

**Private-public mix in woman and child health in low-income countries:  
an analysis of Demographic and Health Surveys**

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## Abstract

Achieving the maternal and child health Millennium Development Goals (MDGs 4 and 5) is still a grand challenge to several low-income countries (LIC). An analysis of the most recent (2001-2006) Demographic and Health Survey (DHS) plus an adjacent prior wave (1995-2000) reveals a wide variation in the role of private sector on health care for women in reproductive ages and children under five in 19 LIC in sub-Saharan Africa (SSA) and six LIC in South and Southeast Asia (SA/SEA). Health providers or facilities sought by women in the nationally representative households for four care tracers: modern contraception, birth delivery, and child diarrhea and fever/cough treatments were grouped hierarchically into three major sources: informal, formal private, and public sectors.

Eight of 19 LIC in SSA and two of six in SA/SEA had over 50% share of family planning services provided by the private sector, mostly through the formal providers or facilities. The private sector was even more dominant on delivery, especially by the informal care. In Vietnam (2002), however, public sector dominated these health markets for women. The informal sector very prevailed on the family planning in Cameroon (2004) and on the delivery care in Ethiopia (2005) and Bangladesh (2004), whereas Indonesia (2002) had the top share of both services by the formal private sector. The informal sector is most prevalent for the treatments of child illnesses similarly between diarrhea and fever/cough, whereby Chad (2004) and Mali (2001) were the informal champions. Vietnam, Nepal (2006) and Uganda (2006) experienced a minimal role of the informal sector for both diarrhea and fever/cough, whereas in Mozambique (2003) treatments by the public sector dominated. India (2005) was the formal private champion for these two diseases.

Comparison between the two DHS waves (approximately 5-6 years apart) shed light on an expanding (or shrinking) trend in this private-public trade off on woman and child health for some countries. For observable geographic and economic gaps, the formal private sector typically tended to favor urban or wealthier population over their rural or

poorer counterparts. For the family planning services, public sector was relied heavily by the rural or poorer subgroups in most countries (except in Mozambique and Mali).

Unfortunately, the public sector was found in favor of the better off on the delivery care in all countries. This DHS analysis found a mixed result on the geographic and economic gaps in the child treatments. Chad and Mali were the two LIC showing a consistent pattern that both formal private and public sectors favored the better off, whereas Vietnam was an example of LIC where the worse off depended largely on the public sector for the treatments of both illnesses.

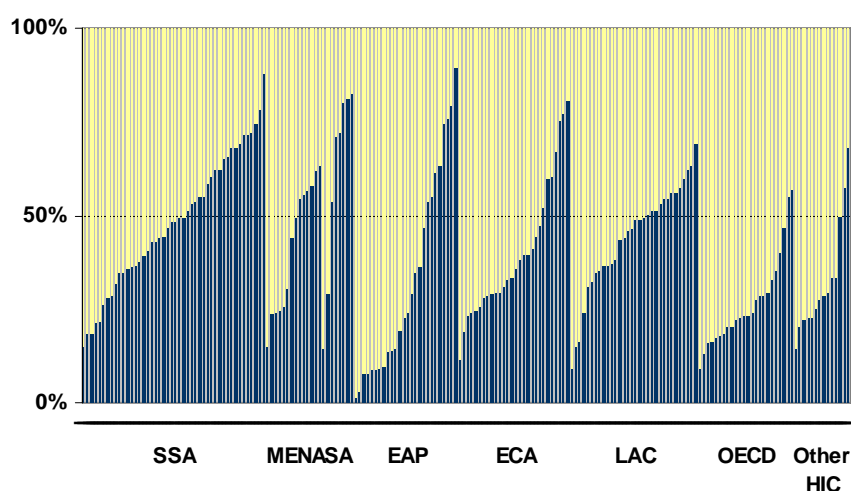
An ecological analysis linking the country's private-public mix to population health outcome has found a consistent correlation of under-five mortality positively with the informal treatment share (correlation coefficient,  $r=0.44$  and  $0.54$ ) but negatively with the formal private treatment share ( $r=-0.55$  and  $-0.70$ ) for fever/cough and diarrhea, respectively. However, both baseline illness prevalence ( $r=0.58$  and  $0.70$ ) and overall treatment coverage ( $r=-0.29$  and  $-0.63$ ) also showed an expected outcome correlation. Other country-level variations, including national income, out-of-pocket health spending, and governance performance were also taken into perspective for further policy recommendation.



## 1. Background

### 1.1 Private health spending

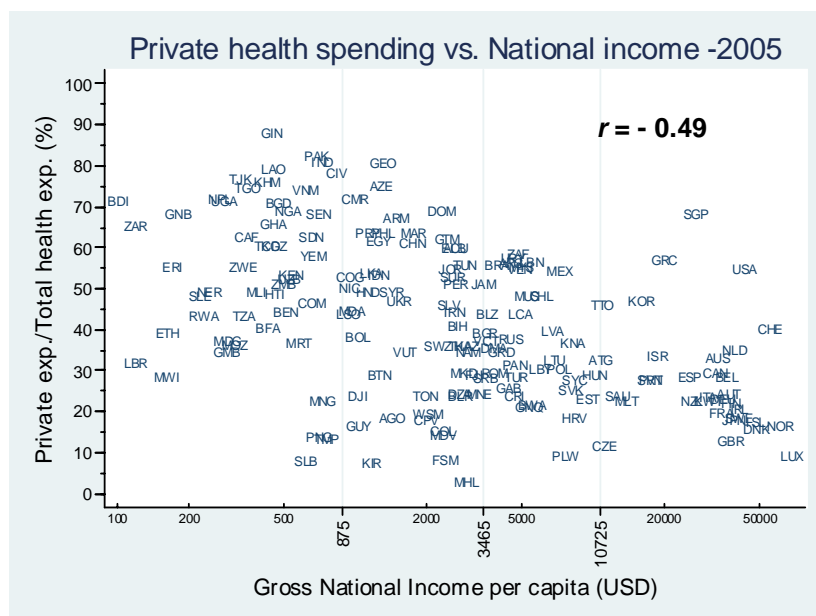
Access to care is one of the major determinants of population health. In developing countries, available national health accounts reveal a major share of health by private spending. Figure 1 shows an ascending order of countries according to the private share of total health expenditures (in blue colored bar) in 2005 broken down by the World Bank's classification of world regions. Several countries in sub-Saharan Africa (SSA), South Asia (SA), and East Asia and Pacific (EAP) regions have more than half of their health expenditures paid directly by the private sector, especially from households.



**Figure 1** Private share of health expenditure in each country by world regions, 2005

Source: Author's analysis from World Health Statistics (WHO, 2008)

Interestingly, a country's private health spending tends to correlate negatively (correlation coefficient,  $r = -0.49$ ) with the country's wealth. Figure 2 illustrates a scatter of countries with respect to the private health share and the national income per capita for all countries in the same year of 2005.



**Figure 2** Private share of health expenditure and GNI, 2005

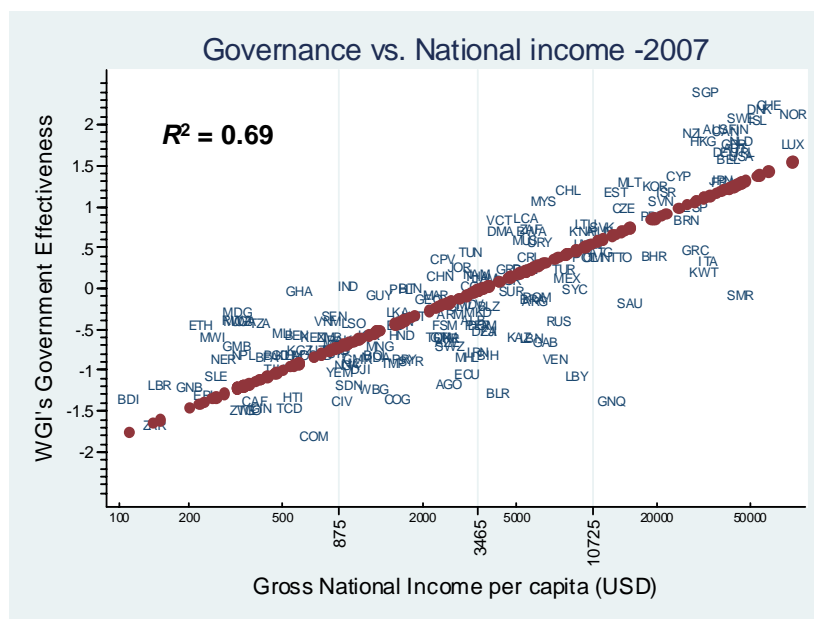
Source: Author's analysis from World Health Statistics (WHO, 2008) and World Development Report (WB, 2006)

Using the expenditure data as a proxy for health care utilization shared by private and public sectors has certain limitations. Health expenditure is a deterministic product between two components: the volume of use and the cost per unit of use. A high expenditure of health care may result from an expensive unit price, a large volume of use, or both. The unit cost is largely driven by supply side. The volume of use can be driven by both the demand (i.e., propensity of use) and supply (i.e., intensity, given a use)-sides.

Private health sector in the developing countries contain both formal care in the westernized institutions and facilities (such as physician clinics and hospitals) and the informal lay sectors including self-medication from pharmacies/dispensaries and street vendors, herbal or alternative medicines from traditional healers, and folk/quack. These sources of health care may not be well captured by the national health accounts. The direct survey of nationally representative households is a good alternative.

## 1.2 Public sector governance

There is a positive correlation between the country's wealth and public sector governance. Figure 3 shows a linear relationship (coefficient of determination,  $R^2 = 0.69$ ) between the national income (in logarithmic scale) and one important dimension of governance performance as measured by the WB's Worldwide Governance Indicators (WGI), government effectiveness.<sup>1</sup>

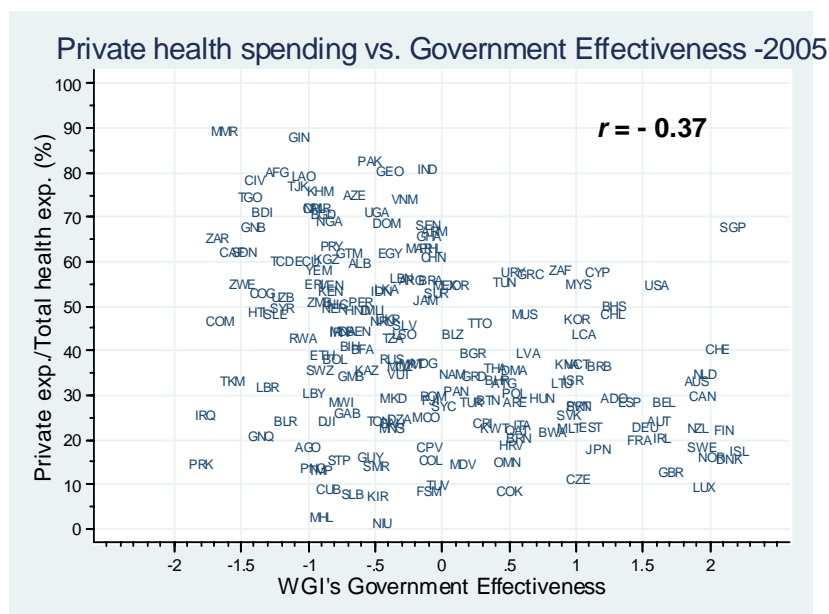


**Figure 3** Government effectiveness and GNI, 2007

Source: Author's analysis from Governance Matters (WB, 2008) and World Development Report (WB, 2008)

Unfortunately, the country that has a large spending from private households tends to perform poorly in the governance. Figure 4 illustrates a negative correlation ( $r = -0.37$ ) of the private share of health expenditure with the government effectiveness.

<sup>1</sup> Defined as “the quality of public services, the quality of civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment”.

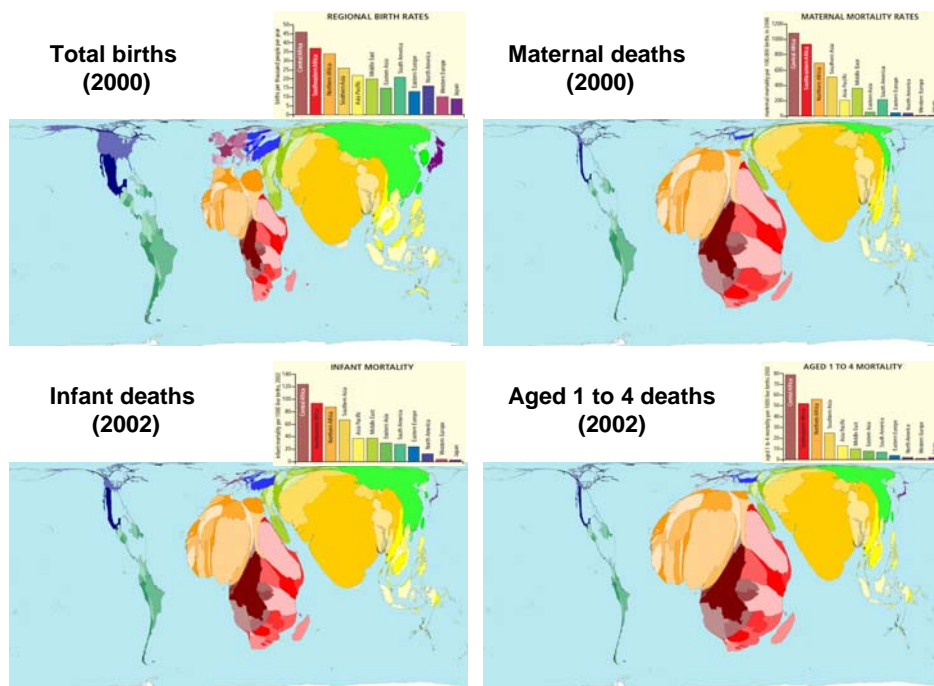


**Figure 4** Private health expenditure share and government effectiveness, 2005

Source: Author's analysis using data from World Health Statistics (WHO, 2008) and Governance Matters (WB, 2008)

### 1.3 Maternal and child health

Achieving the maternal and child health Millennium Development Goals (MDG 4 and 5) is still a grand challenge to several low-income countries (LIC). Again, countries in SSA and SA are unique in that they share a major burden of population health in terms of total number of births and mother and child deaths which are very disproportional to the country's size in terms of land area (Figure 5) and population (Figures 6A – 6D).

