WPS7470

Policy Research Working Paper 7470

Measuring Progress Towards Universal Health Coverage

With An Application to 24 Developing Countries

Adam Wagstaff
Daniel Cotlear
Patrick Hoang-Vu Eozenou
Leander R. Buisman

WORLD BANK GROUP
Development Research Group
Human Development and Public Services Team
&
Health Nutrition and Population Global Practice Group
November 2015

Policy Research Working Paper 7470

Abstract

The last few years have seen a growing commitment worldwide to universal health coverage (UHC). Yet there is a lack of clarity on how to measure progress towards UHC. This paper proposes a 'mashup' index that captures both aspects of UHC: that everyone—irrespective of their ability-to-pay—gets the health services they need; and that nobody suffers undue financial hardship as a result of receiving care. Service coverage is broken down into prevention and treatment, and financial protection into impoverishment and catastrophic spending; nationally representative household survey data are used to adjust population averages to capture inequalities between the poor and better off; nonlinear tradeoffs are allowed between and within the two dimensions of the UHC index; and all indicators are expressed such that scores run from 0 to 100, and higher scores are better. In a sample of 24 countries for which there are detailed information on UHC-inspired reforms, a cluster of high-performing countries emerges with UHC scores of between 79 and 84 (Brazil, Colombia, Costa Rica, Mexico and South Africa) and a cluster of low-performing countries emerges with UHC scores in the range 35–57 (Ethiopia, Guatemala, India, Indonesia and Vietnam). Countries have mostly improved their UHC scores between the earliest and latest years for which there are data—by about 5 points on average; however, the improvement has come from increases in receipt of key health interventions, not from reductions in the incidence of out-of-pocket payments on welfare.

This paper is a product of the Human Development and Public Services Team, Development Research Group; and the Health Nutrition and Population Global Practice Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at awagstaff@worldbank.org.

Measuring Progress Towards Universal Health Coverage: With An Application to 24 Developing Countries

By

Adam Wagstaff*[a], Daniel Cotlear[b], Patrick Hoang-Vu Eozenou[b], Leander R. Buisman[c]

[a] Development Research Group, World Bank, Washington DC, USA
[b] Health, Nutrition and Population Global Practice, World Bank, Washington DC, USA
[c] Institute of Health Policy and Management, Erasmus University Rotterdam, Rotterdam, The Netherlands

Key words: universal health coverage; financial protection; service coverage; equity

JEL classification: I10, I14, I15

Acknowledgments

We thank Andrew Farlow and two anonymous referees for very helpful suggestions on a previous draft. The findings, interpretations and conclusions expressed in this paper are entirely those of the authors, and do not necessarily represent the views of the World Bank, its Executive Directors, or the governments of the countries they represent.

*Corresponding author: Adam Wagstaff, Development Research Group, The World Bank, 1818 H Street, NW, Washington DC 20433, USA. Tel: +1 202 473 0566, awagstaff@worldbank.org.

I. Introduction

The last few years have seen a growing commitment around the world to universal health coverage (UHC) with many countries embarking on UHC-inspired health reforms, and commentators urging others to do so (see e.g. Horton and Das 2014). Yet there are still considerable differences of view about what UHC actually means. Unsurprisingly, as a result, there is a lack of clarity on how to measure progress towards UHC; this in turn has led some (e.g. Fan et al. 2012a) to question whether UHC could ever be the umbrella goal for health in the post-2015 international development goals.

In this paper we propose a way of measuring progress towards UHC. Our index takes as its starting point the definition of UHC proposed by the World Bank and the World Health Organization (Boerma et al. 2014b; Boerma et al. 2014c); we explain below why we adopt this definition. We go on to discuss how our UHC index can be operationalized with existing data in such a way that countries' performances vis-à-vis UHC can be compared and tracked over time. Finally, we use our index to compare UHC performance across 24 countries that have implemented UHC-inspired reforms (which we define as reforms that have sought to increase the fraction of the population covered, the range of services covered, and/or the financial protection associated with use of health services) and for which we have detailed information on how they have done so. While the term "universal health coverage" was popularized by the 2010 World Health Report (World Health

Organization 2000), it has, in fact, been in use in books since at least 1945.[1] We also track these countries' UHC performance over time, including – where possible – comparisons before and after the implementation of their UHC-inspired reforms. These comparisons cannot, of course, tell us whether a reform *caused* the change in UHC performance. However, they allow us to get a sense of how far from attaining UHC a country was before the reform and how far it is from UHC after the reform, and to set in context the estimated impacts of UHC-inspired reforms from studies using methods and data that *do* allow causal effects of UHC reforms to be estimated.

In developing our UHC index we borrow ideas from the Human Development Index (HDI) (UNDP 2014) – an index that, despite its relative sophistication, is widely quoted in the media and in international development forums.[2] But we also build on criticisms of earlier versions of the HDI (Ravallion 2012b)[3], and on suggestions as to what to do and not to do in constructing what Ravallion (2012a) has called a 'mashup' index: "a composite index for which existing theory and practice provides little or no guidance for its design".

[1] See also discussion below in the subsection "A workable definition of UHC".
[2] The HDI also has 'dimensions' and indicators for each dimension; the latter are rescaled and aggregated into an overall index. Unlike our UHC index, the standard HDI does not adjust for inequalities in the various indicators. Recently an inequality-adjusted HDI was introduced. The HDI inequality adjustment is done differently from our inequality adjustment. The HDI adjustment uses the Atkinson index which is blind to the socioeconomic dimension of inequality and focuses on pure inequality; our adjustment takes into account whether it is the poor or better off who have lower values of the indicators in the UHC index. Technical notes on the HDI are available at http://hdr.undp.org/sites/default/files/hdr14_technical_notes.pdf.
[3] Following criticism, recent versions of the HDI uses a geometric average to aggregate across indicators, as do we in our UHC index.

II. What is UHC?

In one widely-used definition, UHC is interpreted as everyone being in a financial protection scheme that covers the costs of health care (Savedoff et al. 2012). Under this definition, measuring UHC involves looking at the fraction of the population in a financial protection scheme; using this definition, commentators point to, for example, the number of uninsured in the US, and how Thailand and Mexico "achieved" UHC through their *Universal Coverage* and *Seguro Popular* schemes.[4]

Universalism is not the issue

This definition implicitly assumes that only 'demand-side' programs can provide financial protection. Tax-financed health systems, like Brazil's, are not counted. Nor are Ministry of Health (MOH)-operated subsystems that provide free or subsidized care in government-run health facilities to *all* citizens, even to families are covered by a social health insurance (SHI) scheme who have, in effect, double coverage. It is only by ignoring such systems and subsystems that commentators like Garrett et al. (2009) can draw maps showing some countries as having less than 100 percent coverage .

The reality is that all citizens in almost all countries are covered by at least one financial protection scheme, and they were covered long before the recent wave of

[4] Some countries claim to have achieved "universal coverage" even though coverage by an insurance scheme is not quite 100%.

UHC-inspired reforms. The *universalism* of coverage is not the issue; rather it is that the *degree* of coverage is not the same for everyone.

From scheme membership to the degree of financial protection

One obvious dimension over which coverage varies is the degree of financial protection provided by a scheme. Those covered by, for example, Vietnam's government-run health insurance scheme receive the same care from the same providers as those who are covered (only) by the health ministry; those outside the scheme pay more out-of-pocket, although not the full cost because government providers are subsidized (Lieberman and Wagstaff 2009). Schemes also change over time in how much financial protection they provide. In the early years of China's rural health insurance scheme, for example, the reimbursement rate (one minus the coinsurance rate) was very low; subsequently, as more central government subsidies were pumped into the scheme, the rate increased (Wagstaff et al. 2009c), although calculations by Hou et al. (2014) suggest the increase in the reimbursement rate was modest (around 20 percentage points to just below 40 percent).

One way to capture this would be to define coverage not as 'on' or 'off' but rather as a matter of degree. One might define coverage as the fraction of the cost of care paid by the patient in out-of-pocket payments at the point of use, or some function thereof (we come back to this below). Whatever metric we use, we should be careful to capture only payments *actually made*. Sometimes patients may pay more than expected – some care might be outside the benefit package, or a patient may be

prescribed a more expensive treatment perhaps as a result of having insurance coverage.

Beyond financial protection to capturing service coverage

While better than simply measuring whether someone is in a financial protection scheme or not, measuring coverage in terms of the costs of care paid out-of-pocket still has a major shortcoming: it does not get at the issue of what health interventions people get. For many, UHC is just as much about coverage in terms of people receiving interventions they need (i.e. 'service coverage') as it is about coverage in terms of financial protection. Government clinics may charge patients only modest copayments on the interventions they deliver, but they may deliver only a relatively small range of interventions; as result, some people might either go without needed interventions or pay for them privately. Or government clinics may levy small copayments only for the covered interventions, and charge market prices for uncovered interventions. There is also the flipside of the coin to worry about: providers – government and private – might deliver (and charge for) interventions that are not actually needed.

One important part of the coverage-measurement agenda is therefore how to capture service coverage. Again, the focus needs to be on the interventions that patients receive *in practice* not on what interventions patients are *entitled* to. Governments often make promises, sometimes even legal commitments; some countries have constitutional guarantees. What patients are promised and what

they actually receive in practice are often different, due to health worker absenteeism and drugs being unavailable (Lavy et al. 1996; Chaudhury et al. 2006; Lindelow 2008). Further, we want to know not just whether the patient received a particular intervention but also whether the intervention was needed. Ideally, in fact, we would like to know as well the degree to which the (received and needed) intervention had its intended effect on the patient's health, so we can get at 'effective coverage', i.e. patients in need of an intervention getting it and the intervention achieving its intended effect on the patient's health (Shengelia et al. 2005; Boerma et al. 2014a). A patient may not seek treatment and go undiagnosed and never receive an intervention even though it is needed. A patient may seek treatment but be incorrectly diagnosed, or a provider, having made the correct diagnosis, may prescribe the wrong treatment, not necessarily due to a provider's ignorance but because providers often do only part of what they know they should do (Das et al. 2012); either way, the patient ends up with an intervention that is inappropriate given their need. Finally, the patient may be correctly diagnosed and prescribed the appropriate intervention, but may fail to see the full health benefit, because of either supply-side factors (e.g. clinical standards were not adhered to) or demand-side factors (the patient failed to adhere to the treatment).

A workable definition of UHC

This points to a broad definition of UHC that captures the payments patients *actually make* and the interventions they *actually receive*. The World Bank and the World Health Organization (WHO) (Boerma et al. 2014b; Boerma et al. 2014c)

propose a definition of UHC that captures these elements: UHC is a situation where *everyone – irrespective of their ability-to-pay – gets the health services they need in a timely fashion without suffering any undue financial hardship as a result of receiving the care.* This captures the idea that policy makers are concerned about *who* pays out-of-pocket payments and *who* receives care: many of the UHC-inspired reforms around the world have, as we will document below, been motivated by a concern to improve the coverage of the poor and the vulnerable. Moreover, the definition relates the two target variables – out-of-pocket payments and receipt of interventions – to a yardstick: the family's ability-to-pay in the case of out-of-pocket spending; and the person's medical needs in the case of receipt of health services. Both need to be defined, of course – an issue we deal with below.

There are strong echoes in this definition of UHC of earlier work in this journal: Wagstaff, van Doorslaer and Paci (1989) identified, and then operationalized, two widely-agreed principles of equity in the health field: that health services ought to be allocated on the basis of need and not ability-to-pay; and that payments for health care ought to be linked to ability-to-pay and not to receipt of services. As one of us has argued elsewhere (Wagstaff 2013), UHC is not, in fact, a new concept, and predates the 2010 World Health Report (World Health Organization 2010). A search for "universal health coverage" in Google Books Ngram viewer shows that the term has been in use in English-language books since 1945, with usage growing rapidly in the period 1990-2000 and more slowly over the period 2000-2008 (data thereafter are currently unavailable). Moreover, as Table 2.1 in Wagstaff and van Doorslaer

(1993) makes clear, the principles of UHC have underpinned health policy in several OECD countries for much of the period post-World War II.

III. An index of UHC attainment

It is one thing to define a concept, another to measure it: we suggest in what follows an index of UHC consistent with the WHO-World Bank definition of UHC.

Preliminaries

We can think of UHC, defined along the lines above, as having two *dimensions*: service coverage (everyone, irrespective of ability-to-pay, getting the services they need); and financial protection (nobody suffering financial hardship as a result of receiving needed care). Each of these dimensions has a 'what?' angle, and a 'who?' angle – we need to capture not just *what* services are received and *what* is paid out-of-pocket, but also *who* receives what and *who* pays what. We are using not a UHC cube (World Health Organization 2010) (whose axes represent services, payments and population) but rather a measurement framework involving two planes, one capturing services by population group, the other capturing payments by population group.

Policy makers care about both dimensions but are presumably willing to trade off one against the other, suggesting it would be useful to have an index of UHC attainment that reflects this. In developing a UHC index we need to take care to avoid the pitfalls of 'mashup' indices highlighted by Ravallion (2012a), namely

inadequate attention to conceptual foundations, lack of clarity on the tradeoffs implied by the index, under-appreciation of the contextual factors relevant to country performance, and failure to assess the sensitivity of implied rankings to changes in data and weights. We also need to take care to present the results in such a way that attainment on the two dimensions is clear, thereby combining the merits of what Ravallion (op. cit.) calls the "dashboard" approach and the overall index approach.

Suppose, for the moment, we can measure success on service coverage and financial protection on a scale ranging from 0 to 100, in such a way that higher numbers are better. We will want the score on both dimensions to reflect not just how the population fares overall but also the degree to which the poor are not left behind. We assume that policy makers prefer, for a given mean, similar values on each dimension to very different values on the two dimensions, or equivalently that the rate at which they are prepared to give up, say, service coverage in exchange for a given increment in financial protection diminishes as the level of financial protection increases and the level of service coverage diminishes.[5] If we weight service coverage and financial protection equally, we might measure UHC using an index that is the geometric mean of the two, i.e. $UHC = SC^{0.5} \cdot FP^{0.5}$, where SC is a service coverage index and FP is a financial protection index.[6,7] The challenge then

[5] This is, of course, the principle of diminishing marginal rate of substitution.
[6] This is, of course, the Cobb-Douglas utility function with equal elasticities that sum to one (i.e. we assume constant return to scale).
[7] The UHC index proposed here adopts many of the principles of the UN's Human Development Index (HDI) (UNDP 2014). The decision to allow a diminishing marginal rate of substitution in the HDI was in response to criticism from Ravallion (2012b) about the absurdities implied by the previous tradeoff implicit in the weighted arithmetic mean of the HDI components.

becomes one of arriving at the *SC* and *FP* indices – a challenge to which we now turn.

Service coverage

We can think of service coverage as having two *domains*: prevention and treatment. The idea behind the SC index is to count the number of people in need who have received each prevention and treatment intervention, and then make an adjustment for differences in rates between the poor and the less poor. We could in principle do this for the entire universe of prevention and treatment interventions, but in practice it makes sense to work with a set of tracer interventions or with composites of interventions. These indicators need to be relevant, and data on them need to be widely available, high-quality and capable of being disaggregated by the relevant household's wealth or consumption (cf. e.g. Boerma et al. 2014b).

