

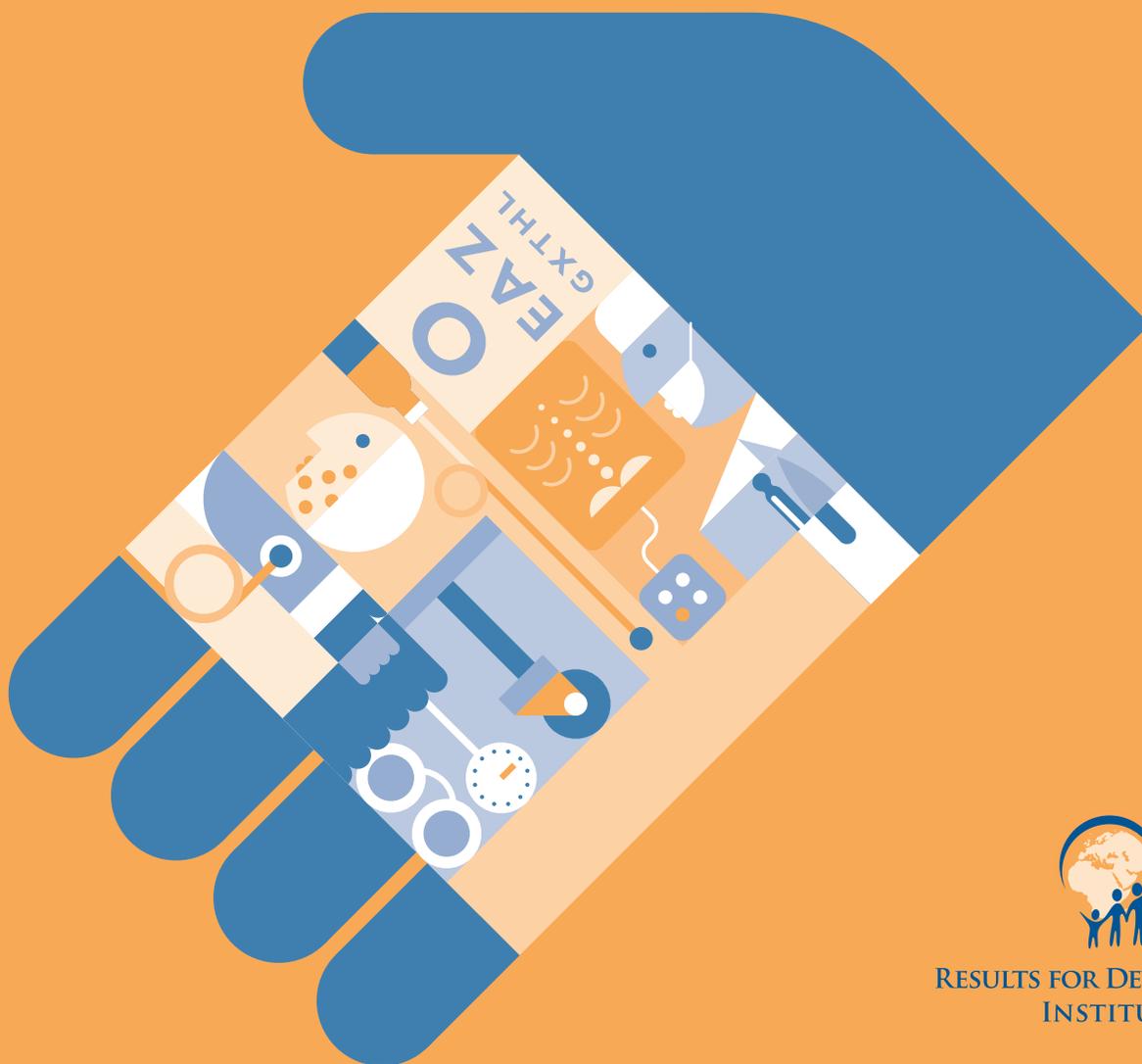
The Rockefeller Foundation–Sponsored Initiative on the Role of the Private Sector in Health Systems in Developing Countries

Technical partner paper 1

Private-Public Mix in Woman and Child Health
in Low-Income Countries: An Analysis of
Demographic and Health Surveys

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and Children in Low-income Countries:
An Analysis of Demographic and Health Surveys**

October 2008

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Contents

| | |
|--|----|
| 1. Background..... | 6 |
| Spending on private health care..... | 6 |
| Figure 1: Private share of country-level health expenditure, by region, 2005..... | 6 |
| Figure 2: Private share of health expenditure and gross national income, 2005 | 7 |
| Public sector governance | 7 |
| Figure 3: Government effectiveness and gross national income, 2007 | 8 |
| Figure 4: Private health expenditure share and government effectiveness, 2005... | 9 |
| Maternal and child health..... | 9 |
| Figure 5: Cartograms of world distribution of total births, maternal deaths, infant deaths, and age 1–4 deaths..... | 10 |
| Figure 6A: Maternal mortality ratio in low-, middle-, and high-income countries, by region, 2000 | 11 |
| Figure 6B: Infant mortality rate in low-, middle-, and high-income countries, by region, 2005 | 11 |
| Figure 6C: Under-five mortality rate in low-, middle-, and high-income countries, by region, 2005 | 12 |
| Private health care providers..... | 13 |
| Figure 7: Percentage of children in the bottom wealth quintile treated outside the public sector for diarrhea and acute respiratory infection, 38 countries..... | 14 |
| 2. Objective..... | 15 |
| 3. Methodology..... | 16 |
| The Demographic and Health Surveys | 16 |
| Figure 8: The 25 countries with 2 years of DHS data sets used in the analysis ... | 16 |
| Health care tracers..... | 16 |
| Table 1: DHS survey questions about four health care tracers..... | 17 |
| Typology of health sectors..... | 17 |
| Table 2: Classification of health care sectors | 17 |
| Table 3: Proportion of multiple sector types of providers per health care episode, most recent..... | 18 |
| 4. Results..... | 20 |
| Women’s health care: Family planning and delivery | 20 |
| Private-public share of women’s health care | 20 |
| Figure 9A: Percentage of women receiving modern contraception outside the public sector | 21 |
| Figure 9B: Percentage of mothers giving birth outside public health facilities.... | 22 |
| Table 4A: Countries where less than half of mothers gave birth only in their own homes, most recent..... | 22 |
| Table 4B: Countries where more than half of mothers gave birth only in their own homes, most recent..... | 23 |
| Trends in the private-public mix in women’s health | 23 |
| Figure 10A: Countries with a change in the formal private sector’s family planning share of more than 10 percentage points..... | 24 |
| Figure 10B: Countries with a change in the informal sector’s family planning share of more than 10 percentage points..... | 25 |

| | |
|--|----|
| Figure 11A: Countries with a change in the formal private sector’s delivery share of more than 5 percentage points | 26 |
| Figure 11B: Countries with a change in the informal sector’s delivery share of more than 10 percentage points | 26 |
| Geographic and economic gaps in the private-public mix in women’s health | 27 |
| Figure 12A: Countries with an urban-rural gap in the public sector’s family planning share of more than 20 percentage points..... | 28 |
| Figure 12B: Countries with a rich-poor gap in the public sector’s family planning share of more than 20 percentage points..... | 29 |
| Figure 13A: Countries with an urban-rural gap in the public sector’s delivery share of more than 20 percentage points..... | 30 |
| Figure 13B: Countries with a rich-poor gap in the public sector’s delivery share of more than 20 percentage points | 31 |
| Treatment of child illnesses | 31 |
| Private-public share of treatment of child illnesses | 31 |
| Figure 14A: Percentage of women whose children received diarrhea treatment outside the public sector..... | 32 |
| Figure 14B: Percentage of women whose children were treated for fever/cough outside the public sector..... | 33 |
| Trends in the private-public mix in the treatment of child illnesses..... | 33 |
| Figure 15A: Countries with a change in the formal private sector’s share of diarrhea treatment of more than 10 percentage points..... | 34 |
| Figure 15B: Countries with a change in the informal sector’s share of diarrhea treatment of more than 10 percentage points..... | 34 |
| Figure 16A: Countries with a change in the formal private sector’s share of fever/cough treatment of more than 10 percentage points..... | 35 |
| Figure 16B: Countries with a change in the informal sector’s share of fever/cough treatment of more than 10 percentage points..... | 36 |
| Geographic and economic gaps in the private-public mix in child treatment | 36 |
| Figure 17A: Countries with an urban-rural gap in the public sector’s share of diarrhea treatment of more than 20 percentage points..... | 37 |
| Figure 17B: Countries with a rich-poor gap in the public sector’s share of diarrhea treatment of more than 20 percentage points..... | 38 |
| Figure 18A: Countries with an urban-rural gap in the public sector’s share of fever/cough treatment of more than 20 percentage points..... | 39 |
| Figure 18B: Countries with a rich-poor gap in the public sector’s share of fever/cough treatment of more than 20 percentage points..... | 40 |
| The influence of socioeconomic contexts..... | 40 |
| National income | 40 |
| Figure 19: Health spending and national income, 2005 | 41 |
| Figure 20: Child illness prevalence and treatment coverage versus national income..... | 42 |
| Figure 21: Public sector share of child illness treatment versus national income | 43 |
| Out-of-pocket health spending..... | 43 |
| Figure 22: Out-of-pocket share of health spending in 25 countries, 2000 and 2005 | 44 |

| | |
|--|----|
| Figure 23A: Public and informal shares of family planning and delivery versus out-of-pocket health spending share | 45 |
| Figure 23B: Public and informal shares of treatment of child diarrhea and fever/cough versus out-of-pocket health spending share | 46 |
| Governance performance | 46 |
| Figure 24: Formal private health share versus government effectiveness | 47 |
| Linkage of health-seeking profiles to population health outcomes | 47 |
| Figure 25: Correlations of under-five mortality with treatment share by the formal private and informal sectors for diarrhea and fever/cough | 48 |
| Figure 26: Illness prevalence and overall treatment coverage for diarrhea and fever/cough | 49 |
| Figure 27A: Urban-rural gap in treatment coverage for diarrhea and fever/cough | 50 |
| Figure 27B: Rich-poor gap in treatment coverage for diarrhea and fever/cough .. | 51 |
| Figure 28: Correlations of under-five mortality with prevalence and treatment coverage of diarrhea and fever/cough | 52 |
| 5. Conclusions and Policy Recommendations | 53 |
| References | 54 |
| Appendix: The Demographic and Health Surveys | 56 |
| Countries ¹ with standard DHS and years of surveys, by region | 56 |
| DHS countries, by region and survey frequency | 58 |

Abstract

Achieving the Millennium Development Goals for maternal and child health (Goals 4 and 5) still poses a great challenge for several low-income countries. An analysis of the most recent (2001–2006) Demographic and Health Surveys (DHS) and an adjacent prior wave (1995–2000) reveals a wide variation in the role of the private sector in health care for women of reproductive ages and children under five in 19 low-income countries in sub-Saharan Africa and 6 low-income countries in South and Southeast Asia. Health providers or facilities sought by women in nationally representative households for four care tracers—modern contraception, birth delivery, and treatment of child diarrhea and child fever and cough—were grouped hierarchically into three major sources: the informal, formal private, and public sectors.

The private sector provided more than 50 percent of family planning services in 8 of the 19 low-income countries in sub-Saharan Africa and in 2 of the 6 countries in South and Southeast Asia, mostly through formal private providers or facilities. The private sector—especially informal providers—was even more dominant in delivery. However, in Vietnam (2002), the public sector dominated these health markets for women. The informal sector strongly prevailed in family planning in Cameroon (2004) and in delivery care in Ethiopia (2005) and Bangladesh (2004), while in Indonesia (2002) the formal private sector provided the greatest share of both family planning and delivery care. The informal sector was most prevalent for the treatment of child diarrhea and child fever and cough, particularly in Chad (2004) and Mali (2001). In Vietnam, Nepal (2006), and Uganda (2006), the informal sector played a minimal role in the treatment of diarrhea and of fever and cough, while in Mozambique (2003) treatment by the public sector dominated. Treatment of these two diseases by the formal private sector predominated in India (2005).

A comparison of two DHS waves (five to six years apart) shed light on an expanding (or shrinking) trend in this private-public mix in women's and children's health care for some countries. For observable urban-rural and rich-poor gaps, the formal private sector typically tended to prevail in the health care for urban or wealthier populations more than for their rural or poorer counterparts. For family planning services, rural or poorer subgroups in most countries relied heavily on the public sector (except in Mozambique and Mali). Ironically, the public sector was found to be more prevalent in the care for the better-off in delivery care in all countries. This analysis of DHS data found mixed results in the urban-rural and rich-poor gaps in the treatment of children. Chad and Mali were the two low-income countries showing a consistent pattern of both the formal private and public sectors figuring more prominently in the care for the better-off, while Vietnam was an example of low-income countries where the worse-off depended largely on the public sector for treatment of both illnesses.

An ecological analysis linking the countries' private-public mix to population health outcomes found a consistent positive correlation between under-five mortality and the informal sector's treatment share (correlation coefficient: $r = 0.44$ and 0.54) but a negative correlation with the formal private sector's treatment share ($r = -0.55$ and -0.70)

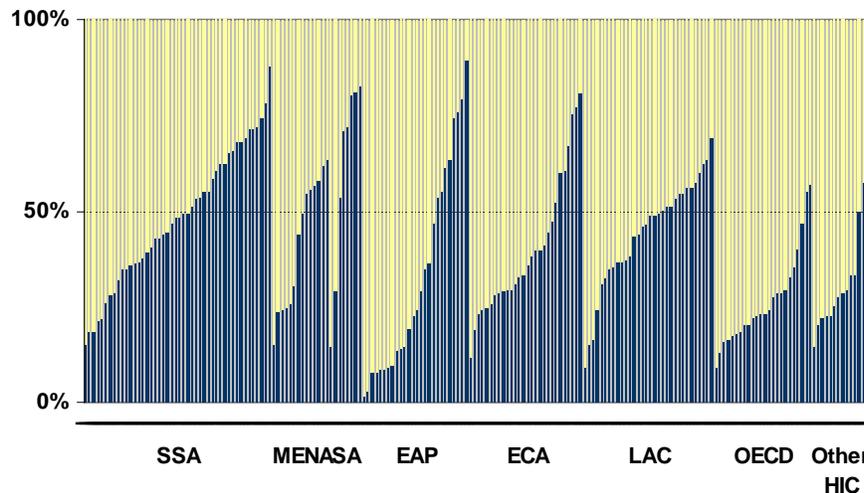
for fever and cough and for diarrhea, respectively. However, both baseline illness prevalence ($r = 0.58$ and 0.70) and overall treatment coverage ($r = -0.29$ and -0.63) also showed an expected outcome correlation. Other country-level variations—national income, out-of-pocket health spending, and governance performance—were put into perspective for further policy recommendations.

1. Background

Spending on private health care

Access to care is one of the major determinants of population health. In developing countries, national health accounts reveal that the private sector receives a major share of spending on health care. Figure 1 shows the private sector's share of total health expenditures in 2005, by ascending order, for the countries in each of region (using the World Bank's classification of world regions). Several countries in sub-Saharan Africa (SSA), South Asia (SA), and East Asia and Pacific (EAP) saw more than half of their health expenditures paid directly into the private sector, especially from households.

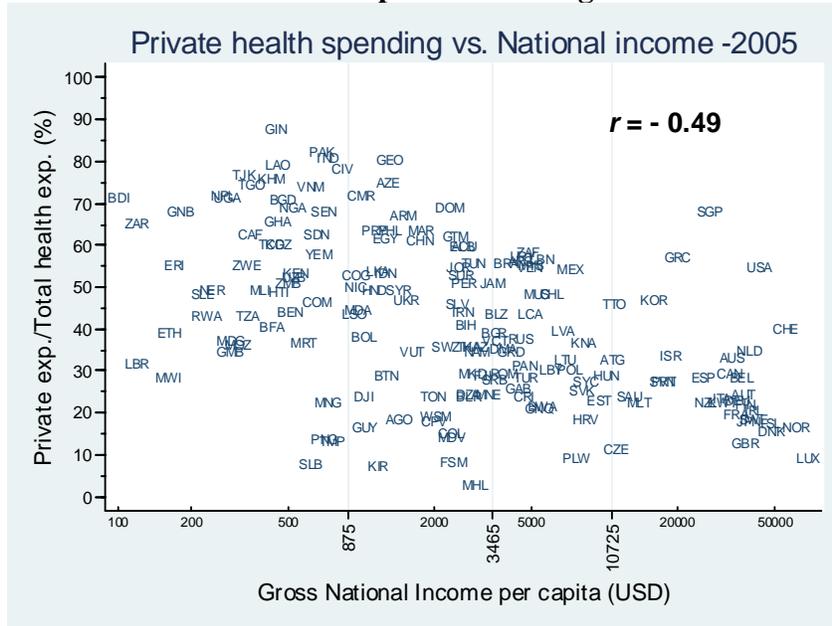
Figure 1: Private share of country-level health expenditure, by region, 2005



Note: SSA –sub-Saharan Africa, MENA –Middle East and Northern Africa, SA –South Asia, EAP –East Asia and Pacific, ECA –Eastern Europe and Central Asia, LAC –Latin America and the Caribbean, OECD –Organization of Economic Cooperation and Development, HIC –high income countries
Source: Author's analysis based on World Health Statistics (WHO 2008).

