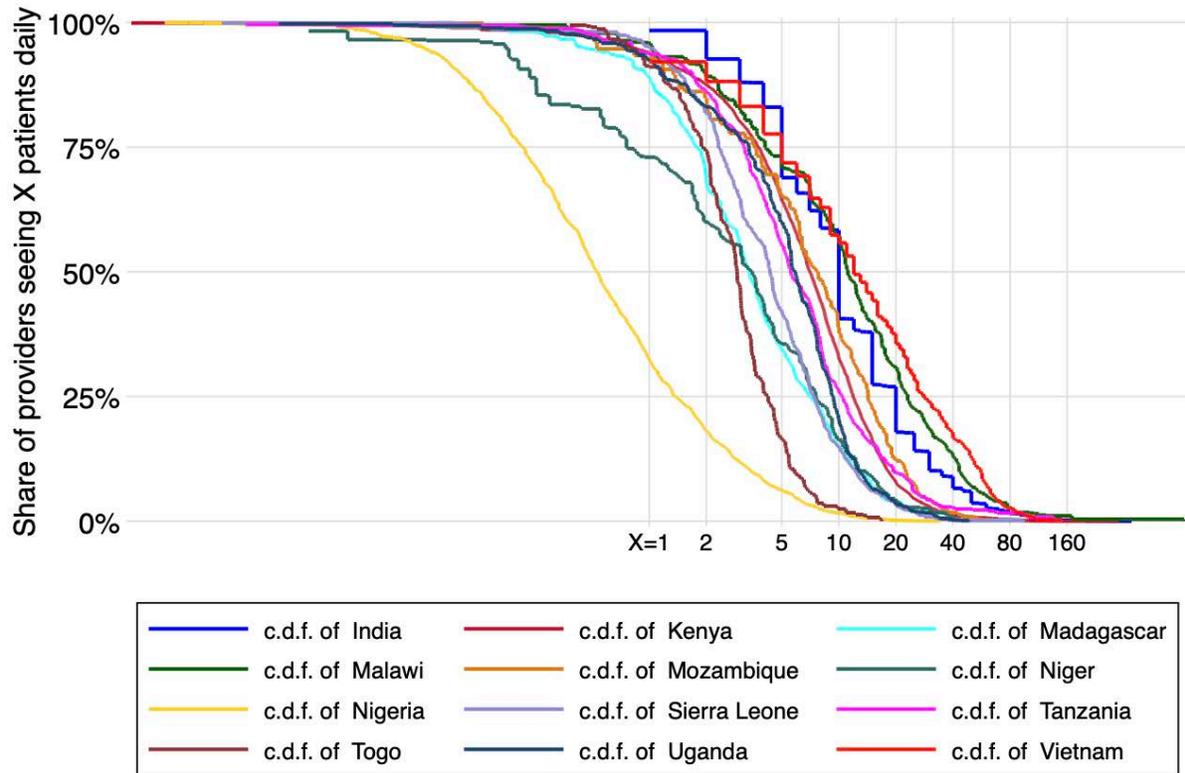
Notes: This figure shows the CDF of health care provider daily outpatient caseloads based on facility-reported data from several studies. In each case, the per-provider-day caseload is calculated by taking the daily facility caseload and dividing by the number of providers practicing at each clinic. The CDF plots illustrate the percentage of providers in each site who are estimated to see at least the number of patients indicated on the horizontal axis each day. The data are from Das et al. (2020) for India, Demombynes and Hurt (2015) for Vietnam and Daniels, Das and Gatti (2022) for the Sub-Saharan African countries.