Capturing 'need' will be more straightforward for some interventions and composites than others. We can think of a person's 'need' for health services as the services required to effect the maximum possible health improvement (cf. Culyer and Wagstaff 1993). Some needs can be determined on the basis of age, gender and pregnancy status: the need for childhood immunization depends only on a child's age; the need for a mammography is gender- and age-specific; and the need for prenatal checkups is gender-specific and specific to whether a woman is pregnant. In such cases, we can focus on the subpopulation in need, and 100 represents everyone in need receiving the needed intervention. By contrast, assessing the need

for a hospitalization – even for a specific condition – is more complex and depends on a person's health status prior to hospitalization, the ascertainment of which is extremely hard, irrespective whether administrative or survey data are used, and on the interventions available and their cost-effectiveness. What can be done is to compare the (national) hospitalization rate to a reasonable benchmark, in which case 100 means the intervention rate is at or exceeds the benchmark. This leaves the possibility that different populations may have different needs for hospitalization because of, for example, different age structures and epidemiology. In addition, groups within the population, including different socioeconomic groups, may have a different need for hospitalization. No attempt is made in this paper to adjust for between- and within-population hospitalization differences for need.[8]

In addition to capturing need, we want to relate receipt of interventions to a person's ability-to-pay such that we can penalize countries who, for a given population mean, have lower coverage rates among the poor. This requires the use of household survey data. Assuming we have such data, we can adjust the population mean for inequality in intervention coverage between the poor and better off by switching from the population mean to the 'achievement' index (Wagstaff 2002). This is a weighted average of values across the population such that the poorest person is assigned a weight of two and the weights fall linearly

[8] The existing literature suggests one option for adjusting for within-population differences in need, namely to replace actual hospitalization rates for each group by need-standardized rates, proxying need by self-reported health status (Wagstaff et al. 1991; Wagstaff and van Doorslaer 2000). An implicit assumption in this approach is that hospitalization is no more responsive to 'need' among the better-off than among the worse-off. Van de Poel et al. (2012) test and reject this assumption and propose a method to relax it; in their analysis of the Philippines WHS data, they conclude that the pro-poor need-justified inequality in inpatient care is underestimated when it is assumed that all subgroups have the same hospitalization-need relationship.

until we reach the richest person, who receives a weight of zero. The 'achievement' index so constructed is equal to the population mean multiplied by the complement of the 'concentration' index (Kakwani et al. 1997); the latter captures the inequality between the poor and less poor. The achievement index falls below the population mean in countries that achieve high service coverage rates by disproportionately covering the better-off.[9]

For each of the tracer interventions and composite interventions we end up with an inequality-adjusted service coverage score, i.e. the achievement index for that intervention. We have one set for the prevention indicators and another for the treatment indicators. We aggregate the prevention indicator scores into a single summary score for prevention, SC_P, using the geometric mean of the prevention indicator scores: $SC_P = SC_{P_1}^{\alpha_1} SC_{P_2}^{\alpha_2} \dots SC_{P_n}^{\alpha_n}$ where the α_i are the weights attached to the inequality-adjusted prevention service coverage scores, which could be all equal or not.[10] We do the same aggregation process for each of the inequality-adjusted scores for the treatment indicators: $SC_T = SC_{T_1}^{\beta_1} SC_{T_2}^{\beta_2} \dots SC_{T_n}^{\beta_n}$ where the β_i are again weights. We then aggregate SC_P and SC_T to get the overall level of service coverage, SC, as a geometric average of SC_P and SC_T, i.e. $SC = SC_P^{\pi} \cdot SC_T^{1-\pi}$ where π is the weight attached to prevention.

[9] This is analogous to the inequality adjustment performed in the UN's HDI, except they use the Atkinson inequality index, which does not capture whether it is the rich or poor who are disproportionately covered, something we consider important in the context of UHC monitoring.

[10] The weights α_i add up to one, as do the β_i below.

Financial protection

Following Wagstaff and van Doorslaer (2003), we can think of financial protection as comprising two domains, namely 'catastrophic' payments (payments that exceed a pre-specified threshold of household consumption) and 'impoverishing' payments (payments that push a family below the poverty line).[11] The impoverishment approach gets directly at the question of out-of-pocket payments leading to financial hardship. By contrast, catastrophic spending need not cause impoverishment; rather this domain captures exposure to financial risk. The idea is to count the fraction of households which incur catastrophic payments and the fraction who incur impoverishing payments, and then make an adjustment for differences in rates of catastrophic payments between the poor and less poor, since policy makers are likely to worry less about better-off households incurring catastrophic payments than those further down the income distribution.

Both financial protection indicators require a choice of threshold: the threshold above which payments, as a share of consumption, are deemed catastrophic; and the threshold below which consumption (net of out-of-pocket spending) is deemed to constitute poverty. Some rescaling and adjustments are also useful. Given that higher values of the service coverage domain indicator are desirable, it makes sense to switch to the complements of the two financial protection indicators, i.e. the fractions of households *not* incurring catastrophic and impoverishing payments. It

[11] One could also add to the impoverishment count the fraction of households below the poverty line who make out-of-pocket payments. Wagstaff and Eozenou (2014) call these 'immiserizing' payments.

also makes sense to rescale the complements of both, since the original catastrophic and impoverishment indicators do not, in practice, ever reach anywhere near one. Our rescaled versions of (the complements of) the catastrophic and impoverishment are FP_{CATA} = ((1-*Cata*)-(1-$Cata_{MAX}$))/((1-$Cata_{MIN}$)-(1-$Cata_{MAX}$)) and FP_{IMPOV} = ((1-*Impov*)-(1- $Impov_{MAX}$))/((1- $Impov_{MIN}$)-(1- $Impov_{MAX}$)), where *Cata* and *Impov* are the fractions of households incurring catastrophic and impoverishing payments, and the MIN and MAX subscripts denote minimum and maximum values.[12] To capture the fact the policy makers are more concerned about catastrophic payments among poor households than among rich households, we replace the fraction not experiencing catastrophic payments, (1-*Cata*), by the corresponding achievement index.[13]

Last – given that they capture different aspects of financial protection, and policy makers are presumably willing to trade one off against the other at a diminishing rate – we combine the two dimensions of financial protection into a single financial protection index: $FP = FP_{CATA}^{\gamma} \cdot FP_{IMPOV}^{1-\gamma}$, where γ is the weight attached to catastrophic payments (the weight could, of course, be a half).

[12] A similar rescaling exercise is performed in the UNDP's HDI.

[13] The achievement index in this case is the fraction of the population not experiencing catastrophic payments multiplied by the complement of the corresponding concentration index. The latter is equal to -(μ/(1-μ)) CI_{CATA}, where μ is the fraction of households experiencing catastrophic payments and CI_{CATA} is the corresponding concentration index (cf. Erreygers 2009 eqn (11)).

Pulling the UHC index together

Figure 1 summarizes the thinking underlying our UHC 'mashup' index. UHC has two dimensions, service coverage and financial protection. Within each dimension, we have two domains: prevention and treatment in the case of service coverage, and impoverishment and catastrophic spending in the case of financial protection. Each domain is captured empirically by an index. These indices are a weighted geometric average of a set of indicators; with the exception of the impoverishment indicator, these indicators are not simply the population mean but are instead the 'achievement index' which reflects not only the mean but also the degree of inequality in the indicator between the poor and better off. The two dimension indices are then weighted geometric averages of the relevant domain indices, and the UHC index is in turn a geometric average of the two domain indices.[14]

IV. Operationalizing the UHC index

We turn now to the question of operationalizing the UHC index. If we want to be able to use the index to see how a country's performance vis-à-vis UHC changes over time or how it compares with other countries' UHC performances, we need to operationalize the index in such a way that it is applicable to multiple time periods and/or multiple countries. This affects our choices vis-à-vis weights, the catastrophic payment threshold, and the poverty line. But it also affects our choice of service coverage indicators, which need to be relevant and available across a

[14] *SC* and *FP* could be weighted unequally, but in the absence of any indication that countries care more about service coverage than financial protection, or vice versa, we have chosen to weight them equally.

range of time periods and/or countries. Data availability is a major constraint in this exercise: our indicators need to be available in household surveys, since without such data we are unable to make the inequality adjustment in the UHC index. We begin therefore by outlining the data sources available for an exercise involving comparisons across countries *and* over time. Clearly there is a risk taking this approach that one ends up with a set of indicators that is the lowest common denominator; a national monitoring exercise might choose a different (richer and perhaps more relevant) set of indicators.

Data sources

For the service coverage domain, we require individual-level data on receipt of and need for health services, and on the living standards of the respondent's household; such data are found most often in in a dedicated health survey. For the financial protection domain, we require household-level data on out-of-pocket spending on health services, and on the household's consumption of budget items other than health services; such data are found most often in a household budget or expenditure survey although some multipurpose household surveys also contain such data. To compare across countries and over time we need definitions that are common across surveys – both over time within a country, and across countries.

Two multi-year global household survey initiatives provide a wealth of data on health service coverage, albeit with a strong focus in most countries on maternal and child health, namely the Demographic and Health Survey (DHS) conducted by

Macro International on behalf of USAID and the Multiple Indicator Cluster Survey (MICS) conducted by UNICEF. Neither survey collects data on household consumption but both have a household wealth or asset index that can be used to proxy a household's living standards (cf. Filmer and Pritchett 2001). The one-off World Health Survey (WHS) and the Multi-Country Survey Study (MCSS) conducted by WHO in the early 2000s are also useful sources of data on the receipt of health services; the WHS is the broadest of all the aforementioned surveys, and the MCSS the narrowest.

The closest to an equivalent of the DHS and MICS in the area of household expenditure and multipurpose surveys is the Living Standards Measurement Study (LSMS) conducted by the World Bank, although it has been conducted in fewer countries than the DHS and the MICS. The WHS and MCSS also collect data on household consumption and out-of-pocket spending, but, as we explain below, the data are not comparable with household expenditure and multipurpose surveys. More extensive in coverage than the LSMS are the various harmonization initiatives whereby household expenditure and multipurpose surveys have been harmonized ex post. The Luxembourg Income Study (LIS) is the best known and best documented of such initiatives, and the data are accessible to the public albeit through remote access. The World Bank also has a number of such initiatives underway, including a centralized initiative that forms part of the international price comparison program, and several region-specific initiatives.

Indicators, weights and thresholds

Of the two service coverage domains, prevention is the easier to operationalize given data availability. We use four indicators to capture the prevention domain: four or more antenatal care (ANC) visits; full immunization of a child; breast cancer screening; and cervical cancer screening.[15] In all four cases, there is an objectively-defined subpopulation in need. We do not attempt any quality adjustment so our indicators are of coverage rather than 'effective coverage'; in the literature to date, as far as we are aware, quality adjustments have been attempted only in the case of ANC (Lozano et al. 2006; Hodgins and D'Agostino 2014).

The treatment domain is harder to operationalize and the data harder to come by. We use three indicators, all relating to young children: whether a baby was delivered by a skilled birth attendant (SBA); whether a child with diarrhea received given oral rehydration salts (ORS) or a home-made solution; and whether a child with acute respiratory infection (ARI) received medical treatment.[16] For the first indicator, the subpopulation in need is objectively defined; for the other two indicators, we must rely on the caregiver's assessment of the patient's need.

[15] These are defined respectively in our analysis as follows: the percentage of mothers aged 15 to 49 who received at least four antenatal care visits from any skilled personnel (as defined in the country's survey) while pregnant with children born in last two years; the proportion of one year-old children who are fully immunized; the proportion of women aged 40 to 49 who received a mammogram (past 3 years); the proportion of women aged 18 to 49 who received a pap smear during last pelvic examination (past 3 years). In some surveys, the recall period for cancer screening is one year, so the rate is adjusted to a 3-year basis using the formula for the probability of an event over multiple trials $(1\ (1\text{-}x)^3)$, where x is the probably of having a cervical or breast cancer screening in the last year. The same approach is used for surveys where the recall period is 2 years, 5 years and unlimited (in which case mean age for the quintile / population is used to make the adjustment).

[16] These are defined respectively in our analysis as follows: the proportion of births in the last two years to mothers aged 15-49 that were attended by skilled health personnel; the proportion of children born within 5 years of survey with a cough and rapid breathing in the last 2 weeks for whom medical treatment was sought for acute respiratory infection; and the proportion of children born within 5 years of survey who had diarrhea in the last 2 weeks who were given oral rehydration salts (ORS) or home-made solution.

Inasmuch as we require the child with ARI to have received medical treatment, our ARI treatment indicator can be thought of as an effective coverage indicator; Lozano et al. (2006) claim as much. We do not, however, adopt Lozano et al.'s (op. cit.) approach of trying to capture quality by requiring that the delivery be by a SBA *and* in a hospital; the evidence on the health benefits of institutional deliveries is somewhat mixed (Hodnett et al. 2010; Tura et al. 2013), and in any case refers to health facilities in general not hospitals specifically. There is, as Lozano et al. (op. cit.) note, no obvious way to adjust for quality in the case of the ORS intervention for a child with diarrhea.

The three treatment indicators above do not go far, of course, toward capturing the majority of treatment episodes in a typical health system. We have therefore used the broad-brush indicator of whether or not someone has been admitted to hospital in the previous year. This indicator has been widely used in impact evaluations of UHC initiatives (see e.g. Chen et al. 2007; Finkelstein et al. 2012; Kondo and Shigeoka 2013; Limwattananon et al. 2015) and gets at the idea that limited hospital supply and high out-of-pocket costs may lead to underutilization of inpatient care. However, in contrast to the other indicators, we cannot here identify the subpopulation in need, and we have to make use of a benchmark to assess whether there is underutilization of inpatient care. We use the WHO Service Availability and Readiness Assessment (SARA) benchmark of 10 admissions per 100 persons (World Health Organization 2013), equivalent, we estimate, to 9.03

persons per 100 reporting *at least one* admission in the previous year.[17] In addition to not having a direct measure of need, the hospitalization indicator also presents a major challenge in terms of adjusting for quality: we do not attempt any quality adjustment, and as a result we are making the very heroic assumption that the quality of hospital care is constant across patients within and between countries.

We assign a lower weight to the prevention domain than to the treatment domain. We set π=0.25. This is a good deal higher than the share of prevention in total health spending in the OECD countries and in Asia (around 5-10 percent[18]) but apparently not much larger than the average share spent in sub-Saharan Africa (Kaplan et al. 2013). Within the prevention domain, we weight indicators equally, but within the treatment domain we assign a 50% weight to inpatient admissions, and split the remaining 50% equally across the other treatment indicators; this is in line with the equal spending split between inpatient and outpatient care in the OECD countries.

While we have split the service coverage indicators into prevention and treatment domains, in some of the charts below we split them into: (a) interventions prioritized by the Millennium Development Goals (MDGs) (cf. e.g. Wagstaff and Claeson 2004) and (b) non-MDG indicators. As we will see in the next section,

[17] Our inpatient admission variable measures whether the respondent has been admitted to hospital at least once in the previous 12 months. On the basis of World Health Survey (WHS) data, we estimate that 10 admissions per 100 persons is equivalent to 9.03 persons per 100 reporting at least one admission in the previous 12 months. We divide our inpatient admission variable by the WHO-SARA benchmark (0.0903) and use this value, or 1, whichever is smaller (a country with more than 9.03% of respondents reporting at least one admission gets a score of 1).

[18] The OECD figure was calculated by the authors using the OECD Health Statistics online database (consulted in November 2014). In Asia, the share is around 5% except in Bangladesh and Vietnam where it is over 10%. Global data are available at the website of the Institute for Health Metrics at http://vizhub.healthdata.org/nha/ (consulted in June 2015).

several countries that have implemented UHC-inspired reforms have prioritized MDG interventions. The MDG indicators are: ANC, immunization, SBA, and treatment for ARI and diarrhea. Given the weights we have chosen, the five MDG indicators combined have weights totaling 25%; the non-MDG indicators get the remaining 25% of the service coverage weight of 50%. We thus weight MDG and non-MDG indicators equally in our service coverage index, *SC*.

On financial protection, we chose a catastrophic payment threshold of 25% of total consumption and a poverty line of $2.00-a-day for the impoverishment indicator. We weight the two domains of financial protection equally, i.e. set γ=0.5.

V. The UNICO countries and their UHC-inspired reforms

The countries to which we apply our UHC index are the 24 countries that the World Bank's 'UNICO' project identified as having implemented major UHC-inspired reforms (Cotlear et al. 2015).[19] Table 1 shows the reform timelines in each of the 24 countries during the course of the last four and a half decades. The timelines draw on the UNICO case studies, but, as most of the case studies focus on a specific reform, we have also drawn on other sources to show the full timeline of reforms.