Interestingly, a country's spending on private health care tends to correlate negatively (correlation coefficient: $r = -0.49$) with its wealth. Figure 2 is a scatter-plot showing the share of spending on private health care and national income per capita for all countries in 2005.

Figure 2: Private share of health expenditure and gross national income, 2005



Source: Author's analysis based on World Health Statistics (WHO 2008) and World Development Report (World Bank 2006).

Using expenditure data as a proxy for determining the relative importance of the private and public sectors in providing health care has certain limitations. Health expenditure is a product of two deterministic components: (1) cost per unit of use; and (2) volume of use. High health care expenditure may result from an expensive unit cost, a large volume of use, or both. The first component, unit cost is largely driven by the supply side from a health care provider. The second component, volume of use can be driven by the demand for health care by population (in terms of the propensity of use), the provider (in terms of the intensity of use, given a use), or both.

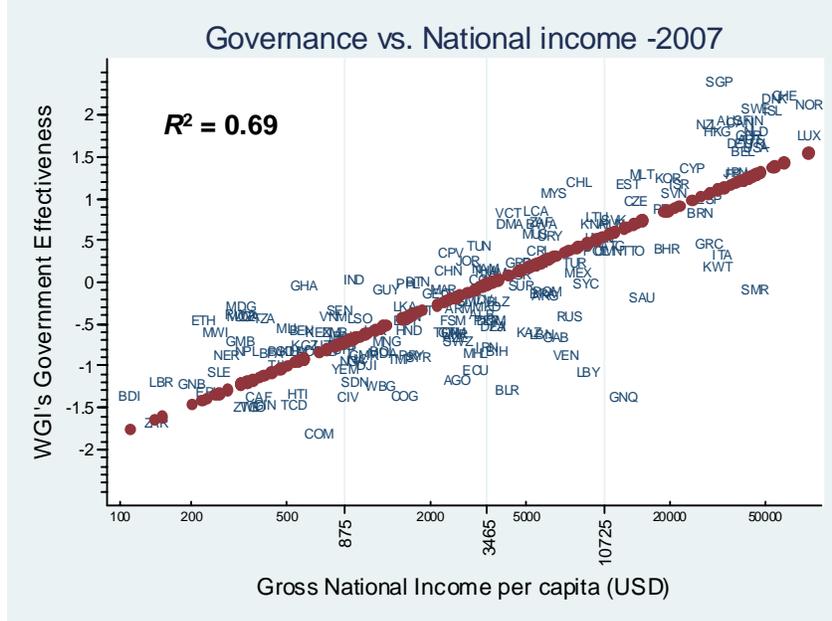
The private health sector in developing countries consists of both formal care in Westernized institutions and facilities (such as clinics and hospitals) and the informal lay sector, including self-medication with medicines from pharmacies, dispensaries, and street vendors; herbal or alternative medicines from traditional healers; and folk or quack treatments. These sources of health care may not be well captured by the national health accounts. Direct surveys of nationally representative households, the Demographic and Health Surveys, are a good alternative.

Public sector governance

There is a positive correlation between a country's wealth and public sector governance. Figure 3 shows a linear relationship (coefficient of determination: $R^2 = 0.69$) between national income (in logarithmic scale) and one important dimension of governance

performance as measured by the World Bank’s Worldwide Governance Indicators, government effectiveness.¹

Figure 3: Government effectiveness and gross national income, 2007

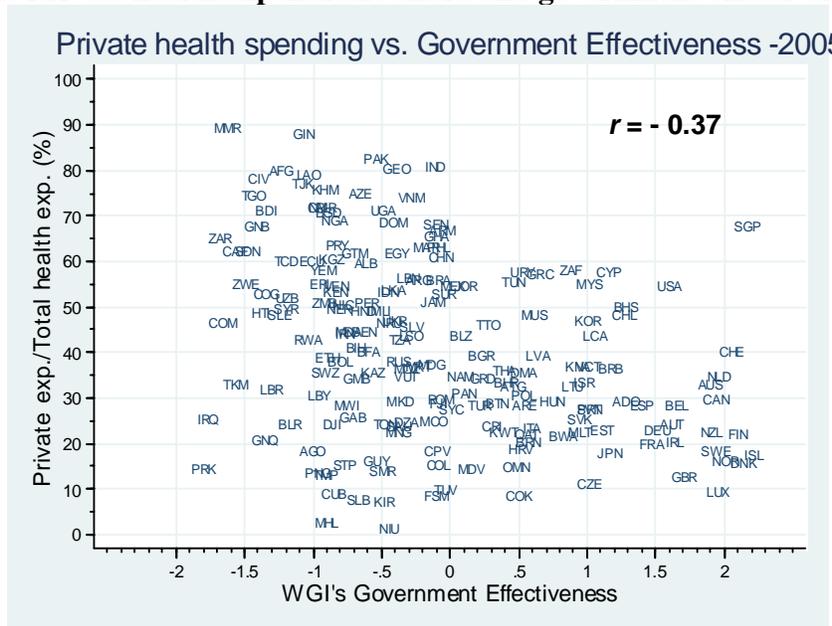


Source: Author’s analysis based on Governance Matters (World Bank 2008a) and World Development Report (World Bank 2008b).

Unfortunately, countries where household spending on health care is high tend to perform poorly in governance. Figure 4 illustrates the negative correlation ($r = -0.37$) between the private share of health expenditure and government effectiveness.

¹ *Government effectiveness* is 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.” (World Bank 2007)

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

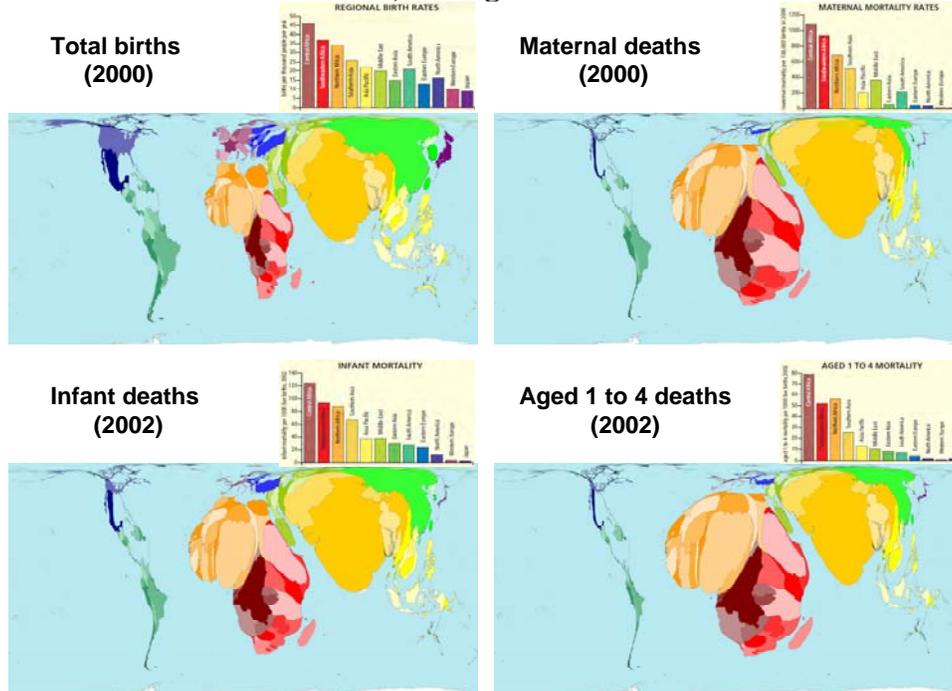


Source: Author's analysis based on World Health Statistics (WHO 2008) and Governance Matters (World Bank 2008a).

Maternal and child health

Achieving the Millennium Development Goals for maternal and child health (Goals 4 and 5) is still a great challenge for several low-income countries. Countries in sub-Saharan Africa and South Asia are unique in that they bear a major population health burden in terms of total number of births and mother and child deaths, which are highly disproportional to their land area (figure 5) and population (figures 6A–6C).

Figure 5: Cartograms of world distribution of total births, maternal deaths, infant deaths, and age 1–4 deaths



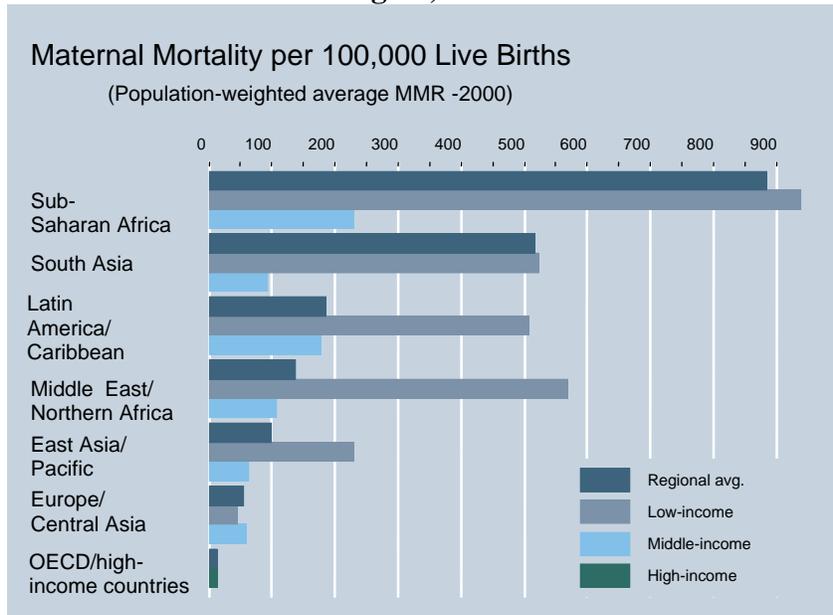
Source: www.worldmapper.org (2006)

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Source: [Worldmapper 2006](http://Worldmapper).

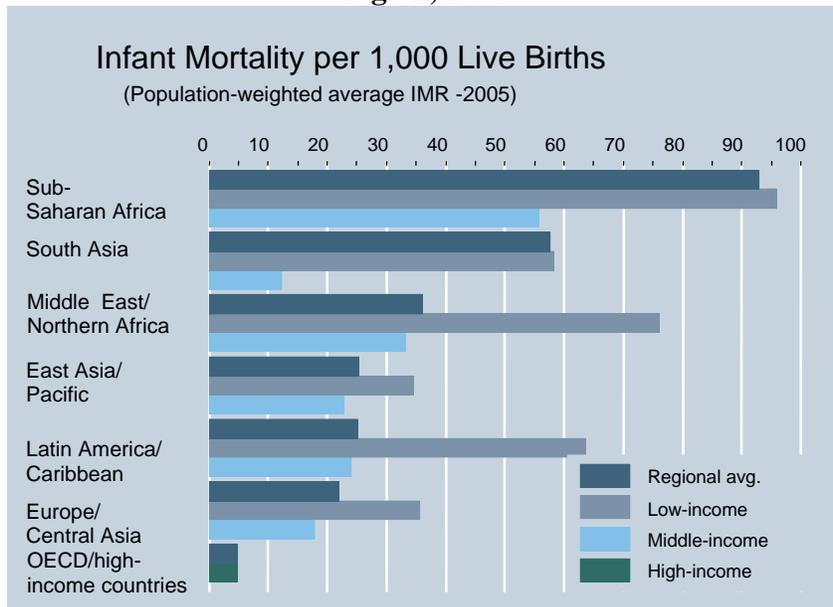
Even worse, these high procreation and mortality rates tend to be confined to subgroups of the population and to countries that have a lower economic status, especially those located in sub-Saharan Africa and South Asia (figures 6A–6C).

Figure 6A: Maternal mortality ratio in low-, middle-, and high-income countries, by region, 2000



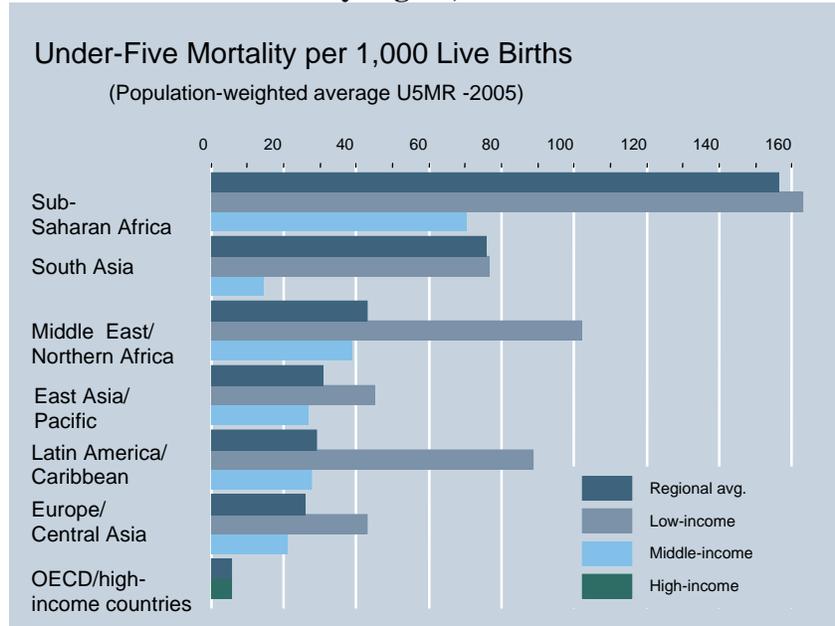
Source: Author's analysis based on World Health Statistics (WHO 2008).

Figure 6B: Infant mortality rate in low-, middle-, and high-income countries, by region, 2005



Source: Author's analysis based on World Health Statistics (WHO 2008).

Figure 6C: Under-five mortality rate in low-, middle-, and high-income countries, by region, 2005



Source: Author's analysis based on World Health Statistics (WHO 2008).

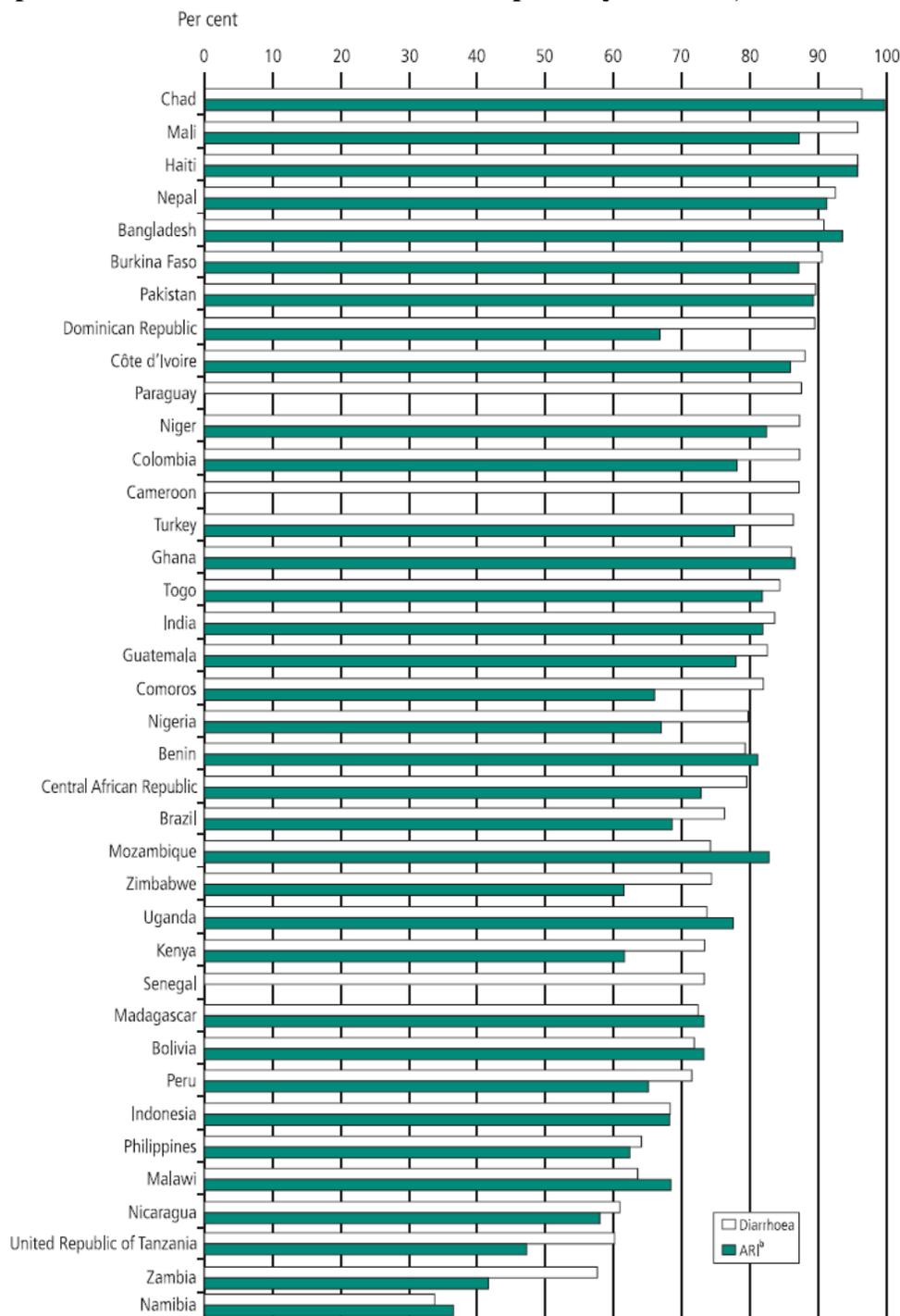
Private health care providers

In sub-Saharan Africa, the majority of malaria episodes were initially treated by private providers, mainly through the purchase of drugs from shops and peddlers (McCombie 1996; Hanson et al. 2000). In South Asia, among children who had diarrhea, more than 50 percent in Nepal (Kafle et al. 1992) and more than 90 percent in India (Rohde 1997) sought care outside the public sector. A recent survey in one large Indian state, Madhya Pradesh, revealed that 76 percent of all physicians and 72 percent of qualified paramedics worked in the private sector (De Costa and Diwan 2007). In the Southeast Asian country of Vietnam, the private sector provided approximately 60 percent of all outpatient visits (Ha, Berman, and Larsen 2002). Similarly, a large proportion of children affected by the common acute illnesses (diarrhea and acute respiratory tract infection) in Egypt (Waters, Hatt, and Axelsson 2002) and in Bolivia, Guatemala, and Paraguay (Berman and Rose 1996) received care from various types of private providers.