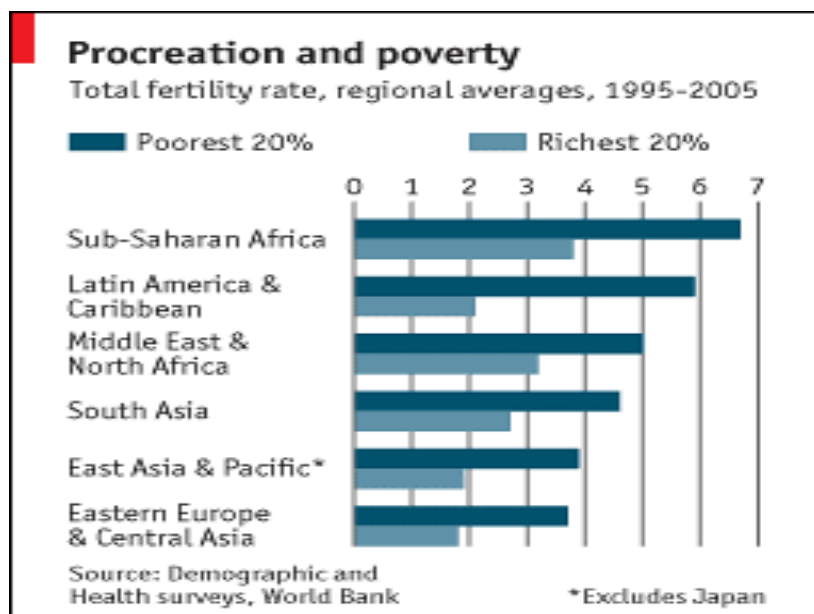


Source: [www.worldmapper.org](http://www.worldmapper.org) (2006)

**Figure 5** Catograms of countries according to world distribution in total births, mother deaths, infant deaths, and age 1-4 deaths, respectively

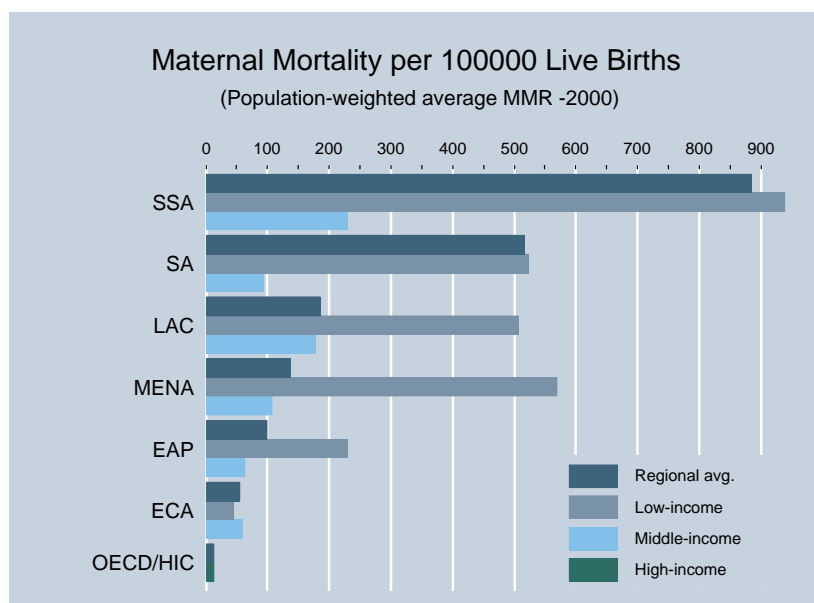
Source: [www.worldmapper.org](http://www.worldmapper.org) (2006)

Even worse, these high procreation and mortality rates tend to confine to subgroups of population and countries that have a lower economic status, especially those located in SSA and SA regions (Figures 6A – 6D).

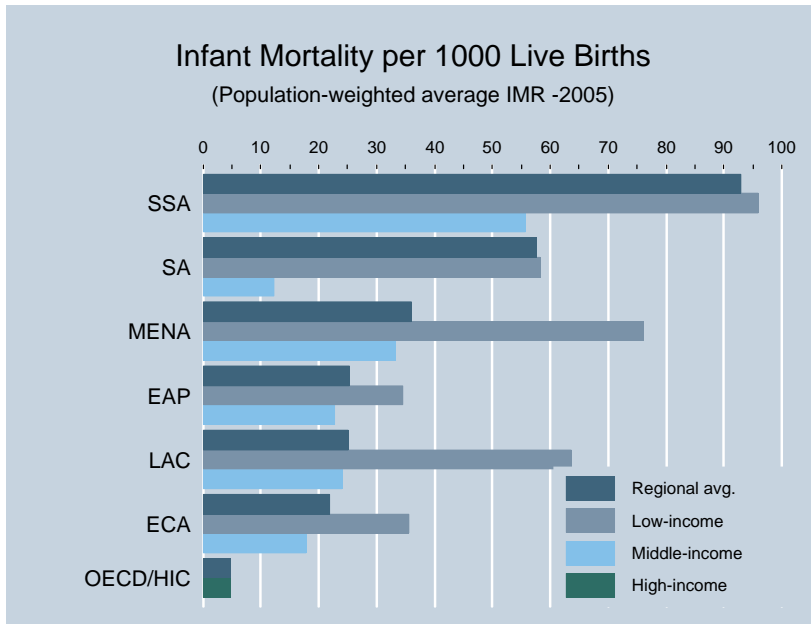


**Figure 6A** Total fertility rate for bottom and top wealth quintiles by region, various years

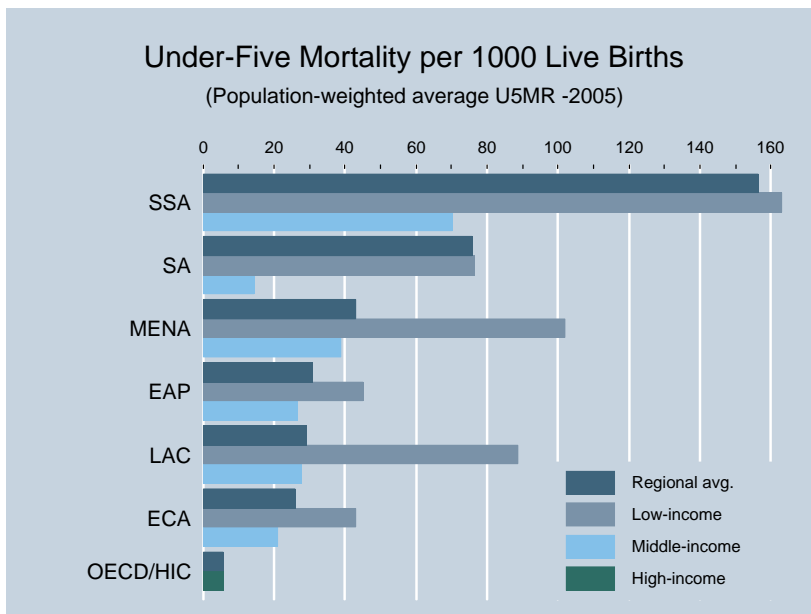
Source: The Economist (10 July 2008)



**Figure 6B** Maternal mortality ratio for LIC, MIC, and HIC by region, 2000



**Figure 6C** Infant mortality rate for LIC, MIC, and HIC by region, 2005



**Figure 6D** Under-five mortality rate for LIC, MIC, and HIC by region, 2005

Source: Author's analysis from World Health Statistics (WHO, 2008)

#### **1.4 Private health care providers**

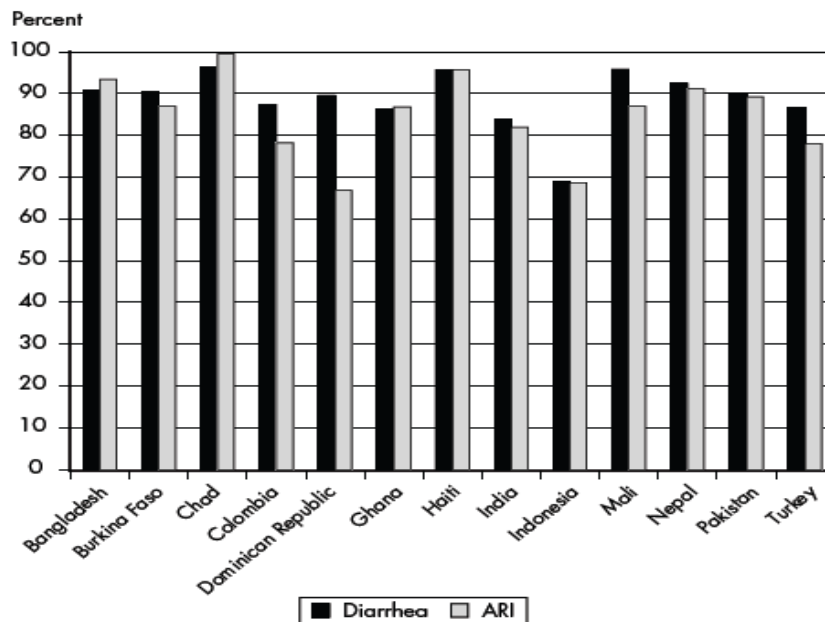
In SSA, the majority of malaria episodes were initially treated by the private providers, mainly through the purchase of drugs from shops and peddlers (McCombie, 1996; Hanson et al., 2000). For children in SA who had diarrhea, more than 50% and 90% of those in Nepal (Kafle et al., 1992) and in India (Rohde, 1997), respectively sought care outside public sector. A recent survey in one large Indian state, Madhya Pradesh revealed 76% of all physicians and 72% of qualified paramedics worked in private sector (De Costa et al., 2007). In South East Asia (SEA) country like Vietnam, the private sector provided approximately 60% of all outpatient visits (Ha et al., 2002). Similarly for countries in other world regions, a large proportion of children affected by the common acute illnesses (diarrhea and acute respiratory tract infection) in Egypt (Waters et al., 2002), Bolivia, Guatemala and Paraguay (Berman et al., 1996), received care from various types of private providers.

Even in the poor population within a country, the private health sector plays a dominant role of care giving. Demographic and Health Surveys (DHS, 1990-2006) have long been a very valuable source of data that can be used to understand health seeking behavior in developing countries by teasing out the sources of health care use by households. A previous analysis of DHS data from 26 SSA countries showed that almost half of the parents of a child who had diarrhea or acute respiratory tract infection (ARI) in the past two weeks did not seek care outside their homes, whereas 28% and 22% brought the child to a public facility and a private provider, respectively (Marek et al., 2005). For the sick children in the 20% poorest households who sought care outside their homes, 51% and 45% went to the public and private sectors, respectively. These countries varied in the major health utilization share of private sector by provider types and economic groups, for example private pharmacies (including drug peddlers and street vendors) for the poorest quintile in Ghana, traditional healers for the poorest quintile in Burkina Faso, Guinea, and Mozambique; and private doctors and facilities for the richest quintile. Some countries that had the different year data also showed an increasing trend in the use



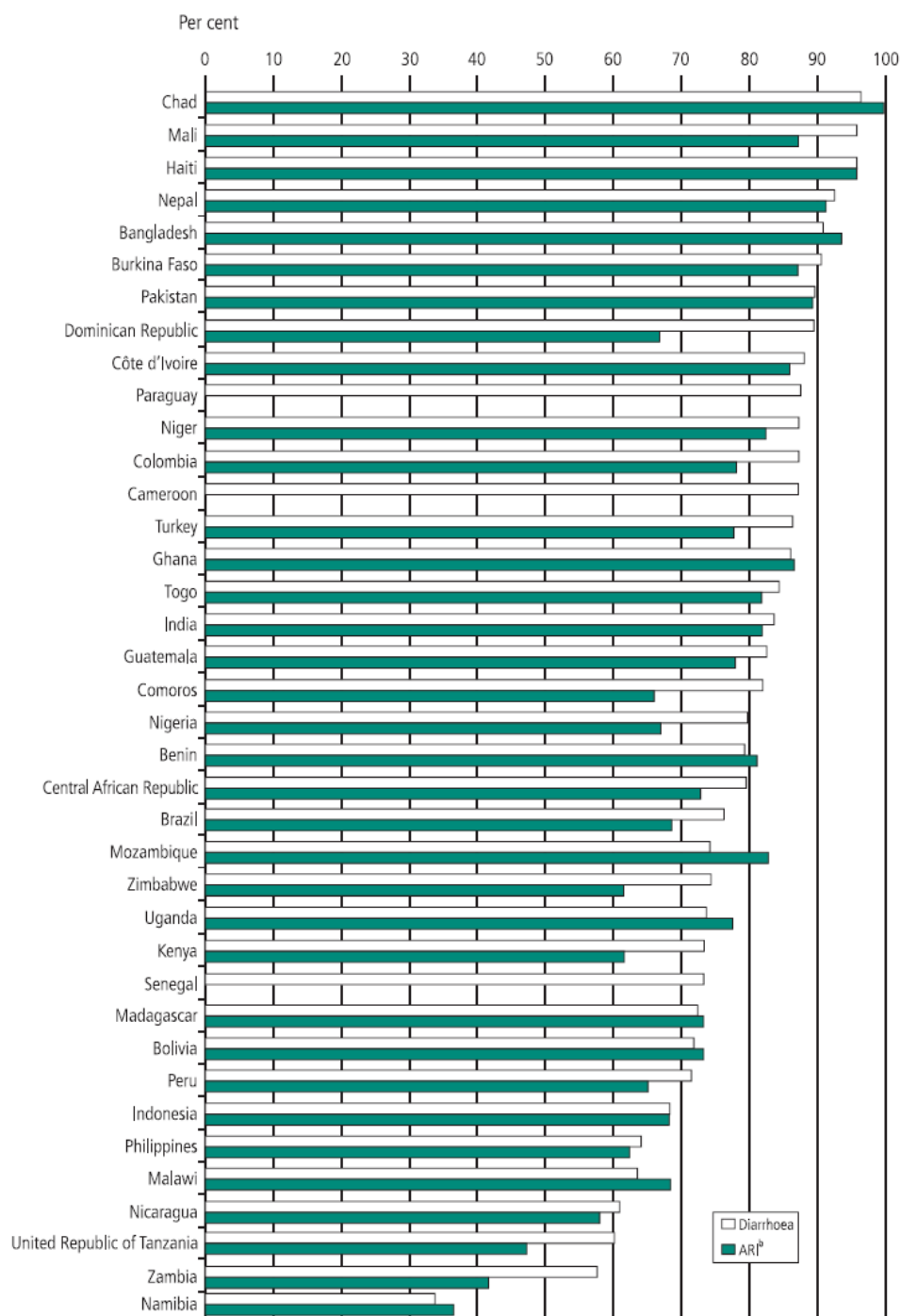
of private providers, such as Malawi (from 27% in 1992 to 39% in 2000 for the poorest quintile and from 31% to 49% over the same period for the richest quintile). In other countries such as Cameroon (1991 vs. 1998), Ghana (1993 vs. 1998), and Benin (1996 vs. 2001); the poor increasingly sought care outside their homes, mostly from public providers whereas the richest favored private providers.

Another DHS analysis in 38 developing countries in SSA and other regions revealed that 34-96% and 37-99% of the poorest quintile children seeking care for diarrhea and ARI, respectively received treatment in the non-state sector (Figures 7A and 7B) (Gwatkin et al., 2000; Bustreo et al., 2003).



**Figure 7A** Percentage of children in the first bottom wealth quintile treated outside public sector for diarrhea and acute respiratory infection, 13 countries

Source: Gwatkin et al. (2000)



**Figure 7B** Percentage of children in the first bottom wealth quintile treated outside public sector for diarrhea and acute respiratory infection, 38 countries

Source: Bustreo et al. (2003)

The DHS data also help shed light on private sector involvement in family planning. In Latin America, the NGOs and commercial entities are very strong in providing the family planning services. Among the top-five countries that had the highest percentage of married women and women in consensual union of reproductive age (15-49 years) who obtained modern (long- and short-acting) contraceptive methods from the private health sector included Indonesia (70%), Colombia (67%), Paraguay (64%), Ecuador (63%), and Guatemala (62%) (PSP-One, 2005). The bottom-five countries were Armenia (3%), Mozambique (6%), Kazakhstan (11%); Vietnam (14%), and Namibia (14%).

## 2. Objective

This present analysis aims to portray health seeking profiles with respect to distinctive private and public health sectors of women and children in 25 LIC, based on the internet-available databases of DHS, a face-to-face interview survey of nationally representative households. Countries were determined for the magnitude of private-public mix for four types of health care utilization: (1) use of modern contraceptive methods; (2) delivery; (3) treatment of childhood diarrhea; and (4) treatment of child fever/cough. Countries with noticeable temporal changes in the private-public health shares over two waves of the Surveys (approximately 5-6 years apart) and wide geographic and economic gaps in the private-public mix were identified with respect to magnitude and direction.

Variations in the private-public mix across countries were determined if there were any linkages with differences in the country socio-economic contexts, including national income, out-of-pocket (OOP) health spending, and governance performance. Lastly, such a private-public mix was examined ecologically for any associations with the population health outcomes in terms of infant and under-five mortalities.

### 3. Methodology

#### 3.1 Demographic and Health Survey

As of 2008, 47 countries have the multi-year DHS datasets. Altogether 29 countries have the completely available datasets for all years, 15 countries have the preliminary data for the most recent years (i.e., 2004-06), and 3 countries have a restricted access to the DHS datasets. For the 25 countries experiencing DHS once, 18 countries have been conducted the DHS during the 1980s-90s and 7 countries have the DHS in the 2000s. Names of the countries with available years of the standard DHS are presented in Table 1 and Figure 8.