Figure 3: Know-do gaps between medical vignettes and standardized patients
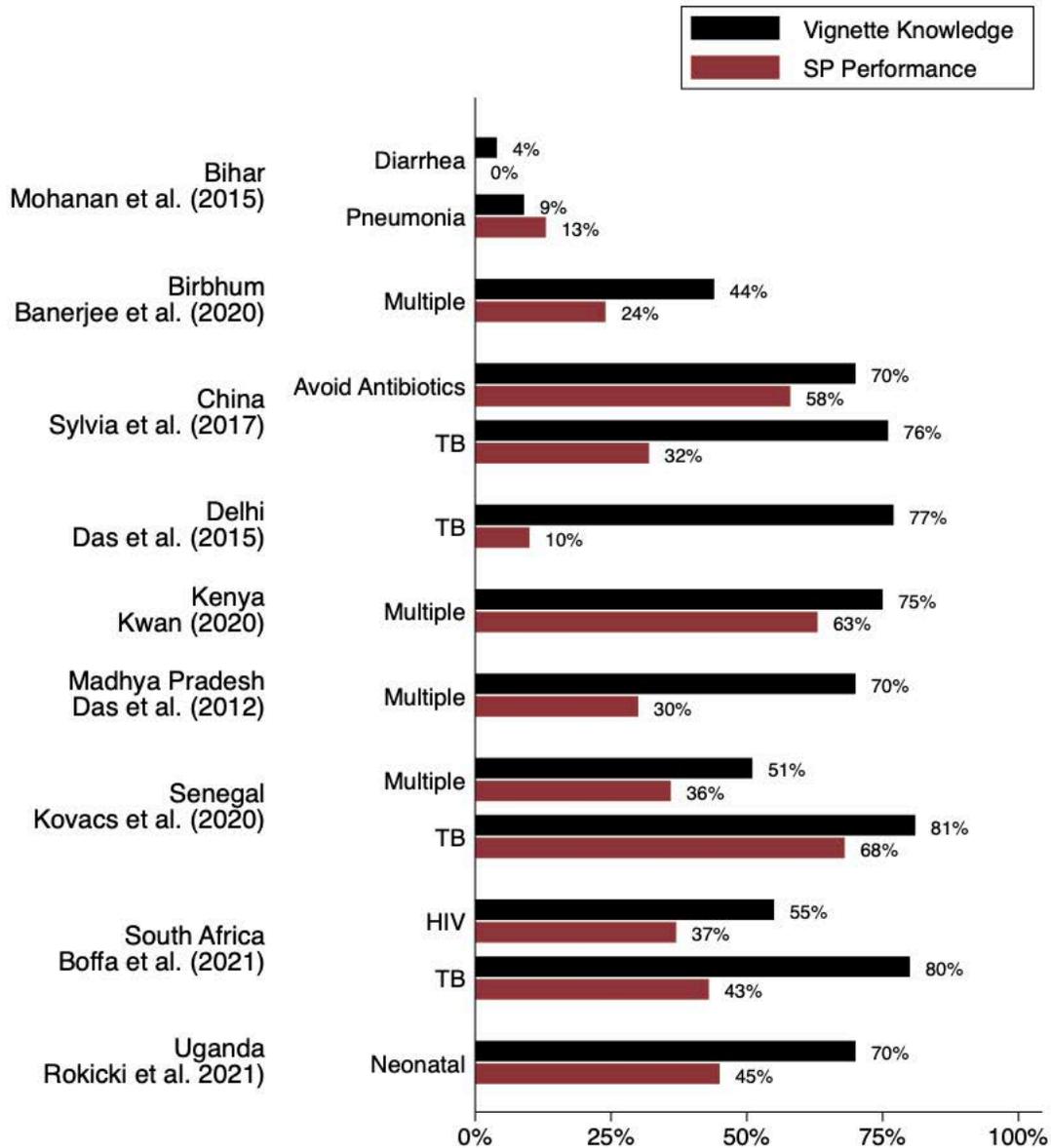
Notes: This figure illustrates "know-do gaps" estimated from several studies which used both medical vignettes and standardized patients with similar (or the same) samples of providers and conditions. "Vignette knowledge" is defined as the share of providers who said they would offer the patient in the indicated case scenario at least minimal correct treatment according to study definitions, regardless of what else they did. (In the "Avoid Antibiotics" case it is the percentage of providers who said they would not give antibiotics.) "SP performance" is the proportion of providers who did the same when presented with an actual standardized patient with the same case scenario. Data sources listed in Appendix C.