Even among poor populations, the private health sector plays a dominant role in care giving. The 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 used by households. A previous analysis of DHS data for 26 countries in sub-Saharan Africa showed that almost half of the parents of children who had diarrhea or acute respiratory tract infection in the two weeks prior to the survey did not seek care outside their homes, while 28 percent sought care at a public facility and 22 percent sought care from a private provider (Marek et al. 2005). Among sick children in the 20 percent poorest households that sought care outside their homes, 51 percent went to public sector providers and 45 percent went to private sector providers. The private sector's major share of health care in these countries varied 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 data for another year also showed an increasing trend in the use of private providers, such as Malawi (from 27 percent in 1992 to 39 percent in 2000 for the poorest quintile, and from 31 percent to 49 percent over the same period for the richest quintile). In other countries, the poor increasingly sought care outside their homes, mostly from public providers, while the richest favored private providers. This was found to be the case in countries such as Cameroon (1991 as compared with 1998), Ghana (1993 as compared with 1998), and Benin (1996 as compared with 2001).

Two other analyses of DHS data—one of 13 and the other of 38 developing countries in sub-Saharan Africa and other regions—revealed that 34–96 percent and 37–99 percent of the poorest quintile children seeking care for diarrhea and acute respiratory tract infection, respectively, received treatment in the non-state sector (Gwatkin et al. 2000; and Bustreo, Harding, and Axelsson. 2003, figure 7).

Figure 7: Percentage of children in the bottom wealth quintile treated outside the public sector for diarrhoea and acute respiratory infection, 38 countries



Source: Bustreo, Harding, and Axelsson 2003.

The DHS data also help shed light on private sector involvement in family planning. In Latin America, nongovernmental organizations and commercial entities frequently provide family planning services. The 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 were Indonesia (70 percent), Colombia (67 percent), Paraguay (64 percent), Ecuador (63 percent), and Guatemala (62 percent) (PSP-One 2005). The bottom five countries were Armenia (3 percent), Mozambique (6 percent), Kazakhstan (11 percent), Vietnam (14 percent), and Namibia (14 percent).

2. Objective

This study aims to portray the relative importance of the private and public sectors in providing health care to women and children in 25 low-income countries. The study is based on data available online from the DHS, face-to-face interview surveys of nationally representative households. Countries were chosen for the magnitude of the private-public mix in 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 and cough. Countries with noticeable temporal changes in the share of health care provided by the private and public sectors over two waves of the surveys (five to six 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 examined for any linkages with differences in country-specific socioeconomic contexts: national income, out-of-pocket health spending, and governance performance. The private-public mix was also examined ecologically for any associations with population health outcomes in terms of infant mortality and under-five mortality.

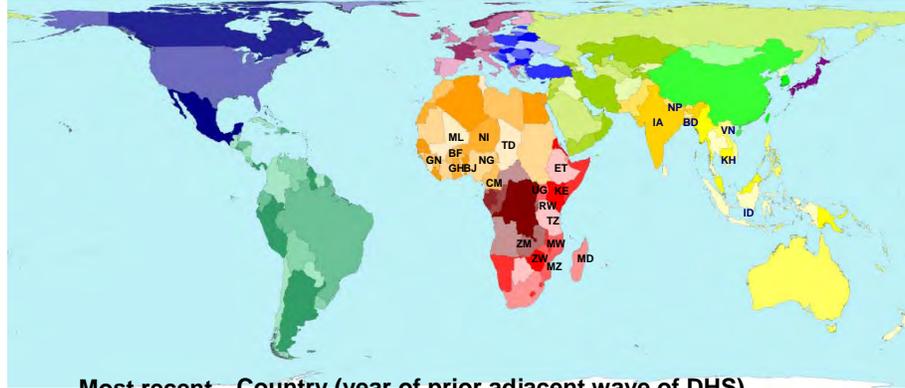
3. Methodology

The Demographic and Health Surveys

The focus of this report is on 25 low-income countries for which multiple waves of DHS data are available. Nineteen of these countries are located in sub-Saharan Africa and six in South and Southeast Asia. Figure 8 shows the 25 countries and the years of DHS that were included in the analysis. Two waves were included for each country: the most recent and a prior adjacent wave.

In the 25 low-income countries selected for this study, the most recent waves of DHS were conducted during the years 2001–2006, and the prior adjacent waves were conducted five to six years earlier, in 1995–2000.

Figure 8: The 25 countries with 2 years of DHS data sets used in the analysis



| Most recent | Country (year of prior adjacent wave of DHS) |
|-------------|---|
| 2006 | Nepal (2001), Uganda (2000), Niger (1998) |
| 2005 | Ethiopia (2000), Cambodia (2000), Rwanda (2000), Guinea (1999), Zimbabwe (1999), India (1998) |
| 2004 | Malawi (2000), Bangladesh (1999), Tanzania (1999), Cameroon (1998), Chad (1996) |
| 2003 | Nigeria (1999), Burkina Faso (1998), Ghana (1998), Kenya (1998), Madagascar (1997), Mozambique (1997) |
| 2002 | Indonesia (1997), Vietnam (1997) |
| 2001 | Benin (1996), Zimbabwe (1996), Mali (1995) |

Source: Author's analysis based on DHS data.

Health care tracers

The analysis focuses on four types of health care that were used as tracers: choices for family planning and delivery in women as well as treatment of diarrhea and of fever and cough in children under the age of five. The survey questions specific to each health care tracer used in the analysis are presented in table 1.

The reference point in time for respondents' recall varies by tracer. The family planning questions focus on the current method of contraception, while questions about delivery

allowed for an unlimited period of recall in the past. Questions about treatment of child illnesses allowed the respondent a recall period of two weeks prior to the interview.

Table 1: DHS survey questions about four health care tracers

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

Source: Author’s analysis based on DHS questionnaires.

Typology of health sectors

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

The public sector covers health facilities and providers that are affiliated with the government (table 2). The formal private sector in this analysis includes the well-defined commercial, for-profit business entities of hospitals, clinics, or pharmacies² as well as health facilities or providers that belong to nongovernmental organizations or missions. The informal sector is very diverse. Most often, the informal sector includes unqualified providers like traditional healers, drug peddlers or vendors, and shops. In this analysis, the informal sector also covers care provided by friends and relatives, and even delivery at the respondent’s own home. Unspecified providers and “others” were placed the informal sector category.

Table 2: Classification of health care sectors

| Tracer | Informal Sector | Formal Private Sector | Public Sector |
|-----------------|--|--|---|
| Family planning | <ul style="list-style-type: none"> • Shop • Church • Friend/relative • Other | <ul style="list-style-type: none"> • Private hospital/clinic • Doctor • Pharmacy • Nongovernmental | <ul style="list-style-type: none"> • Government hospital/clinic • Government field worker |

² In low-income countries, households may not be able to distinguish between pharmacies run by licensed or registered pharmacists and those without qualified pharmacists. The former should be classified as formal private and the latter as informal private providers. In some low-income countries with pluralistic health systems, this gray zone is applicable to other types of health practitioners—for example, doctors could be either Westernized mainstream doctors or alternative traditional healers.

| | | | |
|--|---|--|--|
| | | organization clinic, depot holder, field worker | <ul style="list-style-type: none"> Family welfare center |
| Delivery care | <ul style="list-style-type: none"> Traditional birth attendant's home Midwife's home Relative's home Respondent's home Other | <ul style="list-style-type: none"> Private hospital/clinic Private maternity home Nongovernmental organization hospital/clinic Mission hospital/clinic Other private facility | <ul style="list-style-type: none"> Government hospital Government health center/health post Government maternity home Community health center Primary health center Government dispensary Other public facility |
| Child diarrhea and child fever and cough treatment | <ul style="list-style-type: none"> Shop Traditional healer Drug peddler/vendor Other | <ul style="list-style-type: none"> Private hospital/clinic Private pharmacy Private doctor Private mobile clinic Private health worker Other private facility | <ul style="list-style-type: none"> Government hospital Government health center/health post Government mobile clinic Community health worker Other public facility |

Source: Author's analysis based on DHS data.

For family planning sources, the DHS questioning was restricted to a single type of provider (regarding the current method of contraception). For delivery and for treatment of child diarrhea and child fever and cough, the survey questions allowed for *multiple* choices of care per care-seeking episode. In this analysis, a woman with up to six possible deliveries³ was taken as the unit of analysis for delivery care and a child with up to six treatment choices as the unit of analysis for treatment of illness.

Table 3 summarizes the proportion of analytical units (women or children) who have received care from more than one type of provider or facility per health episode.

Table 3: Proportion of multiple sector types of providers per health care episode, most recent

| Country (Year of DHS) | Delivery Care | Diarrhea Treatment | Fever/Cough Treatment |
|-----------------------|---------------|--------------------|-----------------------|
| Bangladesh (2004) | 1.8% | 25.1% | 22.2% |
| Benin (2001) | 7.6% | 14.8% | 17.6% |
| Burkina Faso (2003) | 6.1% | 6.9% | 4.2% |
| Cambodia (2005) | 3.6% | 31.8% | 29.8% |
| Cameroon (2004) | 8.8% | 13.8% | 18.7% |
| Chad (2004) | 4.1% | 3.6% | 4.2% |
| Ethiopia (2005) | 1.6% | 15.8% | 21.1% |
| Ghana (2003) | 7.7% | 8.4% | 12.0% |
| Guinea (2005) | 5.2% | 6.7% | 9.6% |
| India (2005) | 6.8% | 74.5% | 77.3% |

³ Except in Guinea (2005) and Rwanda (2005), where respondents were allowed up to four and five births per woman, respectively.

| | | | |
|-------------------|-------|-------|-------|
| Indonesia (2002) | 2.0% | 44.1% | 28.4% |
| Kenya (2003) | 11.4% | 28.5% | 28.7% |
| Madagascar (2003) | 8.1% | 29.2% | 30.2% |
| Malawi (2004) | 13.4% | 6.5% | 11.4% |
| Mali (2001) | 8.4% | 21.3% | 66.1% |
| Mozambique (2003) | 7.9% | 2.7% | 1.9% |
| Nepal (2006) | 4.1% | 17.0% | 23.3% |
| Niger (2006) | 4.3% | 6.0% | 32.2% |
| Nigeria (2003) | 6.6% | 12.3% | 14.6% |
| Rwanda (2005) | 10.1% | 8.9% | 7.7% |
| Tanzania (2004) | 11.9% | 14.8% | 11.6% |
| Uganda (2006) | 15.9% | 55.7% | 58.4% |
| Vietnam (2002) | 1.2% | 39.2% | 43.2% |
| Zambia (2001) | 9.2% | 16.7% | 17.5% |
| Zimbabwe (2005) | 7.2% | 18.2% | 10.2% |

Source: Author's analysis based on DHS data.

In almost all 25 countries, a majority of the survey respondents sought maternal and child health care from a single health sector, whether informal, formal private, or public. This is particularly true for the choice of delivery care—at least 90 percent of mothers gave birth to their babies in the same health sector. The proportion of delivery care received from multiple sectors is smaller in South and Southeast Asia than in sub-Saharan Africa, where mothers chose more than one sector to give birth only in Uganda (15.9 percent in 2006), Malawi (13.4 percent in 2004), Tanzania (11.9 percent in 2004), and Kenya (11.4 percent in 2003)

The choice of multiple sectors is more prevalent for treating child illnesses than for delivery care. Per illness episode, India (2005) and Uganda (2006) are the countries where more than half of women sought care from more than one health sector for their children. Nearly all multiple-care types in these two countries were a combination of the public and formal private sectors. The dominance by the public and 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 treatment of child illnesses. Mali (2001), however, is the only country where the combination of public and informal sectors dominated the choice of multiple sectors.

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 public sector health care facilities or providers would be defined as “public.” A woman who had never visited the public sector but had received care from at least one provider in the formal private sector would be classified as “formal private.” The informal sector was restricted to the women or children who chose only the informal care setting. In other words, this is the only resource the survey respondents relied on when seeking care.

Because of this hierarchical typology, the results of the analysis will be biased in favor of the public sector's share of health care and against the informal and formal private

sectors' shares of health care. For example, a woman whose health care choice was classified as "public sector" had sought care at least once from public providers (and *may* have sought care from formal and informal private providers) during the reference period. Meanwhile, a woman whose health care choice was classified as "formal private sector" had *never* received care from public providers during the reference period, but had sought care at least once from formal private providers (and *may* have sought care from informal care providers). The informal private sector represents those who had 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, while the public sector figure represents an upper bound of access to public providers.

4. Results

An analysis of the most recent DHS (2001–2006) and an adjacent prior wave (1995–2000) reveals a wide variation in the role of the private sector in health care for women of reproductive age and for children under five in 19 low-income countries in sub-Saharan Africa and 6 low-income countries in South and Southeast Asia.

Women's health care: Family planning and delivery

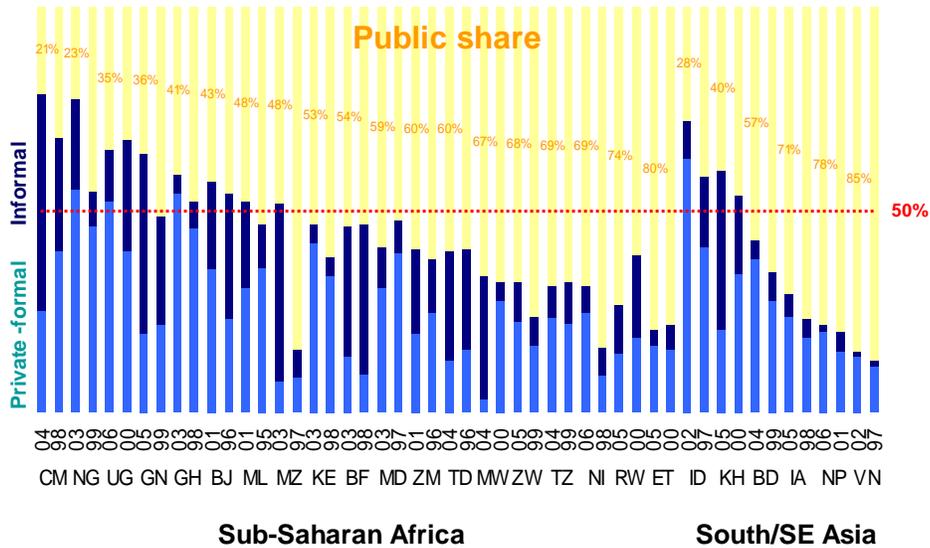
Private-public share of women's health care

In 8 of the 19 low-income countries in sub-Saharan Africa and in 2 of the 6 in South and Southeast Asia, the private sector provided more than 50 percent of family planning services (defined as the use of modern contraceptives), mostly through formal private providers or facilities (figure 9A).⁴

⁴ Note that only women who, at the time they were interviewed, were receiving modern contraception methods are included in the analysis. Hence, this figure does not represent the contraceptive prevalence rate for the entire eligible female population.

