

Composition of pluralistic health systems: how much can we learn from household surveys? An exploration in Cambodia

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In spite of all efforts to build national health services, health systems of many low-income countries are today highly pluralistic. Households use a vast range of public and private health care providers, many of whom are not controlled by national health authorities. Experts have called on Ministries of Health to re-establish themselves as stewards of the entire health system. Modern stewardship will require national and decentralized health authorities to have an overall view of their pluralistic health system, especially of the components outside the public sector. Little guidance has been provided so far on how to develop such a view. In this paper, we explore whether household surveys could be a source of information. The study builds on secondary data analysis of a household survey carried out in three health districts in rural Cambodia and of two national surveys. Cambodia is indeed an interesting case, as massive efforts by donors in favour of the public sector go hand in hand with a dominant role of the private sector in the provision of health care services. The study confirms that the health care sector in Cambodia is now highly pluralistic, and that the great majority of health seeking behaviour takes place outside the public health system. Our analysis of the survey also shows that the disaffection of the population with public health facilities varies across places, socio-economic groups and health problems. We illustrate how such knowledge could allow stewards to better identify challenges for existing or future health policies. We argue that a whole research programme on the composition of pluralistic health systems still needs to be developed. We identify some challenges and opportunities.

Keywords Household surveys, Demographic and Health Surveys, private sector, public sector, stewardship

KEY MESSAGES

- Stewards of a health system can only develop a coherent vision for the health sector if they have a comprehensive view on different health care providers, including those outside the public sector. Guidance and tools for developing such a view are currently lacking.
- This study shows that even secondary data analysis of household surveys can provide considerable insight into the composition of the health care provider system, if combined with insider knowledge.
- The Cambodian health system is shown to be highly pluralistic, yet the analysis also reveals variation within the country. This variation is in itself a source of useful lessons for the national health policy.

Introduction

The mixed or *pluralistic* character of the health care delivery system is frequently ignored, particularly in countries where much effort has been put into building a single, uniform health service delivery system under government administration. Over the last decade, however, there is compelling evidence that for many health problems, households do not automatically avail themselves of the public health services that governments and their technical and financial partners have developed, often preferring to use private providers, to self-medicate or even to forego treatment.

The logical recommendation—that national health authorities have responsibilities to fulfil beyond managing ‘their’ health facilities—is also not contentious anymore (Bloom and Standing 2001). The *World Health Report 2000* was a landmark contribution in this respect, stressing that the government had to fulfil the *stewardship* function of the health system. Accordingly, governments should take up the responsibility for the welfare of their population and show concern for the benefits obtained by the population from all kinds of health care providers, including private ones (Saltman and Ferroussier-Davis 2000; WHO 2000). This concern should lead, among other things, to the adoption of new policy instruments such as regulation or contracting. The view expressed by the *World Health Report 2000* has progressively trickled down to country national health policies, yet actual progress varies greatly across countries. In too many countries, services provided by private health care providers to the population are yet to become a priority of the Ministry of Health.

In order to be able to take up their role as ‘stewards’ of the whole health sector, national health authorities need to have a comprehensive view on the health care provision in the country. If Ministries of Health are usually well informed on the quantity, quality and prices of services provided by ‘their’ facilities, in most countries, the information on the private health sector is not available, or is very basic, with insufficient information on providers (Hanson and Berman 1998). Stewards must also be able to assess the systemic dimensions, i.e. how the different components of the health system relate to each other: for example, are they collaborating enough when it is appropriate to do so? Some of these systemic aspects are formalized in institutional arrangements (e.g. the health system pyramid of the public sector) while others emerge in a more informal way through market forces, including choices made by the users.

In this paper, we explore the potential of household surveys for producing an overview of who does what for whom in a

given pluralistic health system. Our study belongs to a still underdeveloped field of study, which could be coined ‘the study of the technical and institutional composition of the health care delivery system’. Our study builds on previous work (Berman and Rose 1996). It gives more substance to broad recommendations on using household surveys to develop a better view on the private health sector (Chakraborty and Harding 2003). It also dovetails with one of the three main recommendations made recently by a group of experts commissioned by the Rockefeller Foundation to develop a policy view on the ‘public stewardship of private providers in mixed health systems’: in order to improve stewardship of mixed health systems, national stewards and their international partners need to first collect more systematic information about health markets (Lagomarsino *et al.* 2009). This paper can be read as an empirical check of the feasibility of their recommendation, already through the low-cost option of secondary data analysis.