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Appendix A: Figures

Figure A1 – panel A: The likelihood of having health insurance as a function of wealth
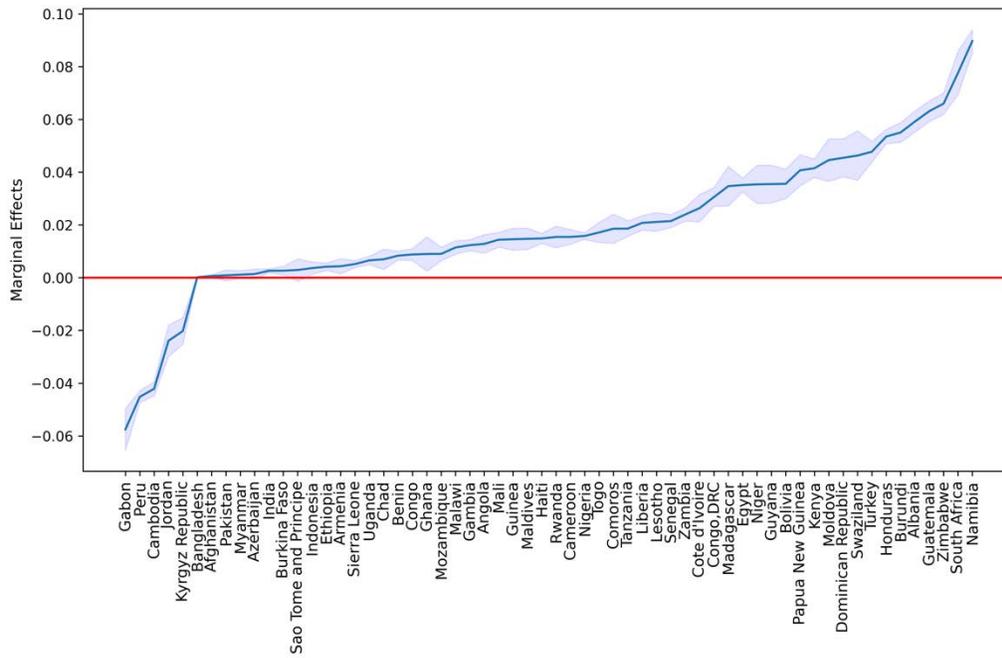
Figure A1 – panel B: The likelihood of having health insurance as a function of education
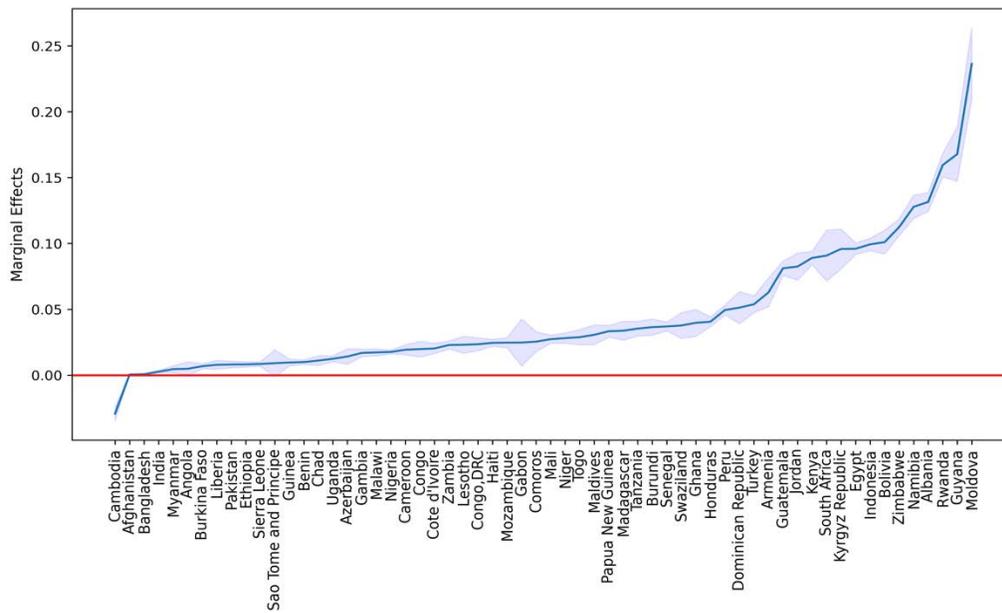
Notes: Source - Demographic and Health Surveys. For each country, we estimate a logistic regression with insurance coverage as the independent variable and household wealth and respondent education level as dependent variables. The marginal effects (and 95 percent confidence interval) are reported. Countries are ranked in increasing order of the estimated marginal effects. Details of the data and estimations are provided in Appendix B.