**Table 2** Countries<sup>a</sup> with standard DHS and years of surveys by region

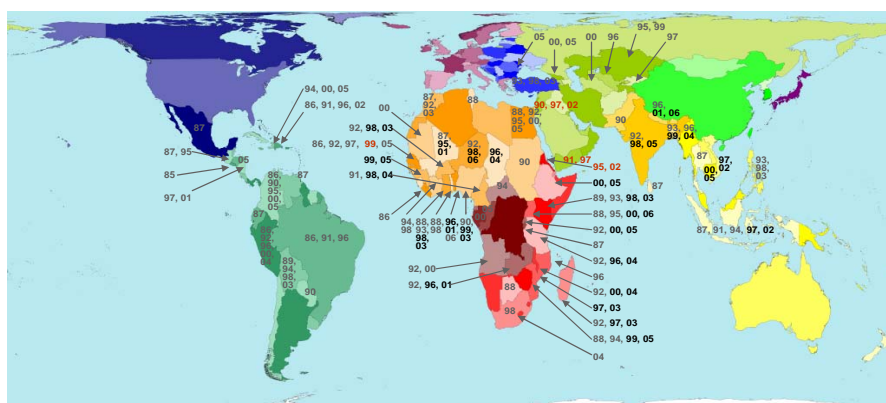
Region (number of countries, N)	Multiple years			Single year (N = 25)
	Complete data (N = 28)	Preliminary data (for 2004-06) (N = 15)	Restricted data <sup>b</sup> (N = 3)	
Sub-Saharan Africa (SSA) (N = 35)	Burkina Faso ( <i>BF</i> -92/93, 98/99, 03), Cameroon ( <i>CM</i> -91, 98, 04), Cote d'Ivoire (94, 98/99), Ghana ( <i>GH</i> -88, 93, 98, 03), Guinea ( <i>GN</i> -99, 05), Kenya ( <i>KE</i> -89, 93, 98, 03), Malawi ( <i>MW</i> -92, 00, 04), Mali ( <i>ML</i> -87, 95/96, 01), Mozambique ( <i>MZ</i> -97, 03), Namibia (92, 00), Nigeria ( <i>NG</i> -90, 99, 03), Togo (88, 98), Zambia ( <i>ZM</i> -92, 96, 01/02) (12 LIC + 1 MIC)	Benin ( <i>BJ</i> -96, 01, 06), Chad ( <i>TD</i> -96/97, 04), Ethiopia ( <i>ET</i> -00, 05), Madagascar ( <i>MD</i> -92, 97, 03/04), Níger ( <i>NI</i> -92, 98, 06), Rwanda ( <i>RW</i> -92, 00, 05), Senegal (86, 92/93, 97, 99, 05*), Tanzania ( <i>TZ</i> -92, 96, 04), Uganda ( <i>UG</i> -88, 95, 00/01, 06), Zimbabwe ( <i>ZW</i> -88, 94, 99, 05/06) (10 LIC)	Eritrea (95, 02) (1 LIC)	Botswana (88), Burundi (87), CAR (94/95), Comoros (96), Congo (05), Gabon (00), Lesotho (04), Liberia (86), Mauritania (00/01), South Africa (98), Sudan (90) (8 LIC + 3 MIC)
South Asia (SA)	Bangladesh ( <i>BD</i> -93/94, 96/97, 99/00, 04), Nepal	India ( <i>IA</i> -92/93, 98/99, 05/06)		Pakistan (90/91), Sri Lanka (87)

Region (number of countries, N)	Multiple years			Single year (N = 25)
	Complete data (N = 28)	Preliminary data (for 2004-06) (N = 15)	Restricted data <sup>b</sup> (N = 3)	
(N = 5)	(NP -96, 01, 06) (2 LIC)	(1 LIC)		(2 LIC)
East Asia and Pacific –South East Asia (SEA) (N = 5)	Indonesia ( <i>ID</i> -87, 91, 94, 97, 02/03), Philippines (93, 98, 03), Vietnam ( <i>VN</i> -97, 02) (2 LIC + 1 MIC)	Cambodia ( <i>KH</i> -00, 05) (1 LIC)		Thailand (87) (1 MIC)
Middle East and North Africa (MENA) (N = 5)	Egypt (88, 92, 95, 00, 05), Morocco (87, 92, 03-04) (2 MIC)		Jordan (90, 97, 02), Yemen (91/92, 97) (1 LIC + 1 MIC)	Tunisia (88) (1 MIC)
Eastern Europe and Central Asia (ECA) (N = 7)	Armenia (00, 05), Kazakhstan (95, 99) (1 LIC + 1 MIC)	Turkey (93, 98, 03) (1 MIC)		Kyrgyz Republic (97), Moldova (05), Turkmenistan (00), Uzbekistan (96) (3 LIC + 1 MIC)
Latin America and Caribbean (LAC) (N = 14)	Bolivia (89, 94, 98, 03), Brazil (86, 91, 96), Colombia (86, 90, 95, 00, 05), Dominican Republic (86, 91, 96, 02), Guatemala (87, 95), Nicaragua (97/98, 01) (1 LIC + 5 MIC)	Haiti (94/95, 00, 05), Peru (86, 92, 96, 00, 04-08) (1 LIC + 1 MIC)		Ecuador (87), El Salvador (85) , Honduras (05), Mexico (87), Paraguay (90), Trinidad and Tobago (87) (6 MIC)

<sup>a</sup> Names of the countries selected for the analysis are shown with abbreviation (in *italic*)

<sup>b</sup> Online data are not readily available

Source: <http://www.measuredhs.com>

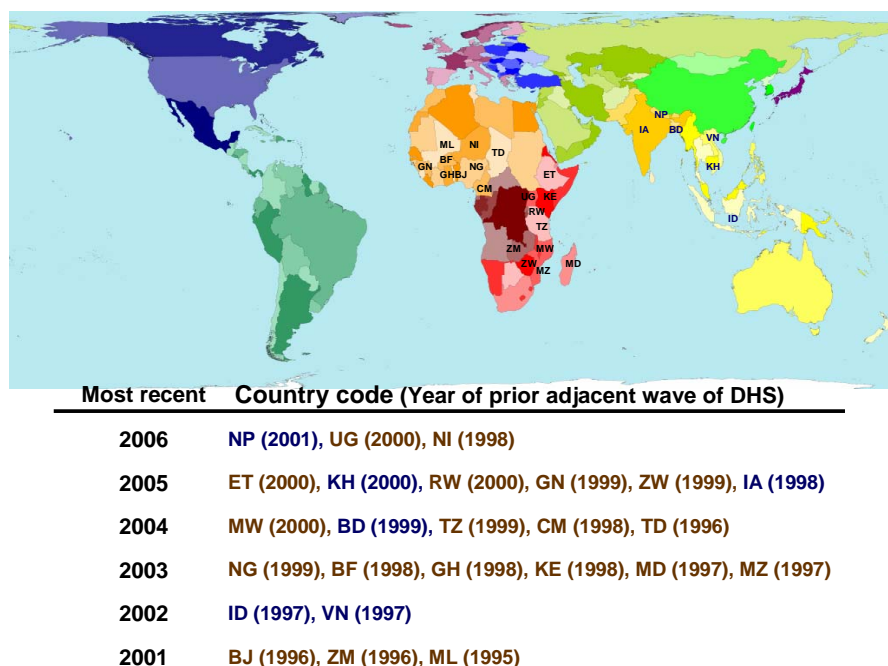


	Multi-years	One year
<b>SSA</b>	<b>23 LIC + 1 MIC</b>	<b>8 LIC + 3 MIC</b>
<b>SA/SEA</b>	<b>6 LIC + 1 MIC</b>	<b>2 LIC + 1 MIC</b>
<b>MENA</b>	1 LIC + 3 MIC	1 MIC
<b>ECA</b>	1 LIC + 2 MIC	3 LIC + 1 MIC
<b>LAC</b>	2 LIC + 6 MIC	6 MIC

**Figure 8** Number of DHS countries (LIC and MIC) per region by survey frequency

The focus in this report is on LIC that have multiple waves of DHS, of which 23 were located in SSA and six in SA/SEA regions. Figure 9 summarizes the 25 countries (abbreviated codes) in SSA and SA/SEA and the years (two waves: most recent and a prior adjacent) of DHS that were included in this analysis.

In these 25 selected LIC, the most recent waves of DHS were conducted during years 2001-2006 and the prior adjacent waves (approximately 5-6 years apart) were in 1995-2000.



**Figure 9** Twenty-five countries with 50 years of DHS datasets used in the analysis

### 3.2 Health care tracers

This present analysis focuses on four types of health care that were used as a tracer. They include choices for family planning and delivery in women as well as treatments for diarrhea and fever/cough in children aged less than five years. Questioning statements specific to each health care tracer to be used for the analysis of private-public mix is presented in Table 2.

The reference point in time for respondent's recall varies by the tracers. While the family planning focuses on the current method of contraception, the delivery allowed for unlimited period of recall in the past. Treatments for child illnesses were given the referent recall period of two weeks prior to the interview.

**Table 2** Questioning statements for four health care tracers in DHS

Tracer	Questioning statement
Family planning	<i>1. Are you currently doing something or using any method to delay or avoid getting pregnant?</i> <i>2. Which method are you using?</i> <i>3. Where did you obtain (CURRENT METHOD) the last time?</i>
Delivery care	<i>1. Who assisted with the delivery of (NAME)? Anyone else?</i> <i>2. Where did you (go to) give birth to (NAME)?</i>
Child diarrhea treatment	<i>1. Has (NAME) had diarrhea in the last two weeks?</i> <i>2. Was anything given to treat the diarrhea?</i> <i>3. Did you seek advice or treatment for the diarrhea?</i> <i>4. Where did you seek advice or treatment? Anywhere else?</i>
Child fever/cough treatment	<i>1. (2.) Has (NAME) been ill with a fever (cough) at any time in the last two weeks?</i> <i>3. Did you seek advice or treatment for (NAME) for the illness?</i> <i>4. Where did you seek advice or treatment? Anywhere else?</i>

### 3.3 Typology of health sectors

Health providers or facilities sought by women in the nationally representative households for four care tracers: modern contraception, delivery, and child diarrhea and fever/cough treatments were grouped into three major sources: informal, formal private, and public sectors.

The public sector covers health facilities and providers that were affiliated with the government (Table 3). Apart from the well-defined commercial, for-profit business entities of hospitals, clinics, or pharmacies<sup>2</sup>, the formal private sector in this present analysis also includes health facilities or providers that belonged to non-government organizations (NGO) or missions. The informal sector is very diverse. Most of the time, the informal sector includes unqualified providers like traditional healers, drug peddler/vendors, and shops. In this analysis, this sector also covers care provided by

<sup>2</sup> In LIC, households may not be able to distinguish between the pharmacies serviced by licensed or registered pharmacists and those without qualified pharmacists. The former should be classified as formal private and the latter as informal private sectors. In some LIC with pluralistic health systems, this grey zone is applicable to other types of health practitioners, for example doctors which could mean either the westernized main stream doctors or the alternative traditional healers.



friends and relatives, and even the delivery at the respondent's own home. Unspecified providers and the rest (i.e., others) were lumped into the informal sector category.

**Table 3** Classification of health care sectors

Tracer	Informal sector	Formal private sector	Public sector
Family planning	- Shop	- Private hospital/clinic	- Government
	- Church	- Doctor	hospital/clinic
	- Friend/relative	- Pharmacy	- Government field worker
	- Other	- NGO clinic, depot holder, fieldworker	- Family welfare center
Delivery care	- Traditional birth attendant's home	- Private hospital/clinic	- Government hospital
	- Midwife's home	- Private maternity home	- Government health center/health post
	- Relative's home	- NGO hospital/clinic	- Government maternity home
	- Respondent's home	- Mission hospital/clinic	- Community health center
	- Other	- Other private facility	- Primary health center
			- Government dispensary
Child diarrhea and fever/cough treatment	- Shop	- Private hospital/clinic	- Government hospital
	- Traditional healer	- Private pharmacy	- Government health center/health post
	- Drug peddler/vendor	- Private doctor	- Government mobile clinic
	- Other	- Private mobile clinic	- Community health worker
		- Private health worker	- Other public facility
		- Other private facility	

Only for the family planning sources that the DHS questioning was restricted to the single type of providers (i.e., the current method of contraception). For delivery and treatments for diarrhea and fever/cough, the question allowed for the *multiple* choices of care per care seeking episode. In this present analysis, a woman (with up to six possible deliveries<sup>3</sup>) was taken as the unit of analysis for the delivery care and a child (with up to six treatment choices) as for the illness treatments.

<sup>3</sup> Except Guinea (2005) and Rwanda (2005) which were allowed for up to 4 and 5 births per woman, respectively.

Table 4 summarizes proportion of the analytical units (women or children) who have received care from more than one type of providers or facilities per health episode.

**Table 4** Proportion of multiple sector types of providers per health care episode, most recent

Country (Year of DHS)	Delivery care	Diarrhea treatment	Fever/cough treatment
Benin (2001)	7.6%	14.8%	17.6%
Mali (2001)	8.4%	21.3%	66.1%
Zambia (2001)	9.2%	16.7%	17.5%
Indonesia (2002)	2.0%	44.1%	28.4%
Vietnam (2002)	1.2%	39.2%	43.2%
Burkina Faso (2003)	6.1%	6.9%	4.2%
Ghana (2003)	7.7%	8.4%	12.0%
Kenya (2003)	11.4%	28.5%	28.7%
Madagascar (2003)	8.1%	29.2%	30.2%
Mozambique (2003)	7.9%	2.7%	1.9%
Nigeria (2003)	6.6%	12.3%	14.6%
Bangladesh (2004)	1.8%	25.1%	22.2%
Cameroon (2004)	8.8%	13.8%	18.7%
Chad (2004)	4.1%	3.6%	4.2%
Malawi (2004)	13.4%	6.5%	11.4%
Tanzania (2004)	11.9%	14.8%	11.6%
Cambodia (2005)	3.6%	31.8%	29.8%
Ethiopia (2005)	1.6%	15.8%	21.1%
Guinea (2005)	5.2%	6.7%	9.6%
India (2005)	6.8%	74.5%	77.3%
Rwanda (2005)	10.1%	8.9%	7.7%
Zimbabwe (2005)	7.2%	18.2%	10.2%
Nepal (2006)	4.1%	17.0%	23.3%
Niger (2006)	4.3%	6.0%	32.2%
Uganda (2006)	15.9%	55.7%	58.4%

Almost every country had a majority of the survey respondents sought maternal and child health care from a single health sector, whether informal, formal private, or public

providers. This is very true for the choice of delivery care; whereby at least 90% of mothers gave birth to their babies in the same health sector. Proportion of the delivery care with multiple sectors is smaller in SA/SEA than in SSA. Only in Uganda (2006), Malawi (2004), Tanzania (2004), and Kenya (2003) that 15.9%, 13.4%, 11.9%, and 11.4% of the mothers, respectively gave births in more than one sector.

The multiple sector choices of child treatments are more prevalent than that of the delivery. Per illness episode, India (2005) and Uganda (2006) are the countries where more than half of the women sought care from more than a single health sector for treating their children. Nearly all multiple care types in these two countries came from a combination between public and formal private sectors. The dominance by public-formal private sectors combined is also the case for other countries, including Indonesia (2002), Vietnam (2002), Cambodia (2005), Madagascar (2003), Kenya (2003), and Niger (2006) where the multiple sector type accounted for more than one-quarter of total child treatments. Mali (2001), however, is only the country where the combination of public and informal sectors dominated the multiple sector choices.

To make the classification of health sectors per unit of analysis mutually exclusive, this analysis applied the following algorithm in assigning types of health sectors for each respondent. A woman, whose choices of care involved at least one visit to health care facilities or providers in public sector would be defined as 'public'. The woman who has never visited to the public sector but at least one of those in formal private sector would be classified as 'formal private'. The informal sector would be restricted to the women or children whose care choices involved only the informal care setting. In other words, this is the only single resource the survey respondents had to rely on when seeking care.