While most publications in this field are comparisons between countries, we focus on analysis and interpretation at country level. In this respect, our paper is rather similar to Demographic and Health Survey (DHS) country reports. Yet, our assessment is that the composition of the health care delivery system has not been examined sufficiently in most DHS country reports so far.

The study builds on secondary data analysis of a household survey carried out in three health districts in rural Cambodia between March and May 2007, and of two national surveys.

Cambodia is indeed an interesting case, given the place taken by private providers in the health sector, in spite of constant efforts put into the public health system by the government and major donors. Throughout the analysis, very simple (cross-tabulation) methods are being used. Our hypothesis is that such a combination of descriptive tables and insider knowledge—in this study we make use of such knowledge to a considerable extent (see the reference list for some of our previous publications on Cambodia)—can substantially empower the national and decentralized health authorities in their role of stewards of the health system.

The structure of the paper is as follows. In the next section, we introduce the Cambodian health system. We then present the research, including the health care provider framework used to report on the composition of the health system. This is followed by the results and a few lessons for stewards of the Cambodian health system.

We then identify the limits of our study and suggest how recurrent household surveys could be adapted for better documentation of the composition of pluralistic health care

delivery systems in low-income countries. We argue that such descriptive work would be valuable for many countries. We formulate some recommendations in this respect to the global community.

The Cambodian health care system

The recent history of the Cambodian health system is a story of three decades of progressive reconstruction following the destruction of the Khmer Rouge regime (1975–79), with relatively substantial international assistance from 1993 (Gollogly 2002; Grundy *et al.* 2009; Guillou 2001). The last 30 years have been marked by some successes (e.g. the control of the HIV/AIDS epidemic), but also by some disappointing results. A longstanding constraint for the functioning of the public health system has been the meagre salary of the health staff, forcing them to develop coping mechanisms, including private practice. This dual practice and the accompanying perverse behaviours (e.g. high absenteeism, poaching of patients to the private practice) have affected the credibility of public health facilities in the eyes of the public. Many of the initiatives adopted by the Ministry of Health and its technical and financial partners over the last decade—e.g. introduction of user fees, contracting, the Health Equity Funds—have been inspired at least partly by the need to counter the consequences of the underfunding of the public health sector (Barber *et al.* 2004; Hardeman *et al.* 2004).

Currently, in Cambodia a vibrant market for health care complements a rather marginalized public health system. According to the 2005 DHS, only one first treatment out of five takes place in the public sector; if one leaves aside drug purchasing, people are twice as likely to use a private provider than a public one (National Institute of Public Health *et al.* 2006). The problem is that private providers are loosely regulated. There is evidence that they often prescribe expensive and unnecessary care and provide services of doubtful quality

(Gollogly 2002; Soeung *et al.* 2008). Households shop around for their health care, and jeopardize both their health and welfare in the process (Van Damme *et al.* 2004): in the countryside, illness is reportedly a more important cause of poverty than crop failure (Kenjiro 2005).

This state of affairs is acknowledged by the Ministry of Health and its partners. The current strategic plan lists several interventions aiming at addressing the problems created by the fragmented character of the health system and more particularly by the lack of control over the private sector (Ministry of Health 2008). Still, there seems to be a lag in terms of actual policy actions. Our hypothesis is that a clearer view on the health seeking behaviours within the whole health system could help the government in developing the appropriate policy responses.

The research and methods

The Rapid Household Survey: purpose, study sites and content

This research is mainly based on data collected by the Poverty and Illness (POVILL) project. More particularly, we use the so-called Rapid Household Survey (RHS), which aimed at producing representative statistics on the proportion of households substantially affected (in terms of expenditures, income loss, etc.) by specific health problems (Lucas *et al.* 2008).