Appendix B: Data Sources and Replication Notes for DHS Analysis

Data sources

Since its first survey in 1984, Demographic and Health Surveys (DHS) have collected nationally-representative data on households with a focus on population, health, and nutrition. The target population of these surveys is women ages 15-49 and their children under 5 years old. Questions on health insurance were not added until 1989. DHS started implementing a standardized module in 2003, with question v481, which asks respondents about health insurance coverage.

In a majority of DHS surveys, eligible individuals include women of reproductive age (15-49) and men age 15-59, or in some cases 15-54. In some countries, only women are interviewed. Data from DHS surveys are produced in both raw and recode formats. A raw data file includes the data as they were collected, without any structural changes. These files are generally not distributed. A recode data file is generated from the raw data. All variables in the raw data file are represented in the recode data file in a standardized format, with the same structure across countries participating in each DHS phase. This standardization is meant to facilitate comparisons across surveys. The surveys are available for different units of analysis, such as household, individual or men. For the analysis in this paper, only the individual recode files pertaining to women respondents from the DHS website have been used.

According to the DHS website survey characteristic search, there are 161 surveys that have an insurance variable and 113 of these surveys are standard DHS surveys with data available to the public. We managed to clean and capture data with insurance variable in 98 surveys. In 90 surveys, insurance was coded under a standard insurance variable (V481) and in 8 surveys, there was a non-standard insurance variable, but the questions could be converted to retain comparability. For 16 surveys, the variable V481 only has missing entries (coded as "NA") in the surveys. This is, for instance, the problem with Colombia and the Philippines. These can still be included by converting non-standard insurance questions, but as of this draft, these countries have been excluded.

Table A1 lists all DHS completed as of April 2022 and indicates those that have questions on health insurance as well as the percentage of respondents that say that they are covered by health insurance.

Table B1: Health insurance information in DHS

s.no.	Country	Year	Includes Standard Insurance Variable	Total Respondents	Insurance coverage (%)
1	Afghanistan	2015	Yes	29461	0.11
2	Albania	2008	Yes	7584	23.31
3	Albania	2017	Yes	15000	29.88
4	Angola	2015	Yes	14379	5.32
5	Armenia	2000	No		
6	Armenia	2005	No		

7	Armenia	2010	Yes	5922	0.76
8	Armenia	2015	Yes	6116	7.82
9	Azerbaijan	2006	Yes	8444	1.17
10	Bangladesh	1993	No		
11	Bangladesh	1996	No		
12	Bangladesh	2000	No		
13	Bangladesh	2004	No		
14	Bangladesh	2007	Yes		
15	Bangladesh	2011	Yes		
16	Bangladesh	2014	Yes		
17	Bangladesh	2017	Yes	20127	0.18
18	Benin	1996	No		
19	Benin	2001	No		
20	Benin	2006	Yes		
21	Benin	2011	Yes	16599	1.4
22	Benin	2017	Yes	15928	1.09
23	Bolivia	1989	No	15846	10.03
24	Bolivia	1993	No		
25	Bolivia	1998	No		
26	Bolivia	2003	No		
27	Bolivia	2008	Yes	16939	26.57
28	Brazil	1986	No		
29	Brazil	1991	No		
30	Brazil	1996	No		
31	Burkina Faso	1992	No		
32	Burkina Faso	1998	No		
33	Burkina Faso	2003	No		
34	Burkina Faso	2010	Yes	17087	0.51
35	Burundi	1987	No		
36	Burundi	2010	Yes	9389	13.63
37	Burundi	2016	Yes	17269	23.18
38	Cambodia	2000	No		
39	Cambodia	2005	Yes		
40	Cambodia	2010	Yes	18754	13.61
41	Cambodia	2014	Yes	17578	14.57