Like the UNICO study, we have focused on reforms that have their aim of reducing inequalities in coverage. Sometimes this involves completely desegregating the health system and creating a unified health system; Brazil and Costa Rica did this

[19] The individual cases studies are available at the UNICO project's website.

as far back as the 1980s. Chile went a long way down this road in the 1950s with the creation of a national health service that merged the provider networks of the social security system and those of the MOH; it continued in this path in the late-1970s with the establishment of a *Fondo Nacional de Salud* (FONASA); but, by allowing better-off families to put their SHI contribution towards the cost of a private insurance premium, the government ended up institutionalizing a two-tiered system. More frequently the reduction in inequality comes about by narrowing coverage gaps between different subpopulations – between and within subsystems. Here we see two approaches.

Reducing coverage gaps through demand-side approaches

Some countries (the majority among the UNICO countries) have pursued a (largely) demand-side approach. Some have transformed their entire MOH subsystem into a genuine coverage scheme for everyone not covered by a SHI scheme, adding resources and stipulating a (more or less) clearly defined broad benefit package; these reforms have typically involved an increased reliance on tax revenues and a reduced reliance on out-of-pocket payments. Examples include China, Colombia, Mexico, and Thailand. Some of these countries have moved to an explicit benefit package, sometimes with legal mandates; Colombia, Mexico, and Thailand are examples. Chile has also harmonized its (minimum) benefit package across subsystems, although the subsystems in Chile's case are FONASA (which covers everyone unless they opt out of it) and the private sector. Colombia and Thailand are examples of countries moving in this direction.

Other countries taking the demand-side approach have created a coverage scheme for a specific subpopulation served by the MOH and/or for a specific set of services and interventions. Several countries have created coverage schemes for the poor, with broad benefits; sometimes these schemes have been expanded to cover the near-poor as well. Indonesia, Tunisia, Turkey, and Vietnam are examples of such countries, though several of these countries have implemented supply-side measures. Other countries have created coverage schemes that focus on a specific set of services and interventions, sometimes restricting coverage to a specific subpopulation. Examples include: Argentina's *Plan Nacer* that focused on the poor and on maternal and child health (MCH) interventions: India's *Rashtriya Swasthya Bima Yojna* (RSBY) and *Rajiv Aarogyasri* schemes that focus on inpatient care (and in RSBY's case on the poor); Jamaica's *National Health Fund* that focuses on medicines; Nigeria's *National Health Insurance Scheme-Millennium Development Goals-Maternal and Child Health* that focuses on MCH interventions; and Peru's *Seguro Integral de Salud* scheme that, in practice, focused on the poor and on MCH interventions.

Many countries have opted for the demand-side approach because it enables a linkage to be made between additional financing provided by the UHC programs and specific results. This is commonly done by a partial shift towards output-based financing. In some countries this operates at the micro-level, providing incentives for quality, productivity or cost-controls through provider payments to hospitals, clinics, managers, or frontline workers. In other countries it reinforces the

clarification of inter-governmental fiscal relations, for example by linking transfers to the achievement of specific performance indicators. Outside the sphere of service provision, financial incentives are also utilized to incentivize the enrollment of priority populations, whereby the agencies or jurisdictions in charge of enrollment receive financial incentives to meet targets which require efforts of outreach and targeting.

Reducing coverage gaps through supply-side approaches

The second approach to reducing coverage inequalities within and between subsystems is to use supply-side mechanisms. After setting up a unified health system, Brazil set out to reduce geographic inequalities in health resources by introducing a pro-poor resource allocation system; more recently Brazil set a floor for government health spending as a share of total government spending, although this was implemented at state and municipality levels only. Costa Rica took steps even before unifying its MOH and SHI subsystems to raise the quantity and quality of care in underserved communities.

Several other countries have sought to improve services within the MOH system, especially in underserved communities; often this has involved an emphasis on strengthening primary care within the MOH system, often with a strong MCH focus. Examples include: Ethiopia's Health Extension Program; India's National Rural Health Mission; Kenya's Sector Services Fund; and South Africa's ANC Health Plan and Phase I of the country's UHC 15-year plan.

VI. UHC performance in the UNICO countries – levels, changes, and trends

In this section we apply the UHC index to the 24 UNICO countries, showing levels of UHC attainment, and changes and trends therein.

Data

Our household surveys are drawn from the data initiatives mentioned above. We also use some of the results in a study of UHC in Latin America (Wagstaff et al. 2015), notably the results produced by researchers from the individual countries who analyzed household expenditure surveys that are not available through one of the aforementioned data harmonization exercises.

We ended up excluding some data on the grounds the results were implausible, given the numbers we obtained using other surveys, what other researchers have concluded about the data, and what we suspect about how the dataset was prepared before it came to us – see annex for further details.

Levels of, and changes in, UHC attainment

Figure 2 shows UHC attainment for the latest year of data for the 14 UNICO countries for which we have complete data on all UHC indicators. The chart shows how each country fares on the two dimensions of UHC – financial protection and service coverage. The curves are contours of UHC attainment, indicating the combinations of the two UHC dimensions that produce the same UHC index score, given our assumption that UHC can be measured as an unweighted geometric

average of the financial protection and service coverage scores. The year against the country's name is the average of the years of the surveys from which the data come: for example, if half the indicators are from 2005, and half are from 2007, the year indicated against the country's name is 2006. The lower panel of Table 2 shows the underlying data.

A couple of points are important to keep in mind in interpreting the charts and table. First, with the exception of impoverishment, the indicators are adjusted for inequality: for a given mean, a country's score is pulled down if the indicator is higher among the better off than among the poor; the larger the pro-rich inequality, the larger the 'penalty.' Second, the financial protection indicators are normed with reference to global maxima for the two underlying indicators: an absence-of-catastrophic-payment score of 0 corresponds to a catastrophic payment rate of 25%, while an absence-of-impoverishing-payment score of 0 corresponds to an impoverishment rate of 15%; by contrast, absence-of-catastrophic-payment and absence-of-impoverishing-payment scores of 80 correspond to catastrophic and impoverishing payment rates of 5% and 3% respectively.

We see a cluster of five countries with overall UHC scores between 79 and 84, namely Brazil, Colombia, Costa Rica, Mexico, and South Africa. Brazil and Colombia do worse than the others on financial protection, but compensate by doing better on service coverage. Countries also reach their dimension-specific scores in different ways. For example, Costa Rica and South Africa achieve similar service coverage scores. Costa Rica outperforms South Africa on all prevention indicators,

and on all treatment indicators except the inpatient admission rate. South Africa's admission rate (before adjusting for inequality) is just above the admission rate implied by the SARA benchmark, while Costa Rica, like most other UNICO countries, has a much lower rate. (Only the Kyrgyz Republic and Thailand hit the SARA benchmark.) This highlights the challenges of capturing service coverage in respect of inpatient care. A high rate, like South Africa's, could be due to a high number of inpatient admissions for ambulatory care-sensitive conditions that could have been avoided by a well-functioning primary health care system, while a low rate, like Costa Rica's, could be a sign of a well performing primary health care system. South Africa's government has, in fact, tried in the last few years to reduce what it sees as an overreliance on hospital care, and has taken steps to expand and strengthen the country's primary care system. Costa Rica, by contrast, took steps early on to integrate primary care into the SHI system, and its rate of hospital admissions for ambulatory care-sensitive conditions (ACSCs) is the lowest in Latin America (Guanais et al. 2012). This is only part of the story, however. Some conditions *do* require inpatient care, and a low inpatient admission rate may also reflect an underdeveloped hospital system that treats only a fraction of cases that could (and *would*) be treated in a more affluent country. Most high-income countries in which the WHS was conducted record inpatient admission rates that are higher than South Africa's and considerably higher than Costa Rica's: the median for the OECD countries is 11%; South Africa's is 10%; and Costa Rica's is just 5%.

Ethiopia illustrates the case of a country with a very low level of service coverage but a *high* level of financial protection: a minority of people in Ethiopia received the interventions covered by the index, with cost likely being a factor; this non-use is reflected in low levels of out-of-pocket payments and a high financial protection score. Capturing both financial protection and service coverage in one index and on one chart nicely illustrates the risk of getting a misleading partial picture if one focuses on only one of the two dimensions of UHC attainment.

Also of interest in Figure 2 are the contrasts between Peru and Vietnam, countries that fare similarly on service coverage but achieve their scores in different ways. Peru dominates on the prevention indicators, with rates that are nearly 30 percentage points higher than Vietnam's. By contrast, Peru lags behind Vietnam on the treatment indicators by around 20 percentage points. It is likely at least in part because of this – and the fact that preventive interventions are much cheaper than treatment interventions and Vietnam operates a fee-for-service system with a high degree of cost-sharing – that Vietnam fares worse than Peru on financial protection.

One general message emerges from Figure 2, namely that the link between UHC achievement, on the one hand, and policies and programs, on the other, is not straightforward. The Latin American countries in our sample all do well except Guatemala, but none has achieved UHC. This is despite legal (and sometimes constitutional) guarantees, and despite the fact that three countries (Brazil, Colombia and Costa Rica) implemented UHC-inspired reforms many years ago. In Figure 2, we might also have expected to see larger differences in UHC performance

between the still segregated systems of Colombia and Mexico and the fully integrated systems of Brazil and Costa Rica. Of course, the cross-country differences in UHC performance in Figure 2 are likely to be driven in part by differences in per capita income; as our UHC index is applied to more countries, stripping out the effects of per capita income differences and trying to pinpoint the effects of differences in policies and programs will become an interesting avenue for future research.

Changes in UHC

Figure 3 shows the changes in UHC for the 14 countries for which we have complete data for at least two periods for at least some of the indicators (we reuse data from an earlier year in some cases). The data are in Table 2.

One striking feature of Figure 3 is that while most countries (11) have seen improvements in service coverage, only four (Colombia, Guatemala, Mexico, and South Africa) have seen improvements in financial protection. On average, across the 14 countries, the service coverage index increased by 6 points, while the financial protection index barely changed.[20] In other words, countries may have done well at increasing utilization of health interventions, but this has been at the price of unchanged exposure to out-of-pocket payments.

[20] This result holds if we include in the calculations countries that have data on only one of the two dimensions of UHC: on average, service coverage increased by almost 6 points, while financial protection fell by 1.2 points.

Trends in UHC attainment

Figure 4 shows trends in inequality-adjusted service coverage, financial protection and – where possible – the UHC index for each of the 24 UNICO countries. Since several of the UNICO countries' UHC-inspired reforms focused on MDG interventions, we have broken the service coverage into MDG indicators and non-MDG indicators. For some countries we have a considerable amount of data; for others, the data are very patchy. In all countries, we have lots of gaps, since most surveys are not conducted every year. In constructing Figure 4, we did some gap-filling on the 10 underlying indicators using linear interpolation and extrapolation. We then formed three-yearly averages of the various indices. Despite this, we ended up with very incomplete pictures, often with key periods not captured at all: for several countries (notably Brazil, Chile, Colombia, Costa Rica, Thailand, and Turkey) our data postdate the countries' most significant UHC-inspired reforms, while in some countries (notably China and Kenya) our data predate the most relevant UHC-inspired reform. Moreover, for some countries our data capture the dimension of UHC that was not the focus of the most recent UHC-inspired reform: Argentina's *Plan Nacer* reform, for example, focused on MDG interventions, while the data available to us only capture financial protection.

The trends for inequality-adjusted MDG intervention coverage are mostly encouraging, but it is noteworthy that in only eight countries (Brazil, Colombia, Guatemala, Mexico, Peru, the Philippines, and Vietnam) is the trend unambiguously upwards. Several countries show unsteady progress in inequality-

adjusted MDG intervention coverage, which may reflect in some cases a widening gap between the poor and better off (Wagstaff et al. 2014). While, as we mentioned in the Introduction, we cannot conclude anything about causal effects of reforms from Figure 4, it is nonetheless striking that in some of the countries that have implemented MDG-focused UHC-inspired reforms, such as Ethiopia (2003) and Nigeria (2008), we do not see striking and sustained improvements in inequality-adjusted MDG intervention coverage following the reforms. By contrast, we *do* see evidence of progress in countries where MDG indicators have *not* been the focus of UHC-inspired reforms. This suggests that broader-based reforms (which have often been associated with demand-side measures) may have had beneficial effects also on MDG indicators. We have less data for the non-MDG indicators: questions on inpatient admissions and cancer screening are less common in household surveys than questions concerning MDG interventions. We see an encouraging upward trend in Argentina, Colombia, and Peru, and an increase in non-MDG intervention coverage in Chile after the launch of *Plan AUGE* (*Acceso Universal de Garantías Explícitas*), which aimed at ensuring universal coverage of a specific set of interventions; but we see unsteady progress in Guatemala and Mexico.

Trends in financial protection have been even less clear-cut. In some countries, such as Argentina, Ethiopia, Guatemala, Thailand, and Turkey, both domains of financial protection have shown improvements over time. It is hard to believe that the changes in Ethiopia have anything to do with the recent reforms given the reforms' focus on MDG interventions. The data for Turkey and Thailand postdate

the relevant major reforms (the 1992 *Green Card* and 2003 *Universal Coverage* (UC) reforms), although Turkey's reform was in effect a staggered one (the details of, and enrollment in, the program changed over time), and parallel supply-side efforts were also staggered. The micro evidence from Turkey (Aran and Hentschel 2012) finds no causal effect of expansion of the Green Card program on the incidence of catastrophic and impoverishing spending. By contrast, the micro evidence from Thailand (Limwattananon et al. 2015) suggests that the improvement since the 2001 reform seen in Figure 4 *does* reflect, at least in part, a causal impact of the UC scheme's introduction.

Georgia, Nigeria, the Philippines, and Vietnam are counterexamples to the aforementioned countries: in these four countries, financial protection has apparently worsened almost continuously. In the case of Georgia, this is despite the introduction of the Medical Insurance Program in 2006, which appears to have reduced the incidence of out-of-pocket payments among the 20 percent of the population covered by it (Bauhoff et al. 2011). And in the case of Vietnam, the deterioration is despite the introduction in 2003 of the Health Care for the Poor (HCFP) initiative which appears to have reduced out-of-pocket payments (Axelson et al. 2009; Wagstaff 2010). The implication is that the drop in financial protection in Georgia and Vietnam would have been even more pronounced without these programs.

In other countries, the picture is more mixed. Colombia, Ghana, Guatemala, Indonesia, Jamaica, the Kyrgyz Republic, Mexico, and Peru saw deteriorations in

one or both domains of financial protection followed by improvements. The timing of the upturns in financial protection in some of these countries is consistent with UHC-inspired reforms having their intended effects, but often the improvements predate the reforms. Colombia passed its *Sentencia T-760* in 2008, which called upon the government to adopt deliberate measures to progressively realize universal coverage by 2010 (Yamin and Parra-Vera 2009); however, it seems the improvements in financial protection started before then. In the case of Ghana, the improvement in financial protection also predates the relevant reform, namely the launch of the National Health Insurance Scheme in 2005; it is possible that the upturn owes something to the voluntary mutual health insurance organizations that sprang up across Ghana in the early 2000s (Ramachandra and Hsiao 2007). The fact that the upturn in financial protection in Indonesia did not occur until the late 2000s is consistent with evidence suggesting that the *Askeskin* reform of 2004 may have *increased* out-of-pocket payments in urban areas and not reduced such payments in rural areas (Sparrow et al. 2013); the improvement in financial protection in Indonesia in the late 2000s suggests the successor program (*Jamkesmas*) may have met with more success. Jamaica saw improvements in financial protection around the time of the launch of the National Health Fund (2004). The State-Guaranteed Benefit Package reform occurred in 2005 in the Kyrgyz Republic – around the time improvements in financial protection started to occur. Peru introduced its Universal Health Insurance program in 2009, after which we see an improvement in financial protection. Mexico's improvements in both

financial protection domains predate the 2003 *Seguro Popular* reform but the improvements continued thereafter; this is consistent with evidence suggesting the reform reduced the incidence of catastrophic payments among the part of the population affected by the reform (King et al. 2009).