Figure 9A: Percentage of women receiving modern contraception outside the public sector

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



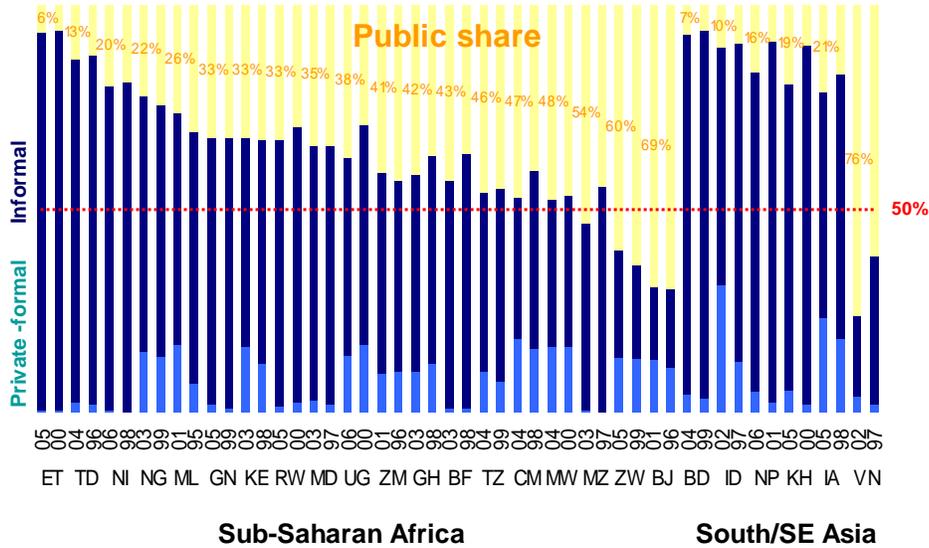
Note: The middle range (dark blue) represents the informal sector; the bottom range (light blue) represents the formal private sector; the top range (yellow) represents the public sector.
 Source: Author’s analysis based on DHS data.

In several countries, a majority of the female population of reproductive age obtained modern contraceptives from informal providers, which include shops, churches, friends, and relatives, for example. The informal sector accounted for the largest share (53 percent) in Cameroon in 2004. The public and formal private sectors had a share of approximately 21 percent and 25 percent, respectively.

The private sector played an even more dominant role in delivery care in these 25 countries, according to the DHS data. Informal delivery at the survey respondents’ homes or at the homes of their friends, relatives, midwives, and traditional birth attendants was revealed to be the only resort for almost all deliveries in the private sector in several countries (figure 9B).

Figure 9B: Percentage of mothers giving birth outside public health facilities

Where did you give birth to (NAME)?



Note: The middle range (dark blue) represents the informal sector; the bottom range (light blue) represents the formal private sector; the top range (yellow) represents the public sector.
 Source: Author’s analysis based on DHS data.

In Vietnam (2002), however, the public sector dominated these two health care services for the female population. The informal sector clearly prevailed in family planning in Cameroon (2004), and in delivery care in Ethiopia (2005) and Bangladesh (2004), while the formal private sector accounted for the greatest share of both family planning and delivery services in Indonesia (2002).

Nearly all informal delivery care occurred in the homes of surveyed mothers. Taking together all health sectors for those choosing a single type of health sector, delivery only at home accounted for 40–60 percent, while delivery at the homes of relatives, midwives, or traditional birth attendants accounted for less than 10 percent in most countries (tables 4A and 4B). Countries where less than half of mothers gave birth only in their own homes tended to have a large share of total deliveries by the public and formal private sectors (table 4A). In Ethiopia (2005), Chad (2004), Niger (2006), and Nepal (2006), more than three-fourths of mothers gave birth in their own homes only (table 4B). Noticeably in these four countries, the formal private and public sectors had a modest share (less than 20 percent) of total deliveries.

Table 4A: Countries where less than half of mothers gave birth 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% |

| | | | |
|-------------------|-------|-------|-------|
| Cameroon (2004) | 33.6% | 4.3% | 62.1% |
| Ghana (2003) | 42.7% | 9.6% | 47.7% |
| India (2005) | 48.2% | 11.1% | 40.7% |
| Kenya (2003) | 49.4% | 8.1% | 42.5% |
| Malawi (2004) | 18.5% | 10.1% | 71.4% |
| Mozambique (2003) | 44.9% | 5.3% | 49.8% |
| Tanzania (2004) | 43.9% | 5.9% | 50.2% |
| Uganda (2006) | 45.6% | 12.1% | 42.3% |
| Vietnam (2002) | 19.8% | 0.4% | 79.8% |
| Zimbabwe (2005) | 23.5% | 5.1% | 71.4% |
| Zambia (2001) | 43.9% | 10.1% | 46.0% |

Source: Author's analysis based on DHS data.

Table 4B: Countries where more than half of mothers gave birth 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 |
|--------------------------|---------------------------|-----------------------------|---------------------------------------|
| Bangladesh (2004) | 63.4% | 26.6% | 10.0% |
| Burkina Faso (2003) | 57.1% | 2.9% | 40.0% |
| Cambodia (2005) | 73.9% | 4.4% | 21.7% |
| Chad (2004) | 84.1% | 3.8% | 12.1% |
| Ethiopia (2005) | 87.9% | 6.5% | 5.6% |
| Indonesia (2002) | 57.3% | 2.2% | 40.5% |
| Guinea (2005) | 59.2% | 9.9% | 30.9% |
| Madagascar (2003) | 54.5% | 13.4% | 32.1% |
| Mali (2001) | 57.8% | 4.4% | 37.8% |
| Nepal (2006) | 78.4% | 3.4% | 18.2% |
| Niger (2006) | 79.9% | 3.3% | 16.8% |
| Nigeria (2003) | 60.6% | 6.7% | 32.7% |
| Rwanda (2005) | 66.7% | 5.9% | 27.4% |

Source: Author's analysis based on DHS data.

Trends in the private-public mix in women's health

A comparison of the private-public mix between two DHS waves (five to six years apart) sheds light on each sector's expanding (or shrinking) role in women's health in some countries.

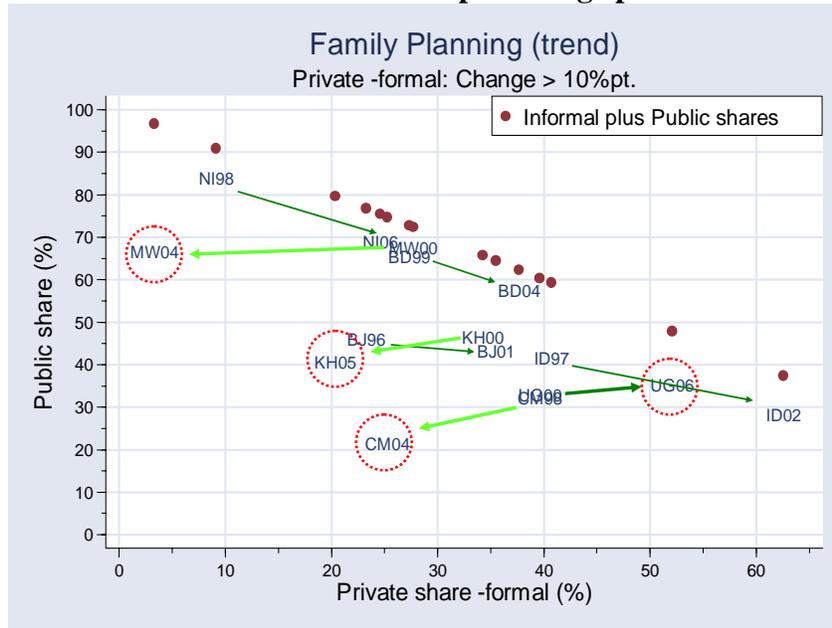
Figures 10A and 10B depict countries that experienced a change of more than 10 percentage points between the two waves of DHS in the formal and informal private sectors' relative shares of family planning services.⁵

Between 1997 and 2002, Indonesia saw an increase of about 22 percentage points in family planning services provided by the formal private sector, while the public sector's share declined by 14 percentage points and the informal sector's share declined by 8

⁵ This represents a change in the size of a piece of the pie, not the size of the whole pie, because women who were not receiving family planning services were not taken into account.

percentage points (figure 10A). In contrast, three countries saw the formal private share decline by more than 10 percentage points: Cameroon (between 1998 and 2004), Malawi (between 2000 and 2004), and Cambodia (between 2000 and 2005).

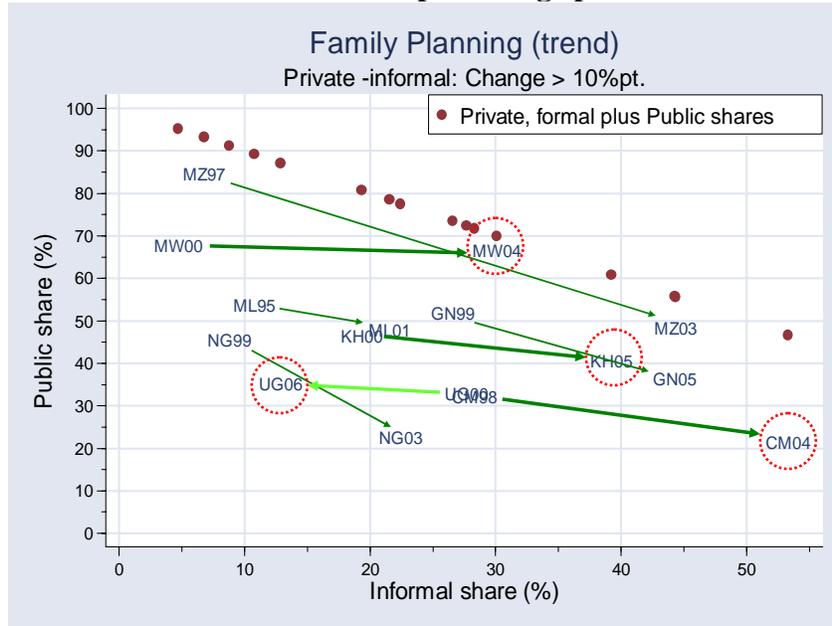
Figure 10A: Countries with a change in the formal private sector’s family planning share of more than 10 percentage points



Source: Author’s analysis based on DHS data.

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

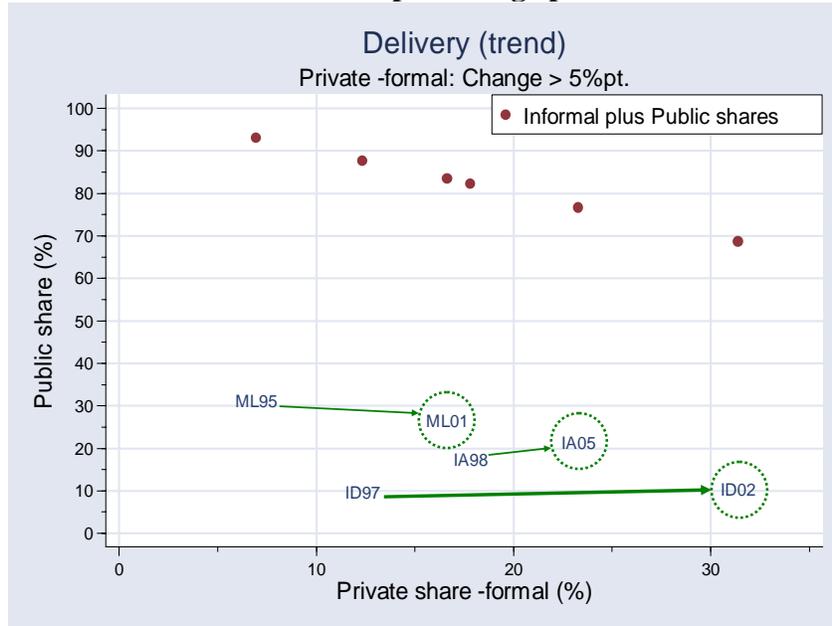
Figure 10B: Countries with a change in the informal sector’s family planning share of more than 10 percentage points



Source: Author’s analysis based on DHS data.

Trends in the formal private sector’s share of delivery care are not that obvious. Only three countries saw the formal private sector expand its share by more than 5 percentage points. These countries are Indonesia (between 1997 and 2002), Mali (between 1995 and 2001), and India (between 1998 and 2005) (figure 11A). The increasing trend in the formal private sector’s share of delivery in Indonesia came at the expense of a declining trend in the informal sector’s share by a comparable magnitude (shown in figure 11B). This means that the public sector’s share of delivery in Indonesia was relatively stable between the years 1997 and 2002.

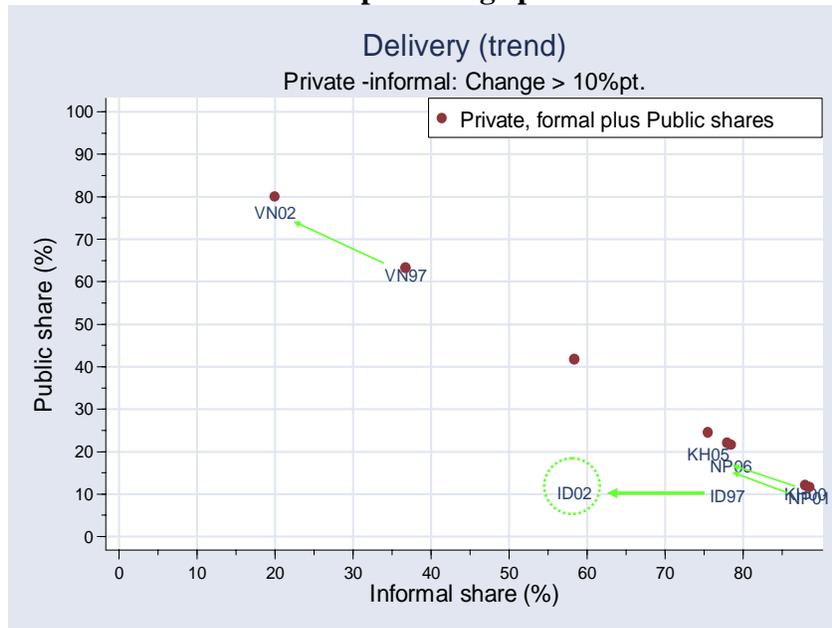
Figure 11A: Countries with a change in the formal private sector’s delivery share of more than 5 percentage points



Source: Author’s analysis based on DHS data.

Apart from Indonesia, three other countries in Asia (Cambodia, Nepal, and Vietnam) experienced a shrinkage of more than 10 percentage points in the informal sector’s share of delivery.

Figure 11B: Countries with a change in the informal sector’s delivery share of more than 10 percentage points



Source: Author’s analysis based on DHS data.

Geographic and economic gaps in the private-public mix in women's health

In this analysis, the term *geographic gap* refers to a difference in the public (or private) sector's share of health care between people who live in urban areas and those who live in rural areas, and the term *economic gap* is defined as the difference between the top and bottom wealth quintiles.⁶

Where there are geographic and economic gaps, conventional wisdom says that the formal private sector is typically more prevalent in the health care for the urban or wealthier population than for their rural or poorer counterparts.

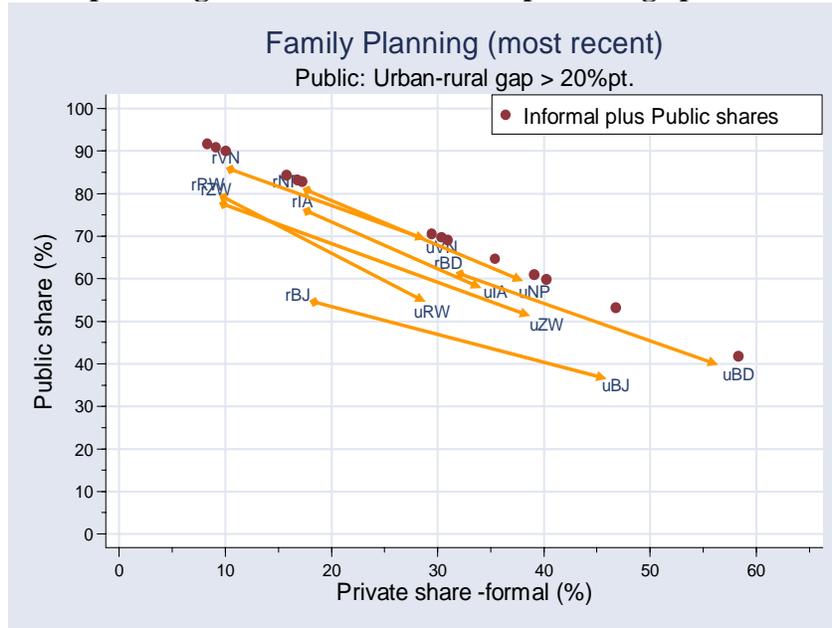
Figures 12A and 13A depict countries where there is a noticeable gap (a gap of more than 20 percentage points) between urban and rural populations in the public sector's share of family planning services and delivery care. Figures 12B and 13B show countries where there is a similar gap between rich and poor populations in the public sector's share for the two women's health tracers. (The length of the arrows in each figure represents the magnitude and direction of the geographic and economic gaps in the private-public share of service delivery.)