42	Cameroon	1991	No		
43	Cameroon	1998	No		
44	Cameroon	2004	No		
45	Cameroon	2011	Yes	15426	1.64
46	Cameroon	2018	Yes	14677	2.17
47	Cayman Islands	1997	No		
48	Cayman Islands	2012	Yes	16416	88.28
49	Central African Republic	1994	No		
50	Chad	1996	No		
51	Chad	2004	No		
52	Chad	2014	Yes	17719	0.3
53	Colombia	1986	No		
54	Colombia	1990	No		
55	Colombia	1995	No		
56	Colombia	2000	No		
57	Colombia	2004	No		
58	Colombia	2009	Yes		
59	Colombia	2015	Yes		
60	Comoros	1996	No		
61	Comoros	2012	Yes	5329	5.4
62	Congo, Rep.	2005	Yes		
63	Congo, Rep.	2011	Yes	10819	2.01
64	Congo,Dem. Rep.	2007	Yes		
65	Congo, Dem. Rep.	2013	Yes	18827	4.13
66	Côte d'Ivoire	1994	No		
67	Côte d'Ivoire	1998	No		
68	Côte d'Ivoire	2011	Yes	10060	2.82
69	Dominican Republic	1986	No		
70	Dominican Republic	1991	No		
71	Dominican Republic	1996	No		
72	Dominican Republic	1999	No		
73	Dominican Republic	2002	No		

74	Dominican Republic	2007	Yes		
75	Dominican Republic	2013	Yes	11079	56.5
76	Ecuador	1987	No		
77	Egypt, Arab Rep.	1988	No		
78	Egypt, Arab Rep.	1992	No		
79	Egypt, Arab Rep.	1995	No		
80	Egypt, Arab Rep.	2000	No		
81	Egypt, Arab Rep.	2003	No		
82	Egypt, Arab Rep.	2005	No	38948	5.89
83	Egypt, Arab Rep.	2008	Yes		
84	Egypt, Arab Rep.	2014	Yes	21762	9.88
85	Ethiopia	1992	No		
86	Ethiopia	1997	No		
87	Ethiopia	2010	Yes	16515	0.89
88	Ethiopia	2016	Yes	15683	4.2
89	Ethiopia	2011	Yes		
90	Gabon	2000	No		
91	Gabon	2012	Yes	8422	54.03
92	Gambia, The	2013	Yes	10233	2.13
93	Gambia, The	2019	Yes	11865	2.17
94	Ghana	1988	No		
95	Ghana	1993	No		
96	Ghana	1998	No		
97	Ghana	2003	No		
98	Ghana	2008	Yes	4916	41.7
99	Ghana	2014	Yes	9396	65.95
100	Guam	1987	No		
101	Guam	1995	No		
102	Guam	1998	No		
103	Guam	2014	Yes	25914	12.5
104	Guinea	1999	No		
105	Guinea	2005	No		
106	Guinea	2012	Yes		
107	Guinea	2018	Yes	10874	1.44

108	Guyana	2009	Yes	4996	16.33
109	Haiti	1994	No		
110	Haiti	2000	No		
111	Haiti	2005	Yes	10757	1.59
112	Haiti	2012	Yes	14287	2.93
113	Haiti	2016	Yes	15393	2.24
114	Honduras	2005	Yes	19948	8.19
115	Honduras	2011	Yes	22757	7.66
116	India	1992	No		
117	India	1998	No		
118	India	1999	No		
119	India	2000	No		
120	India	2005	Yes	248770	2.97
121	India	2015	Yes	699686	17.86
122	Indonesia	1987	No		
123	Indonesia	1991	No		
124	Indonesia	1994	No		
125	Indonesia	1997	No		
126	Indonesia	2002	No		
127	Indonesia	2007	Yes		
128	Indonesia	2012	Yes	45607	40.71
129	Indonesia	2017	Yes	49627	61.36
130	Jordan	1990	No		
131	Jordan	1997	No		
132	Jordan	2002	No		
133	Jordan	2007	Yes		
134	Jordan	2009	Yes		
135	Jordan	2012	Yes		
136	Jordan	2017	Yes	14689	70.32
137	Kazakhstan	1995	No		
138	Kazakhstan	1999	No		
139	Kenya	1988	No		
140	Kenya	1993	No		
141	Kenya	1998	No		
142	Kenya	2003	No		