The RHS was carried out in three rural health districts: Sotnikum, Kirivong and Mongol Borei (Table 1). Several reasons motivated the selection. One concern was to select districts where the referral public hospital was really operational, including a surgical capacity. Because of a previous research project, the research team was familiar with the performance of these three rural hospitals and deemed it satisfactory (Meessen *et al.* 2008). The sample also guaranteed that different situations in terms of health service provision to the population would be documented. Indeed, although the three districts look

Table 1 Key characteristics of the health care market in the three health districts, Mongol Borei, Sotnikum and Kirivong

	Mongol Borei	Sotnikum	Kirivong
Total population (2007)	294 253	285 347	232 917
No. of beds at the district hospital (2006)	195	100	80
No. of public health centres	21	23	20
International assistance	Hospital assisted by the International Committee of the Red Cross (ICRC) till the early 1990s; no major assistance since then.	Assistance to the whole district, first by <i>Médecins Sans Frontières</i> –Belgium (MSF-B) (1994–2004) and then by the Belgian Technical Cooperation (2004–today).	One of the 11 districts which took part in the ADB-DFID-World Bank experience. Assistance delivered by <i>Enfant et Développement</i> (1999–2004) and later by the Swiss Red Cross (2004–08).
Health Equity Fund	Yes	Yes	Yes
Specialized outpatient unit at the district hospital	None	Chronic Disease Clinic supported by MSF-B (2002–06).	HIV/AIDS unit supported by the national programme.
Other characteristics of the local health care market	Border with Thailand; presence of many private clinics in the city.	Strong appeal of two charity paediatric hospitals (practicing free care policy) located in the neighbouring city of Siem Reap.	Border with Vietnam; proximity with the Takeo hospital, probably the best performing rural hospital in Cambodia.

fairly similar on paper, in reality the services they provide vary in terms of quality. This is partly due to a different recent history in terms of international assistance. Sotnikum and Kirivong health districts have been consistently supported by decentralized aid actors (since 1994 and 1999, respectively). This support followed the classical input-based approach (i.e. technical assistance, rehabilitation, equipment and drugs) for a while, and later shifted to performance-based approaches (Van Damme *et al.* 2001; Jacobs *et al.* 2009). There is evidence that public health facilities in both health districts have benefited substantially from this assistance (Jacobs and Price 2003; Jacobs and Price 2006; Janssens *et al.* 2007).

Evidence from the routine health information system and a previous research project (Meessen *et al.* 2008) showed that the performance of public health facilities in Mongol Borei (e.g. in terms of utilization rate) was lower than in Kirivong or Sotnikum, in part due to the lack of close, constant and comprehensive support that has typified Kirivong and Sotnikum in the last decade. In the early 1990s, the Mongol Borei hospital was reportedly one of the best in the country. Yet, when the International Committee of the Red Cross left, the hospital lost a lot of its capacity and prestige, with several well-trained clinicians opening their own private clinics. Therefore, the hypothesis was that the composition of the health care system would be more pluralistic and fragmented in Mongol Borei.

On the demand side, as reported in Table 1 and evidenced elsewhere (Meessen *et al.* 2008), the three districts benefit from the existence of a health equity fund, a third-party purchasing arrangement to identify the poor and pay user fees and other access-related costs on their behalf (Noirhomme *et al.* 2007; Bigdeli and Annear 2009).

Data collection took place under tight constraints (requirement to collect the data in about 45 minutes), but the RHS contains nevertheless the usual variables: general demographic structure of the household; some proxy variables for the socio-economic status of the household; recent history of illnesses (1 month recall period); recent history of major illnesses (1 year recall period); and basic information on health seeking behaviours for the reported episodes of illness (with a possibility of multiple and sequential use of different providers). A random sampling technique ensures representativeness; the sampling was large enough to ensure statistical significance when necessary.

After data cleaning and some preliminary exploratory analysis, self-reported diagnoses in the RHS had to be reclassified to provide more detail, under the supervision of two medical doctors familiar with Cambodia (PI and WVD). The next stage was the production of the socio-economic status (SES) index. Based on variables in the poverty assessment section of households, SES quintiles were computed, through a principal components analysis (Vyas and Kumaranayake 2006). Fourteen asset-items were used for the index, with loadings on the SES-component varying from 0.661 to 0.292.

The survey was approved by the National Ethics Committee for Health Research of Cambodia. More information on the RHS (design, sampling etc.) has been published elsewhere (Ir *et al.* 2010).

Studying the composition of the Cambodian health system: methodological issues

Carrying out secondary data analysis of household surveys to study the composition of a health system raises several challenges. A methodological issue reported in previous similar studies was the consistency of definitions used for different providers, and private health care providers in particular (Berman and Rose 1996), though definition consistency is less an issue using a single survey in one country.