By this hierarchical typology, the analysis result will bias in favor of the health share by public sector and against the health shares by informal sector and formal private sector, respectively. For example, a woman who was classified her health care choice as 'public sector' is the person who has (*at least once*) ever sought care from public providers (and *may* did so from formal and informal private providers) during the reference period.

Meanwhile, a woman classified her choice as ‘formal private sector’ is the one who have *never* received care from the public providers during the reference period, but *at least once* have sought care from the formal private providers (and *may* did so from the informal care providers). Lastly, the informal private sector represents the one who have sought care *only* from the informal care providers during the reference period. As a consequence, the informal sector figure tends to be a lower bound of (or underestimates) the informal care choice as a fraction of total health care; whereas the public sector figure represents an upper bound of an access to the public providers.

## 4. Result

An analysis of the most recent (2001-2006) Demographic and Health Survey (DHS) plus an adjacent prior wave (1995-2000) reveals a wide variation in the role of private sector on health care for women in reproductive ages and children under five in 19 LIC in sub-Saharan Africa (SSA) and six LIC in South and Southeast Asia (SA/SEA).

### 4.1 Woman health care: family planning and delivery

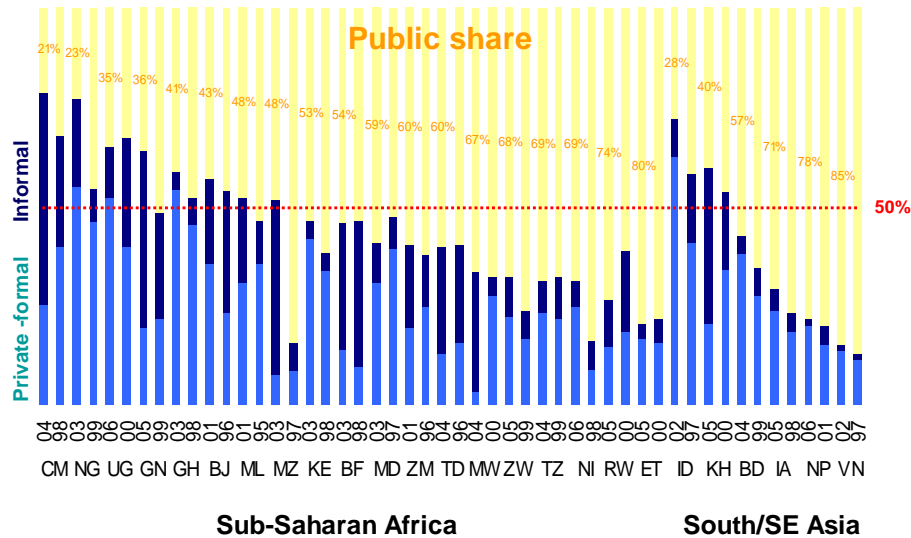
#### 4.1.1 Private-public share of woman health

Eight of 19 LIC in SSA and two of six in SA/SEA had over 50% share of family planning services (defined by use of modern contraceptives) provided by the private sector, mostly through the formal private providers or facilities (Figure 10A).<sup>4</sup>

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<sup>4</sup> Note that only women who at the time of interview were receiving modern contraception methods are included in the analysis. Hence, this figure does not represent the contraceptive prevalence rate (CPR) of all eligible female population.

**Where did you obtain (CURRENT METHOD) the last time?**

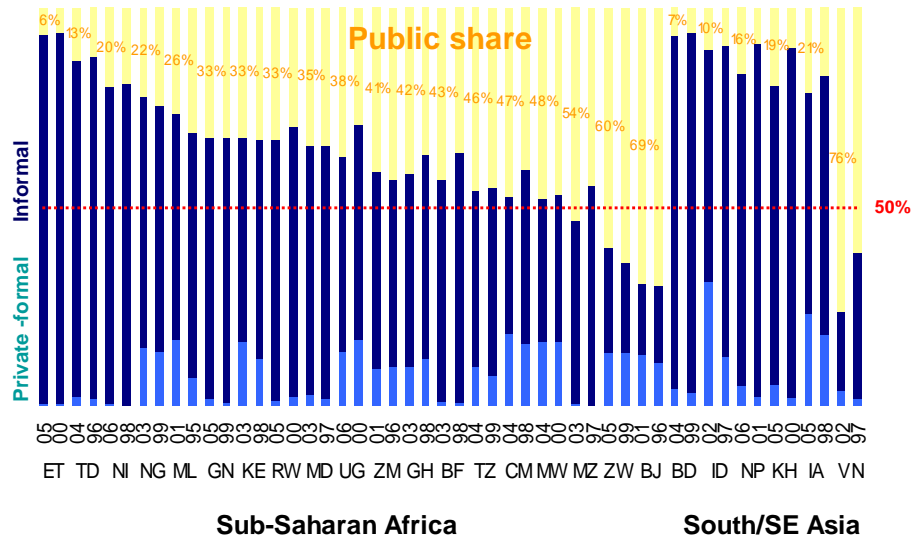


**Figure 10A** Percentage of women receiving modern contraception outside public sector

Several countries have majority of the female population in reproductive ages obtained the modern contraceptives from informal providers, which include shops, churches, friends, and relatives, for example. The largest share (53%) by the informal sector was found in Cameroon in 2004. The public and formal private sectors have the share of approximately 21% and 25%, respectively.

The private sector played an even more dominant role on the care for delivery in these 25 DHS countries. An informal care which covers the delivery at the survey respondents' homes, their friends/relatives' homes, midwives' homes, and traditional birth attendants' homes was revealed as the only resort for almost all of the private deliveries in several countries (Figure 10B).

### Where did you give birth to (NAME)?



**Figure 10B** Percentage of mothers giving birth outside public health facilities

Note: (Middle) dark blue -informal, (bottom) light blue -formal private, (top) yellow -public sectors

In Vietnam (2002), however, public sector dominated these two health cares for female population. The informal sector very prevailed on the family planning in Cameroon (2004) and on the delivery care in Ethiopia (2005) and Bangladesh (2004), whereas Indonesia (2002) had the top share of both services by the formal private sector.

Nearly all of the informal care of delivery occurred in the homes of surveyed mothers. Taking together all health sectors for those choosing a single type of health sector, the delivery only at home accounts for 40-60%; whereas the delivery at the homes of relatives, midwives, or traditional birth attendants accounts for less than 10% in most countries (Tables 5A and 5B). Countries that less than half of mothers gave birth only at their own homes tend to have a large share of total deliveries by public and formal private sectors (Table 5A). Ethiopia (2005), Chad (2004), Niger (2006), and Nepal (2006) are the countries where more than three quarters of the mothers gave birth at their own homes only (Table 5B). Noticeably in these four countries, the formal private and public sectors had a modest share (< 20%) of total deliveries.

**Table 5A** Countries that less than half of mothers had the delivery only in their own homes, most recent

Country (Year of DHS)	Respondent's home only	With other informal care	With formal private or public care
Benin (2001)	18.4%	0.9%	80.7%
Malawi (2004)	18.5%	10.1%	71.4%
Vietnam (2002)	19.8%	0.4%	79.8%
Zimbabwe (2005)	23.5%	5.1%	71.4%
Cameroon (2004)	33.6%	4.3%	62.1%
Ghana (2003)	42.7%	9.6%	47.7%
Tanzania (2004)	43.9%	5.9%	50.2%
Zambia (2001)	43.9%	10.1%	46.0%
Mozambique (2003)	44.9%	5.3%	49.8%
Uganda (2006)	45.6%	12.1%	42.3%
India (2005)	48.2%	11.1%	40.7%
Kenya (2003)	49.4%	8.1%	42.5%

**Table 5B** Countries that more than half of mothers had the delivery only in their own homes, most recent

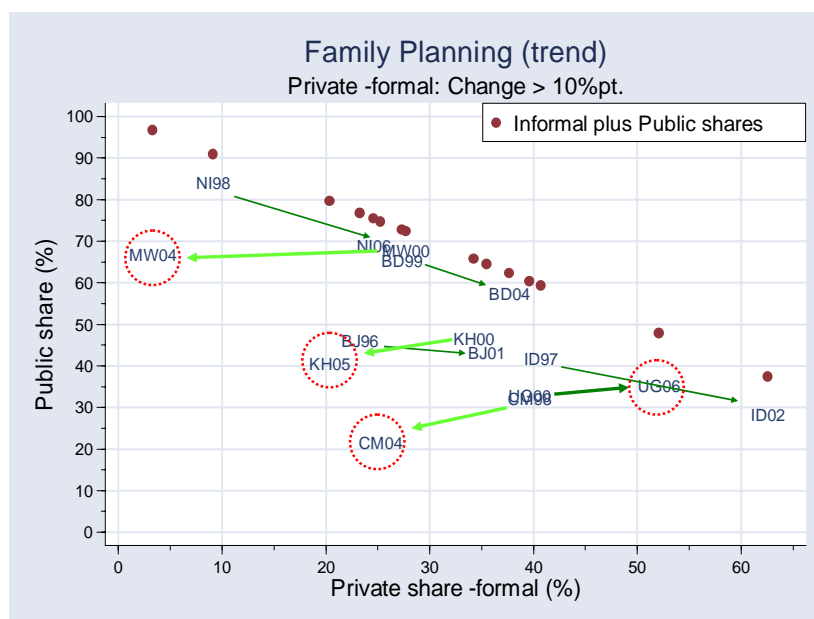
Country (Year of DHS)	Respondent's home only	With other informal care	With formal private or public care
Madagascar (2003)	54.5%	13.4%	32.1%
Mali (2001)	57.8%	4.4%	37.8%
Indonesia (2002)	57.3%	2.2%	40.5%
Burkina Faso (2003)	57.1%	2.9%	40.0%
Guinea (2005)	59.2%	9.9%	30.9%
Nigeria (2003)	60.6%	6.7%	32.7%
Bangladesh (2004)	63.4%	26.6%	10.0%
Rwanda (2005)	66.7%	5.9%	27.4%
Cambodia (2005)	73.9%	4.4%	21.7%
Nepal (2006)	78.4%	3.4%	18.2%
Niger (2006)	79.9%	3.3%	16.8%
Chad (2004)	84.1%	3.8%	12.1%
Ethiopia (2005)	87.9%	6.5%	5.6%

#### 4.1.2 Trends in private-public mix in woman health

Comparison of the private-public mix between two DHS waves (approximately 5-6 years apart) shed light on an expanding (or shrinking) role on woman health in some countries.

Figures 11A and 11B depict countries that have experienced a temporal change of more than 10 percentage points between the two waves of DHS in the formal and informal private share of family planning services, respectively.<sup>5</sup>

Between 1997 and 2002, Indonesia has approximately 22-percentage point increase in the family planning shared by the formal private source, while the public and the informal shares reduced by 14 and 8 percentage points, respectively (Figure 11A). In contrast, Cameroon, Malawi, and Cambodia are the three countries that have the formal private share declined by more than 10 percentage points between 1998 and 2004, 2000 and 2004, and 2000 and 2005, respectively.

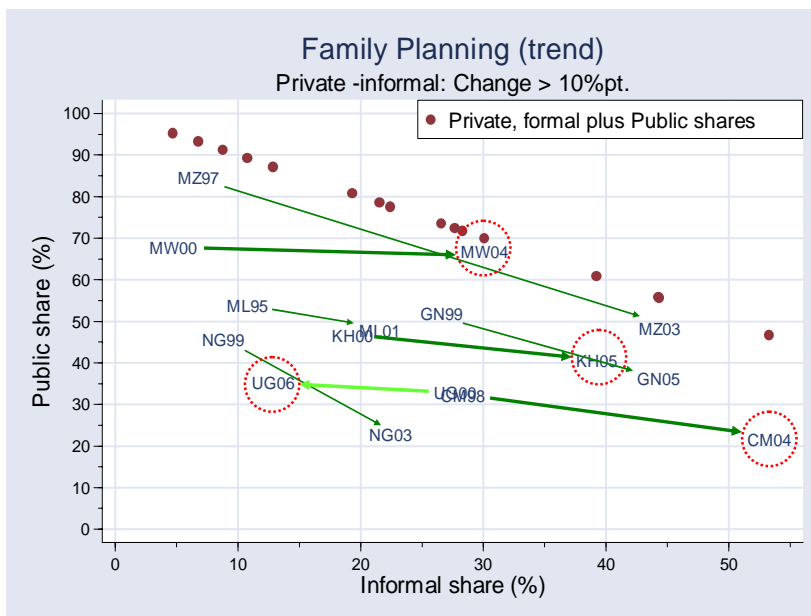


**Figure 11A** Countries with change in family planning share by formal private sector > 10 percentage points

<sup>5</sup> This represents change in the size of a piece of the pie, not the size of the whole pie since female population who were not receiving family planning service were not taken into account.

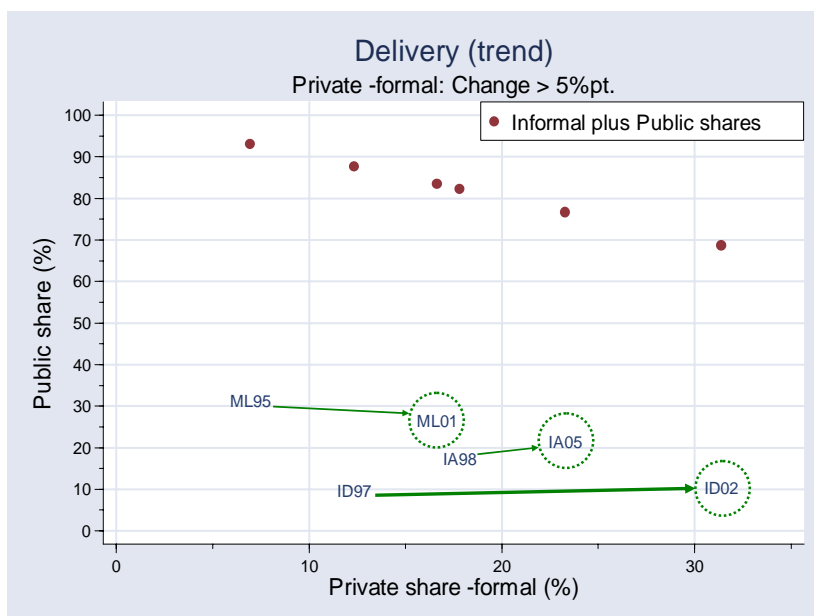


A 24-percentage point reduction in the formal private share in Malawi in 2004 (Figure 11A) comes with an increase in the informal share by an almost equal magnitude (25 percentage points, shown in Figure 11B). Cameroon and Cambodia are other two countries that also have an increasing trend in the informal share of family planning over a similar period (at the expense of the formal private sector and little reduction in the public share). Uganda is the only country experiencing shrinkage in the informal share by more than 10 percentage points between 2000 and 2006 (with an increase in the formal private share shown in Figure 11A).



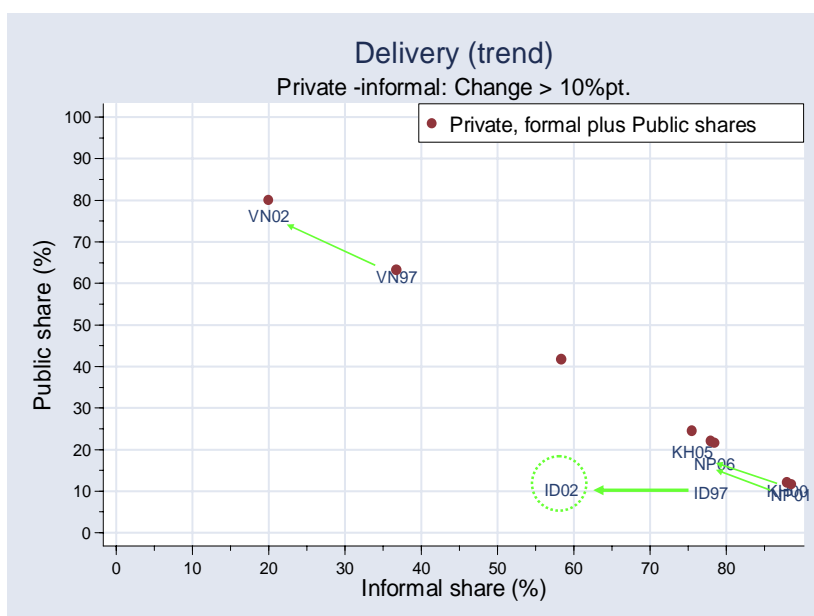
**Figure 11B** Countries with change in family planning share by informal sector > 10 percentage points

Trend in the formal private share of delivery care is not that obvious. Only three countries have the formal private sector expanded the share more than 5 percentage points. These countries are Indonesia (1997 and 2002), Mali (1995 and 2001), and India (1998 and 2005) (Figure 12A). The increasing trend in the formal private share of delivery in Indonesia comes with the expense of a reducing trend in the informal share by a comparable magnitude (shown in Figure 12B). This means that the public share of delivery in Indonesia is relatively stable between the years 1997 and 2002.