143	Kenya	2008	Yes	8444	7.15
144	Kenya	2014	Yes	31079	7.21
145	Kyrgyzstan	2012	Yes	16416	88.28
146	Liberia	1986	No		
147	Liberia	2006	Yes		
148	Liberia	2013	Yes	18478	3.58
149	Liberia	2019	Yes	16130	3.69
150	Lesotho	2004	No		
151	Lesotho	2009	Yes	7624	8.74
152	Lesotho	2014	Yes	6621	1.65
153	Madagascar	1992	No		
154	Madagascar	1997	No		
155	Madagascar	2003	No		
156	Madagascar	2008	Yes	17375	1.88
157	Malawi	1992	No		
158	Malawi	2000	No		
159	Malawi	2004	No		
160	Malawi	2010	Yes		
161	Malawi	2015	Yes	24562	1.37
162	Maldives	2009	Yes		
163	Maldives	2016	Yes	7699	4.86
164	Mali	1987	No		
165	Mali	1995	No		
166	Mali	2001	No		
167	Mali	2006	Yes		
168	Mali	2012	Yes	10424	2.51
169	Mali	2018	Yes	10519	4.76
170	Mexico	1987	No		
171	Moldova	2005	No	14880	27.45
172	Morocco	1987	No		
173	Morocco	1992	No		
174	Morocco	2003	No		
175	Mozambique	1997	No		
176	Mozambique	2003	No		
177	Mozambique	2011	Yes	13745	3.08

178	Mozambique	2015	Yes	7749	2.97
179	Myanmar	2015	Yes	12885	0.96
180	Namibia	1992	No		
181	Namibia	2000	No		
182	Namibia	2006	Yes	9804	15.77
183	Namibia	2013	Yes	9176	17.73
184	Nepal	1995	No		
185	Nepal	2000	No		
186	Nepal	2005	Yes		
187	Nepal	2010	Yes		
188	Nepal	2016	Yes		
189	New Caledonia	1997	No		
190	New Caledonia	2001	No		
191	Nicaragua	1997	No		
192	Nicaragua	2001	No		
193	Niger	1992	No		
194	Niger	1998	No		
195	Niger	2006	Yes		
196	Niger	2012	Yes	11160	3.58
197	Nigeria	1990	No		
198	Nigeria	2003	No		
199	Nigeria	2008	Yes	33385	1.79
200	Nigeria	2013	Yes	38948	2.11
201	Nigeria	2018	Yes	41821	2.67
202	Pakistan	1990	No		
203	Pakistan	2006	Yes		
204	Pakistan	2012	Yes		
205	Pakistan	2017	Yes	12364	2.57
206	Papua New Guinea	2016	Yes	15198	3.93
207	Paraguay	1990	No		
208	Peru	1986	No		
209	Peru	1991	No		
210	Peru	1996	No		
211	Peru	2000	No		

212	Peru	2003	Yes	81104	26.57
213	Peru	2009	Yes	24213	52.94
214	Peru	2010	Yes	22947	59.93
215	Peru	2011	Yes	22517	62.17
216	Peru	2012	Yes	23888	58.05
217	Philippines	1993	No		
218	Philippines	1998	No		
219	Philippines	2003	No		
220	Philippines	2008	Yes		
221	Philippines	2013	Yes		
222	Philippines	2017	Yes		
223	Rwanda	1992	No		
224	Rwanda	2000	No		
225	Rwanda	2005	No	22642	20.68
226	Rwanda	2007	Yes		
227	Rwanda	2010	Yes		
228	Rwanda	2014	Yes		
229	Rwanda	2019	Yes	14634	83.22
230	São Tomé and Príncipe	2008	Yes	2615	1.8
231	Senegal	1986	No		
232	Senegal	1992	No		
233	Senegal	1997	No		
234	Senegal	2005	No		
235	Senegal	2010	Yes	15688	5.11
236	Senegal	2012	Yes		
237	Senegal	2014	Yes		
238	Senegal	2015	Yes		
239	Senegal	2016	Yes	8865	5.7
240	Senegal	2017	Yes		
241	Senegal	2018	Yes		
242	Senegal	2019	Yes		
243	Sierra Leone	2008	Yes	7374	2.12
244	Sierra Leone	2013	Yes	16658	1.2
245	Sierra Leone	2019	Yes	15574	3.47