Seven countries (Bangladesh, Benin, India, Nepal, Rwanda, Vietnam, and Zimbabwe) had a noticeable urban-rural gap in family planning services, whereby the rural female population relied on the public sector more than their urban counterparts did by a magnitude of at least 20 percent (figure 12A).⁷

⁶ These are the top 20 percent of households with the highest wealth index and the bottom 20 percent of households with the lowest wealth index per country.

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

Figure 12A: Countries with an urban-rural gap in the public sector’s family planning share of more than 20 percentage points

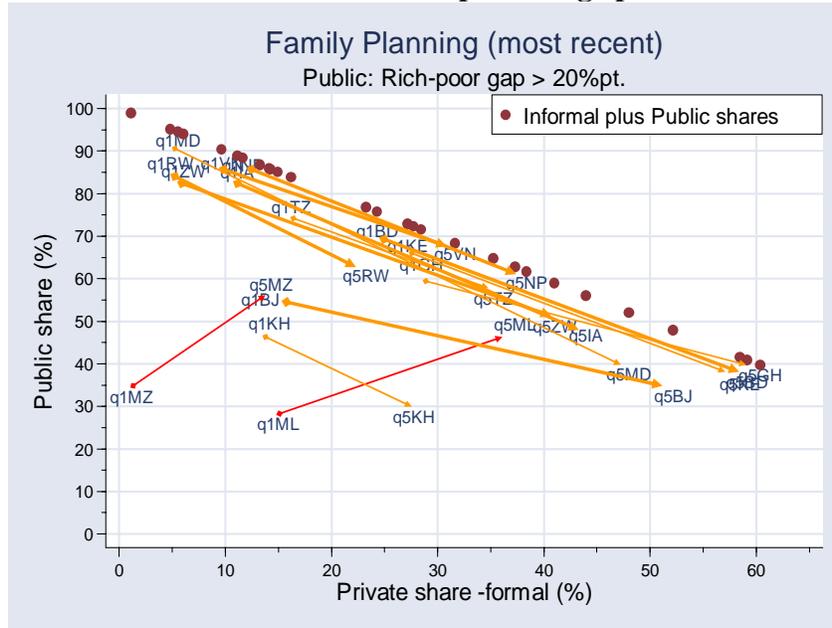


Source: Author’s analysis based on DHS data.

Seven more countries were found to have a wide economic gap (a gap of more than 20 percentage points) in the public provision of family planning services (figure 12B), in addition to those with a noticeable geographic gap.

The fact that the public and formal private sectors reflected differences in choices by population subgroups differently (public for the rural and private for the urban) is also observed in the rich-poor gap. Women in the poorest quintile of households relied heavily on the public sector for family planning services in most countries as contrasted with the richest quintile, except in two countries, Mozambique and Mali, where both the public and private sectors were preferred by the rich subgroup.

Figure 12B: Countries with a rich-poor gap in the public sector’s family planning share of more than 20 percentage points

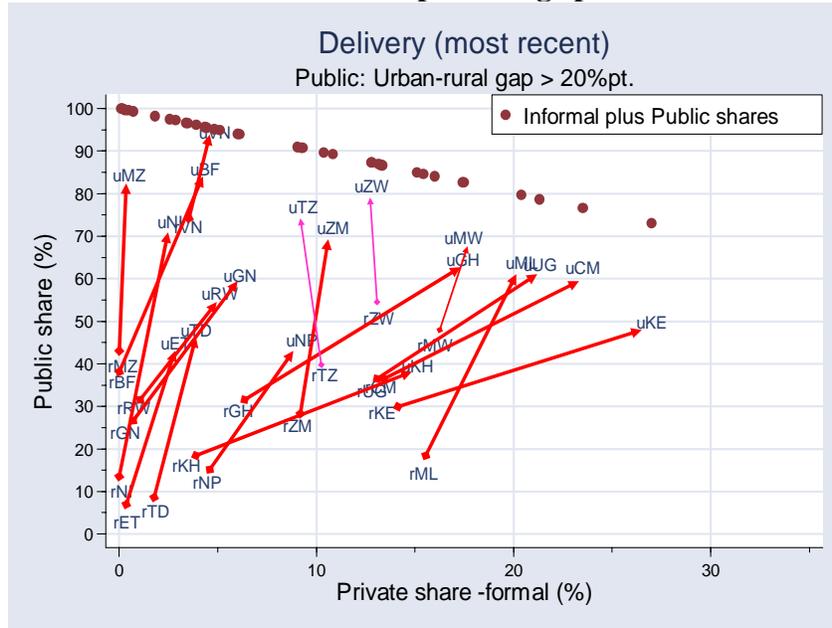


Source: Author’s analysis based on DHS data.

Even more countries had wide geographic and economic gaps in the public sector’s share for delivery care (figures 13A and 13B), more so than for family planning.

Unfortunately, not only was the formal private sector found to be more prevailing in the care for the urban and rich mothers in all countries, but also the public sector tended to favor these better-off subgroups (as shown by the red arrows), except for the urban-rural gap in Tanzania and Zimbabwe (as shown by the pink arrows in figure 13A), where the formal private share of delivery for mothers living in rural areas was a little higher than for their urban counterparts.

Figure 13A: Countries with an urban-rural gap in the public sector’s delivery share of more than 20 percentage points

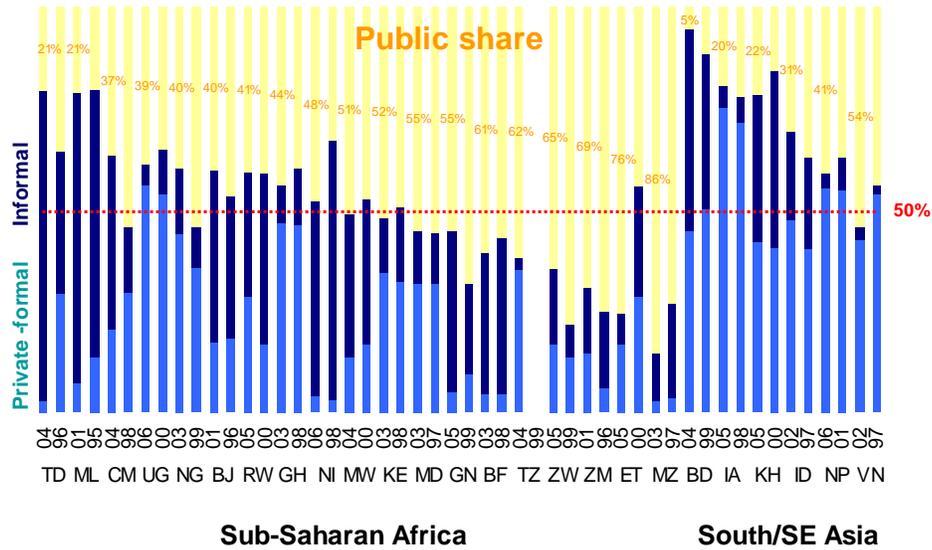


Source: Author’s analysis based on DHS data.

The rich-poor gap in the public and formal private shares of delivery care is even greater than the urban-rural gap. More countries had a gap of more than 20 percentage points. Besides, all the arrows are red and point toward the northeast direction, indicating a higher prevalence of health care share by both public and formal private sectors among the economically well off female population (figure 13B).

Figure 14A: Percentage of women whose children received diarrhea treatment outside the public sector

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

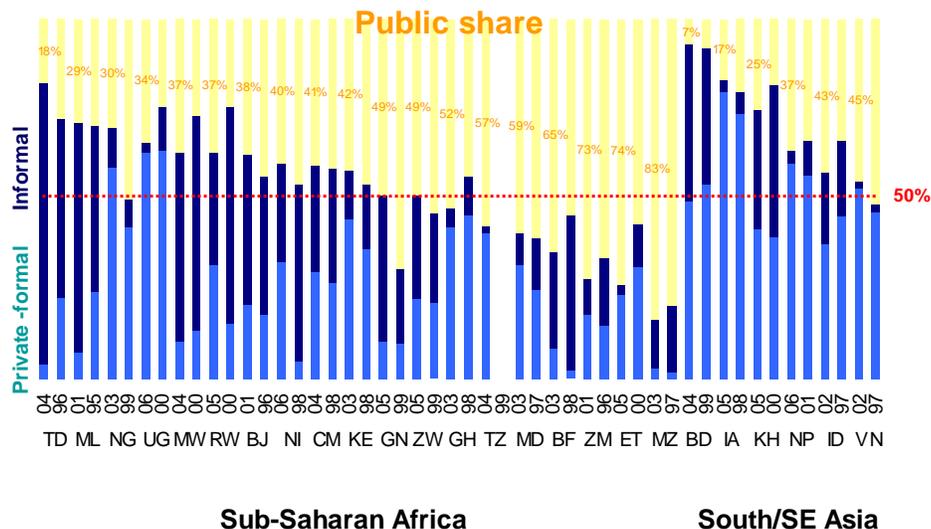


Note: The middle range (dark blue) represents the informal sector the bottom range (light blue) represents the formal private sector; the top range (yellow) represents public sector.
 Source: Author's analysis based on DHS data.

Vietnam (2002), Nepal (2006), and Uganda (2006) experienced a minimal role of the informal sector for diarrhea and for fever and cough, while in Mozambique (2003) treatment by the public sector dominated. In India (2005), the formal private sector was dominant for these illnesses.

Figure 14B: Percentage of women whose children were treated for fever/cough outside the public sector

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



Note: The middle range (dark blue) represents the informal sector the bottom range (light blue) represents the formal private sector; the top range (yellow) represents public sector.
 Source: Author’s analysis based on DHS data.

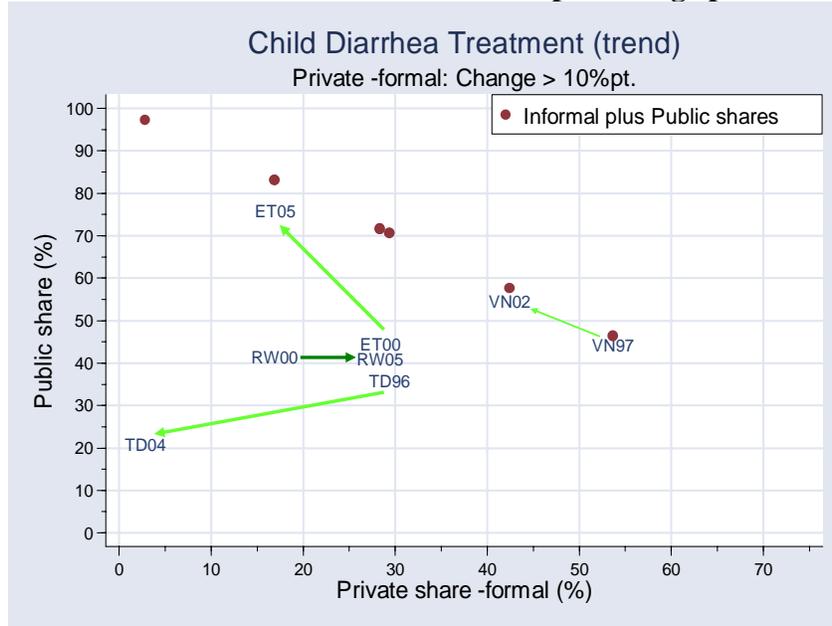
Trends in the private-public mix in the treatment of child illnesses

Three countries experienced a reduction in the formal private share of child diarrhea treatment by more than 10 percentage points over a period of about five years between the two waves of DHS. These countries are Chad, Ethiopia, and Vietnam (figure 15A).

In addition, the public sector’s share was decreasing in Chad, while Ethiopia and Vietnam experienced an increasing trend in the public share of diarrhea treatment.

Only Rwanda showed an increasing trend of more than 10 percentage points in the formal private sector’s share of diarrhea treatment, at the expense of the informal sector (figure 15B).

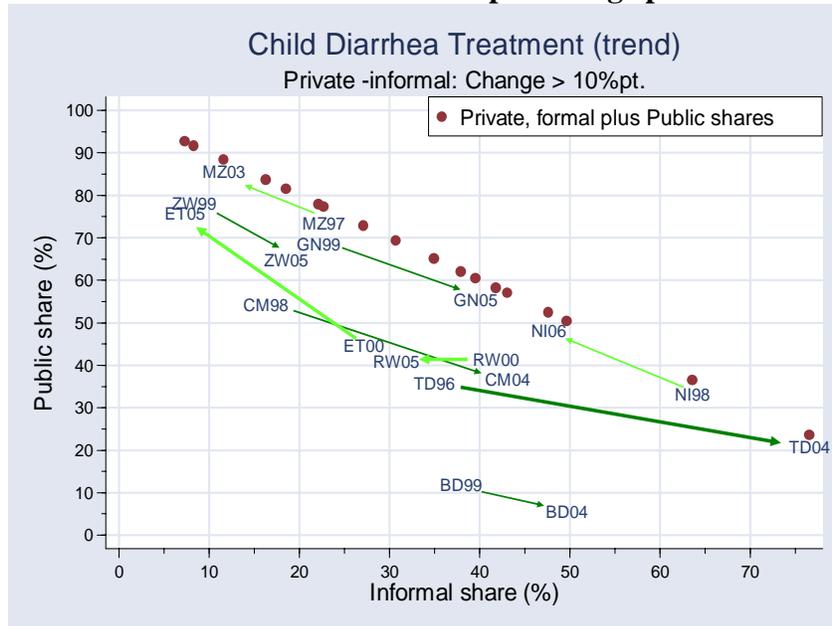
Figure 15A: Countries with a change in the formal private sector’s share of diarrhea treatment of more than 10 percentage points



Source: Author’s analysis based on DHS data.

Chad saw a large expansion in informal care of child diarrhea at the expense of both the formal private and public sectors (figure 15B). Ethiopia experienced a decline in both the formal and informal private shares (with a huge increase in the public share).

Figure 15B: Countries with a change in the informal sector’s share of diarrhea treatment of more than 10 percentage points

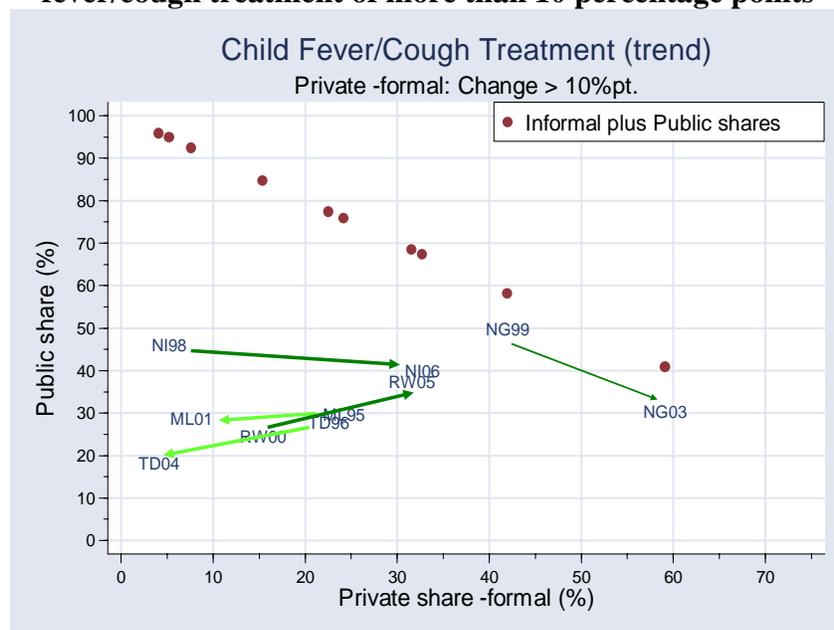


Source: Author’s analysis based on DHS data.

As in the trend in diarrhea treatment, Chad also experienced a shrinkage in the formal private sector (with an increasing trend in the informal sector, shown in figure 16B), while Rwanda moved in the opposite direction; its formal private sector was expanding (figure 16A).