**Figure 12A** Countries with change in delivery share by formal private sector > 5 percentage points

Apart from Indonesia, other three countries in Asia (Vietnam, Cambodia, and Nepal) experienced more than 10-percentage point shrinkage in the informal share of delivery.



**Figure 12B** Countries with change in delivery share by informal sector > 10 percentage points

#### 4.1.3 Geographic and economic gaps in private-public mix in woman health

In this analysis, a geographic gap is referred to a difference in the public (or private) share of health care between the people who lived in the urban and those in the rural areas; whereas an economic gap is defined as the difference between the first bottom and the top wealth quintiles<sup>6</sup>.

For the geographic and economic gaps, conventional wisdom tells that the formal private sector typically favor urban or wealthier population over their rural or poorer counterparts.

All figures below depict countries that the noticeable urban-rural gap and rich-poor gap in the public share of health care tracers which are define as the gap wider than 20 percentage points. The arrow represents magnitude and direction of these geographic and economic gaps in the private-public share of service delivery.

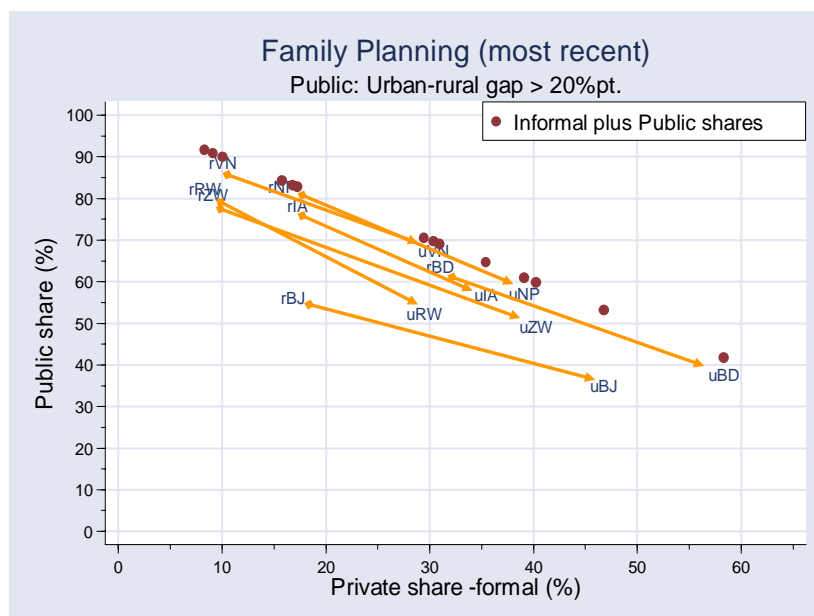
Seven countries (Bangladesh, Benin, India, Nepal, Rwanda, Vietnam, Zimbabwe) have such a noticeable urban-rural gap the in the family planning services, whereby the rural female population relied on public sector in a greater proportion than their urban counterpart at a magnitude of at least 20% (Figure 13A).<sup>7</sup>

In a contrary, formal private sector had a larger share in the urban population than in the rural subgroup. As such, all arrows with the yellow color (each per country) point toward the south-east direction, representing preference of most rural women for the public sector while most urban women would prefer the formal private sector. Length of each arrow represents magnitude of such an urban-rural gap in both public and private share of the family planning services.

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<sup>6</sup> The top 20% households with highest wealth index vs. the bottom 20% households with lowest wealth index per country.

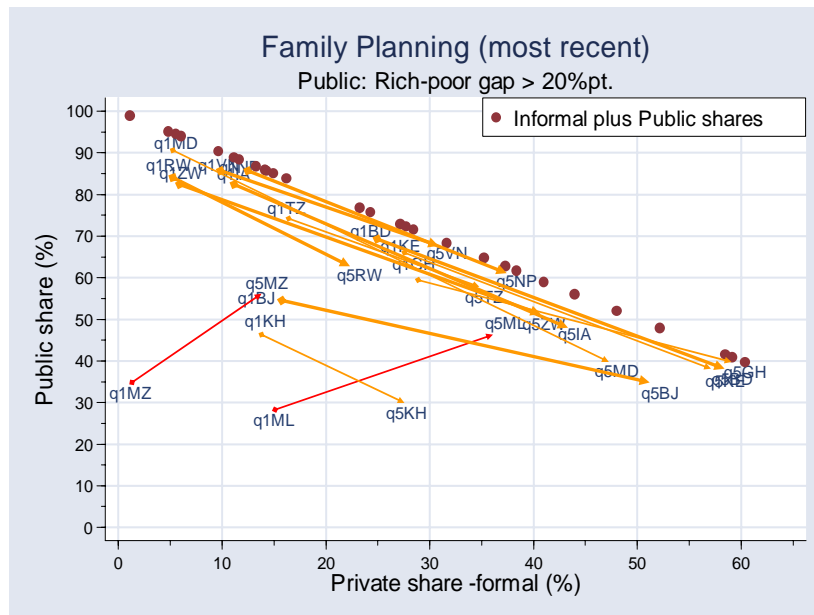
<sup>7</sup> This gap does not account for fractions of the population subgroups who were non-users. Hence, the figures do not represent the use rate per all urban and rural women.



**Figure 13A** Countries with the urban-rural gap in family planning share by public sector > 20 percentage points

Seven more countries were found with a wide (>20 percentage points) economic gap in the public provision of the family planning (Figure 13B) additional to those with a noticeable geographic gap.

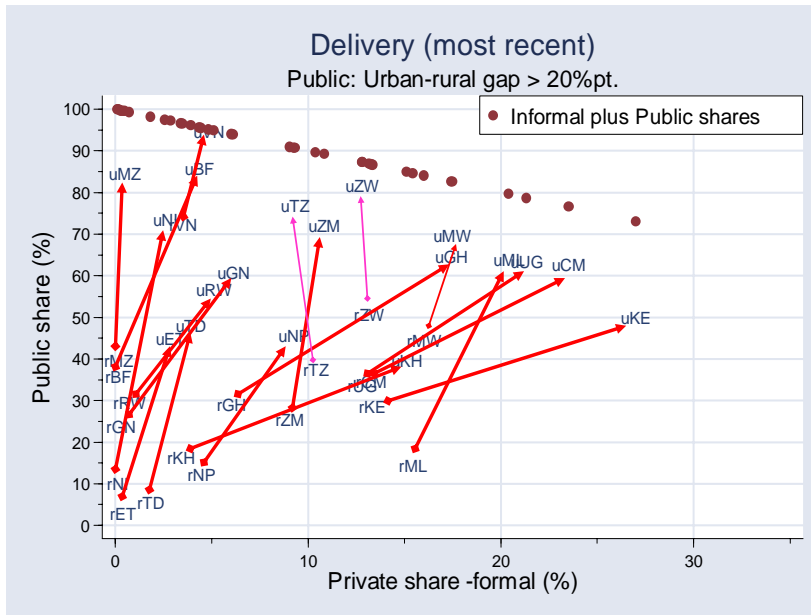
The fact that public and formal private sectors favor population subgroups differently (i.e., public for the rural and private for the urban) is also observed in the rich-poor gap. Women in the 20% poorest households relied heavily on the public sector for family planning services in most countries as contrasted to the 20% richest, except in two countries, Mozambique and Mali, where both public and private sectors favor the rich subgroup (the arrow points to the north-east direction with the red color).



**Figure 13B** Countries with the rich-poor gap in family planning share by public sector > 20 percentage points

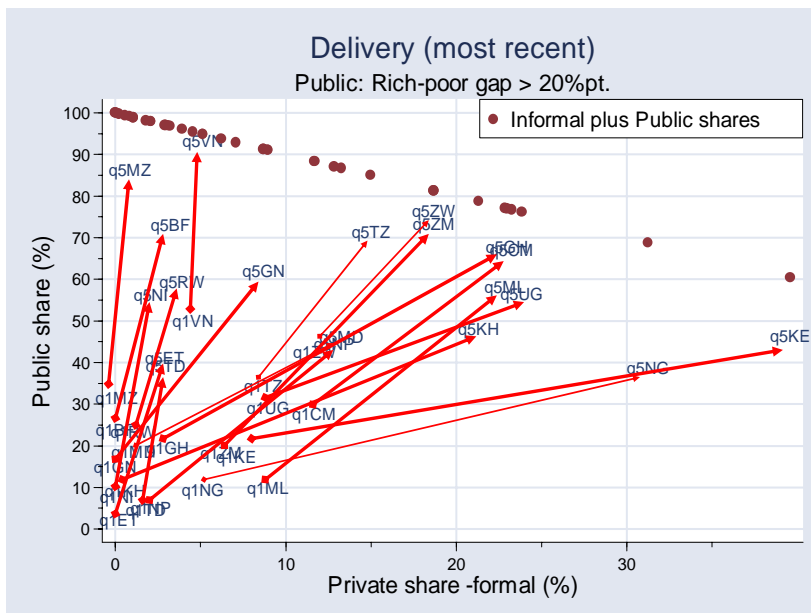
Even more countries have such a wide gap in the public share for delivery care (Figures 14A and 14B) than family planning.

Unfortunately, not only the formal private sector was found in favor of the urban and rich mothers in all countries but also the public sector tended to favor these better off subgroups. All arrows point out to the north-east direction with red color, except for the urban-rural gap in Tanzania and Zimbabwe with the pink arrows (Figure 14A), whereby the formal private share of delivery in mothers living in the rural area is a little higher than that in the urban.



**Figure 14A** Countries with the urban-rural gap in delivery share by public sector > 20 percentage points

The rich-poor gap in the public and formal private share of the delivery is even worse than the urban-rural gap. More countries have their gaps above the 20-percentage point cut point. Besides, all the arrows are red and point toward the north-east direction.



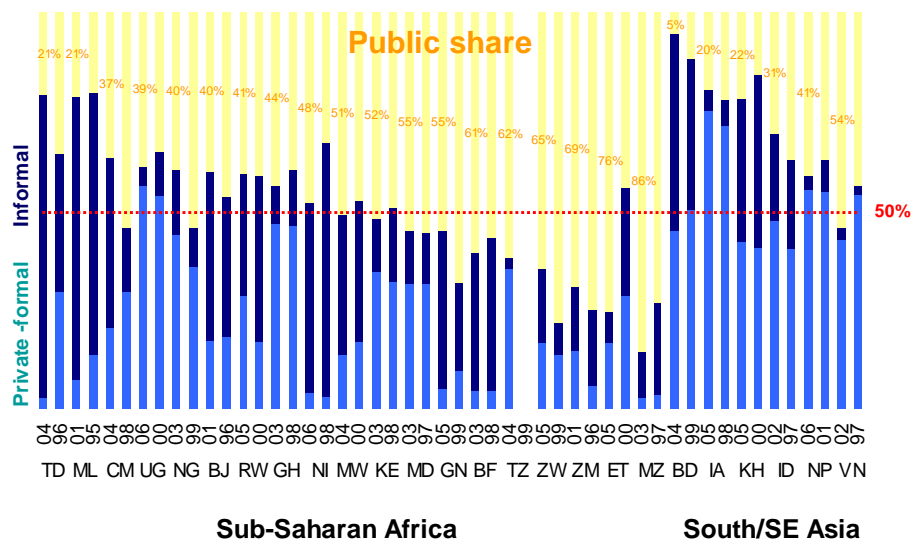
**Figure 14B** Countries with the rich-poor gap in delivery share by public sector > 20 percentage points

## 4.2 Treatments of child illnesses

### 4.2.1 Private-public share in child treatments

The informal sector is most prevalent for the treatments of child illnesses similarly between diarrhea and fever/cough, whereby Chad (in 2004) and Mali (in 2001) were the informal champions (Figures 15A and 15B).

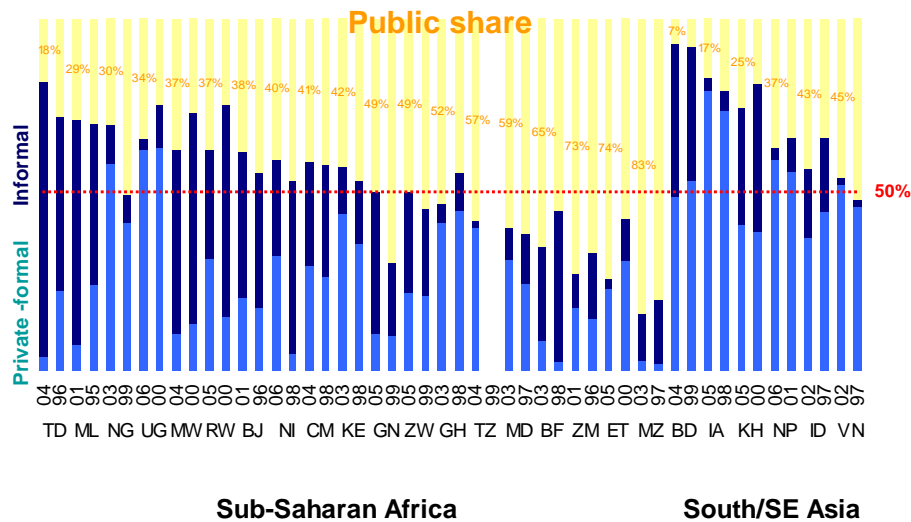
#### *Where did you seek advice or treatment (for diarrhea)?*



**Figure 15A** Percentage of women whose children with diarrhea receiving care outside public sector

Vietnam (2002), Nepal (2006) and Uganda (2006) experienced a minimal role of the informal sector for both diarrhea and fever/cough, whereas in Mozambique (2003) treatments by the public sector dominated. India (2005) was the formal private champion for these two diseases.

### Where did you seek advice or treatment (for fever/cough)?



**Figure 15B** Percentage of women whose children with fever and cough receiving care outside public sector

Note: (Middle) dark blue -informal, (bottom) light blue -formal private, (top) yellow -public sectors

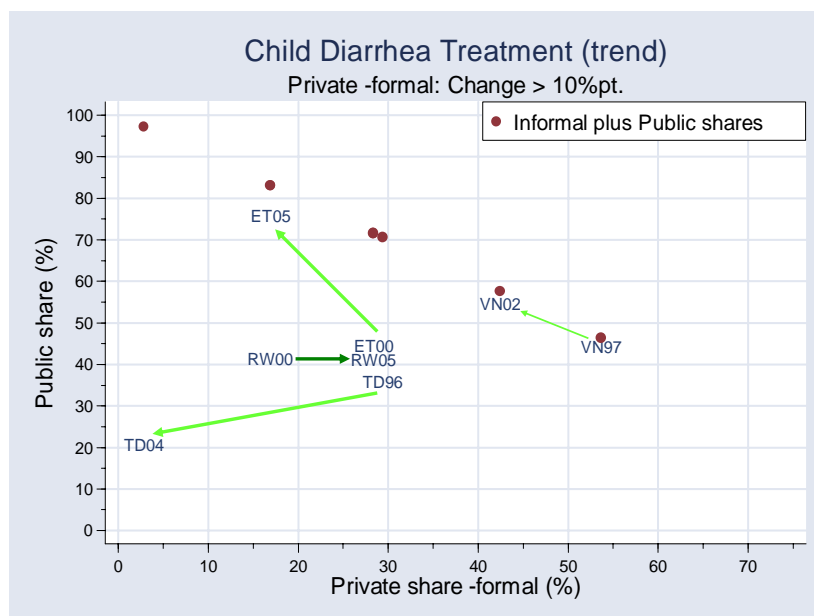
#### 4.2.2 Trends in private-public mix in child treatments

Three countries experienced a reduction in the formal private share of child diarrhea treatment by more than 10 percentage points over an approximately 5-year period between the two waves of DHS. These countries are Chad, Ethiopia, and Vietnam (Figure 16A).