A related but more fundamental question for the study of the composition of a pluralistic health system pertains to the framework used when structuring the analysis or reporting the information. In our opinion, the guiding principle for the classification of different providers should be their potential contribution to the goals pursued by the steward of the health system (e.g. better health status, responsiveness, welfare protection). Hence, information must be collected at the level of both the individual health care providers and the health system.

The potential contribution by health care providers to the population's better health is first dependent on their technical capacity. The analyst must therefore have a good understanding of different types of services deliverable by different kinds of providers. Using this rationale, a hospital with surgical capacity, medical doctors and inpatient beds must obviously be distinguished from a health centre where nurses can provide ambulatory care only. A second and related criterion can be the therapeutic model adopted by the provider. Distinguishing providers who derive their legitimacy from other sources than modern biomedicine is important, though some non-biomedical providers are incorporating accessible biomedical therapies into their regimens.

The fact that a health care provider subscribes to the biomedical therapeutic paradigm and has a sound technical capacity does not automatically mean that it is aligned with (all) the steward's goals. For instance, a private clinic responsive to its clients can have zero consideration for poverty induced by health care expenditure; a public health facility can be accessible to the rural population but offer service of low quality.

The steward may develop different mechanisms to get providers and individuals aligned with the objectives it finds socially desirable. Enforcing these mechanisms or *institutional arrangements* consumes resources, entailing *transaction costs*. A third criterion for our typology of providers examines characteristics that influence these transaction costs: ownership structure, integration in the formal economy and existing connections to the health authorities. The same transaction cost argument implies that systemic dimensions also need to be documented. For example, the greater the number of autonomous organizations involved in the health system, the more expensive it will be for the steward to develop control over its whole health system. The prevalence of the rule of law in the country also impinges on the transaction costs for steering the health system.

For this study, we have distinguished providers according to three criteria: technical degree of the health care service, ownership (public, private non-profit, private for-profit) and formality of the relationship with the Ministry of Health. In

Table 2 Criteria to distinguish health care providers

	Technical degree	Ownership	Formality
Public hospitals	Medium	Public	High
Public first-line services	Basic	Public	High
Non-profit health facility	High	Private non-profit	High
Private clinics	Medium	Private for-profit	Low to medium
Private practitioner (cabinet or at patient's home)	Low to medium	Private for-profit	Low to medium
Pharmacies	Low to basic	Private for-profit	Low to medium
Other drug retailers	Low	Private for-profit	Low
Traditional healer	Low	Private for-profit	Low
Providers abroad	Medium to high	Unknown	Out of control
Other	Low or unknown	Unknown	Vary

Table 2, we provide our classification of providers; our scorings for the technical capacity, ownership and 'formality' relate to providers active in rural areas and small towns. We have considered four levels of technical capacity: low, basic, medium and high. A 'low' score was given to providers for whom there is no guarantee that the personnel has a biomedical professional training. A 'basic' score was given if no medical doctor is working full-time in the facility. The distinction between the 'medium' and 'high' scores refers to a mix of dimensions on the inputs (beds, staff and technology), processes and outputs (types of services) of health care delivery. These ratings are based on the field experience of several of the authors.

The analysis of the data was carried out in SPSS and Excel. The results in this paper are presented in a straightforward format: they are mainly cross-tabulations of a variable of interest per types of health care providers for each district. The tables produce 'maps' of health seeking behaviours, which one can easily compare across sites.

In order to assess the representativeness of our RHS results (and thus implications for the whole Cambodian countryside), we have carried out similar analyses on two recent national household surveys: the Cambodian Socio-Economic Survey 2004 and the Demographic and Health Survey (DHS) 2005. For these two surveys, we have worked on the subsamples of individuals or households identified as 'rural' in these datasets (respectively, $n = 15\,000$ and $14\,243$ households).

Main results

Many questions can be raised from household surveys on the composition of a health system, but most of them can be reformulated as 'where people go for treatment for a given condition'. For this analysis, we have used two recall periods: a short one (which captures both minor and major illnesses) and a long one (which captures only major illnesses). Within the short recall period samples, we have assessed the health conditions in two different ways: (1) the self-reported degree of severity and/or chronicity; (2) symptoms or diagnoses. The unit of analysis (the health seeking behaviour) has been observed at individual level (yet we highlight once that carrying out the analyses at household level can also be insightful). For

all these variables, sub-analyses can be done by age groups, socio-economic status, gender, etc. We did some of such sub-analyses for illustration.