Sometimes the two domains of financial protection pull in different directions. This happens in India and South Africa. In India, we see improvements after recent UHC reforms in protection against catastrophic spending but a worsening in protection against impoverishing spending. The evidence (Fan et al. 2012b; Rao et al. 2014) suggests that at least one of the UHC-inspired reforms (the *Rajiv Aarogyasri* scheme in Andhra Pradesh) slowed the rate of increase of out-of-pocket payments, implying that protection against impoverishment might have fallen even faster; however, the program applies to one state only (there is no evidence yet on the impacts of the, almost nationwide, RSBY program).

Finally, it is interesting to compare countries in terms of their 'need' for financial protection reforms and their choice of reforms. Some countries that embarked on such reforms had already achieved high rates of financial protection even before their reforms: notable examples are Mexico and Thailand, reflecting the cumulative effects of previous reform efforts including supply-side subsidies in Mexico and supply- and demand-side initiatives in Thailand. By contrast, reform efforts have been relatively muted in some countries where financial protection levels are lower. In Chile, even after the *Plan AUGE* reform of 2004, financial protection rates appear still to be low, especially for such a prosperous country. Argentina also has

relatively low rates of financial protection, albeit higher apparently than Chile's, and the recent reform efforts have not focused on financial protection. In India, while the incidence of catastrophic payments has apparently fallen, the rate of impoverishment from out-of-pocket payments remains high; the focus of the RSBY and Aarogyasri reform efforts have been on costly inpatient care (La Forgia and Nagpal 2012), and yet Indian households – including poor ones – spend large amounts out-of-pocket payments on ambulatory care providers, many of whom deliver care of dubious quality (Das and Hammer 2007). In Nigeria, the reform efforts have focused exclusively on MDG interventions despite the deteriorating financial protection situation in that country.

VII. Conclusions

We have proposed a 'mashup' index of UHC that captures both aspects of UHC: that everyone – irrespective of their ability-to-pay – gets the health services they need; and that nobody suffers undue financial hardship as a result of receiving the care. We break the service coverage dimension of UHC into prevention and treatment domains, and the financial protection dimension into impoverishment and catastrophic spending domains. In each domain (with the exception of impoverishment) we adjust population averages to reflect inequalities between the poor and better off, penalizing countries who achieve high average coverage rates by disproportionately covering the better off. In each dimension we form a sub-index that reflects achievement on the two domains, but aggregate across them in such a way as to allow for a nonlinear tradeoff between them. In aggregating our sub-

indices into an overall index of UHC attainment, we also allow for a nonlinear tradeoff – this time between the two dimensions of UHC.

Our operationalization of the index is perhaps best seen as illustrative, since we have emphasized inter-country and temporal comparability, and because of this we are inevitably constrained by what data have been collected through household surveys on a regular basis. Arguably it is on the treatment domain where the available data are weakest: we have only two indicators that capture need for treatment, and both relate to outpatient treatment of illness among young children; our indicator capturing treatment in hospital is a broad-brush indicator and we are forced to rely on WHO inpatient admission rate norms to give it a need-based benchmark. We express all indicators such that higher scores are better and run from 0 to 100.

We find a cluster of countries with UHC scores of between 79 and 84: Brazil, Colombia, Costa Rica, Mexico, and South Africa. At the other extreme, we find a cluster of countries in the range 35-57, namely Ethiopia, Guatemala, India, Indonesia, and Vietnam. Countries achieve their UHC scores in different ways: Colombia outperforms Costa Rica on service coverage but falls behind on financial protection; Vietnam outperforms Ethiopia on service coverage but falls behind on financial protection, in part probably because Vietnam has high rates of service coverage especially on the treatment indicators but reimburses them at low rates. We find that countries have, on average, improved their UHC scores between the earliest and latest years for which we have data – by about 5 points. However, the

improvement has come from improvements in service coverage, not from improvements in financial protection which has, on average, stayed unchanged.

We cannot of course attribute UHC changes over time to reforms, but some interesting points nonetheless emerge when we look at changes in UHC attainment and the timing and content of reforms. Mostly we see fairly continuous improvements in attainment on MDG indicators, but we do not see faster improvements in countries that have focused their reforms on MDG interventions. We see financial protection improving in some countries, but only in Thailand is there micro evidence supporting a causal effect of the UHC reform; the improvements in Turkey, by contrast, do not appear to have been due to expansion of the Green Card program. In some countries we see a more-or-less continuous worsening in financial protection; in some cases (e.g. Georgia and Vietnam) this is despite reforms that, according to micro evidence, improved financial protection for the (often small) target population. In still other countries we see deteriorations in financial protection followed by improvements: in some cases, the improvement is around the time of a major reform, but in others the improvement predates and postdates the reform. One interesting point that does emerge is that some of the countries that embarked on a reform geared to improving financial protection, such as Mexico and Thailand, already had a high level of financial protection, such that the improvements uncovered in micro-based studies, while statistically significant, are small in the overall scheme of things. By contrast, in several countries, such as Argentina and Nigeria, where financial protection is low and/or falling, we see

reform efforts focused firmly on service coverage rather than on financial protection; in these countries a well-designed financial protection-oriented reform might have had a larger and more needed impact on financial protection.

There are, of course, plenty of opportunities for further work in this area. Work is already underway applying the index to other countries (see e.g. Wagstaff et al. 2015). In that work, we have also broken apart the index, showing, for example, in one chart trends in the gap in indicators between the poorest and richest quintiles; such complementary charts are useful since changes in the index could be due to changes in the population mean, or to changes in inequality, or both. Adding countries and years to the database is likely to be of value to countries wanting to benchmark their levels and progress against those of other countries. It will also likely help donors to identify lagging countries that may benefit from additional technical and/or financial assistance, as well as to help countries themselves identify areas within the UHC index where their performance is relatively weak.

Another important challenge is how to improve the empirical implementation of the UHC index. As Figure 1 makes clear, it is worth distinguishing between the conceptual underpinnings of the index, on the one hand, and the choice of indicators, weights and thresholds, on the other. We have chosen, in our empirical implementation of the index, one particular set of weights and thresholds. The sensitivity of the results to these choices is important to explore; one might, in fact, want to explore using *simultaneously* several thresholds in constructing the two financial protection measures. We have also chosen one specific set of indicators.

Some of the indicators we have used could be questioned. In some cases, alternatives could be tried: for example, it might be argued that DPT3 coverage is a more comparable indicator than full immunization. In other cases, such as the treatment of ARI and diarrhea in children, our indicators can be criticized (in these cases because the estimation of need is rather crude), but no better alternatives currently exist (cf. Boerma et al. 2014a). In yet other cases, it might be argued our indicators ought not to be included at all. For example, although the two cancer screening indicators appear among the examples of intervention coverage indicators in Boerma et al. (2014a), concerns have been expressed about the wisdom of breast cancer screening given the high rates of false positives (see e.g. Independent UK Panel on Breast Cancer Screening 2012); we include breast cancer screening because it speaks to the non-communicable disease agenda, and because it is still recommended by professional bodies, despite concerns about false positives.[21]

Arguably, the biggest challenge in the future is extending the indicator set to get a more complete picture of service coverage. Boerma et al. (2014a) suggest several candidates for inclusion in a broader service coverage indicator set (cf. their Table 1), and propose 10 effective coverage indicators, five for each of the prevention and treatment domains (cf. their Table 2). We considered, in fact, several of these, but

[21] There are issues, however, that we have been unable tom resolve satisfactorily on the data front. The 40-49 age range was chosen for the breast cancer screening indicator in part because of data availability. The WHS uses the 40-69 age range; however, the DHS uses the 15-49 or 40-49 age range. We have therefore worked with the lowest common denominator – the 40-49 age range. In the US, there is divergence of view over whether screening should start at 40 or 50, with the American Cancer Society and the Mayo Clinic continuing to recommend starting at age 40, and the U.S. Preventive Services Task Force in 2009 recommending starting only at age 50 instead of at age 40 as it had recommended in its 2002 recommendation. The 18-49 age range was chosen for the cervical cancer screening indicator also in part because of data availability. The WHS uses the 18-69 age range; however, the DHS uses the 15-49 age range. We have therefore worked with the lowest common denominator – the 18-49 age range. The WHS age range is more in line with national screening guidelines – currently screening is recommended (every three years) for the 21-65 age group in the US.

decided to exclude them. In some cases, we felt that the proposed indicator was not actually a health service intervention: examples include improved water source and adequate sanitation, fulfilment of family planning requirements, and non-use of tobacco. These reflect decisions made by individuals and agencies outside the health system, and health is only one of the factors considered when choices are made. More relevant to UHC would be indicators that capture health prevention and promotion efforts, and efforts by the health system to improve access to relevant goods and services, e.g. family planning; such indicators are hard to come by. More often though, we decided not to use the proposed indicators in Boerma et al. (2014a) because we were unable to find sufficient data to allow comparisons across countries and over time: examples include antiretroviral therapy, tuberculosis case detection and treatment success, hypertension treatment, and diabetes treatment.[22]

Data ought to become less of a constraint as household surveys become richer, and as the necessary data for quality adjustments become more available, thereby enabling 'coverage' to move closer to 'effective coverage'. In many countries, in fact, the necessary data are already available, and a comparative analysis of trends in a subset of data-rich countries would be possible immediately. There will, however, be indicators that may not be feasible (or may be prohibitively expensive) to collect through household surveys, raising the question: Where will the data on household living standards come from that are required for the computation of the

[22] The WHS contains some relevant information. A better source, however, is WHO's STEPS survey. This has been fielded in only three Latin American countries (Colombia, Paraguay and Uruguay) and WHO is unable to make the microdata publicly available.

'achievement' index? One possibility is to conduct an exit survey of users of health facilities, the aim being to gather information not only on the health services received and the need for them, but also on the living standards of the person's household; the latter data can be used to construct a wealth index using the same scoring system as in a national survey (like the DHS), so that users can be placed in the national wealth distribution. As Wagstaff and Waters (2005) report, several studies in the 'Reaching the Poor' volume (Gwatkin et al. 2005) used such an approach. The increased use of electronic personal identification systems to target public resources on the poor and vulnerable, such as the smart card used in India's aforementioned RSBY program, provide another potential source of information on the living standards of a user's household; sometimes this may only indicate whether the household is above or below a poverty line, but over time more granular data may be recorded in the system, such as the household's score on whatever means test (or proxy means test) was used to determine the position vis-à-vis the poverty line or eligibility for a subsidy.

An additional area for future work is using the index to shed light on policy. A couple of approaches suggest themselves. One is to use the index to quantify the impacts of reforms on UHC. Reforms and programs often focus on specific challenges, sometimes those deemed most important by the international development community, and will, because of their limited focus, likely affect only some of the indicators in the UHC index. If one has good evidence on the impacts of a reform or program on a subset of indicators, one could use these estimates to see

how far reform or program affects the overall UHC index. Van de Poel et al. (2014), for example, find that maternity care voucher schemes in Cambodia increased attended deliveries by about 10 percentage points and antenatal visits by around 3 percentage points. On the (we think, reasonable) assumption that the program had no effects on other indicators in our UHC index, and using plausible values for these other indicators, the voucher program might have increased Cambodia's UHC score from 32 to 33. The index thus allows the impacts of specific programs to be seen in broader perspective. Incorporating the costs of reforms into the picture, one could also start to get at the cost-effectiveness of different reforms in terms of UHC. For example, in the example above, could other equally costly reforms in Cambodia have produced a larger increase in the UHC index?

There is a second approach that might prove fruitful in linking the UHC index to policy, namely to see what the correlates are at country level of high levels of and/or changes in the UHC index. For example, Wagstaff et al. (2015) apply the index to the countries of Latin America and find a correlation between the UHC index and the degree of integration of a country's health system: the countries with fully or nearly fully integrated systems do better than the countries with semi-integrated systems, which, in turn, do better than the countries that have yet to start integrating their health systems. One would, of course, like to move beyond correlations; it may be, for example, that the countries of Latin America with the more integrated health systems also have relatively high per capita incomes. In principle, one could assemble a country-level panel dataset, and use to it to tease

out the effects of reforms, controlling for (changes in) other determinants of UHC such as per capita income.[23] Such an analysis would require many more data points than we currently have, and would also be challenged by the heterogeneity of UHC-inspired reforms around the world. But this, like the other avenues for future research suggested above, is nonetheless likely to be one worth exploring.

[23] Wagstaff and Moreno-Serra (2009) and Moreno-Serra and Wagstaff (2010) use such an approach to estimate the effects on health system outcomes, not UHC, of health insurance and hospital payment reforms in Europe and Central Asia following the collapse of Communism.

Annex: Notes on Data

We decided not to include data on maternal and child health (MCH) indicators from the World Health Survey (WHS): the rates are typically very different from those obtained from the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Survey (MICS) surveys, which are the gold standard for MCH indicators, even after we made adjustments to the three surveys to ensure consistency in recall period, the number of children covered by the question, etc. We also decided not to include data on financial protection from both the WHS and the Multi-Country Survey Study (MCSS) surveys: rates of catastrophic and impoverishing spending were significantly different from those obtained from other surveys, likely due to the fact that data on household consumption were collected through just a handful of questions, with a focus on expenditure rather than the broader concept of consumption.[24] We also ended up excluding data from the Luxembourg Income Study (LIS) for China and India: the data for both countries yielded estimates of financial protection that were very different from those obtained using other surveys, and our suspicion is that the data for these two countries have been subject to a substantial amount of trimming, reducing the incidence of large out-of-pocket payments; by contrast, the LIS data for Mexico and South Africa were in line with estimates from other datasets.[25] Finally, where we had multiple sources over time in a country, we analyzed their consistency with one another, and where inconsistencies emerged we selected one or two sources that looked the most reliable.

[24] The consensus among researchers who have looked at the issue (cf. Lu et al. 2009; Heijink et al. 2011; Raban et al. 2013) seems to be that total consumption is likely to be underestimated in the WHS especially among the poor. How the WHS fares vis-à-vis out-of-pocket spending seems to depend on which WHS questions are used to construct the out-of-pocket spending variable. Lu et al. (2009) find that use of the single-item question (Q0804) leads to a *smaller* estimate of out-of-pocket spending than the multi-item question (Q0807- Q0814). They also find that using the inpatient question with a 4-week recall period (Q0807) leads to a *larger* estimate of out-of-pocket spending than the inpatient question using the 11-month recall period (Q0816).

[25] We did not include LIS-based financial protection estimates for Mexico in 1984.