246	South Africa	1998	No		
247	South Africa	2016	Yes	8514	6.31
248	Sri Lanka	1987	No		
249	Sudan	1989	No		
250	Eswatini	2006	Yes	4987	5.31
251	Tajikistan	2012	Yes		
252	Tajikistan	2017	Yes		
253	Tanzania	1991	No		
254	Tanzania	1996	No		
255	Tanzania	1999	No		
256	Tanzania	2004	No		
257	Tanzania	2009	Yes	10139	4.9
258	Tanzania	2015	Yes	13266	8.13
259	Thailand	1987	No		
260	Timor-Leste	2009	Yes		
261	Timor-Leste	2016	Yes		
262	Togo	1988	No		
263	Togo	1998	No		
264	Togo	2013	Yes	9480	4.55
265	Trinidad and Tobago	1987	No		
266	Tunisia	1988	No		
267	Türkiye	1993	No		
268	Türkiye	1998	No	17152	28.11
269	Türkiye	2003	No	16150	33.76
270	Türkiye	2008	Yes	14810	41.78
271	Türkiye	2013	Yes	9746	88.58
272	Uganda	1988	No		
273	Uganda	1995	No		
274	Uganda	2000	No		
275	Uganda	2006	Yes		
276	Uganda	2011	Yes	8674	1.61
277	Uganda	2016	Yes	18506	1.29
278	Ukraine	2007	Yes		
279	Uzbekistan	1996	No		

280	Vietnam	1997	No		
281	Vietnam	2002	No		
282	Yemen, Rep.	1991	No		
283	Yemen, Rep.	2013	Yes	25434	1.77
284	Zambia	1992	No		
285	Zambia	1996	No		
286	Zambia	2001	No		
287	Zambia	2007	Yes	7146	7.16
288	Zambia	2013	Yes	16411	2.54
289	Zambia	2018	Yes	13683	1.86
290	Zimbabwe	1988	No		
291	Zimbabwe	1994	No		
292	Zimbabwe	1999	No		
293	Zimbabwe	2005	Yes	8907	8.77
294	Zimbabwe	2010	Yes	9171	6.6
295	Zimbabwe	2015	Yes	9955	12.21
296	Zimbabwe	2015	Yes	9955	12.21

Appendix Figure 1 uses logistic regressions, one for each country, to report the correlation between insurance coverage and wealth and education. Marginal effects are reported. The wealth variable used is v190 and the education variable is v106, which measures the highest education level of the respondent. Both are coded in the datasets. For each country, we use the latest available DHS and run a logistic regression of the respondent's insurance coverage on her education and household wealth.

Definition of Wealth Variable (v190): The wealth index is a composite measure of a household's cumulative living standard. The wealth index is calculated using easy-to-collect data on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities. Generated with a statistical procedure known as principal components analysis, the wealth index places individual households on a continuous scale of relative wealth. DHS separates all interviewed households into five wealth quintiles to compare the influence of wealth on various population, health and nutrition indicators. The wealth index is presented in the DHS Final Reports and survey datasets as a background characteristic.

Definition of education variable (v106): Highest education level attended. This is a standardized variable providing level of education in the following categories: No education, Primary, Secondary, and Higher. In some countries the educational system does not fit naturally within this scheme and a different categorization was used for the Final Report. In this case, this variable is constructed as accurately as possible from the country's own scheme and the variable used for the Final Report is included as a country-specific variable.

Table B2 displays the regression results.