The first step examines the relative utilization of different health care providers by households with at least one ill member. Table 3 reports frequencies for the utilization of various health care providers (first treatment) during the last month, in the three health districts. Figures between brackets are percentages relative to the total of individuals reporting an episode of illness, with the exception of the row 'total of individuals reporting an illness', where the denominator is the size of the sample. We have added two columns for similar information from two national surveys, the DHS 2005 and the Cambodian Socio-Economic Survey 2004 (for both, rural population only).

An episode of illness was reported for 13 443 (40.5%) out of the total RHS sample of 33 161 household members. Among the 13 443 persons with an illness, 12 187 sought treatment at least once (90.6%) and 1006 sought more than one treatment.

We see that in the three health districts, as in the rest of the country, the majority of health service utilization happens outside of the public health system. Purchasing drugs from a drug retailer, formal or informal, is the most frequent health seeking behaviour; this utilization pattern is particularly striking in Mongol Borei. Private practitioners are the second most popular option; they provide services at their own clinic or through home visits. Public first-line health services (almost exclusively health centres) are the third most frequent strategy. Figures in Sotnikum and Kirivong are superior to the corresponding national figures; conversely, in Mongol Borei health centres do not look like an attractive option for households. The underuse of public hospitals in Mongol Borei district is remarkable as well. The public hospital is not much preferred in Sotnikum either, but in this district the popularity of charity paediatric hospitals in the neighbouring city of Siem Reap explains a great deal. The utilization of public hospitals is particularly encouraging in Kirivong; additionally, utilization seems also well-distributed across levels (64% at the district hospital, 28% at the provincial hospital and 8% at the national hospital) in this district.

The 'attendance at public first-line services' and 'utilization of private practitioners' appear not to be negatively correlated,

Table 3 Health service utilization in rural Cambodia

	POVILL RHS data (2007)				DHS (2005)	CSES (2004)**
	Mongkol Borei	Sotnikum	Kirivong	Total		
Public hospitals	87 (1.8%)	111 (2.4%)	225 (5.7%)	423 (3.1%)	7.5%	7.3%
Public first-line services	379 (7.7%)	886 (19.3%)	743 (18.8%)	1930 (14.4%)	14.4%	9.1%
Non-profit health facility	49 (1.0%)	174 (3.8%)	19 (0.5%)	242 (1.8%)	0.6%*	4.0%*
Private clinics	245 (5.0%)	200 (4.4%)	262 (6.6%)	707 (5.3%)	6.3%	9.8%
Private practitioner	897 (18.3%)	1049 (22.9%)	963 (24.3%)	2909 (21.6%)	33.2%	32.2%
Pharmacies	974 (19.8%)	360 (7.9%)	297 (7.5%)	1631 (12.1%)	6.6%	13.0%
Other drug retailers	1774 (36.1%)	1183 (25.8%)	978 (24.7%)	3935 (29.3%)	20.1%	18.0%
Traditional healer	58 (1.2%)	62 (1.4%)	61 (1.5%)	181 (1.3%)	1.5%	2.2%
Treatment abroad	5 (0.1%)	0 (0.0%)	79 (2.0%)	84 (0.6%)	n.a.	n.a.
Other	24 (0.5%)	13 (0.3%)	30 (0.8%)	67 (0.5%)	0.9%	3.4%
Did not seek care	419 (8.5%)	539 (11.8%)	298 (7.5%)	1256 (9.3%)	8.9%	n.a.
Total of individuals reporting an illness	4911 (42.7%)	4577 (41.8%)	3955 (36.9%)	13443 (40.5%)	9575 (16.9%)	7320 (12.3%)
Size of the sample	11 495	10 950	10 716	33 161	56 546	59 435

*We considered private hospitals in the DHS and the Cambodian Socio-Economic Survey (CSES) and non-profit health facilities in the POVILL surveys comparable categories. However, overlap might be only partial.

**In the CSES questionnaire, the question on the type of providers for the 4 weeks recall period was 'which provider is usually consulted for care?.'

though this would be expected if these were mutually exclusive competitors. A possible explanation is that 'public' and 'private' providers are often the same person (i.e. in dual practice): working in the public health centre would thus boost private business (by the opportunity to build a reputation or to 'poach' patients).