Chad is also a country that has a decreasing share of public sector, whereas Ethiopia and Vietnam have experienced an increasing trend in the public sharing of diarrhea treatment.

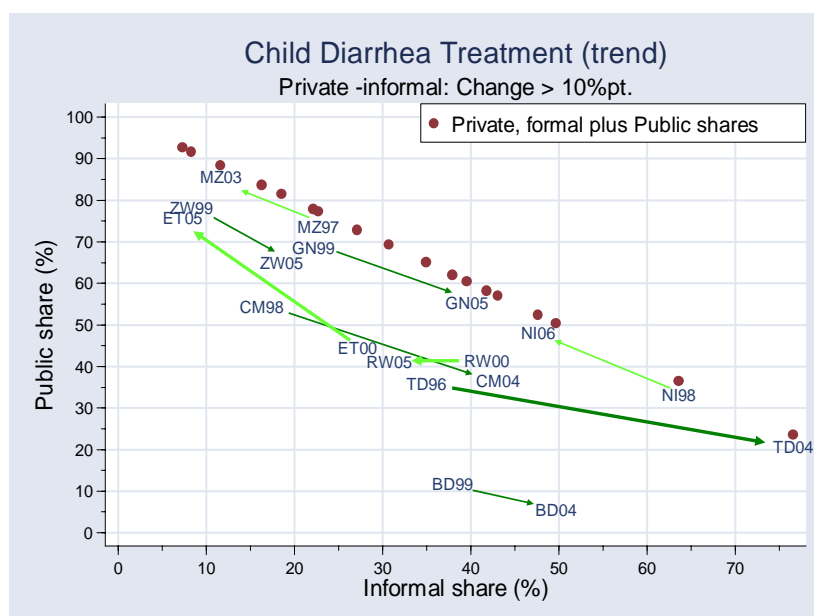
Only Rwanda shows an increasing trend at the magnitude of more than 10 percentage points in the formal private share of the diarrhea treatment (at the expense of the informal sector shown in Figure 16B).





**Figure 16A** Countries with change in share of diarrhea treatment by formal private sector > 10 percentage points

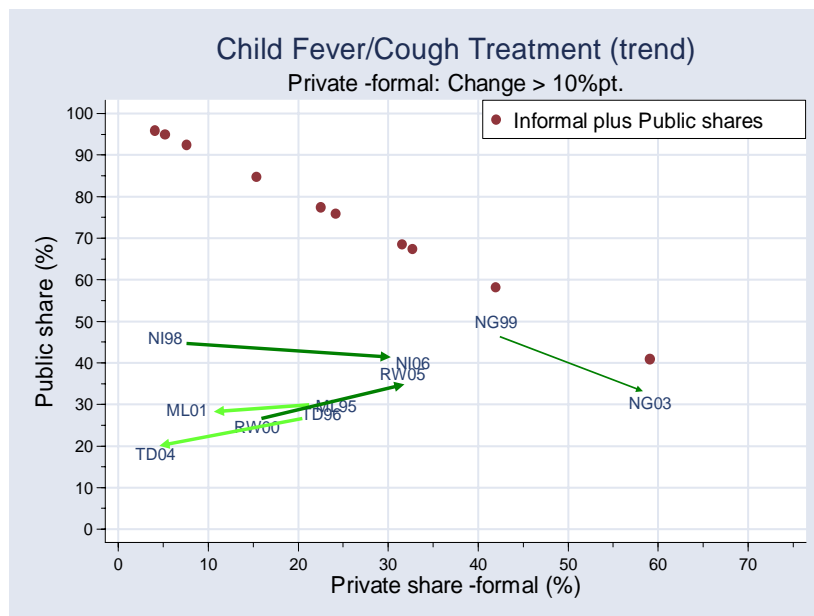
Chad has a large expansion in the informal care for child diarrhea at the expenses of both formal private and public sectors (Figure 16B). Ethiopia has experienced the decline in both formal and informal private shares (with a huge increase in the public share).



**Figure 16B** Countries with change in share of diarrhea treatment by informal sector > 10 percentage points

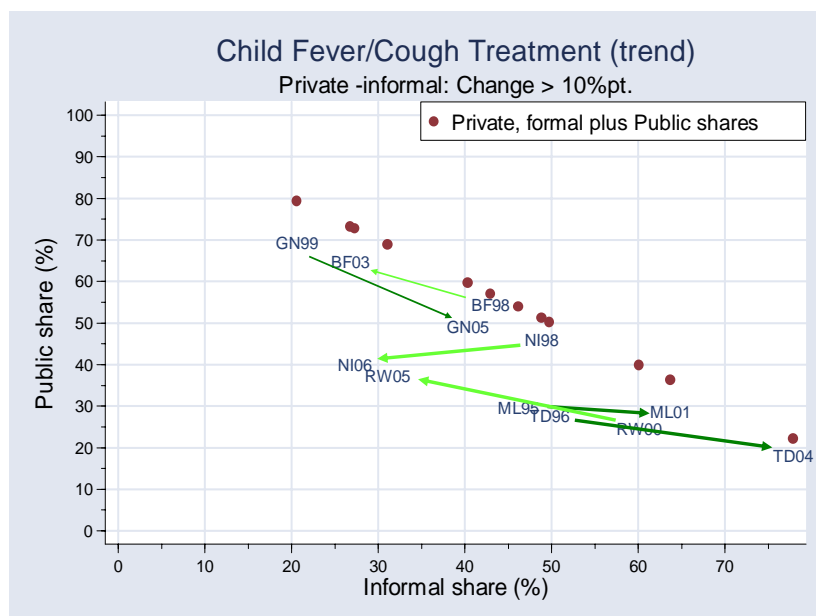
Similar to the trend in the diarrhea treatment, Chad also experienced a shrinkage in the formal private sector (with an increasing trend in the informal sector, shown Figure 17B); whereas Rwanda is in the opposite direction of an expanding formal private sector (Figure 17A).

Two other countries, Mali has experienced a decreasing trend in the formal private sharing similar to Chad; whereas Niger is similar to Rwanda with an increasing formal private sector trend.



**Figure 17A** Countries with change in share of fever/cough treatment by formal private sector > 10 percentage points

Again, for Chad and Rwanda that have an opposite movement in the private sector sharing in both diarrhea and fever/cough treatments, Figure 17B depicts an expansion of the informal sector for Chad and a shrinkage for Rwanda. Mali and Niger are acting in parallel with Chad and Rwanda, respectively.

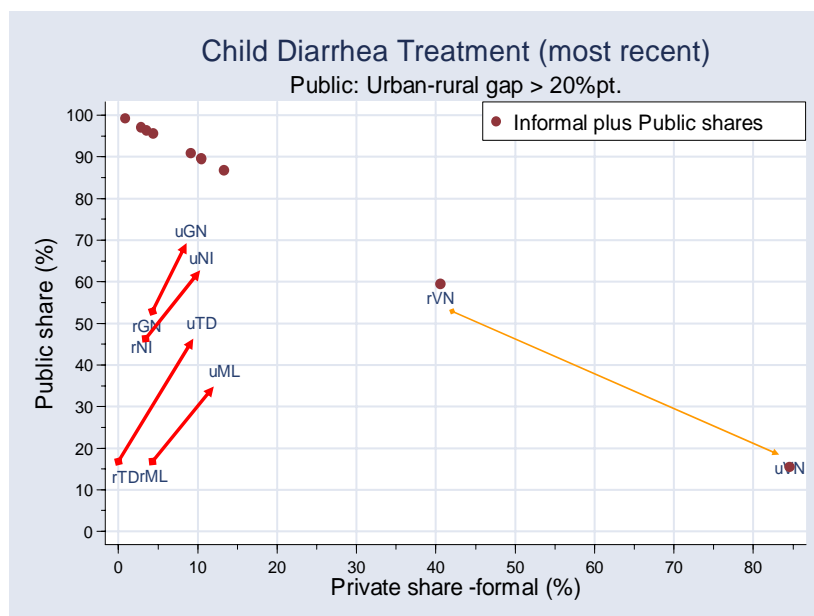


**Figure 17B** Countries with change in share of fever/cough treatment by informal sector > 10 percentage points

#### 4.2.3 Geographic and economic gaps in private-public mix in child treatments

This DHS analysis found a mixed result on the geographic and economic gaps in the child treatments. Countries with a noticeable gap (more than 20 percentage points) in the public share of child illness treatments between urban and rural areas (and between wealth quintiles 5 and 1) were selected for an illustration.

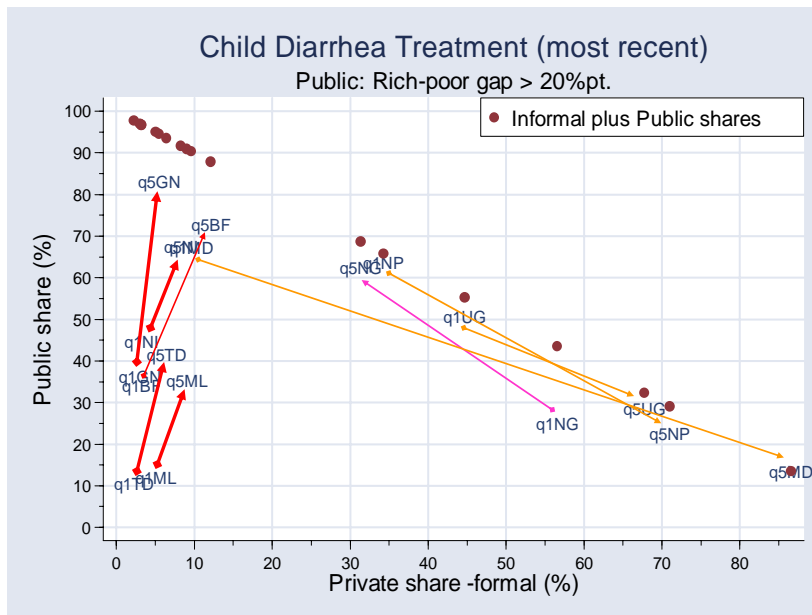
Five countries (Guinea, Niger, Chad, Mali, and Vietnam) have the urban-rural gap in the public share of diarrhea treatment wider than 20 percentage points (Figure 18A). All these countries have their urban children who received the treatment chose the formal private providers in a greater proportion than those by the rural children. However, Vietnam is the only country that their rural households chose the public facilities in a greater proportion than the urban counterparts. All other four countries have their urban households chose care from both public and private sectors in a greater proportion than their rural counterparts.



**Figure 18A** Countries with the urban-rural gap in share of diarrhea treatment by public sector > 20 percentage points

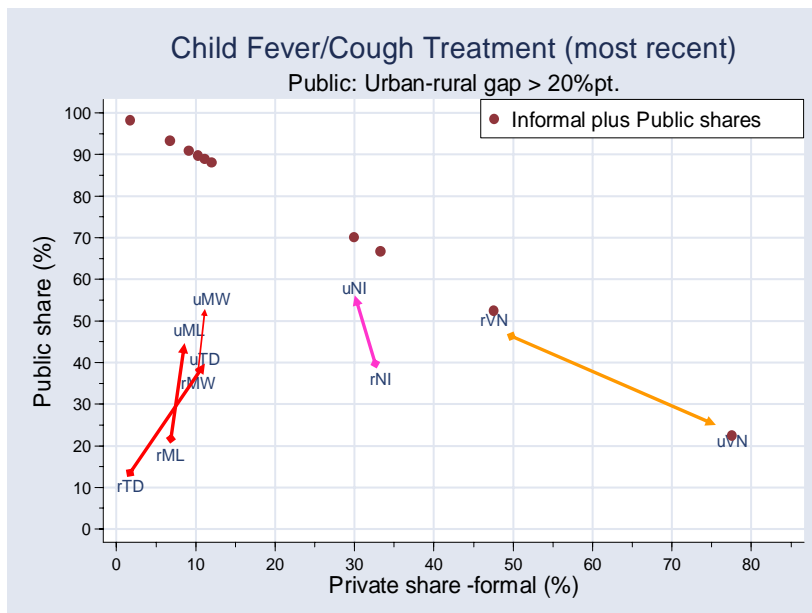
The same four countries (Guinea, Niger, Chad, and Mali) also have the rich-poor gap in the private-public mix of diarrhea treatment in the same pattern as the urban-rural gap (i.e., the urban children received care from both public and formal private sectors in a larger proportion than the rural children) (Figure 18B).

In Indonesia, Nepal, and Uganda, the children with diarrhea in the 20% poorest households relied more on the treatment from public sector than from the formal private sector. Nigeria is the country standing out on the opposite direction, whereby the 20% poorest children relied more on the formal private sector and less on the public sector.



**Figure 18B** Countries with the rich-poor gap in share of diarrhea treatment by public sector > 20 percentage points

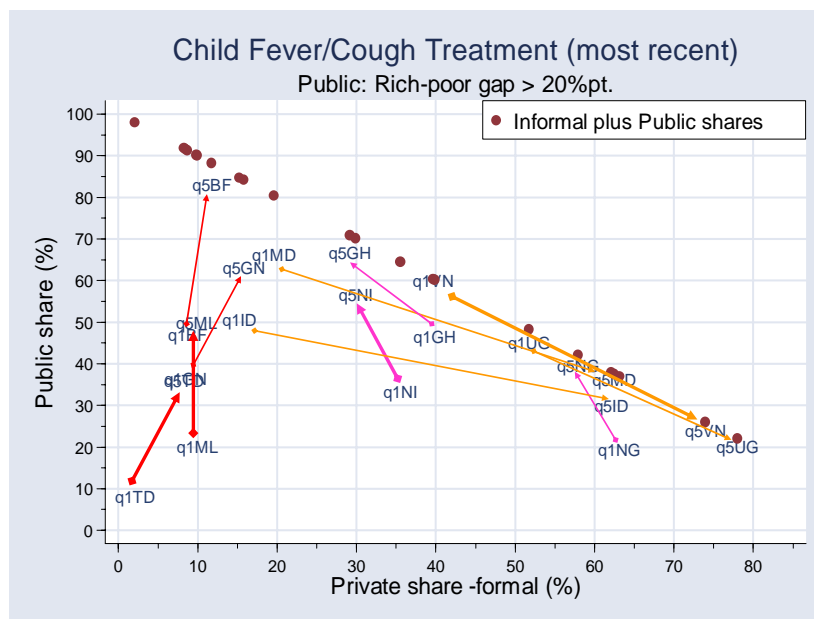
For the treatment of child fever/cough, Chad and Mali as well as Vietnam still show the same pattern of the urban-rural gap in the public and formal private sectors as the diarrhea treatment (Figure 19A).



**Figure 19A** Countries with the urban-rural gap in share of fever/cough treatment by public sector > 20 percentage points

The urban children in Chad and Mali have the treatment share by both public and formal private sectors higher than their rural counterparts; whereas in Vietnam, the urban children relied more on the formal private sector and the rural children did on the public sector.

Those three countries also have the same pattern for the rich-poor gap (Figure 19B).



**Figure 19B** Countries with the rich-poor gap in share of fever/cough treatment by public sector > 20 percentage points

Chad and Mali were the two LIC showing a consistent pattern that both formal private and public sectors favored the better off, whereas Vietnam was an example of LIC where the worse off depended largely on the public sector for the treatments of these two common illnesses of children.