Table B2: Logistic regression marginal effects

1	2	3
Country	Wealth	Education
Afghanistan	0.001	0.000
	(0.000)	(0.000)
Albania	0.059	0.132
	(0.002)	(0.004)
Angola	0.013	0.005
	(0.002)	(0.003)
Armenia	0.004	0.063
	(0.001)	(0.006)
Azerbaijan	0.001	0.014
	(0.001)	(0.003)
Bangladesh	0.0	0.001
	(0.0)	(0.0)
Benin	0.008	0.01
	(0.001)	(0.001)
Bolivia	0.036	0.101
	(0.003)	(0.005)

Burkina Faso	0.003 (0.001)	0.007 (0.001)
Burundi	0.055 (0.002)	0.036 (0.003)
Cambodia	-0.042 (0.001)	-0.029 (0.003)
Cameroon	0.015 (0.001)	0.019 (0.002)
Chad	0.007 (0.002)	0.011 (0.002)
Comoros	0.019 (0.003)	0.025 (0.004)
Congo, Rep.	0.009 (0.001)	0.02 (0.003)
Congo, Dem. Rep.	0.031 (0.002)	0.023 (0.002)
Côte d'Ivoire	0.026 (0.003)	0.02 (0.002)
Dominican Republic	0.045 (0.004)	0.051 (0.006)
Egypt, Arab Rep.	0.035 (0.001)	0.096 (0.002)
Ethiopia	0.004 (0.001)	0.008 (0.001)
Gabon	-0.058 (0.004)	0.025 (0.009)
Gambia, The	0.012 (0.001)	0.017 (0.001)
Ghana	0.009 (0.003)	0.04 (0.005)
Guatemala	0.063 (0.002)	0.081 (0.003)
Guinea	0.015 (0.002)	0.01 (0.001)
Guyana	0.035 (0.004)	0.168 (0.01)
Haiti	0.015 (0.001)	0.025 (0.001)
Honduras	0.053 (0.001)	0.041 (0.002)
India	0.003 (0.0)	0.003 (0.001)

Indonesia	0.004 (0.001)	0.099 (0.002)
Jordan	-0.024 (0.003)	0.082 (0.005)
Kenya	0.041 (0.002)	0.089 (0.003)
Kyrgyz Republic	-0.02 (0.003)	0.096 (0.008)
Lesotho	0.021 (0.002)	0.023 (0.003)
Liberia	0.021 (0.001)	0.008 (0.001)
Madagascar	0.035 (0.004)	0.034 (0.004)
Malawi	0.011 (0.001)	0.017 (0.001)
Maldives	0.015 (0.002)	0.031 (0.004)
Mali	0.014 (0.001)	0.027 (0.002)
Moldova	0.045 (0.004)	0.236 (0.014)
Mozambique	0.009 (0.001)	0.025 (0.002)
Myanmar	0.001 (0.001)	0.005 (0.001)
Namibia	0.09 (0.002)	0.128 (0.005)
Niger	0.035 (0.004)	0.028 (0.002)
Nigeria	0.016 (0.001)	0.018 (0.001)
Pakistan	0.001 (0.001)	0.008 (0.001)
Papua New Guinea	0.041 (0.003)	0.033 (0.002)
Peru	-0.045 (0.001)	0.049 (0.002)
Rwanda	0.016 (0.002)	0.159 (0.005)
São Tomé and Príncipe	0.003 (0.002)	0.009 (0.005)

Senegal	0.021 (0.001)	0.037 (0.002)
Sierra Leone	0.005 (0.001)	0.009 (0.001)
South Africa	0.078 (0.004)	0.091 (0.01)
Eswatini	0.046 (0.005)	0.038 (0.005)
Tanzania	0.019 (0.001)	0.035 (0.003)
Togo	0.017 (0.002)	0.029 (0.003)
Türkiye	0.048 (0.002)	0.054 (0.003)
Uganda	0.007 (0.001)	0.012 (0.001)
Zambia	0.024 (0.001)	0.023 (0.002)
Zimbabwe	0.066 (0.002)	0.112 (0.003)
Note: Standard errors in parentheses.		

Appendix C: Data Sources for Figures 1, 2 and 3

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