Figure 1: The principles underlying the UHC Index

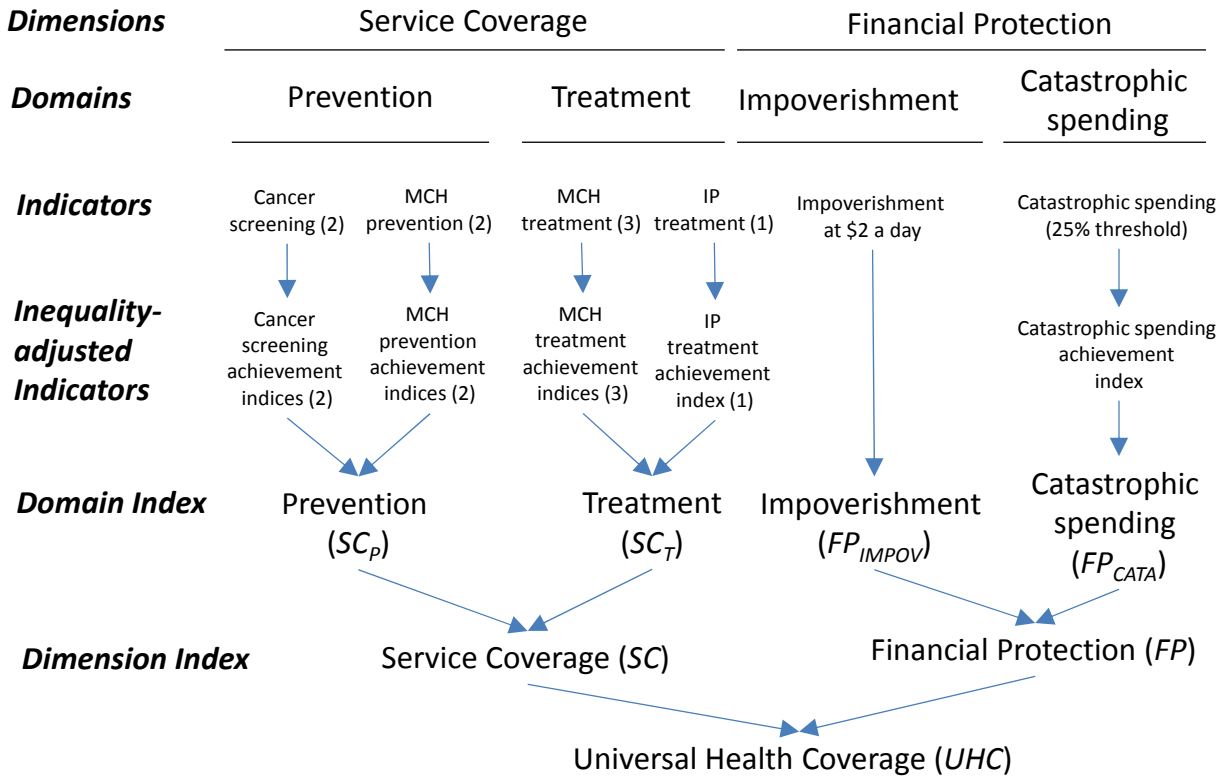
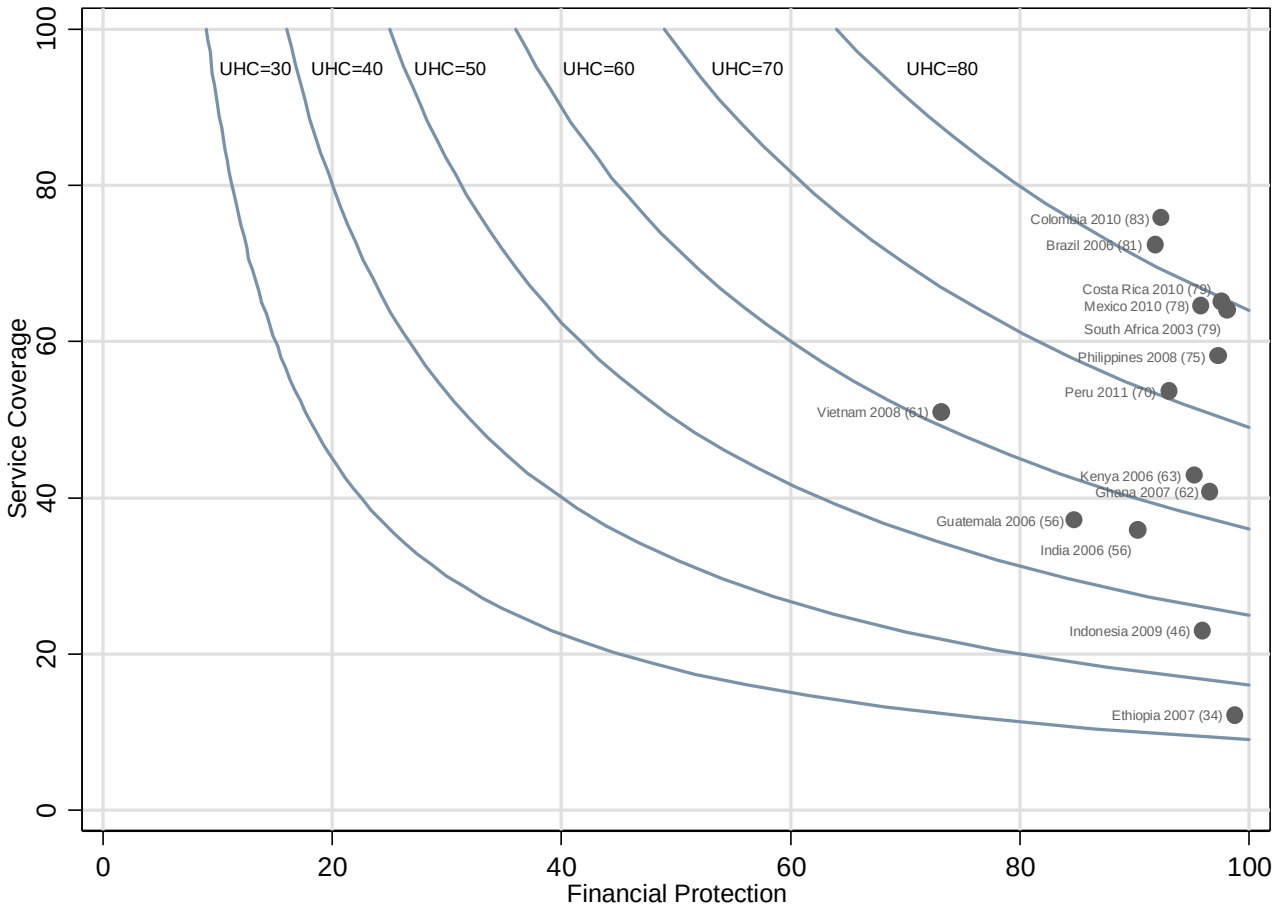
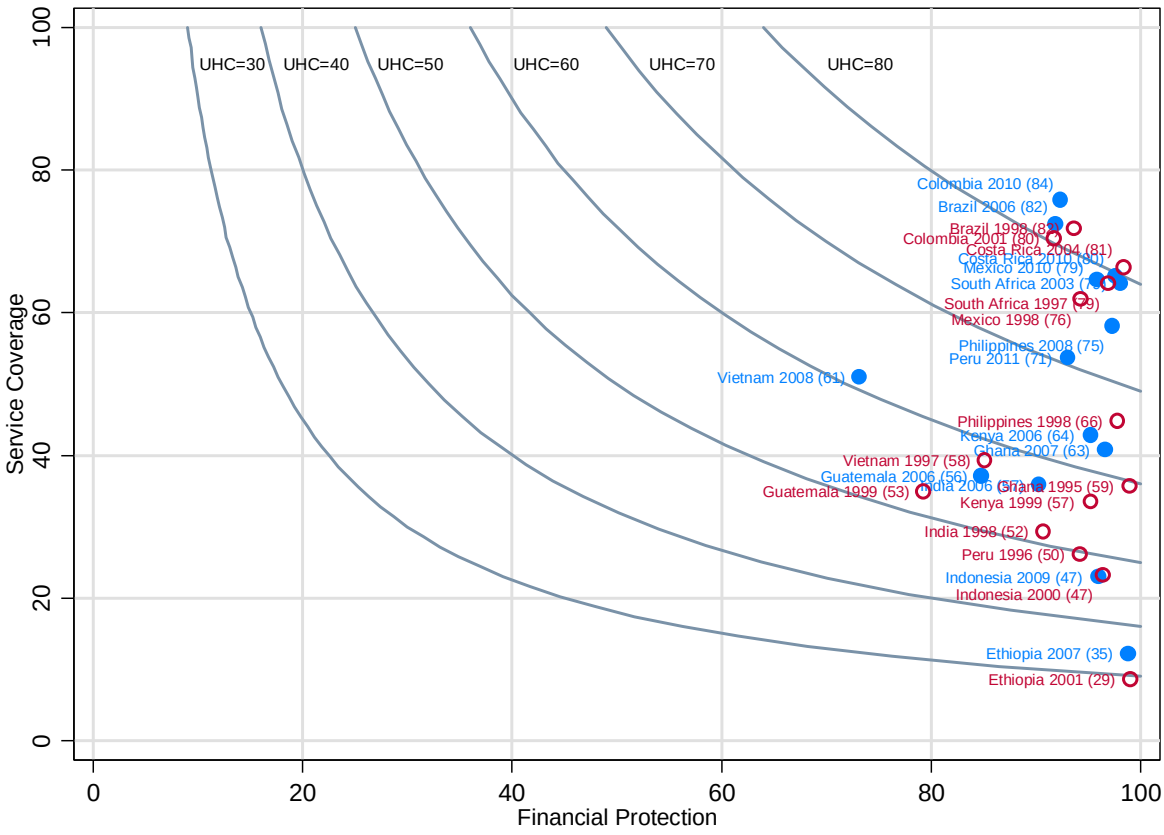


Figure 2: Financial protection, service coverage, and UHC index values



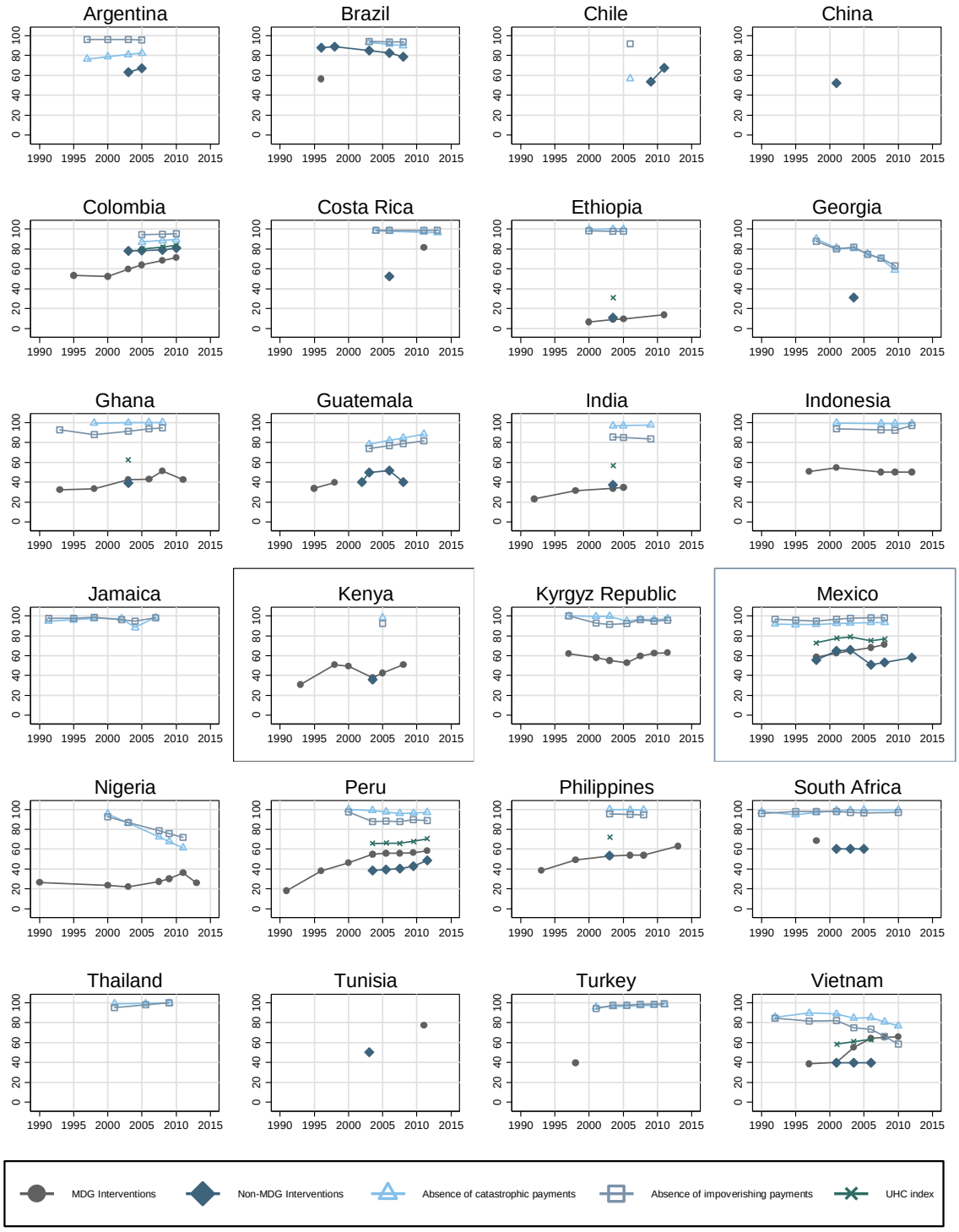
Source: authors' calculations using data described in text.
Notes: FP index reflects narrow definition of impoverishment, i.e. includes only households who cross the poverty line as a result of out-of-pocket payments. Data are for latest year. Year indicated against country name is the average year of the data.

Figure 3: Changes in financial protection, service coverage, and UHC index values



Source: authors' calculations using data described in text.
Notes: FP index reflects narrow definition of impoverishment, i.e. includes only households who cross the poverty line as a result of out-of-pocket payments. Data are for latest year. Year indicated against country name is the average year of the data.

Figure 4: Trends in service coverage and financial protection



Source: authors' calculations using data described in text. Notes: MDG interventions include ANC, immunization, SBA, and treatment of childhood ARI and diarrhea. Non-MDG interventions include screening for breast and cervical cancer, and IP admissions. Financial protection reflects the narrow interpretation of impoverishment, i.e. households crossing the poverty line. Data are three-year averages, 1990-92, 1992-94, etc.