Mali experienced a decreasing trend in the formal private share similar to the trend in Chad, while Niger was similar to Rwanda with an increasing formal private sector trend.

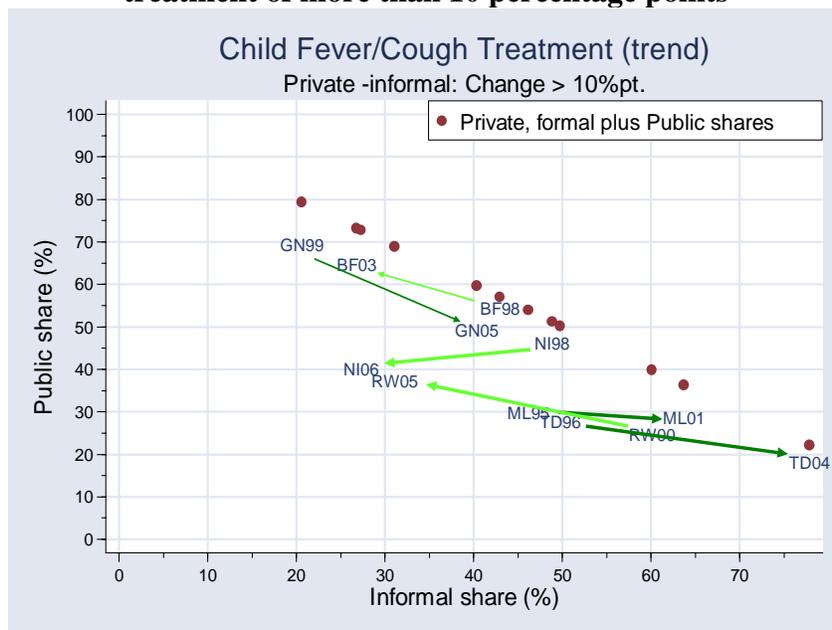
Figure 16A: Countries with a change in the formal private sector’s share of fever/cough treatment of more than 10 percentage points



Source: Author’s analysis based on DHS data.

Again, for Chad and Rwanda, which experienced an opposite movement in the private sector’s share of treatment of both diarrhea and of fever and cough, figure 16B depicts an expansion of the informal sector for Chad and a shrinkage for Rwanda. Mali and Niger showed trends that paralleled those in Chad and Rwanda, respectively.

Figure 16B: Countries with a change in the informal sector’s share of fever/cough treatment of more than 10 percentage points



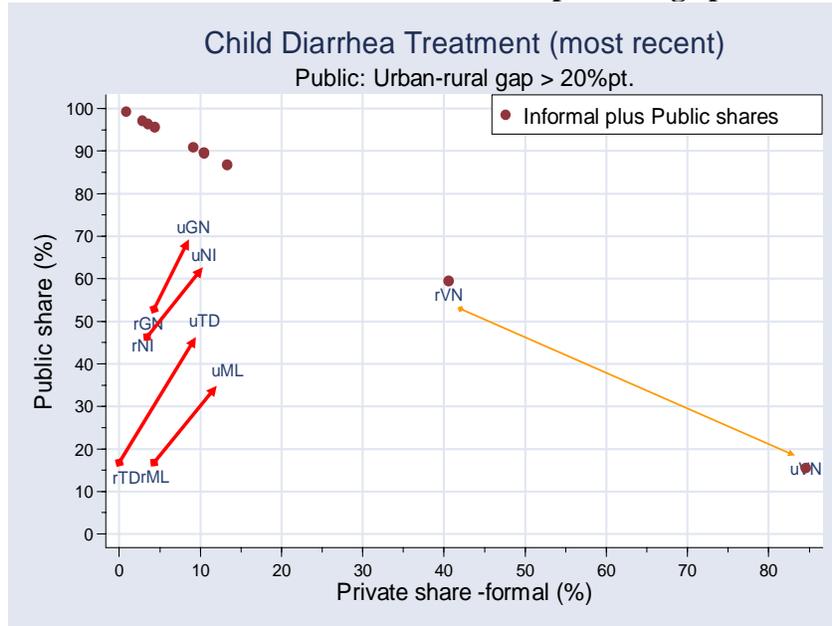
Source: Author’s analysis based on DHS data.

Geographic and economic gaps in the private-public mix in child treatment

Analysis of the DHS data found a mixed result on the geographic and economic gaps in the treatment of child illnesses. Countries with a noticeable gap (more than 20 percentage points) in the public share of child illness treatment between urban and rural areas (and between the first and fifth wealth quintiles) were selected for an illustration.

Five countries (Chad, Guinea, Mali, Niger, and Vietnam) had an urban-rural gap of more than 20 percentage points in the public share of diarrhea treatment (figure 17A). In all five countries, urban children who received treatment chose formal private providers in a greater proportion than rural children. However, Vietnam is the only country where rural households chose public facilities in a greater proportion than their urban counterparts. In the four other countries, urban households chose care from both the public and private sectors in a greater proportion than their rural counterparts.

Figure 17A: Countries with an urban-rural gap in the public sector's share of diarrhea treatment of more than 20 percentage points

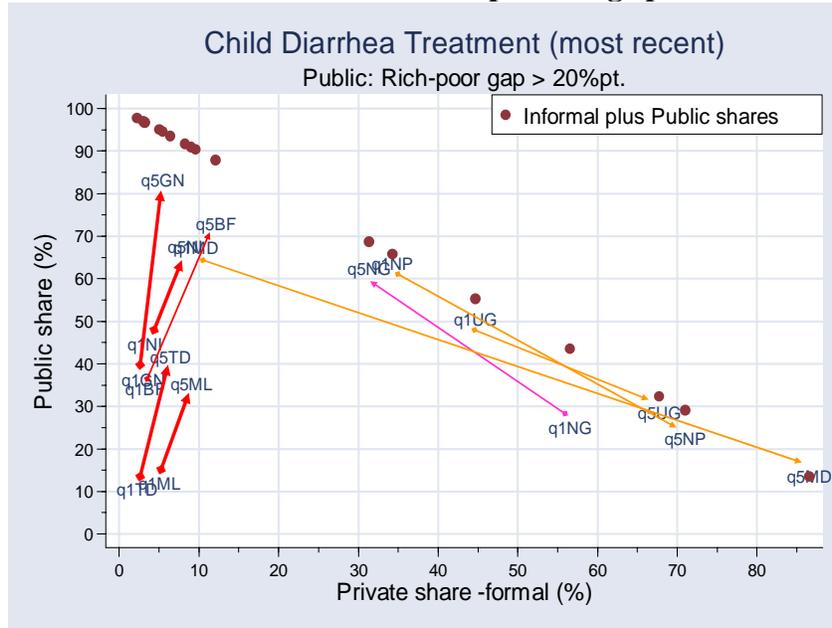


Source: Author's analysis based on DHS data.

The same four countries (Chad, Guinea, Mali, and Niger) also had a rich-poor gap in the private-public mix of diarrhea treatment in the same pattern as their urban-rural gap (urban children received care from both the public and formal private sectors in a larger proportion than rural children) (figure 17B).

In Indonesia, Nepal, and Uganda, children with diarrhea in the 20 percent poorest households relied more on treatment from the public sector than from the formal private sector. The only country moving noticeably in the opposite direction was Nigeria, where the 20 percent poorest children relied more on the formal private sector and less on the public sector.

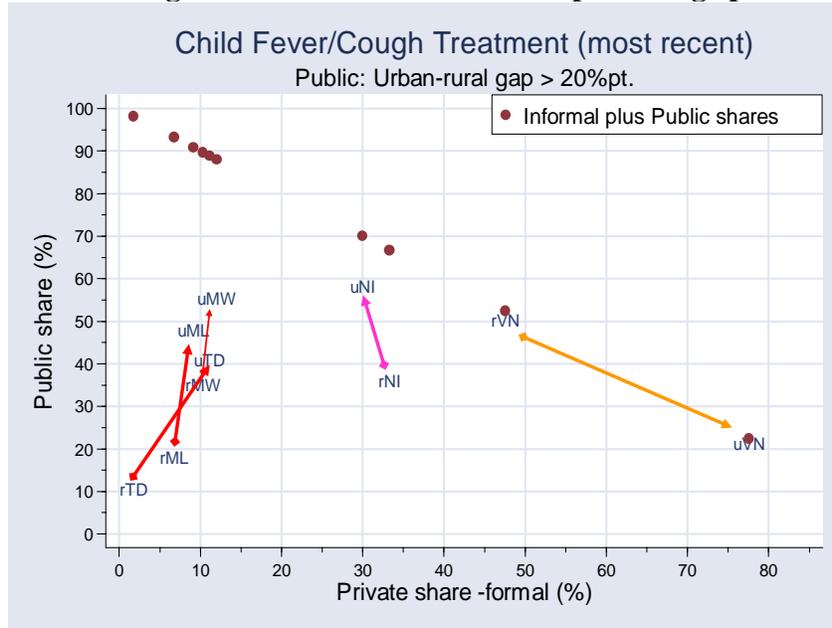
Figure 17B: Countries with a rich-poor gap in the public sector's share of diarrhea treatment of more than 20 percentage points



Source: Author's analysis based on DHS data.

For the treatment of child fever and cough, Chad and Mali as well as Vietnam still showed the same pattern of an urban-rural gap between the public and formal private sectors as for the treatment of diarrhea (figure 18A).

Figure 18A: Countries with an urban-rural gap in the public sector's share of fever/cough treatment of more than 20 percentage points

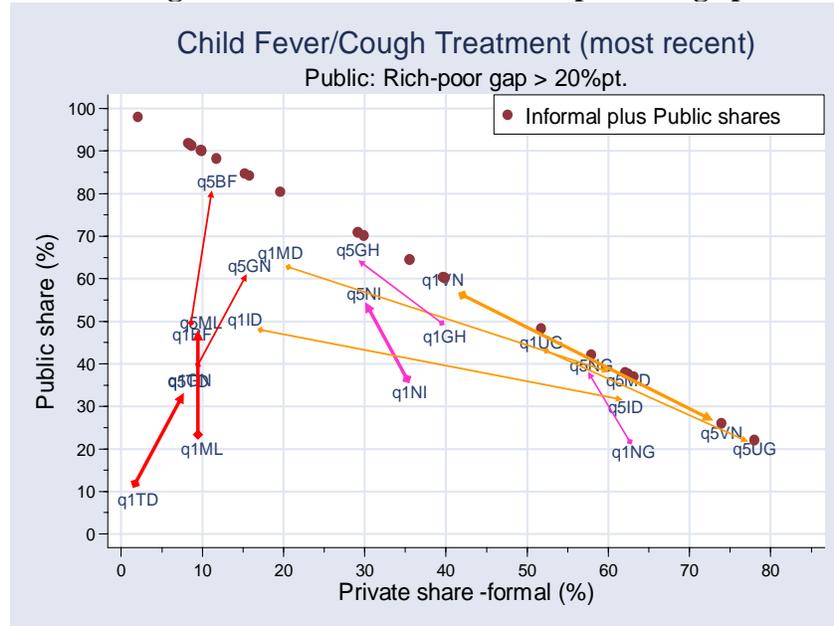


Source: Author's analysis based on DHS data.

Urban children in Chad and Mali more often sought treatment in both the public and formal private sectors than their rural counterparts, while in Vietnam, urban children relied more on the formal private sector and rural children relied on the public sector.

Chad, Mali, and Vietnam also had the same pattern for the rich-poor gap (figure 18B).

Figure 18B: Countries with a rich-poor gap in the public sector's share of fever/cough treatment of more than 20 percentage points



Source: Author's analysis based on DHS data.

Chad and Mali were the two low-income countries that showed a consistent pattern in which both the formal private and public sectors were more prevalent in the health care for the better-off, while Vietnam was an example of a low-income country where the worse-off depended largely on the public sector for the treatment of these two common illnesses in children.

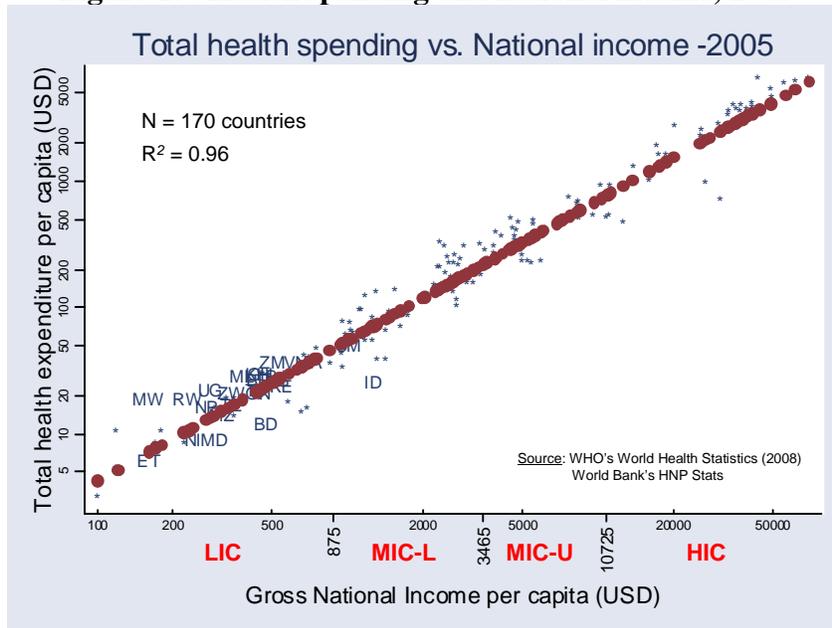
The influence of socioeconomic contexts

The following subsections examine the linkage (if any) between socioeconomic contexts and the private-public mix in women's and children's health care. Country-level variations in national income, out-of-pocket health spending, and governance performance were put into perspective for further policy implications.

National income

The 25 countries in this analysis are at the lower end of the all-country distribution in terms of level of economic development. However, the observed health spending covers both higher spending (e.g., Malawi, Rwanda, Uganda) and lower spending (e.g., India, Bangladesh, Madagascar) than the level predicted by national income in 2005 (figure 19).

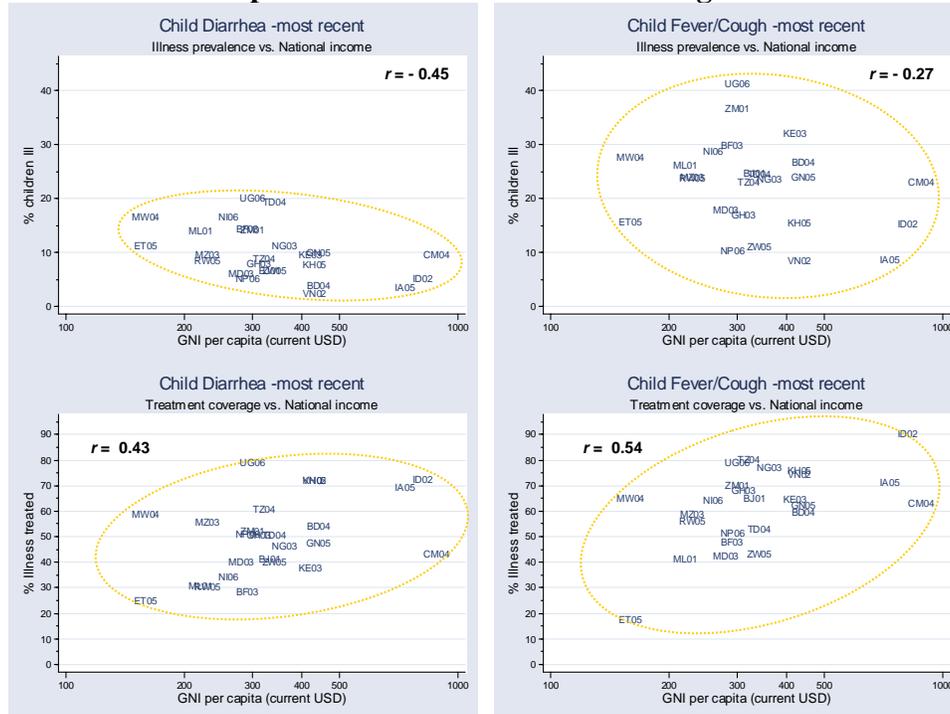
Figure 19: Health spending and national income, 2005



Note: LIC stands for low-income countries; MIC-L stands for lower-middle-income countries; MIC-U stands for upper-middle-income countries; HIC stands for high-income countries.
Source: Author's analysis based on World Health Statistics (WHO 2008) and HNP Stats (World Bank 2008).

As a country's economic condition improved, the proportion of children who suffered from diarrhea and from fever and cough declined ($r = -0.45$ and -0.27 , respectively) (figure 20, upper left and right panels). Conversely, national income showed a positive correlation with treatment coverage of the two illnesses ($r = 0.43$ for diarrhea and 0.54 for fever and cough) (figure 20, bottom left and right).