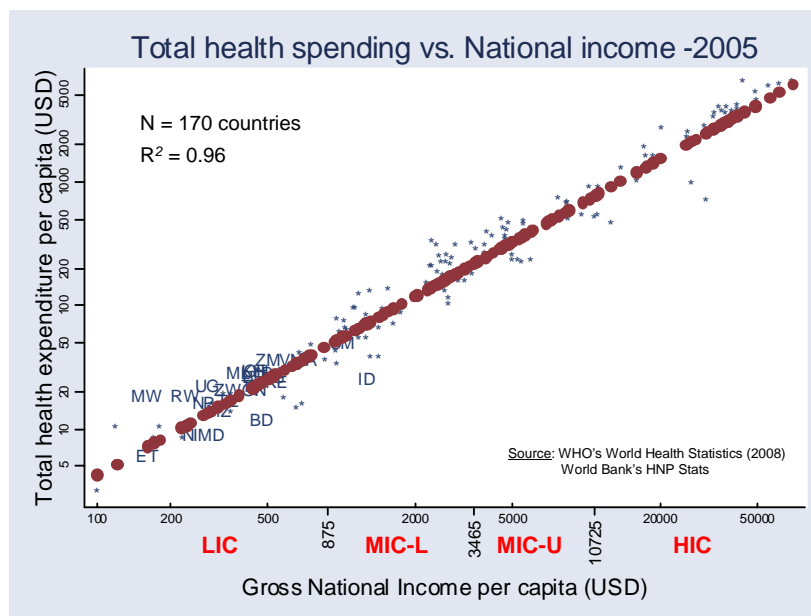
#### 4.3 Influences from socio-economic contexts

The following subsections examine linkage (if any) between socio-economic contexts and the private-public mix in woman and child health. The country-level variations in

national income, OOP health spending, and governance performance were taken into perspective for further policy implication.

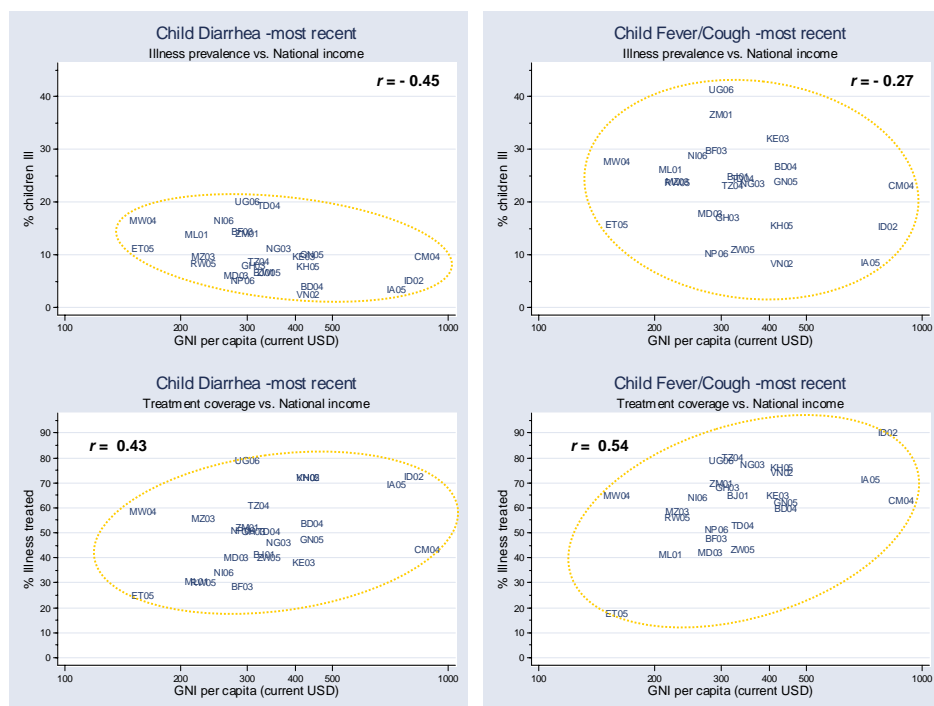
#### 4.3.1 National income

The 25 DHS countries in this present analysis are located at the lower-end of all-country distribution in terms of level of economic development. However, the observed health spending covers both higher- (e.g., Malawi, Rwanda, Uganda) and lower- (e.g., India, Bangladesh, Madagascar) than the predicted for national income in 2005 (Figure 20).



**Figure 20** Health spending and national income, DHS countries and the rest -2005

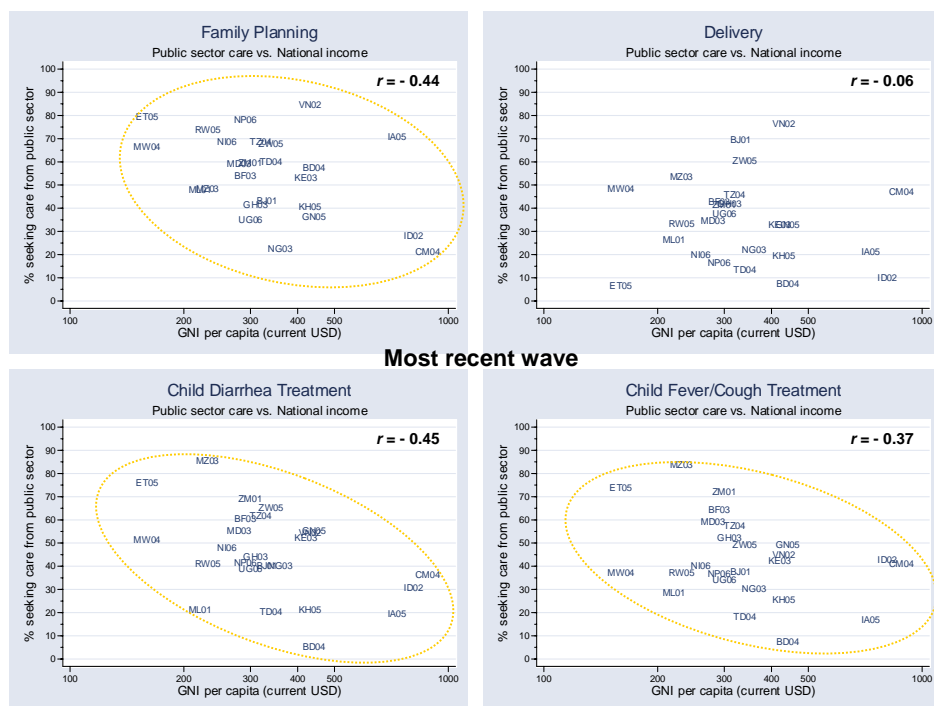
As country's economic condition improved, proportions of the children who suffered from diarrhea and fever/cough declined ( $r = -0.45$  and  $-0.27$ , respectively) (Figure 21, upper left and right panels). In a contrary, the national income shows a positive correlation with treatment coverage of the two illnesses ( $r = 0.43$  and  $0.54$ , respectively) (Figure 21, bottom left and right).



**Figure 21** Child illness prevalence and treatment coverage vs. national income

Results from this analysis raise a concern with the role of public sector on woman and child health that in these 25 countries, country's economy and the public sector does not necessarily followed a conventional wisdom of positive association. Instead, countries with a higher national income tended to have a lower public share of family planning services ( $r = -0.44$ ) and treatment of diarrhea ( $r = -0.45$ ) and fever/cough ( $r = -0.37$ ) (Figure 22). Though a correlation between the national income and the public share of delivery is minimal, it is negative ( $r = -0.06$ ) (Figure 22, upper right panel).



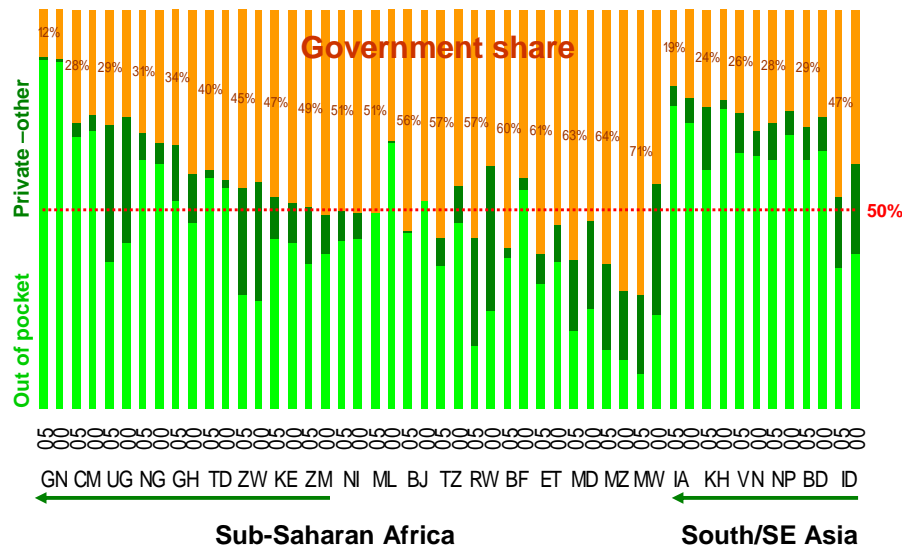


**Figure 22** Public sector share of child illness treatment vs. national income

#### 4.3.2 Out-of-pocket health spending

Nine of 19 SSA and all six SA/SEA countries have had more than 50% of their total health expenditures paid privately (Figure 23).

## Out-of-Pocket Health Expenditures 2005 vs. 2000

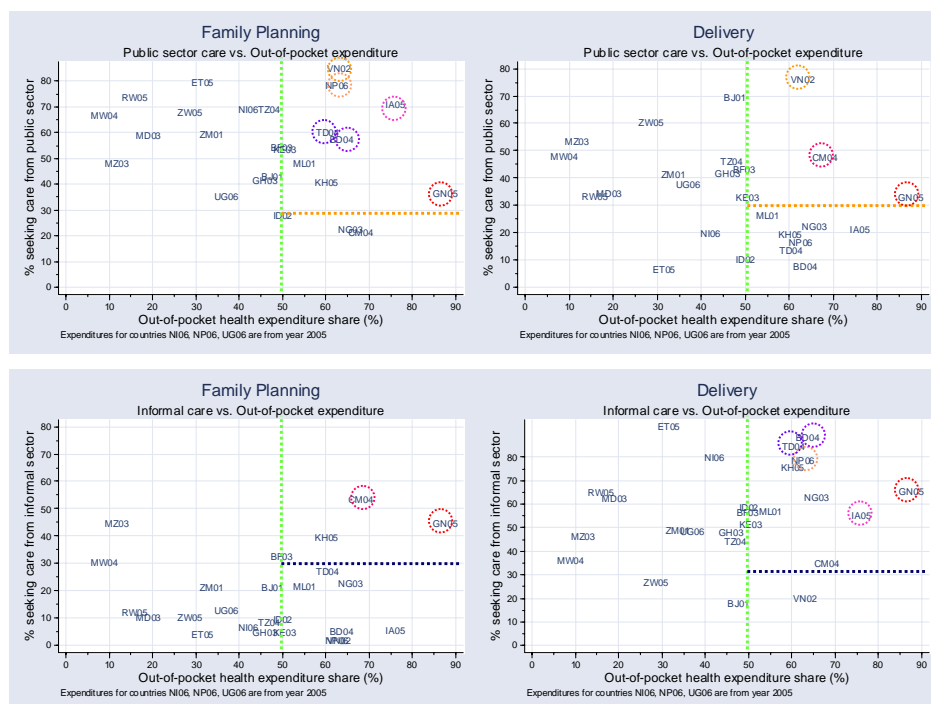


**Figure 23** Out-of-pocket share of health spending in 25 DHS countries, 2000 and 2005

Note: (Bottom) light green -OOP payment, (middle) dark green -other private, (top) orange -government

Almost all of the private health payment in these countries was shouldered by households at point of services. This OOP payment could be incurred even the service provided in the public sector. In these high OOP spending countries, financial risk protection becomes an important policy concern.

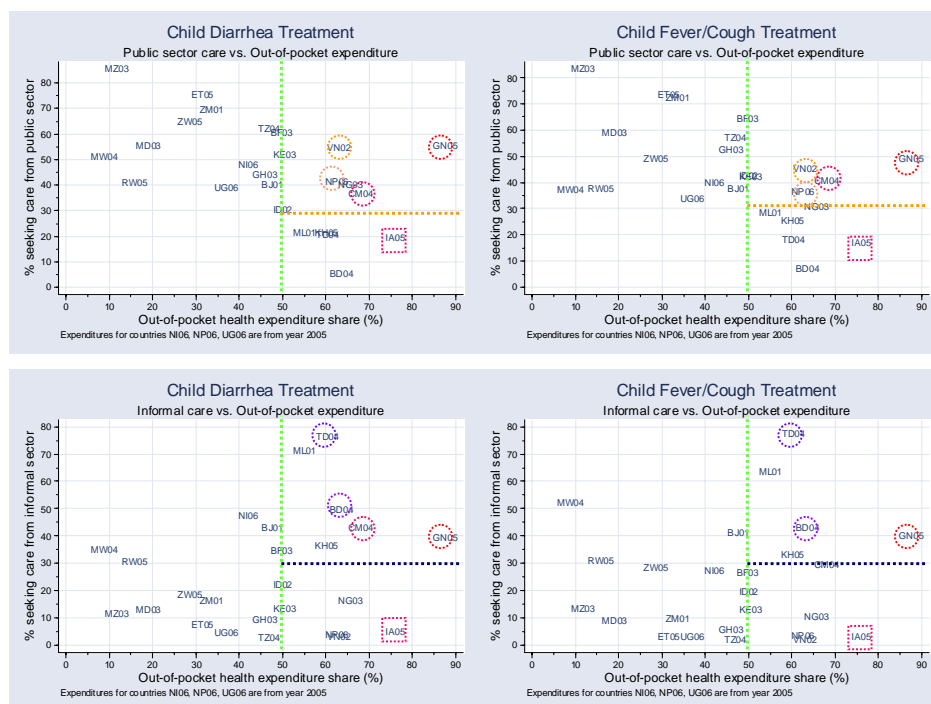
India, Chad and Bangladesh are the countries with not only a high OOP share but also with majority (60-70%) of family planning services were responsible by public sector (Figure 24A). For delivery care, however, the public sector did not play a major role in these high OOP spending countries. Instead, the informal sector shared a little more than 50% of total delivery care in India, 60% in Guinea, almost 80% in Cambodia and Nepal, and more than 80% in Chad and Bangladesh.



**Figure 24A** Public and informal share of family planning and delivery vs. OOP health spending share

Cameroon and Guinea are the high OOP spending countries that approximately 40-50% of the treatments for diarrhea and fever/cough were covered by the public sector (Figure 24B). Almost another half of women and children in these two countries and in Bangladesh sought care from informal sector. Chad is noticed for the high OOP spending country where the informal sector accounted for almost 80% of the treatments for these two common illnesses in children; whereas India experienced the major role in child treatments played by the formal private sector.

According to a previous analysis on the economic gap in child treatments, Chad and Guinea are the two countries that were found that both public and private sectors tended to favor the rich than the poor for both diarrhea and fever/cough.



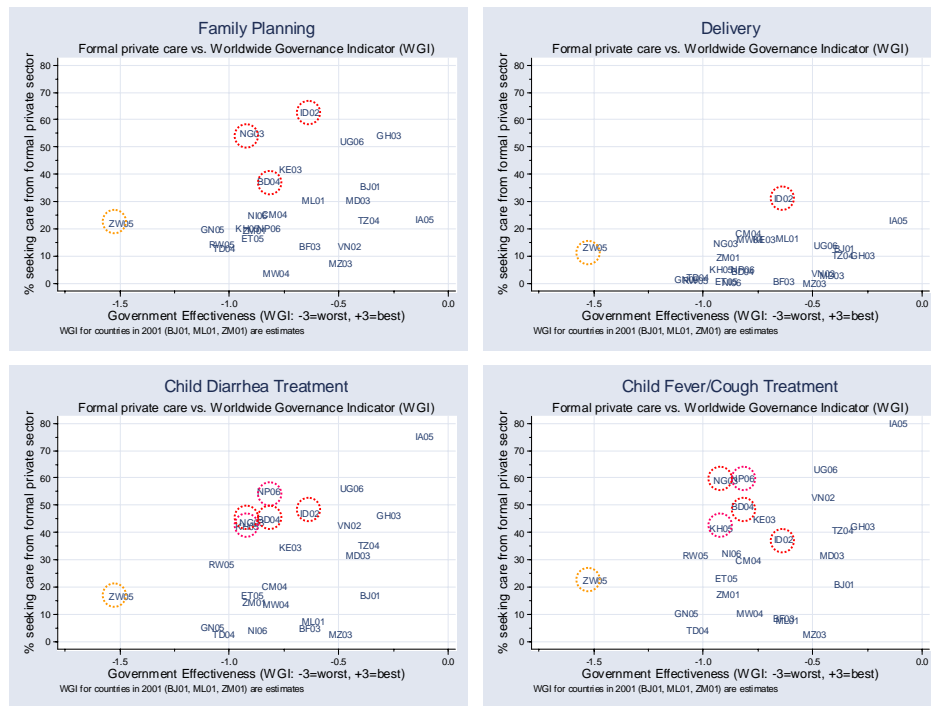
**Figure 24B** Public and informal share of treatments for child diarrhea and fever/cough vs. out-of-pocket health spending share

Vietnam and Nepal are the two countries with a high OOP share that the public sector had an important role on the provision of health services for both women and children, accounting for 80% of family planning and 40-50% of treatments for diarrhea and fever/cough.