Table 1: UHC-inspired reforms in the UNICO countries

Country	1970s and 1980s	1990s	2000s
Argentina	• 1970: formal-sector workers and government employees were required to affiliate with one of Argentina's *Obras Sociales* (sickness funds) that contracted with private health providers. • 1971: Comprehensive Medical Care Program (PAMI) was established to cover the costs of health care of retirees, the disabled, and war veterans. • Early 1980s: Argentina developed a primary health care (PHC) strategy for its public sector to provide care to the poor and the uninsured, structured around over 6,000 PHC centers throughout the country, funded by provinces or municipalities.	• 1990s: private health insurers emerged catering to the better off; Superintendency of Health Services (SSS) defined a Mandatory Medical Program (PMO) that establishes the minimum package of services that all insurance plans (*Obras Sociales* and private) must provide to their members.	• 2002: *Plan Remediar* introduced through which a standard package of common medicines are provided free-of-charge in govt. PHCs. • 2005: *Plan Nacer* introduced aimed at 2 million poor and vulnerable people not enrolled with an *Obra Social*; the program focused on MCH interventions. • 2012: *Plan Nacer* replaced by *Plan Sumar* which extends coverage to uninsured children, adolescents under the age of 19 and to uninsured women between the ages of 20 and 64.
Brazil	• 1970s: social security institute (INAMPS) extended coverage beyond formal-sector workers to include the self-employed, and rural and domestic workers. • 1980s: reforms sought to reduce duplication, increase integration, decentralize responsibilities to states and municipalities, and reduce emphasis on "curative privatizing model." • 1980s: Community Health Agents Program (PACS) was piloted in Ceará and some other states. • 1988: constitution established right to health; a tax-financed unified health system (SUS) was established guaranteeing the right to free health care. SUS implementation began with transfer of INAMPS to MOH.	• Early 1990s: service delivery was devolved to municipal level, and a new pro-poor financial mechanism for allocating federal funds was introduced. • 1994: Family Health Strategy (ESF), based on PACS, adopted as national strategy. • Late 1990s: increasingly strong emphasis placed on primary care.	• 2000: constitutional amendment passed establishing minimum value for govt. health spending as a share of overall govt. spending; implemented at municipal and state levels only. • 2003: *Bolsa Família* conditional cash transfer program established under which payments to eligible families are conditional on inter alia use of specific health services, notably vaccination of children under age 7, growth-monitoring visits, pre- and postnatal visits, well-baby visits, and breastfeeding and nutrition educational activities.
Chile	• 1952: Creation of the National Health Service, merging all public and social security providers into a single institution. • 1979: Creation of single public health insurer (FONASA) established requiring income-related contributions from those above an income threshold.		• 2004: Plan *Acceso Universal a Garantías Explícitas* (AUGE) (Explicit Health Guarantees Plan) introduced whose aim was to ensure that everyone – whether publicly or privately insured – is covered for the same set of interventions and has the same opportunity to access timely and quality services. Previously neither FONASA nor the private

Country	1970s and 1980s	1990s	2000s
	• 1983. High income social security contributors are allowed to opt-out of the public insurer and take their contribution to private insurers called ISAPRES (*Instituciones de Salud Previsional*); two-tier system was thereby institutionalized.		insurers were required to have an explicit benefit package; private insurers varied their coverage as they pleased, and FONASA rationed care through queues, denial of care, and low-quality services. • 2005: health superintendent established to regulate FONASA and private insurers. • 2010: elderly exempted from contributions to FONASA.
China	• Late 1970s: economic liberalization led to collapse of health insurance schemes for rural and urban residents, and a reduction in real terms of budgets to health facilities, leading them to charge user fees to cover the shortfall between costs and budget allocations.	• 1990s: some mostly unsuccessful efforts to resuscitate rural scheme occurred. Price regulation intended to limit subsidies to govt. facilities incentivized over-delivery of high-cost care. • 1998 onwards: efforts to revive urban schemes were more successful with Basic Medical Insurance (BMI) being introduced.	• 2003-2007: New Rural Cooperative Medical Scheme was rolled out with generous financial support and directives from central government. Focused mostly on inpatient care. Coverage initially shallow with large copayments but coverage deepened as central government funding increased. • 2003-2007: Medical Assistance safety net program was introduced, targeted at poor households. • 2007: urban scheme introduced for people not covered by BMI.
Colombia	• 1970s: MOH created a network of govt. providers to extend basic services to all Colombians. • 1970s: Parallel to this the Social Security Institute (ISS, created in 1946) provided cover and delivered care to formal-sector workers and civil servants, while private insurers and providers catered to those willing and able to pay.	• 1993: Colombia introduced a two-scheme SHI system: a mandatory contribution-based scheme for formal sector workers and families, and a subsidized scheme for the rest of the population. Although there were explicit cross-subsidies from the contributory scheme to the subsidized scheme, the expenditure per person was historically lower in the subsidized scheme.	• 2012: govt. passed a regulation requiring the subsidized and contributory schemes to have the same benefits package.
Costa Rica	• 1941: Social Security of Costa Rica (CCSS) established providing health insurance for salaried workers. • 1961: coverage expanded to workers' dependents. • 1961-1975: a series of laws, regulations, and agreements between the CSSS and MOH expanded coverage of primary health care and outpatient and inpatient specialized services to individuals living in rural areas and to lower-income and other vulnerable groups. • 1970s: MOH expanded its primary care network to serve those not covered by CSSS. • 1975: CCSS health insurance coverage expanded to include farmers and peasants. • 1978: a voluntary regime for independent workers who could receive partial public subsidies was established.	• 1993: all provision of care was moved to CCSS, and MOH became the regulator and coordinator of the sector.	• 2000: Workers Protection Act mandated CCSS enrollment by independent workers.

Country	1970s and 1980s	1990s	2000s
	• 1984: CSS created the Special Regime, funded from general tax revenues, to cover the indigent.		
Ethiopia		• 1997: Launch of the Health Sector Development Program, rapid expansion of the primary health care network (from a very low initial level)	• 2003: Health Extension Program (HEP) introduced aimed at increasing primary care coverage through construction of health posts and deploying health extension workers; MDG-focused.
Georgia		• 1991 onwards: old Soviet health system became unaffordable after transition to independence with dramatic fall in govt. spending. • 1995 onwards: reform process involving introduction of social health insurance, privatization and corporatization of health facilities, decentralization to regions, and introduction of explicit and limited benefit package. The system remained chronically underfunded and benefit package was poorly understood; out-of-pocket payments increased.	• 2004: SHI abandoned. • 2004-2006: targeted social assistance program introduced, extended to the health sector as Medical Insurance Program (MIP). • 2007: govt. hospitals privatized. • 2007-2008: govt. issued vouchers to vulnerable population to obtain insurance form private insurers; voluntary private insurance encouraged for remainder of population.
Ghana	• 1985: copayments introduced in the country's National Health Service (modeled on the UK's NHS) to avoid its collapse.	• 1992: "cash and carry" introduced, i.e. copayments had to be paid before care was delivered. In case of drugs, full cost recovery applied. Some exemptions. • Early 1990s: voluntary health mutual insurance organizations (MHOs) started to emerge: 4 MHOs existed in 1999.	• Early 2000s: proliferation of MHOs (159 in 2002, concentrated in 3 regions, and often linked to churches). • 2003: National Health Insurance Scheme (NHIS) introduced. Premium exemptions for the indigent, elderly, and children (if both parents enroll). Premium reductions for the poor. Restricted benefit package but includes (some) inpatient care.
Guatemala	• 1960-96: Civil war led to the destruction of health care network in much of the country.	• 1997: Expansion of Coverage Program (*Programa de Extensión de Cobertura*, PEC) introduced, based on the intensive use of mobile health workers, many hired through NGOs	• 2012: PEC is mainstreamed into the services of the Ministry of Health, strengthening its primary health care clinics.
India	• 1983: National Health Policy, based on recommendations of 1946 Bhore Commission, which envisaged a NHS-type three-tier integrated system driven by decentralized primary health centers (PHCs). • 1980-1990: number of PHCs more than tripled and the number of doctors increased considerably. Over time, however, the states, which in India are responsible for the delivery of health care, lacked the necessary resources to maintain the structure. The private sector grew in response to dissatisfaction with the underfunded and poorly performing public sector.	•	• 2005: National Rural Health Mission (NRHM) established aimed at strengthening the govt. health care delivery system, by inter alia increasing govt. spending especially on primary care and public health, reducing regional inequalities in infrastructure, introducing greater flexibility in hiring, integrating vertical programs, etc. • 2007: Ministry of Labor and Employment launched Rashtriya Swasthya Bima Yojana (RSBY) health insurance scheme; the scheme, targeted at families below the poverty line, provides cover up to 30,000 rupees ($600) a year per family for inpatient treatment (primarily secondary care). By September 2012, RSBY had enrolled over 32

Country	1970s and 1980s	1990s	2000s
			million families who became eligible for inpatient treatment in more than 10,000 hospitals across the country included in RSBY's network. • 2007: Andhra Pradesh introduced the "Rajiv Aarogyasri" insurance scheme; the scheme, which covers 80% of the state's population, provides cover against the costs of treatment of serious and life-threatening conditions (secondary and tertiary care) for 20 million families.
Indonesia	• 1978: civil servants scheme introduced. • Mid-1970s onwards: experiments in community based health insurance.	• 1992: SHI for formal-sector workers introduced. • 1999: financial assistance 'health card' scheme for the poor introduced as part of a social safety net to cushion the effects of the financial crisis.	• 2005: "health insurance for the poor" (Askeskin) program introduced, covering 26 million target beneficiaries. • 2008: the program was expanded to include the near-poor and reached 76 million target beneficiaries (about 40% of the population); the program was renamed Jamkesmas.
Jamaica		• 1996: Jamaica Drug for the Elderly Program (JADEP) launched aimed at covering Jamaicans over the age of 60 who have been diagnosed with of one or more covered chronic diseases.	• 2003: Jamaica National Health Fund (NHF) established aimed at "reduc[ing] the financial burden of health care on the public sector in Jamaica." NHF provides subsidies on a range of prescribed pharmaceuticals for patients suffering from one of 15 specific chronic diseases. All beneficiaries, regardless of income, are required to make a high copayment, ranging from 25 to 53 percent of the cost of the drugs. • 2008: user fees at public facilities abolished.
Kenya	• 1966: National Hospital Insurance Fund (NHIF) established within MOH aimed at salaried public and private-sector employees. • 1989: user fees introduced.	• 1998: NHIF became a state corporation. NHIF coverage limited to inpatient care, covers only 20% of the population and suffers from poor management and corruption. • 1999: community-based health insurance began to appear, but even by 2013 covered only 1% of the population.	• 2004: govt. proposed a National Social Health Insurance Fund (NSHIF) with everyone with an income above a threshold required to make a contribution and everyone, including those with incomes below the threshold, receiving free hospital care. The NSHIF Bill was passed by parliament in 2004 but the president did not sign the bill and the NSHIF never got set up. • 2010: Sector Services Fund (HSSF) launched aimed at increasing funds flowing to the health sector, improving equity in their allocation, and ensuring that funds actually reach facilities expeditiously. Essential Package of Health Services focused on ambulatory and preventive care.
Kyrgyz Republic	•	• 1991–95: old Soviet health system became unaffordable after transition to independence. Breadth of coverage stayed the same, but the depth of coverage was reduced, as informal out-of-pocket payments became the norm, and	• 2000: Additional Drug Package (ADP) piloted. • 2001–2005: *Manas* reforms sought to improve the financial sustainability of the health sector by restructuring the oversized and unaffordable hospital delivery network that was absorbing an increasing share of government resources.

Country	1970s and 1980s	1990s	2000s
		the gap between de jure and de facto entitlements grew. • 1997: earmarked payroll tax introduced to increase funds for health sector. • 1997: Mandatory Health Insurance Fund (MHIF) set up.	• 2001: State Guaranteed Benefit Package (SGBP) piloted. Under SGBP, primary care and emergency care are provided free of charge; referral care is provided for a flat copayment, with exemptions for e.g. the poor but these are decided by the facility. Some benefit caps in SGBP and high-tech services generally excluded. Regional funds pooled at national level under a national MHIF. • 2006–2011: *Manas Taalimi* reforms further strengthened health sector reforms, placing particular emphasis on reducing the financial burden on patients. • 2012–2016: *Den Sooluk* reforms focused on creating a strong link between program activities and their impact on health outcomes. Four priority health improvement areas have been selected: cardiovascular diseases (CVDs), mother and child health (MCH), tuberculosis (TB), and HIV.
Mexico	• 1983: constitutional amendment passed giving all Mexicans the right to health protection. • 1980s and 1990s: efforts to integrate the MOH and SHI systems floundered due to lack of resources and political opposition.	• 1990s: several changes aimed at improving access for those outside the SHI system occurred, including the Coverage Extension Program (PAC) and the *Solidaridad* anti-poverty program which included a health component; program was later called *Progresa* and then was renamed *Oportunidades*.	• 2003: Social Protection System in Health (SPSS) introduced covering those not in one of Mexico's SHI schemes, the aim being to ensure they could access, free-of-charge, a defined set of services, delivered in MOH facilities, not too dissimilar to the set available to those enrolled in SHI schemes. SPSS includes the *Seguro Popular* health insurance programs and a Fund for Protection against Catastrophic Health Expenditure (FPGC) which offers Seguro Popular beneficiaries a package of high-complexity services that are deemed to result in catastrophic health expenditure. *Seguro Popular* covers 284 primary and secondary care interventions (the Universal Health Services Catalog), while the FPGC covers 57 high-complexity interventions and antiretroviral drugs for HIV/AIDS patients.
Nigeria			• 2008: National Health Insurance Scheme-Millennium Development Goals-Maternal and Child Health (NHIS-MDG-MCH) program piloted in 78 local govt. areas in 12 states. The aim is to improve worsening MCH indicators. The program provides free primary health services to all registered pregnant women and children under 5 years of age, and secondary maternal services through capitation payments (at the primary level) and fee-for-service (at the secondary level) to accredited providers.

Country	1970s and 1980s	1990s	2000s
Peru		• 1997: Free Health insurance for Children in Schools (SEG) launched. • 1998: Maternal and Child Health Insurance (SMI) launched.	• 2001: *Seguro Integral de Salud* (SIS) established which began by merging SEG and SMI, and then expanded to cover adult emergency care and poor adults; even in 2004 SIS was still basically an MCH program with less than 10% of its resources going to these additional groups. The nonpoor can join at a cost. SIS affiliates receive free care in govt. facilities for covered services. Benefit package initially focused on MCH but later extended to a "prioritized list of health interventions" covering 20%-25% of the disease burden. In principle, these are also available to non-enrollees; the difference is that facilities are paid extra for delivering them. • 2009: more ambitious Universal Health Insurance (AUS) reform was approved. Benefit package called "the essential health services plan" (PEAS) aimed at covering 65% of the disease burden; includes more complex interventions. However, budget increase necessary to finance PEAS did not materialize. New targeting mechanism being introduced.
Philippines	• 1972: Medicare Commission set up with task of mandatory enrollment of formal-sector workers.	• 1991: local government code introduced dealing with service delivery and enrollment of indigents. • 1995: Philippine Health Insurance Corporation (PhilHealth) created to replace Medicare Commission. • 1996: Sponsored Program (SP) introduced aimed at providing poor households with free SHI coverage. PhilHealth assumed responsibility for schemes for civil servants and formal sector workers. • 1997: voluntary individual-payer program (IPP) introduced. Benefits focused largely on inpatient care.	• 2000: outpatient benefits introduced for SP. • 2001: Plan 500 aimed at mass enrollment of poor households introduced. • 2003: Partnership with Organized Groups Initiative introduced. • 2004: Plan 5/2005 aimed at mass enrollment of indigent households introduced. • 2010: efforts increased to enroll more poor households in SP, expand benefits package, and reduce copayments. • 2011: "no balance billing" policy introduced for SP enrollees.
South Africa	• 1977: Health Act perpetuated the fragmentation of health system with curative services being made a provincial responsibility and prevention a local government responsibility. • 1983: Parliament further fragmented health services with white, colored, and Indian "own affairs" departments.	• 1994: African National Congress (ANC) came to power in country's first democratic elections. ANC Health Plan sought to shift emphasis away from hospitals towards primary care. • 1996: free care for children younger than 6 years and pregnant women, and free primary health care for all. • 1994 onwards: several proposals to introduce a mandatory health insurance scheme floundered due to opposition by Ministry of	• 2004: National Health Act legislates for national health system incorporating public and private sectors and the provision of equitable health-care services; legislates for the establishment of the district health system to implement primary health care throughout South Africa. • 2011: Green Paper committing govt. to moving towards UHC over a 15-year period, in three 5-year phases; (i) improving access to, and management and quality of, public sector health services, particularly at the primary health care level; (ii) establishing the tax-financed National Health

Country	1970s and 1980s	1990s	2000s
		Finance which was concerned about placing an additional burden on middle-income groups.	Insurance Fund (NHIF) as a semi-autonomous purchaser; (iii) introducing strategic purchasing mechanism.
Thailand	• 1975: Medical Welfare Scheme (MWS) introduced exempting the poor from user fees at govt. facilities. Scheme suffered from poor targeting and underfunding. • 1980: SHI for civil servants introduced. • 1981: MWS transformed into Low-Income Card (LIC) scheme but targeting remained poor.	• 1990: SHI for formal-sector workers for firms with 20 or more employees introduced. • 1991: Voluntary Health Card scheme introduced to encourage enrollment by informal sector; met with little success. • 1992-94: LIC scheme expanded to include elderly and children. • 1994: Limit for formal-sector scheme lowered to firms with 10 or more employees.	• 2001: Universal coverage (UC) scheme introduced covering (at tax-payer's expense) everyone not in civil-servant or formal-sector workers schemes; copayment of 30 Baht (around $1) to the nonpoor, but abolished in 2006. Benefit package is comprehensive.
Tunisia		• 1991: Free Medical Assistance for the Poor (FMAP) program introduced with poorest households receiving free health care cards giving exemption from all user fees. • 1998: scheme expanded to non-poor vulnerable households who receive subsidized health care cards giving entitlement to reduced fees. No explicit benefits package.	• 2000s: FMAP expanded reaching an estimated 27% of the population in 2011 (7% free; 20% subsidized). Despite FMAP, out-of-pocket payments remain high among low-income households, and are increasing. Funding through central government transfers (in 2010, FMAP accounted for 14% percent of govt. health expenditures).
Turkey		• 1992: Green Card Program for the Poor established. Program also covered (irrespective of income) the elderly and persons with some chronic diseases. Only inpatient costs covered. Budget increased throughout 1990s but number registered with program remained low (3% of population in 2003) and targeting was poor.	• 2003: Health Transformation Program launched. Supply-side measures included: establishment of a Family Medicine Program reorganizing and significantly expanding primary health care throughout the country; significant investments in infrastructure and equipment in public hospitals; and a pay reform that combined large increases in salaries with the requirement of exclusive public service for doctors in the public sector. • 2004: benefits expanded to cover both outpatient and inpatient services at MOH and university hospitals. • 2005: outpatient prescription drugs included as well. • 2012: Green Card program integrated into SHI scheme; same targeting method as used by other social programs.
Vietnam	• Late 1980s: economic reforms led to introduction of user fees in hospitals, legalization of private medicine, and deregulation of pharmaceutical sector (retail and production).	• Early 1990s: out-of-pocket payments increase, accounting for over 70% of total health spending. • 1992: SHI introduced for civil servants and formal-sector workers. • 1994: fee exemptions for the poor introduced but no funding provided to facilities. • 1998: "people of merit" included in SHI scheme. Family members allowed to enroll (at a cost) but few do so.	• 2002: tax-financed SHI Health Care Fund for the Poor (HCFP) scheme introduced. • 2005: HCFP strengthened as local governments required to enroll the poor in SHI rather than provide reimbursement of fees. Targeting of HCFP very strong. • Mid-2000s: beginning of a move away from fee-for-service. • 2009: partial subsidy for SHI coverage to the near-poor was introduced. Very broad benefit package.