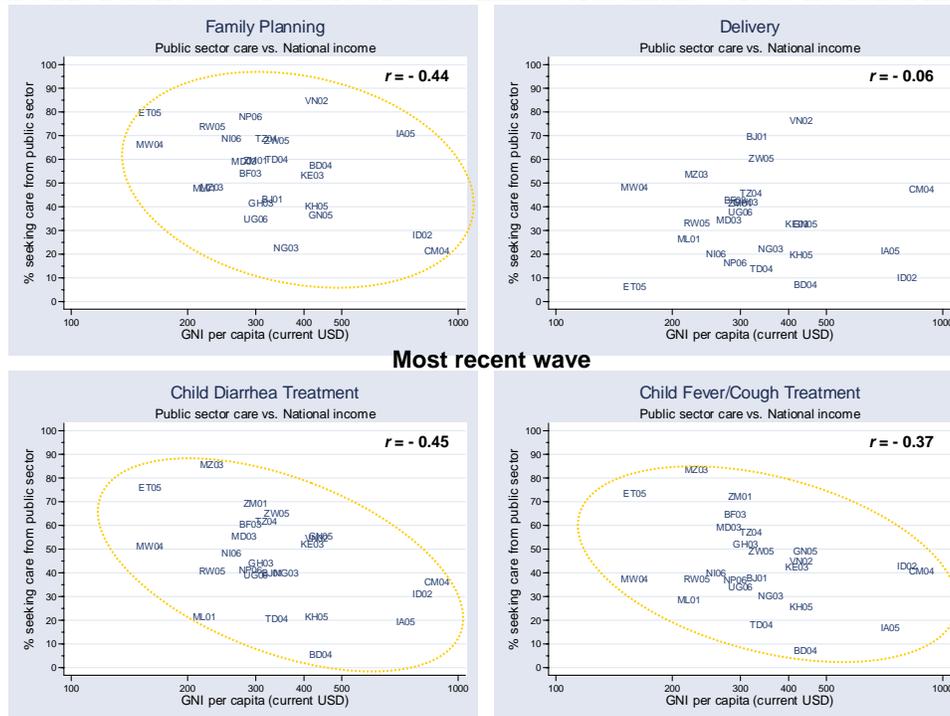
Figure 20: Child illness prevalence and treatment coverage versus national income



Source: Author's analysis based on DHS data and HNP Stats (World Bank 2008).

Results from this analysis raise a concern about the role of the public sector in women's and children's health: In these 25 countries, income level and the public sector's share do not necessarily follow the conventional wisdom of positive association. Instead, countries with a higher national income tended to have a lower public share of family planning services ($r = -0.44$), treatment of diarrhea ($r = -0.45$), and treatment of fever and cough ($r = -0.37$) (figure 22). Although the correlation between national income and the public sector's share of delivery is minimal, it is negative ($r = -0.06$) (figure 21, upper right panel).

Figure 21: Public sector share of child illness treatment versus national income



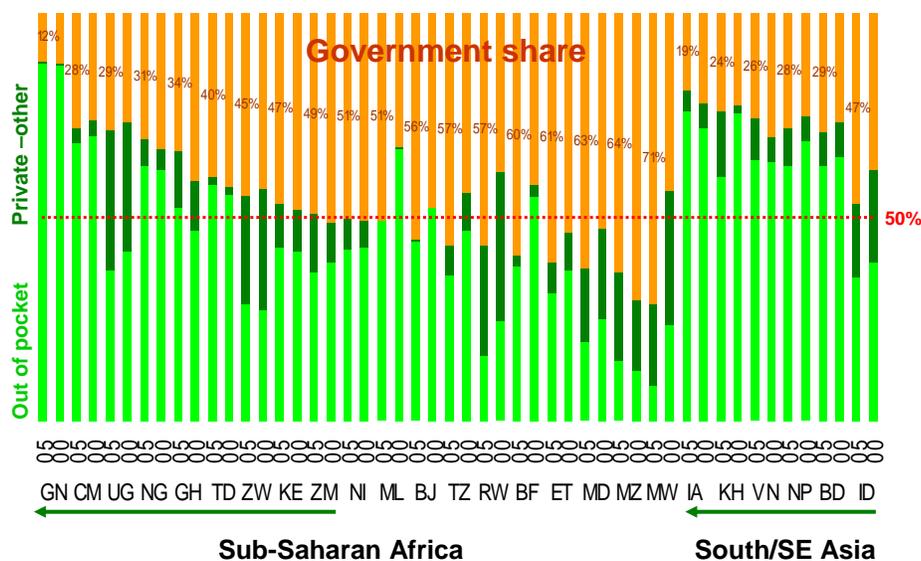
Source: Author's analysis based on DHS data and HNP Stats (World Bank 2008).

Out-of-pocket health spending

Out-of-pocket and other private sources of spending on health care accounted for more than 50 percent of total health expenditures in 9 of the 19 sub-Saharan African countries studied and in all 6 of the South and Southeast Asian countries studied (figure 22).

Figure 22: Out-of-pocket share of health spending in 25 countries, 2000 and 2005

Out-of-Pocket Health Expenditures 2005 vs. 2000

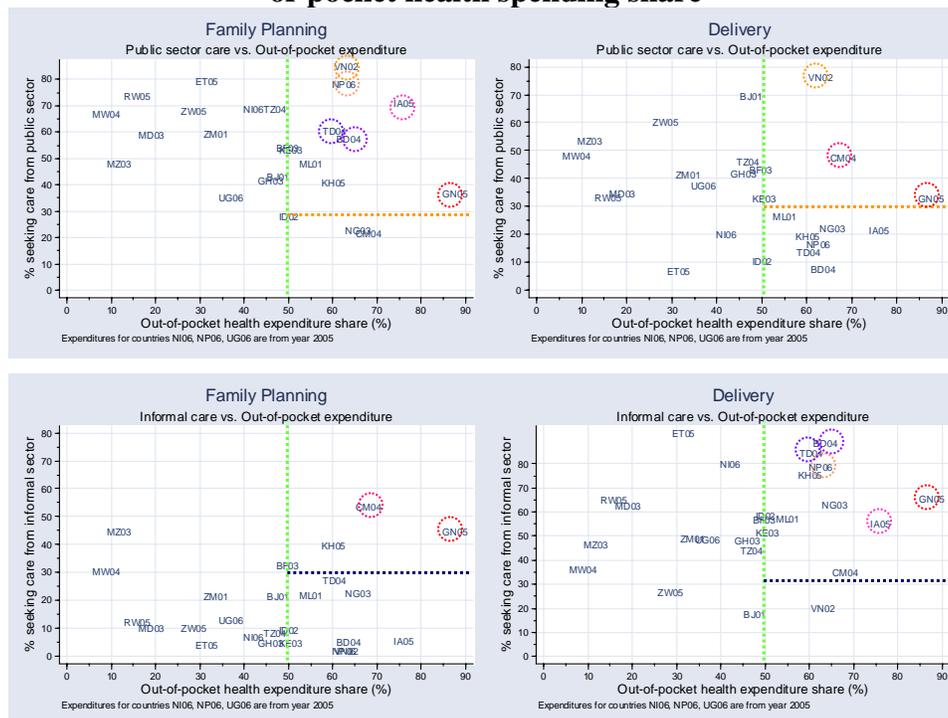


Note: The bottom range (light green) represents out-of-pocket payments; the middle range (dark green) represents other private spending; the top range (orange) represents government spending.
Source: Author's analysis based on World Health Statistics (WHO 2008).

Almost all of the private health payments in these countries were shouldered by households at the point of service. These out-of-pocket payments could be incurred even for care provided in the public sector. In countries with high out-of-pocket spending, financial risk protection becomes an important policy concern.

Bangladesh, Chad, and India had not only a high out-of-pocket share but also a majority (60–70 percent) of family planning services provided by public sector (figure 23A). For delivery care, however, the public sector did not play a major role in these countries with high out-of-pocket spending. Instead, the informal sector's share was a little more than 50 percent of total delivery care in India, 60 percent in Guinea, almost 80 percent in Cambodia and Nepal, and more than 80 percent in Chad and Bangladesh.

Figure 23A: Public and informal shares of family planning and delivery versus out-of-pocket health spending share

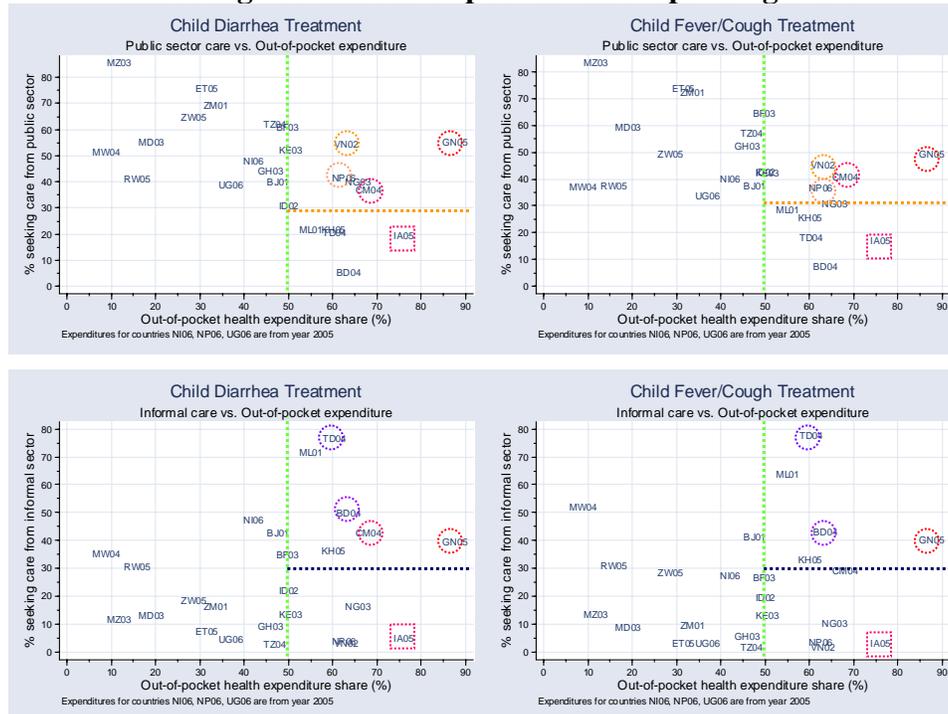


Source: Author's analysis based on DHS data and World Health Statistics (WHO 2008).

In two countries with high out-of-pocket spending, Cameroon and Guinea, the public sector provided about 40–50 percent of treatment of diarrhea and of fever and cough (figure 23B). Almost another 50 percent of women and children in these two countries and in Bangladesh sought care from the informal sector. In Chad, another country with high out-of-pocket spending, the informal sector accounted for almost 80 percent of the treatment of these two common illnesses in children, while India's formal private sector played a predominant role in the treatment of children.

As shown in the analysis of the economic gap in children's health care, Chad and Guinea are the two countries where both the public and private sectors tended to be more often chosen by the rich rather than by the poor for treatment of diarrhea and of fever and cough.

Figure 23B: Public and informal shares of treatment of child diarrhea and fever/cough versus out-of-pocket health spending share



Source: Author's analysis based on DHS data and World Health Statistics (WHO 2008).

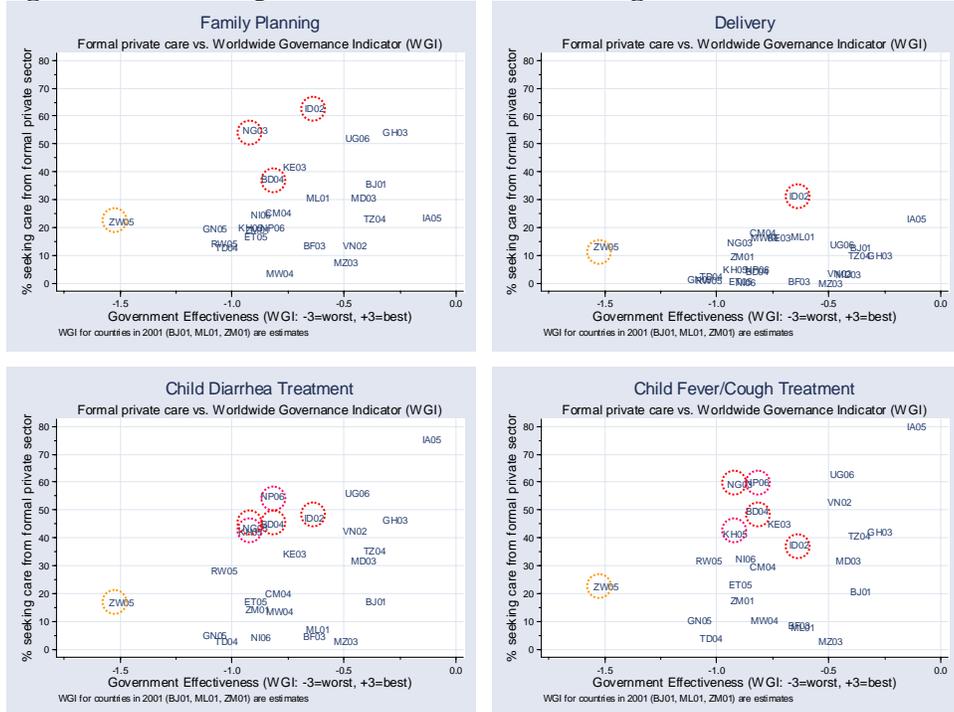
In Vietnam and Nepal, which also had a high out-of-pocket share, the public sector played an important role in the provision of health services for both women and children, accounting for 80 percent of family planning and 40–50 percent of treatment of diarrhea and of fever and cough.

Governance performance

Among the countries with relatively poor governance in terms of government effectiveness, the formal private sector played a major role in the treatment of child illnesses in five countries—Bangladesh, Cambodia, Indonesia, Nepal, and Nigeria (the two bottom panels of figure 24). This analysis also found that in Nigeria, the public share of child illness treatment was much larger for the top wealth quintile than for the poorest quintile.

In Bangladesh, Indonesia, and Nigeria, the formal private sector also accounted for 40–60 percent of family planning services for women. This probably reflects the fact that the government in these countries did not have a strong commitment to providing primary care.

Figure 24: Formal private health share versus government effectiveness

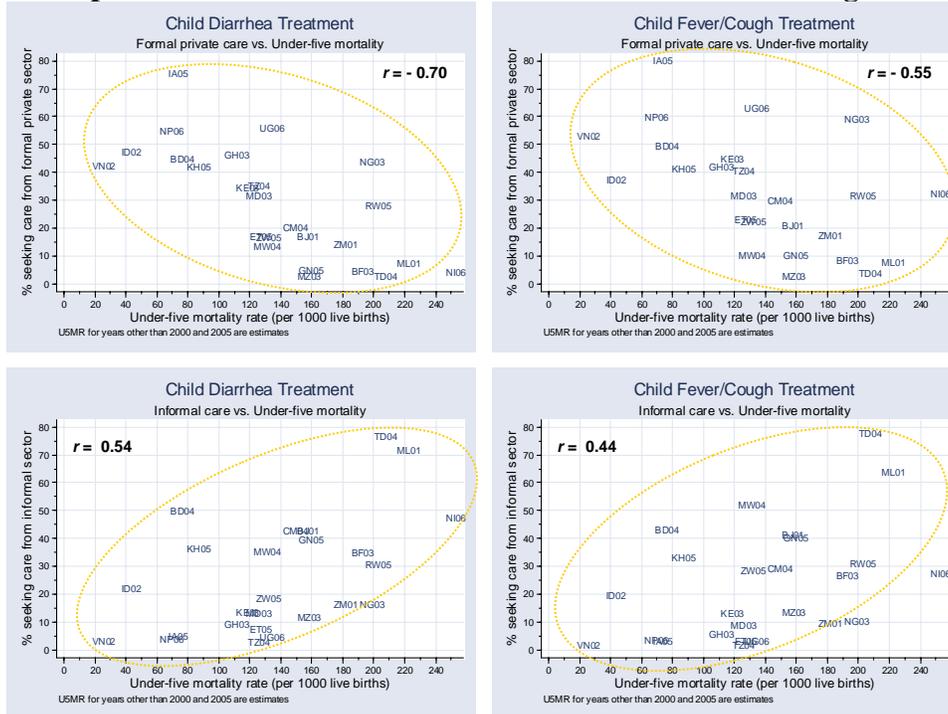


Source: Author's analysis based on DHS data and Worldwide Governance Indicators (World Bank 2008a).

Linkage of health-seeking profiles to population health outcomes

An ecological analysis linking the private-public mix to population health outcomes found a consistent negative correlation between the under-five mortality rate and the formal private sector's treatment share ($r = -0.70$ and -0.55) but a consistent positive correlation with the informal sector's treatment share ($r = 0.54$ and 0.44) for diarrhea and for fever and cough, respectively (figure 25).