#### 4.3.3 Governance performance

Among the DHS countries with relatively poor governance in terms of government effectiveness, five countries including Bangladesh, Cambodia, Indonesia, Nepal, and Nigeria consistently showed a major role of the formal private sector on treatments for the child illnesses (Figure 25). This analysis also found that Nigeria is also the country where the public share of child illness treatments was much larger in the top wealth quintile than in the poorest quintile.

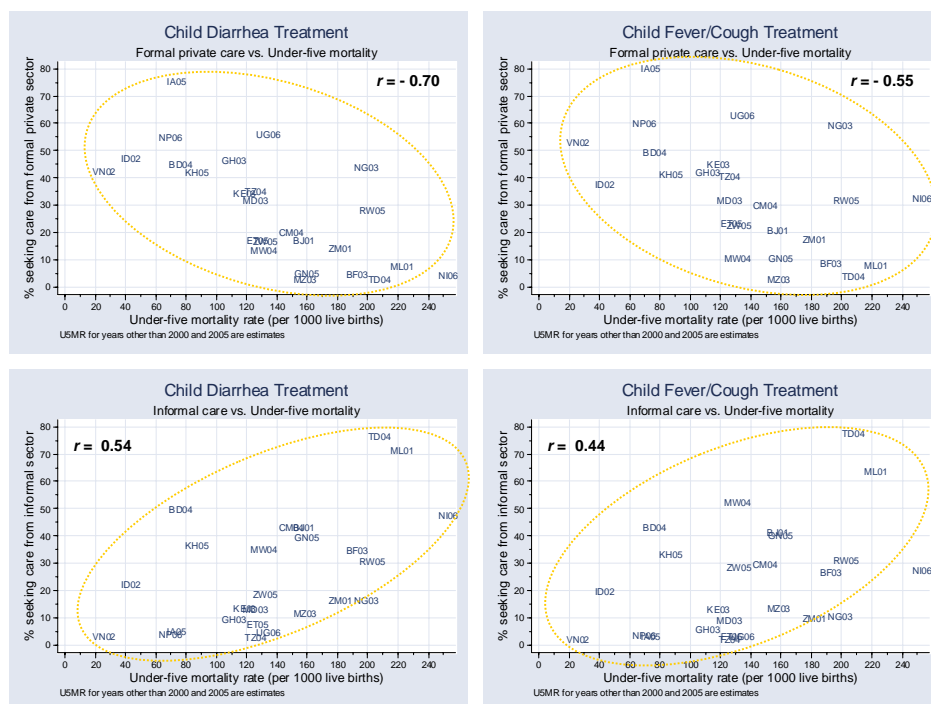
Bangladesh, Indonesia, and Nigeria are the countries where the formal private sector also accounted for 40-60% of family planning services for women. This probably reflects the fact that in these countries, governments did not have a strong commitment for providing the primary care.



**Figure 25** Formal private health share vs. government effectiveness

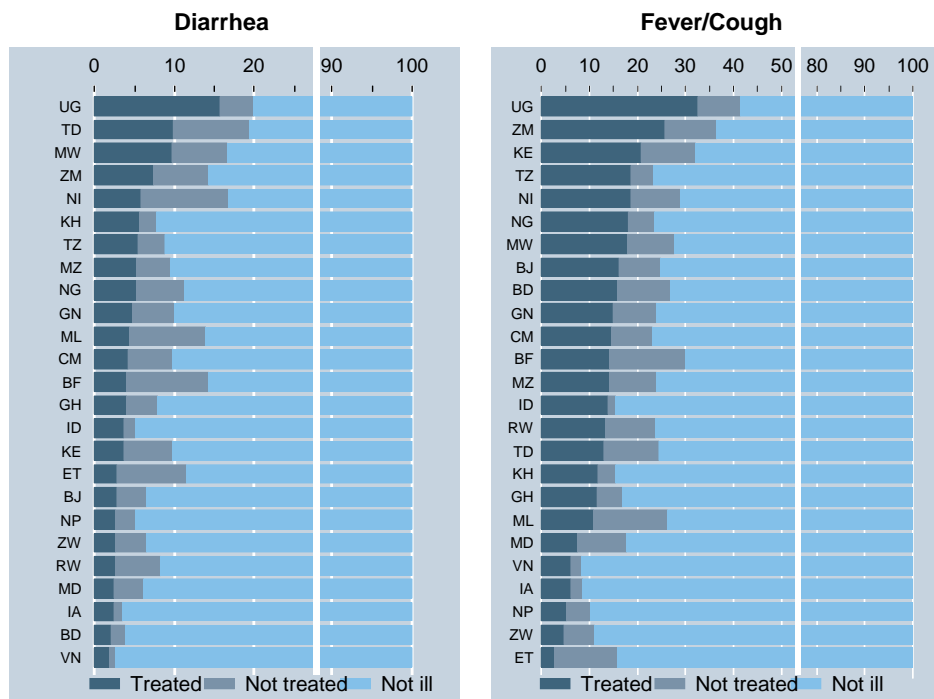
#### 4.4 Linkage of health seeking profiles to population health outcomes

An ecological analysis linking the country's private-public mix to population health outcome has found a consistent correlation of the under-five mortality negatively with the formal private treatment share ( $r = -0.70$  and  $-0.55$ ) but positively with the informal treatment share ( $r = 0.54$  and  $0.44$ ) for diarrhea and fever/cough, respectively (Figure 26).



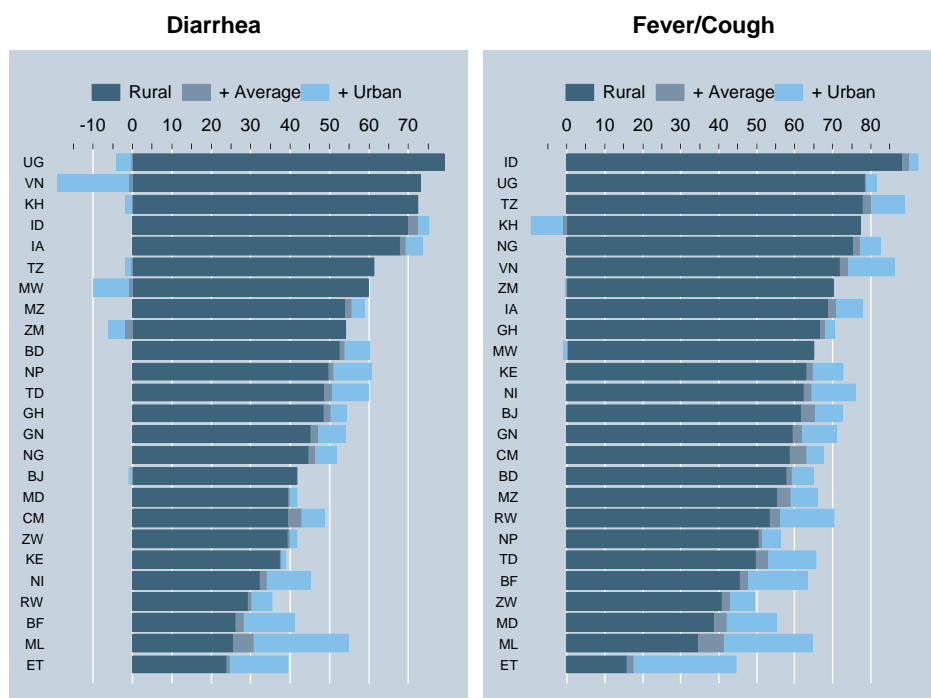
**Figure 26** Correlations of the under-five mortality with treatment share by the formal private and informal sectors for diarrhea and fever/cough

Because countries are also different in the prevalence of illnesses and treatment coverage of the ill population, it is important to take account of these baseline variations in further teasing out the linkage with health outcome variations (Figure 27).



**Figure 27** Illness prevalence and overall treatment coverage for diarrhea and fever/cough

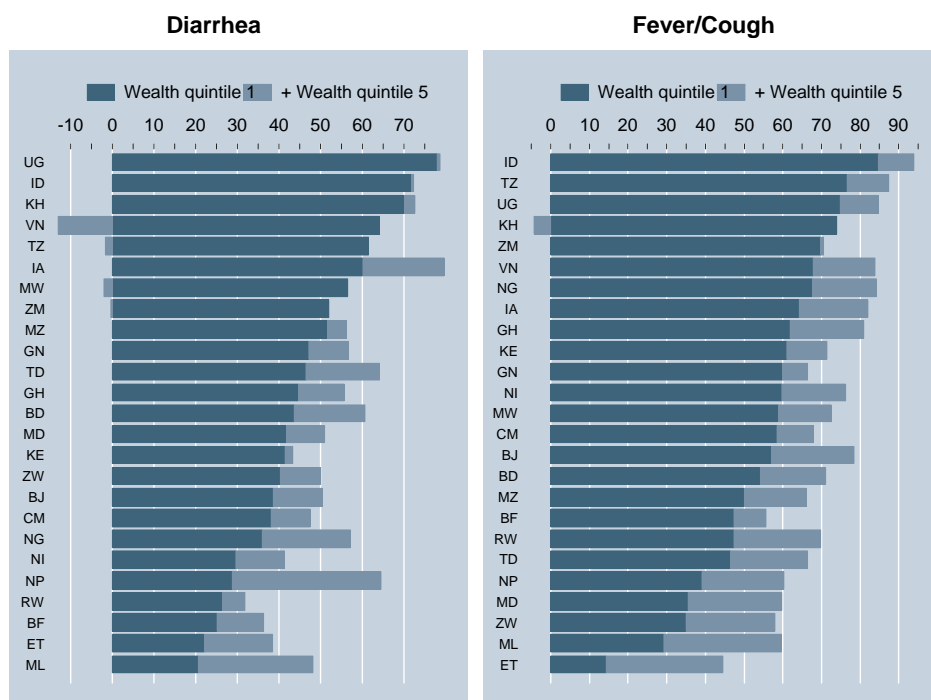
Countries are also different in the geographic gap and economic gap of child illness treatments. Figure 28A depicts countries showing the urban-rural gap in the treatment coverage of children with diarrhea (left panel) and fever/cough (right panel) by a descending order of the rural coverage. Noticeably, countries with wider geographic gap tended to have a relatively low coverage among the rural children. The rural coverage in some countries like Vietnam, Malawi, and Uganda (for diarrhea) and Cambodia (for fever/cough) are even greater than the urban coverage.



**Figure 28A** Urban-rural gap in the treatment coverage for diarrhea and fever/cough

Countries with a wide urban-rural gap tended to have a wide rich-poor gap. Vietnam and Cambodia are still the two countries that the treatment coverage (for diarrhea and fever/cough) among the poorest households is higher than among the richest one. Similarly, as the treatment coverage in the first bottom quintile (quintile 1) improved, the economic gap became narrow (Figure 28B).

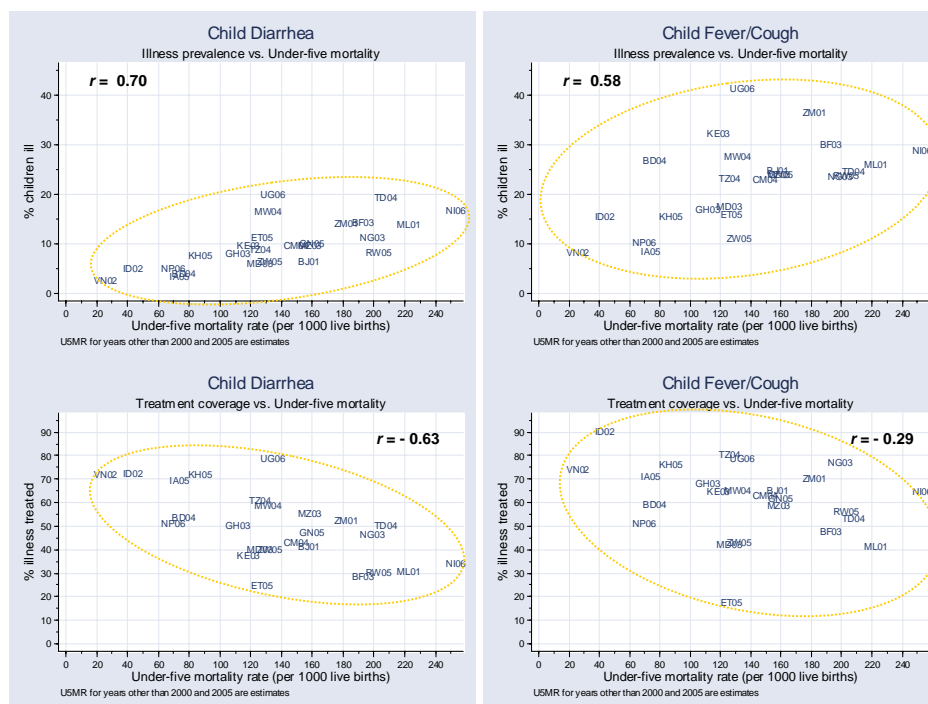




**Figure 28B** Rich-poor gap in the treatment coverage for diarrhea and fever/cough

Both baseline illness and treatment coverage were found in this analysis to be correlated with child mortality.

Figure 29 shows an expected correlation with the illness prevalence ( $r = 0.70$  and  $0.58$ ) and overall treatment coverage ( $r = -0.63$  and  $-0.29$ ) for diarrhea and fever/cough.



**Figure 29** Correlations of the under-five mortality with prevalence and treatment coverage of diarrhea and fever/cough

## 5. Conclusion and policy recommendation

This DHS analysis result reiterates the claim that LIC cannot deny an existence of private sector and its prevailing role on the provision of health care for women and children. The private health sector, however, is not homogeneous in its entity, ranging from the informal care providers to not-for-profit NGO and for-profit businesses (which in this analysis were lumped together and defined as the formal private sector).

This analysis found households behaved differently across health areas when seeking care. In nine of 25 countries, more than one-quarter of mothers sought care for their children from multiple sectors, mostly as a combination between public and formal private facilities. This is not the case for delivery, whereby less than 10% of mothers sought care from the multiple sectors in most countries. Health sector mix for the delivery was very dominated by the informal care, whereby 55-88% of the mothers gave birth at their own homes in 13 countries.

All 25 LIC in this analysis are diverse in the private-public mix of woman and child health services. Trend over time and the geographic and economic gaps in the private-public mix also vary across countries. Findings on magnitude and direction of the correlations between the private-public mix and the contextual characteristics of these countries should be taken into perspective for further policy implication. The country's economic development explains childhood illness prevalence and treatment coverage with the expected directions (i.e., negatively with the illnesses but positively with the treatment coverage). However, the country with a higher national income tends to have lower share by the public sector of woman and child health. Some countries with major public sector shares that have a large health spending share by OOP should consider a health financing reform. Some countries with poor governance on government effectiveness have experienced a major role of private sector. Lastly, the positive correlation between the informal sector share and child mortality raises a concern on how

countries can engage the informal providers even though identifying the informal sector is not an easy job.

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