Country	1970s and 1980s	1990s	2000s
		• 1999: free health care cards for the poor distributed, but scheme met with limited success.	

Sources: Arfa and Elgazzar (2013), Ataguba et al. (2014), Atim and Bhatnagar (2013), Berman (1998), Bitrán et al. (2011), Bitrán (2013), Bonilla-Chacín and Aguilera (2013), Cercone and Jiménez (2008), Cercone et al. (2011), Chao (2013), Chakraborty (2013), Coovadia (2009), Cortez and Romero (2013), Cotlear et al. (2014), Couttolenc and Dmytraczenko (2013), Francke (2013), Giuffrida et al. (2013), Gragnolati et al. (2013), Hanvoravongchai (2013), Hanvoravongchai and Hsiao (2007), Harimurti et al. (2013), Jowett and Hsiao (2007), Liang and Langenbrunner (2013), Lieberman and Wagstaff (2009), Ma and Sood (2008), Menon et al. (2013), Montenegro Torres (2013), Montenegro Torres and Bernal Acevedo (2013), Muiya and Kamau (2013), Nagpal (2013), OECD (2005), Penchaszadeh et al. (2012), Peters et al. (2003), Pinto and Hsiao (2007), Ramachandra and Hsiao (2007), Ramana et al. (2013), Rokx et al. (2009), Smith (2013), Somanathan et al. (2013), Unger et al. (2008), Wagstaff et al. (2009a; 2009b; 2009c), Wagstaff (2010), Workie and Ramana (2013), World Health Organization (2009; 2011).

Table 2: UHC index values for the UNICO countries

country	year	Mammogram	PAP smear	ANC	Immunization	SBA	ARI treatment	Diarrhea treatment	Inpatient admission	Impoverish-ment	Catastrophic spending	UHC
Argentina	2005	47.5	36.1	94.0			53.3	26.3	100.0	96.1	76.6	
Brazil	1998	82.8	95.4	68.0	67.6	83.7	40.5	44.1	92.3	94.1	93.2	82.0
Chile	2006	29.2	51.6						100.0	92.0	56.8	
China	2001	15.0	30.1						69.4			
Colombia	2001	73.4	90.4	61.4	61.5	76.9	42.5	41.0	96.6	95.2	88.4	80.4
Costa Rica	2004	29.8	59.7	93.9	73.0	89.6	17.3	70.1	100.0	98.6	98.2	80.9
Ethiopia	2001	0.2	24.2	4.9	9.4	1.7	12.7	14.2	18.0	98.3	99.9	29.2
Georgia	2001	2.1	31.7		24.6		56.4	48.9	32.4	88.4	88.5	
Ghana	1995	1.1	24.9	48.8	49.0	30.4	38.5	19.6	76.8	98.3	99.6	59.5
Guatemala	1999	8.3	7.0	30.8	42.5	21.7	32.8	51.6	60.4	76.7	82.0	52.7
India	1998	1.3	20.2	14.3	26.0	20.6	70.8	10.3	71.6	85.2	96.7	51.6
Indonesia	2000	0.6	0.5	56.4	49.4	40.6	62.8	49.7	27.9	93.4	99.6	47.3
Jamaica	1990									97.1	95.2	
Kenya	1999	1.0	36.1	60.7	74.4	31.8	53.7	8.4	65.7	92.2	98.5	56.5
Kyrgyz Republic	1998			86.7	76.3	97.1	43.3	43.0	100.0	94.2	99.8	
Mexico	1998	35.3	65.8	80.8	69.7	85.5	55.9	39.2	68.2	96.6	92.0	76.4
Nigeria	1995			37.2	21.1	22.3	34.9	21.8	32.8	86.9	86.3	
Peru	1996	9.2	30.1	21.9	52.1	28.6	25.8	4.7	47.8	89.3	99.5	49.5
Philippines	1998	81.7	8.7	40.3	68.5	39.6	47.3	23.0	64.7	95.7	100.0	66.2
South Africa	1997	4.6	45.2	74.5	61.7	81.0	75.4	53.0	96.6	95.9	97.9	78.8
Thailand	2003				95.3		83.1	68.4	100.0	95.7	99.1	
Tunisia	2008	5.6	20.3	83.6	84.7	96.8	69.9	62.7	84.0			
Turkey	1997			26.0	56.7	66.6	34.5	25.2	25.2	95.9	96.0	
Vietnam	1997	1.7	8.7	5.9	46.7	47.4	64.0	45.2	86.7	84.6	85.7	57.8
Argentina	2008	64.7	56.8	94.0			53.3	26.3	79.0	95.9	82.5	
Brazil	2006	50.5	73.5	94.9	67.6	95.7	60.0	43.0	85.9	93.6	90.1	81.6
Chile	2009	53.4	65.3						71.0	92.0	56.8	
China	2002	15.0	30.1						72.5			
Colombia	2010	78.7	94.4	84.3	67.5	92.3	60.9	60.5	79.2	95.5	89.4	83.7
Costa Rica	2010	29.8	77.4	86.5	83.3	89.6	81.7	70.1	53.9	98.7	96.5	79.8
Ethiopia	2007	0.2	24.2	10.8	18.8	4.7	20.1	26.3	18.0	97.7	100.0	34.7
Georgia	2006	2.1	31.7		24.6		56.4	48.9	46.7	66.5	60.4	
Ghana	2007	1.1	24.9	83.9	93.5	55.6	13.9	47.7	76.8	93.4	100.0	62.8
Guatemala	2006	2.7	26.6	44.4	54.8	26.3	58.9	36.4	53.5	81.4	88.4	56.1
India	2006	1.3	20.2	22.7	34.5	35.6	65.3	22.1	71.6	83.7	97.6	56.9
Indonesia	2009	0.6	0.5	37.6	59.5	38.1	72.5	48.2	27.9	93.1	99.0	47.0
Jamaica	2007									98.1	98.6	
Kenya	2006	1.0	36.1	37.1	66.9	35.6	52.3	73.3	65.7	92.2	98.5	63.9
Kyrgyz Republic	2010			81.2	75.9	99.3	28.2	70.9	100.0	95.4	96.9	
Mexico	2010	82.1	85.3	91.8	77.2	94.7	62.4	54.0	51.3	98.3	93.6	78.7
Nigeria	2010			33.7	14.2	23.5	27.8	31.9	32.8	75.8	67.6	
Peru	2011	16.7	34.5	87.9	62.6	82.1	59.4	35.3	60.8	89.7	96.6	70.7
Philippines	2008	66.2	13.8	78.3	72.6	68.2	57.2	54.3	64.7	95.0	99.7	75.2

country	year	Mammogram	PAP smear	ANC	Immunization	SBA	ARI treatment	Diarrhea treatment	Inpatient admission	Impoverish-ment	Catastrophic spending	UHC
South Africa	2003	4.6	45.2	74.5	61.7	81.0	75.4	53.0	96.6	96.7	99.5	79.3
Thailand	2006				95.3		83.1	68.4	100.0	99.8	99.8	
Tunisia	2008	5.6	20.3	83.6	84.7	96.8	69.9	62.7	84.0			
Turkey	2005			39.0	49.6	76.2	38.1	25.2	25.2	98.9	98.3	
Vietnam	2008	1.7	8.7	49.9	30.6	86.9	82.5	65.9	86.7	66.1	80.9	61.1

References

Aran, M. A. and J. S. Hentschel (2012). Protection in good and bad times? the Turkish green card health program. The World Bank, Policy Research Working Paper Series, 6178.

Arfa, C. and H. Elgazzar (2013). Consolidation and Transparency: Transforming Tunisia's Health Care for the Poor. UNICO Study Series number 4. Washington DC, World Bank.

Ataguba, J. E., C. Day and D. McIntyre (2014). "Monitoring and evaluating progress towards Universal Health Coverage in South Africa." PLoS Med **11**(9): e1001686.

Atim, C. and A. Bhatnagar (2013). Toward Synergy and Collaboration to Expand the Supply of and Strengthen Primary Health Care in Nigeria's Federal Context, with Special Reference to Ondo State. UNICO Study Series number 3. Washington DC, World Bank.

Axelson, H., S. Bales, D. M. Pham, B. Ekman and U. G. Gerdtham (2009). "Health financing for the poor produces promising short-term effects on utilization and out-of-pocket expenditure: evidence from Vietnam." International Journal for Equity in Health **8**.

Bauhoff, S., D. R. Hotchkiss and O. Smith (2011). "The Impact of Medical Insurance for the Poor in Georgia: A Regression Discontinuity Approach." Health Economics **20 11**: 1362-1378.

Berman, P. A. (1998). "Rethinking health care systems: Private health care provision in India." World Development **26**(8): 1463-1479.

Bitrán, R., R. Muñoz and L. Prieto (2011). Health insurance and access to health services, health services use, and health status in Peru. The Impact of Health Insurance in Low-and Middle-Income Countries. M. L. Escobar, C. Griffin and R. P. Shaw. Washington DC, Brookings Inst Press.

Bitrán, R. (2013). Explicit Health Guarantees for Chileans: The AUGE Benefits Package. UNICO Study Series number 21. Washington DC, World Bank.

Boerma, T., C. AbouZahr, D. Evans and T. Evans (2014a). "Monitoring Intervention Coverage in the Context of Universal Health Coverage." PLoS Med **11**(9): e1001728.

Boerma, T., P. Eozenou, D. Evans, T. Evans, M.-P. Kieny and A. Wagstaff (2014b). "Monitoring Progress towards Universal Health Coverage at Country and Global Levels." PLoS Med **11**(9): e1001731.

Boerma, T., P. H.-V. Eozenou, D. Evans, T. Evans, M.-P. Kieny and A. Wagstaff (2014c). Monitoring progress towards universal health coverage at country and global levels: Framework, measures and targets. Geneva and Washington DC, WHO and the World Bank.

Bonilla-Chacín, M. E. and N. Aguilera (2013). The Mexican Social Protection System in Health. UNICO Study Series number 1. Washington DC, World Bank.

Cercone, J. and J. P. Jiménez (2008). Costa Rica: "Good Practice" in Expanding Health Care Coverage—Lessons from Reforms in Low- and Middle-Income Countries. Good practices in health financing: lessons from reforms in low and middle-income countries. P. E. Gottret, G. Schieber and H. Waters. Washington DC, World Bank.

Cercone, J., E. Pinder, J. P. Jiménez and R. Briceno (2011). Impact of health insurance on access, use, and health status in Costa Rica. The Impact of Health Insurance in Low-and Middle-Income Countries. M. L. Escobar, C. Griffin and R. P. Shaw. Washington DC, Brookings Inst Press.

Chakraborty, S. (2013). Philippines' Government Sponsored Health Coverage Program for Poor Households. UNICO Study Series number 22. Washington DC, World Bank.

Chao, S. (2013). Jamaica's Effort in Improving Universal Access within Fiscal Constraints. UNICO Study Series number 6. Washington DC, World Bank.

Chaudhury, N., J. Hammer, M. Kremer, K. Muralidharan and F. H. Rogers (2006). "Missing in Action: Teacher and Health Worker Absence in Developing Countries." Journal of Economic Perspectives **20 1**: 91-116.

Chen, L., W. Yip, M.-C. Chang, H.-S. Lin, S.-D. Lee, Y.-L. Chiu and Y.-H. Lin (2007). "The effects of Taiwan's National Health Insurance on access and health status of the elderly." Health Economics **16**(3): 223-242.

Coovadia, H., R. Jewkes, P. Barron, D. Sanders and D. McIntyre (2009). "The health and health system of South Africa: historical roots of current public health challenges." Lancet **374**(9692): 817-834.

Cortez, R. and D. Romero (2013). Argentina-Increasing Utilization of Health Care Services among the Uninsured Population: The Plan Nacer Program. UNICO Study Series number 12. Washington DC, World Bank.

Cotlear, D., O. Gómez-Dantés, F. Knaul, R. Atun, I. C. H. C. Barreto, O. Cetrángolo, M. Cueto, P. Francke, P. Frenz, R. Guerrero, R. Lozano, R. Marten and R. Sáenz (2014). "Overcoming social segregation in health care in Latin America." The Lancet.

Cotlear, D., S. Nagpal, O. Smith, A. Tandon and R. Cortez (2015). Going Universal: How 24 developing countries are implementing Universal Health Coverage Reforms. Washington DC, World Bank.

Couttolenc, B. and T. Dmytraczenko (2013). Brazil's Primary Care Strategy. UNICO Study Series number 2. Washington DC, World Bank.

Culyer, A. J. and A. Wagstaff (1993). "Equity and Equality in Health and Health-Care." Journal of Health Economics **12**(4): 431-457.

Das, J. and J. Hammer (2007). "Money for Nothing: The Dire Straits of Medical Practice in Delhi, India." Journal of Development Economics **83 1**: 1-36.

Das, J., A. Holla, V. Das, M. Mohanan, D. Tabak and B. Chan (2012). "In urban and rural India, a standardized patient study showed low levels of provider training and huge quality gaps." Health Aff (Millwood) **31**(12): 2774-2784.

Erreygers, G. (2009). "Correcting the Concentration Index." Journal of Health Economics **28 2**: 504-515.

Fan, V. Y., A. Glassman and W. D. Savedoff (2012a). "A post 2015 development goal for health—should it be universal health coverage?" Blogpost. BMJ Blog http://blogs.bmj.com/bmj/2012/09/25/amanda-glassman-et-al-a-post-2015-development-goal-for-health-should-it-be-universal-health-coverage/.

Fan, V. Y., A. Karan and A. Mahal (2012b). "State Health Insurance and Out-of-Pocket Health Expenditures in Andhra Pradesh, India." International Journal of Health Care Finance and Economics **12 3**: 189-215.

Filmer, D. and L. Pritchett (2001). "Estimating wealth effects without expenditure data or tears: An application to educational enrollments in states of India." Demography **38**(1): 115-132.