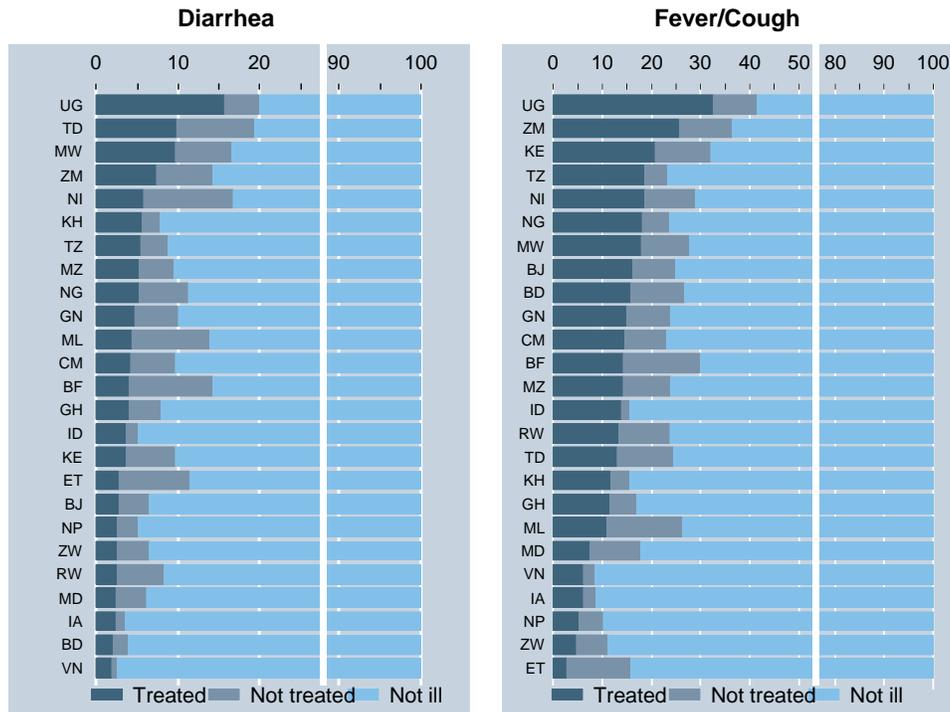
Figure 25: Correlations of under-five mortality with treatment share by the formal private and informal sectors for diarrhea and fever/cough



Source: Author's analysis based on DHS data and World Health Statistics (WHO 2008).

Because the prevalence of illnesses and treatment coverage of the ill population also vary among the countries studied, it is important to take into account these baseline variations in further teasing out the linkage with health outcome variations (figure 26).

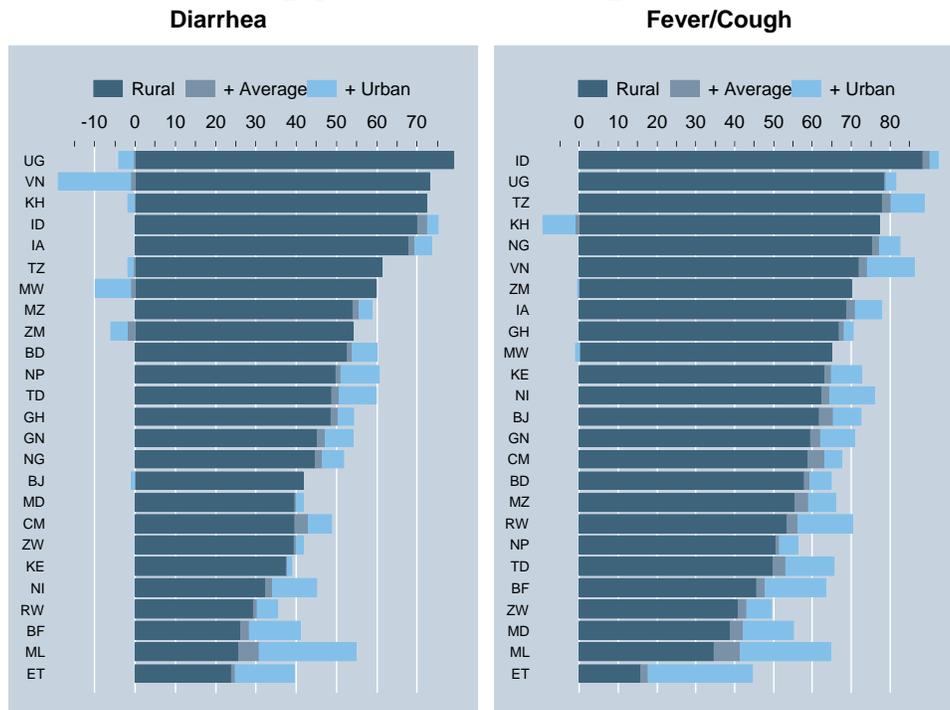
Figure 26: Illness prevalence and overall treatment coverage for diarrhea and fever/cough



Source: Author's analysis based on DHS data.

Country differences were also observed in the urban-rural gap and the economic gap with regard to the treatment of child illnesses. Figure 27A depicts the urban-rural gap in the treatment of children with diarrhea (left panel) and with fever and cough (right panel) by descending order of rural coverage. Noticeably, countries with a wider geographic gap tended to have a relatively low coverage of rural children. Rural coverage in some countries like Malawi, Uganda, and Vietnam (for diarrhea) and Cambodia (for fever and cough) was even greater than urban coverage.

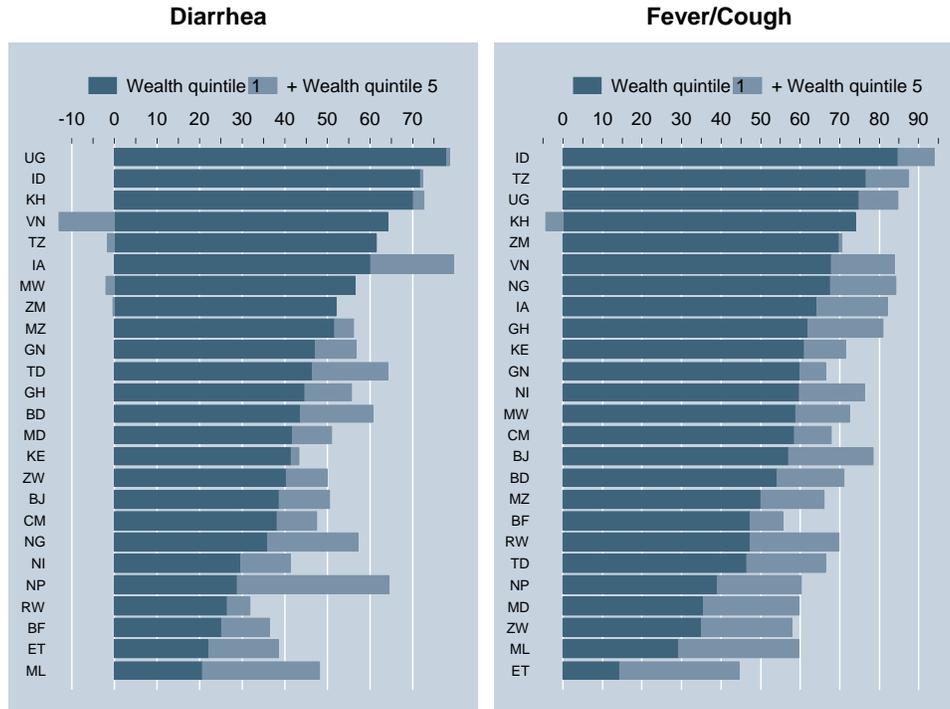
Figure 27A: Urban-rural gap in treatment coverage for diarrhea and fever/cough



Source: Author's analysis based on DHS data.

Countries with a wide urban-rural gap tended to have a wide rich-poor gap. Nonetheless, in Vietnam and Cambodia, the treatment coverage (for diarrhea and for fever and cough) among the poorest households was higher than among the richest ones. Similarly, as treatment coverage in the bottom quintile (quintile 1) improved, the economic gap narrowed (figure 27B).

Figure 27B: Rich-poor gap in treatment coverage for diarrhea and fever/cough

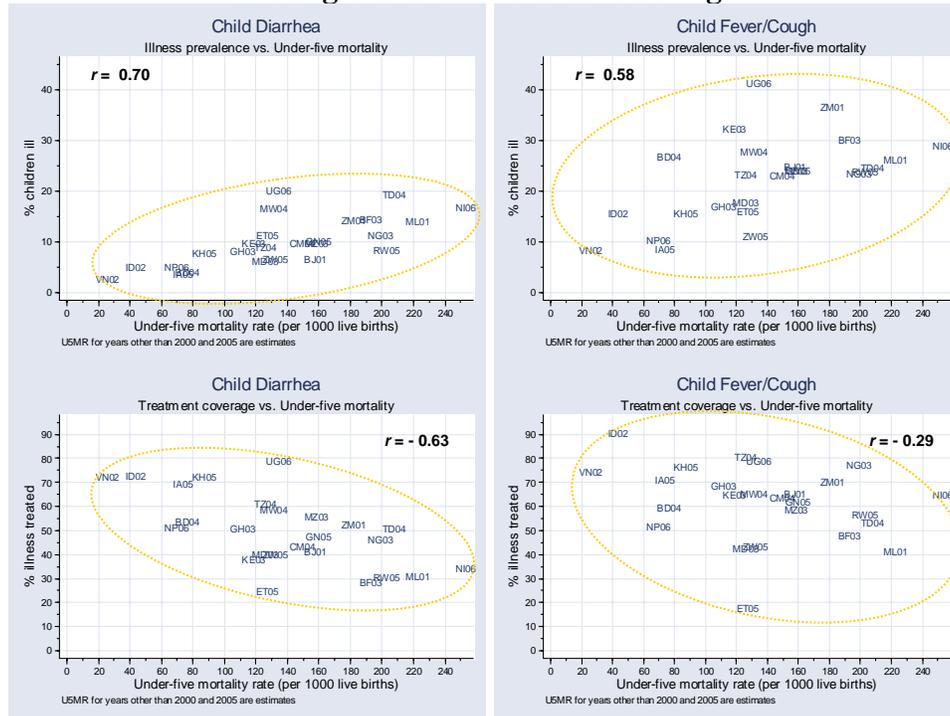


Source: Author's analysis based on DHS data.

This analysis found that both baseline illness and treatment coverage were correlated with child mortality.

Figure 28 shows an expected correlation between illness prevalence ($r = 0.70$ for diarrhea and 0.58 for fever and cough) and overall treatment coverage ($r = -0.63$ for diarrhea and -0.29 for fever and cough).

Figure 28: Correlations of under-five mortality with prevalence and treatment coverage of diarrhea and fever/cough



Source: Author's analysis based on DHS data and World Health Statistics (WHO 2008).

5. Conclusions and Policy Recommendations

The results of this analysis of DHS data for 25 countries reaffirms the claim that low-income countries cannot ignore the existence of the private sector and its prevailing role in the provision of health care for women and children. The private health sector, however, is not a homogeneous entity. It encompasses informal care providers as well as not-for-profit nongovernmental organizations and for-profit businesses (which were grouped together in this analysis and defined as the formal private sector).

This analysis found that households behaved differently across health care areas when seeking care. In 9 of the 25 countries studied, more than one-quarter of mothers sought care for their children from multiple sectors, mostly from a combination of public and formal private facilities. This was not the case for delivery—less than 10 percent of mothers sought delivery care from multiple sectors in most countries. The health sector mix for delivery was highly dominated by informal care—in 13 countries, 55–88 percent of mothers gave birth in their own homes.

All 25 low-income countries in this analysis are diverse in the private-public mix of women's and children's health services. The trends over time and the geographic and economic gaps in the private-public mix also varied across countries. Findings on the magnitude and direction of the correlations between the private-public mix and the contextual characteristics of these countries should be placed into perspective for further policy implications. A country's level of economic development explains the expected trend in childhood illness prevalence and treatment coverage (that is, negatively with illnesses but positively with treatment coverage). However, in countries with higher national incomes, the public sector tended to have a lower share of women's and children's health care. Some countries with a major public sector share and a large share of out-of-pocket health spending should consider health financing reform. In some countries with a poor governance rating on government effectiveness, the private health sector played a major role. Last, the positive correlation between the informal sector's share and child mortality raises a concern as to how countries can engage the informal health providers, given that identifying the informal sector is not an easy job.

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Appendix: The Demographic and Health Surveys

As of 2008, 46 countries had multi-year DHS data sets. Of these, 28 countries had fully available data sets for all years, 15 countries had preliminary data for the most recent years (2004–2006), and 3 countries had restricted access DHS data sets. In 25 countries, the DHS has been conducted only once; 18 of these countries conducted the DHS during the 1980s and 1990s, and 7 conducted the DHS in the 2000s. The countries and available years of the standard DHS data are presented in the table and figure below.

Countries¹ with standard DHS and years of surveys, by region

| Region | Multiple Years | | | Single Year (25 countries) |
|--|---|---|--|---|
| | Complete Data (28 countries) | Preliminary Data (for 2004–2006) (15 countries) | Restricted Data ² (3 countries) | |
| Sub-Saharan Africa (35 countries) | <i>Burkina Faso</i> (92/93, 98/99, 03), <i>Cameroon</i> (91, 98, 04), <i>Côte d'Ivoire</i> (94, 98/99), <i>Ghana</i> (88, 93, 98, 03), <i>Guinea</i> (99, 05), <i>Kenya</i> (89, 93, 98, 03), <i>Malawi</i> (92, 00, 04), <i>Mali</i> (87, 95/96, 01), <i>Mozambique</i> (97, 03), <i>Namibia</i> (92, 00), <i>Nigeria</i> (90, 99, 03), <i>Togo</i> (88, 98), <i>Zambia</i> (92, 96, 01/02) (12 low-income countries + 1 middle-income country) | <i>Benin</i> (96, 01, 06), <i>Chad</i> (96/97, 04), <i>Ethiopia</i> (00, 05), <i>Madagascar</i> (92, 97, 03/04), <i>Niger</i> (92, 98, 06), <i>Rwanda</i> (92, 00, 05), <i>Senegal</i> (86, 92/93, 97, 99, 05 ²), <i>Tanzania</i> (92, 96, 04), <i>Uganda</i> (88, 95, 00/01, 06), <i>Zimbabwe</i> (88, 94, 99, 05/06) (10 low-income countries) | Eritrea (95, 02) (1 low-income country) | 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 low-income countries + 3 middle-income countries) |
| South Asia (5 countries) | <i>Bangladesh</i> (93/94, 96/97, 99/00, 04), <i>Nepal</i> (96, 01, 06) (2 low-income countries) | <i>India</i> (92/93, 98/99, 05/06) (1 low-income country) | | Pakistan (90/91), Sri Lanka (87) (2 low-income countries) |
| East Asia and Pacific –Southeast Asia (5 countries) | <i>Indonesia</i> (87, 91, 94, 97, 02/03), <i>Philippines</i> (93, 98, 03), <i>Vietnam</i> (97, 02) (2 low-income countries + 1 middle-income country) | <i>Cambodia</i> (00, 05) (1 low-income country) | | Thailand (87) (1 middle-income country) |
| Middle East and Northern Africa (5 countries) | <i>Egypt</i> (88, 92, 95, 00, 05), <i>Morocco</i> (87, 92, 03–04) (2 middle-income countries) | | <i>Jordan</i> (90, 97, 02), <i>Yemen</i> (91/92, 97) (1 low-income country + 1 middle-income country) | Tunisia (88) (1 middle-income country) |
| Europe and Central Asia (7 countries) | <i>Armenia</i> (00, 05), <i>Kazakhstan</i> (95, 99) (1 low-income country + 1 middle-income country) | <i>Turkey</i> (93, 98, 03) (1 middle-income country) | | Kyrgyz Republic (97), Moldova (05), Turkmenistan (00), Uzbekistan (96) |

| Region | Multiple Years | | | Single Year (25 countries) |
|--|--|---|---|--|
| | Complete Data (28 countries) | Preliminary Data (for 2004–2006) (15 countries) | Restricted Data ² (3 countries) | |
| countries) | | | | (3 low-income countries + 1 middle-income country) |
| Latin America and Caribbean (14 countries) | 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 low-income country + 5 middle-income countries) | Haiti (94/95, 00, 05), Peru (86, 92, 96, 00, 04–08) (1 low-income country + 1 middle-income country) | | Ecuador (87), El Salvador (85), Honduras (05), Mexico (87), Paraguay (90), Trinidad and Tobago (87) (6 middle-income countries) |

¹ The 25 countries selected for the analysis are shown in italics.

² Online data are not readily available.

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