Finkelstein, A., S. Taubman, B. Wright, M. Bernstein, J. Gruber, J. P. Newhouse, H. Allen, K. Baicker and Oregon Health Study Group (2012). "The Oregon Health Insurance Experiment: Evidence from the First Year." The Quarterly Journal of Economics **127**(3): 1057-1106.

Francke, P. (2013). Peru's Comprehensive Health Insurance and New Challenges for Universal Coverage. UNICO Study Series number 11. Washington DC, World Bank.

Garrett, L., A. M. Chowdhury and A. Pablos-Mendez (2009). "All for universal health coverage." Lancet **374**(9697): 1294-1299.

Giuffrida, A., M. Jakab and E. M. Dale (2013). Toward Universal Coverage in Health: The Case of the State Guaranteed Benefit Package of the Kyrgyz Republic. UNICO Study Series number 17. Washington DC, World Bank.

Gragnolati, M., B. Couttolenc and M. Lindelow (2013). Twenty years of health system reform in Brazil : an assessment of the Sistema Unico de Saude. Washington DC, World Bank.

Guanais, F. C., R. Gómez-Suárez and L. Pinzón (2012). Series of Avoidable Hospitalizations and Strengthening Primary Health Care: Primary Care Effectiveness and the Extent of Avoidable Hospitalizations in Latin America, Inter-American Development Bank.

Gwatkin, D. R., A. Wagstaff and A. S. Yazbeck (2005). Reaching the Poor with Health, Nutrition, and Population Services: What Works, What Doesn't, and Why. Washington, D.C., World Bank.

Hanvoravongchai, P. and W. C. Hsiao (2007). Thailand: Achieving universal coverage with social insurance. Social Health Insurance for Developing Nations. W. C. Hsiao and R. P. Shaw. Washington, D.C., World Bank.

Hanvoravongchai, P. (2013). Health Financing Reform in Thailand: Toward Universal Coverage Under Fiscal Constraints. UNICO Study Series number 20. Washington DC, World Bank.

Harimurti, P., E. Pambudi, A. Pigazzini and A. Tandon (2013). The Nuts & Bolts of Jamkesmas, Indonesia's Government-Financed Health Coverage Program for the Poor and Near-Poor. UNICO Study Series number 8. Washington DC, World Bank.

Heijink, R., K. Xu, P. Saksena and D. Evans (2011). Validity and comparability of out-of-pocket health expenditure from household surveys: a review of the literature and current survey instruments. Geneva, WHO.

Hodgins, S. and A. D'Agostino (2014). "The quality-coverage gap in antenatal care: toward better measurement of effective coverage." Glob Health Sci Pract **2**(2): 173-181.

Hodnett, E. D., S. Downe, D. Walsh and J. Weston (2010). "Alternative versus conventional institutional settings for birth." Cochrane Database Syst Rev(9): CD000012.

Horton, R. and P. Das (2014). "Universal health coverage: not why, what, or when-but how?" Lancet.

Hou, Z., E. Van de Poel, E. Van Doorslaer, B. Yu and Q. Meng (2014). "Effects of NCMS on access to care and financial protection in China." Health Economics **23**(8): 917-934.

Independent UK Panel on Breast Cancer Screening (2012). "The benefits and harms of breast cancer screening: an independent review." The Lancet **380**(9855): 1778-1786.

Jowett, M. and W. C. Hsiao (2007). The Philippines: Extending Coverage Beyond the Formal Sector. Social Health Insurance for Developing Nations. W. C. Hsiao and R. P. Shaw. Washington, D.C., World Bank.

Kakwani, N., A. Wagstaff and E. van Doorslaer (1997). "Socioeconomic Inequalities in Health: Measurement, Computation, and Statistical Inference." Journal of Econometrics **77 1**: 87-103.

Kaplan, A., S. Nakhimovsky, A. Won and C. Avila (2013). An Analysis of Spending on Prevention and Public Health in Africa. Bethesda, MD, Abt Associates Inc.

King, G., E. Gakidou, K. Imai, J. Lakin, R. T. Moore, C. Nall, N. Ravishankar, M. Vargas, M. M. Téllez-Rojo, J. E. H. Ávila, M. H. Ávila and H. H. Llamas (2009). "Public policy for the poor? A randomised assessment of the Mexican universal health insurance programme." The Lancet **373**(9673): 1447-1454.

Kondo, A. and H. Shigeoka (2013). "Effects of universal health insurance on health care utilization, and supply-side responses: Evidence from Japan." Journal of Public Economics **99**(0): 1-23.

La Forgia, G. and S. Nagpal (2012). Government-sponsored Health Insurance in India: Are You Covered? Washington DC, World Bank Publications.

Lavy, V., J. Strauss, D. Thomas and P. de Vreyer (1996). "Quality of care, survival and health outcomes in Ghana." Journal of Health Economics **15**(333-357).

Liang, L. and J. C. Langenbrunner (2013). The Long March to Universal Coverage: Lessons from China. UNICO Study Series number 9. Washington DC, World Bank.

Lieberman, S. S. and A. Wagstaff (2009). Health Financing and Delivery in Vietnam: Looking Forward. Washington, DC, World Bank.

Limwattananon, S., S. Neelsen, O. O'Donnell, P. Prakongsai, V. Tangcharoensathien, E. van Doorslaer and V. Vongmongkol (2015). "Universal coverage with supply-side reform: The impact on medical expenditure risk and utilization in Thailand." Journal of Public Economics **121**(0): 79-94.

Lindelow, M. (2008). Tracking Public Money in the Health Sector in Mozambique: Conceptual and Practical Challenges. Are You Being Served? New Tools for Measuring Service Delivery. S. Amin, J. Das and M. Goldstein. Washington, D.C., World Bank**:** xi-xii.

Lozano, R., P. Soliz, E. Gakidou, J. Abbott-Klafter, D. M. Feehan, C. Vidal, J. P. Ortiz and C. J. L. Murray (2006). "Benchmarking of performance of Mexican states with effective coverage." The Lancet **368**(9548): 1729-1741.

Lu, C., B. Chin, G. Li and C. J. Murray (2009). "Limitations of methods for measuring out-of-pocket and catastrophic private health expenditures." Bulletin of the World Health Organization **87**(3): 238-244, 244A-244D.

Ma, S. and N. Sood (2008). A comparison of the health systems in China and India. Santa Monica, CA, Rand Corporation, Center for Asia Pacific Policy.

Menon, R., S. Mollahaliloglu and I. Postolovska (2013). Toward Universal Coverage: Turkey's Green Card Program for the Poor. UNICO Study Series number 18. Washington DC, World Bank.

Montenegro Torres, F. (2013). Costa Rica Case Study: Primary Health Care Achievements and Challenges Within the Framework of the Social Health Insurance. UNICO Study Series number 14. Washington DC, World Bank.

Montenegro Torres, F. and O. Bernal Acevedo (2013). Colombia Case Study: The Subsidized Regime of Colombia's National Health Insurance System. UNICO Study Series number 15. Washington DC, World Bank.

Moreno-Serra, R. and A. Wagstaff (2010). "System-Wide Impacts of Hospital Payment Reforms: Evidence from Central and Eastern Europe and Central Asia." Journal of Health Economics **29 4**: 585-602.

Muiya, B. M. and A. Kamau (2013). "Universal Health Care in Kenya: Opportunities and challenges for the informal sector workers." Journal of Education and Research **1**(11): 1-10.

Nagpal, S. (2013). Expanding Health Coverage for Vulnerable Groups in India. UNICO Study Series number 13. Washington DC, World Bank.

OECD (2005). OECD Reviews of Health Systems: Mexico. Paris, OECD.

Penchaszadeh, V. B., F. Leone and M. Rovere (2012). "The health system in Argentina: an unequal struggle between equity and the market." Italian Journal of Public Health **7**(4): 350-358.

Peters, D. H., K. S. Rao and R. Fryatt (2003). "Lumping and splitting: the health policy agenda in India." Health Policy and Planning **18**(3): 249-260.

Pinto, D. and W. C. Hsiao (2007). Colombia: Social health insurance with managed competition to improve health care delivery. Social Health Insurance for Developing Nations. W. C. Hsiao and R. P. Shaw. Washington, D.C., World Bank.

Raban, M. Z., R. Dandona and L. Dandona (2013). "Variations in catastrophic health expenditure estimates from household surveys in India." Bulletin of the World Health Organization **91**(10): 726-735.

Ramachandra, S. and W. C. Hsiao (2007). Ghana: Initiating Social Health Insurance. Social Health Insurance for Developing Nations. W. C. Hsiao and R. P. Shaw. Washington, D.C., World Bank**:** xi, 172.

Ramana, G. N., R. Chepkoech and N. Walelign (2013). Improving Universal Primary Health Care by Kenya: A Case Study of the Health Sector Services Fund. UNICO Study Series number 5. Washington DC, World Bank.

Rao, M., A. Katyal, P. V. Singh, A. Samarth, S. Bergkvist, M. Kancharla, A. Wagstaff, G. Netuveli and A. Renton (2014). "Changes in addressing inequalities in access to hospital care in Andhra Pradesh and Maharashtra states of India: a difference-in-differences study using repeated cross-sectional surveys." BMJ Open **4**(6): e004471.

Ravallion, M. (2012a). "Mashup Indices of Development." World Bank Research Observer **27 1**: 1-32.

Ravallion, M. (2012b). "Troubling tradeoffs in the human development index." Journal of Development Economics **99**(2): 201-209.

Rokx, C., G. Schieber, P. Harimurti, A. Tandon and A. Somanathan (2009). Health Financing in Indonesia: A Reform Road Map. Washington, D.C., World Bank.

Savedoff, W. D., D. de Ferranti, A. L. Smith and V. Fan (2012). "Political and economic aspects of the transition to universal health coverage." Lancet **380**(9845): 924-932.

Shengelia, B., A. Tandon, O. B. Adams and C. J. L. Murray (2005). "Access, utilization, quality, and effective coverage: An integrated conceptual framework and measurement strategy." Social Science & Medicine **61**(1): 97-109.

Smith, O. (2013). Georgia's Medical Insurance Program for the Poor. UNICO Study Series number 16. Washington DC, World Bank.

Somanathan, A., H. L. Dao and T. V. Tien (2013). Integrating the Poor into Universal Health Coverage in Vietnam. UNICO Study Series number 24. Washington DC, World Bank.
Sparrow, R., A. Suryahadi and W. Widyanti (2013). "Social health insurance for the poor: Targeting and impact of Indonesia's Askeskin programme." Social Science & Medicine **96**(0): 264-271.
Tura, G., M. Fantahun and A. Worku (2013). "The effect of health facility delivery on neonatal mortality: systematic review and meta-analysis." BMC Pregnancy Childbirth **13**: 18.
UNDP (2014). Human Development Report 2014. Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience. New York, NY, UNDP.
Unger, J.-P., P. De Paepe, R. Buitrón and W. Soors (2008). "Costa Rica: Achievements of a Heterodox Health Policy." American Journal of Public Health **98**(4): 636-643.
Van de Poel, E., E. Van Doorslaer and O. O'Donnell (2012). "Measurement of inequity in health care with heterogeneous response of use to need." Journal of Health Economics **31**(4): 676-689.
Van de Poel, E., G. Flores, P. Ir, O. O'Donnell and E. Van Doorslaer (2014). "Can vouchers deliver? An evaluation of subsidies for maternal health care in Cambodia." Bull World Health Organ **92**(5): 331-339.
Wagstaff, A., E. van Doorslaer and P. Paci (1989). "Equity in the Finance and Delivery of Health Care: Some Tentative Cross-country Comparisons." Oxford Review of Economic Policy **5 1**: 89-112.
Wagstaff, A., E. Vandoorslaer and P. Paci (1991). "On the Measurement of Horizontal Inequity in the Delivery of Health-Care." Journal of Health Economics **10**(2): 169-205.
Wagstaff, A. and E. E. Van Doorslaer (1993). Equity in the finance and delivery of health care: Concepts and definitions. Equity in the Finance and Delivery of Health Care: An International Perspective. E. van Doorslaer, A. Wagstaff and F. Rutten. Oxford, OUP.
Wagstaff, A. and E. van Doorslaer (2000). "Measuring and testing for inequity in the delivery of health care." Journal of Human Resources **35**(4): 716-733.
Wagstaff, A. (2002). "Inequality aversion, health inequalities and health achievement." Journal of Health Economics **21**(4): 627-641.
Wagstaff, A. and E. van Doorslaer (2003). "Catastrophe and Impoverishment in Paying for Health Care: With Applications to Vietnam 1993-1998." Health Economics **12**(11): 921-934.
Wagstaff, A. and M. Claeson (2004). The Millennium Development Goals For Health : Rising to the Challenges. Washington, DC, World Bank.
Wagstaff, A. and H. Waters (2005). How were the reaching the poor studies done? Reaching the Poor with Health, Nutrition and Population Services: What Works, What Doesn't, and Why. D. Gwatkin, A. Wagstaff and A. Yazbeck. Washington DC, World Bank.
Wagstaff, A., M. Lindelow, G. Jun, X. Ling and Q. Juncheng (2009a). "Extending health insurance to the rural population: An impact evaluation of China's New Cooperative Medical Scheme." Journal of Health Economics **28**(1): 1-19.
Wagstaff, A., M. Lindelow, S. Wang and S. Zhang (2009b). Reforming China's Rural Health System. Washington DC, World Bank.
Wagstaff, A. and R. Moreno-Serra (2009). "Europe and central Asia's great post-communist social health insurance experiment: Aggregate impacts on health sector outcomes." Journal of Health Economics **28**(2): 322-340.
Wagstaff, A., W. Yip, M. Lindelow and W. C. Hsiao (2009c). "China's health system and its reform: a review of recent studies." Health Economics **18 Suppl 2**: S7-23.
Wagstaff, A. (2010). "Estimating Health Insurance Impacts under Unobserved Heterogeneity: The Case of Vietnam's Health Care Fund for the Poor." Health Economics **19**(2): 189-208.
Wagstaff, A. (2013). "Universal health coverage: Old wine in a new bottle? If so, is that so bad?" Blogpost. Let's Talk Development http://blogs.worldbank.org/developmenttalk/universal-health-coverage-old-wine-in-a-new-bottle-if-so-is-that-so-bad.
Wagstaff, A., C. Bredenkamp and L. Buisman (2014). "Progress on global health goals: are the poor being left behind?" World Bank Research Observer **29**(2): 137-162.
Wagstaff, A. and P. H. V. Eozenou (2014). CATA meets IMPOV: a unified approach to measuring financial protection in health. The World Bank, Policy Research Working Paper Series, 6861.

Wagstaff, A., T. Dmytraczenko, G. Almeida, L. R. Buisman, P. H.-V. Eozenou, C. Bredenkamp, J. Cercone, D. Maceira, F. Mori-Sarti, G. Paraje, F. Ruiz, J. Scott and M. Valdivia (2015). Assessing Latin America's Progress Toward Achieving Universal Health Coverage." Health Affairs 34(10): 1704-1712.

Workie, N. W. and G. N. Ramana (2013). The Health Extension Program in Ethiopia. UNICO Study Series number 10. Washington DC, World Bank.

World Health Organization (2009). Georgia Health System Review: Health Systems in Transition, Vol. 11 No. 8. Copenhagen, European Observatory on Health Systems and Policies.

World Health Organization (2010). The World Health Report - Health Systems Financing: The Path to Universal Coverage. Geneva, World Health Organization.

World Health Organization (2011). The Philippines Health System Review: Health Systems in Transition, Vol. 1 No. 2 Manila, Asia Pacific Observatory on Health Systems and Policies.

World Health Organization (2013). Service Availability and Readiness Assessment (SARA): An Annual Monitoring System for Service Selivery - Reference Manual. Geneva, WHO.

Yamin, A. E. and O. Parra-Vera (2009). "How Do Courts Set Health Policy? The Case of the Colombian Constitutional Court." PLoS Med **6**(2): e1000032.