From the analysis of the service utilization per age group, we can assess the performance of the public health system for children, the main target group of primary health care. The analysis shows a stunning underuse of public or non-profit health facilities in Mongol Borei for children under 5 years: in Mongol Borei, these providers count for less than 17% of total health seeking behaviours for this age group (versus 44% and 32% in Sotnikum and Kirivong, respectively). Both in Sotnikum and Kirivong, around 26% of ill children under 5 visited a health centre. The two charity paediatric hospitals in Siem Reap contribute to the particularly good results in Sotnikum. Still, these utilization figures remain rather low, given the substantial efforts put into establishing a public health sector at least responding to the needs of children and mothers.

For the stewards, it is important to understand how different components of the health care sector make an integrated contribution to population health. In this respect, the study of 'trajectories for health care' adopted by individuals who used more than one provider can be insightful. Again, the POVILL household survey is instructive (although we can only speculate on reasons for going to a particular provider as no data was collected on health seeking behaviour motives).

As the number of people who report three or more health seeking behaviours was fairly limited (79), our analysis focuses on those who sought treatment at least twice. From Table 4, we can infer that among this group, a majority had their first health seeking behaviour at a public provider (567/1006), and at public first-line services in particular (483). Among the people who first went to a public first-line provider, only

21 seem to have followed a 'referral trajectory' (16 to district hospitals, 5 to provincial hospitals); the vast majority left the public sector, to visit either a drug retailer (possibly to buy drugs out-of-stock at the health centre) or a private provider (these were possibly patients poached by the civil servant for his/her own private practice). The lack of outpatient departments in referral hospitals in Cambodia (or their weakness) could be another explanation.

By reading the table vertically, we can trace where the patients with a second treatment got their first treatment. We observe that the majority of patients seeking a second treatment at public hospitals came from a public health facility (26/30). The public facilities were also the main source of 'supply' for private clinics as second provider (43/50); interestingly enough, private clinics received more patients (43) than public hospitals (26) did from public health facilities! This analysis of trajectories clearly shakes the preconception prevailing in Cambodia that patients come to public hospitals after a disappointing experience in a private facility (including mis-treatment that has made the condition more severe). As it turns out, only 9% (91/1006) of second treatments occurred in a public health facility.

We can apply the same analyses for the private sector. The place of the drug retailers is particularly interesting. When we focus on the rows of the table, we observe that those who went first to a drug retailer (self-medication probably) and have a second health seeking behaviour prefer to go to a private practitioner (140/258). This could correspond to households fully discarding the public sector as an appropriate source of health care. When we look at the columns of the table, user frustration with the availability of drugs in the public first-line services is evident (either a problem of drug shortages or of a too-restrictive essential drug list): indeed most of people going to drug retailers as a second treatment come from this category of public providers (206/338).

Table 4 Trajectories for health care for patients who sought treatment twice (RHS)

If sick, where did they seek care/treatment? 1st provider	If sick, where did they seek care/treatment? 2nd provider											Total
	National hospital in Phnom Penh	Provincial hospital	District hospital	Public first-line services	Non-profit health facility	Private clinics	Private practitioner	Pharmacy	Other drug retailer	Traditional healer	Seek treatment abroad	
National hospital in Phnom Penh	0	0	0	0	1	0	0	0	0	0	0	1
Provincial hospital	0	0	3	4	0	0	4	2	0	1	0	14
District hospital	0	2	0	14	1	12	17	16	3	3	1	69
Public first-line services	0	5	16	10	15	31	189	77	129	6	3	483
Non-profit health facility	0	0	0	3	0	1	13	3	11	0	1	32
Private clinics	2	0	1	5	4	0	14	19	5	4	2	56
Private practitioner	0	1	0	13	4	2	0	18	13	8	3	62
Pharmacy	0	0	0	11	7	1	53	0	28	20	1	121
Other drug retailers	0	0	0	11	0	1	87	12	7	14	5	137
Traditional healer	0	0	0	2	0	2	18	1	6	0	1	30
Other	0	0	0	0	0	0	1	0	0	0	0	1
Total	2	8	20	61	32	50	396	148	190	56	17	1006

For the cases with more than one health seeking behaviour, another interesting analysis is at household level. In around 95% of households, there has indeed been more than one episode of illness in the last 30 days. How do households behave in terms of health seeking behaviours: are they loyal to one type of provider or are they instead 'shopping around' (for good or bad reasons)? For such an analysis, it is better to focus on households reporting a large number of episodes of illness. In our sample of 5975 households, 1021 reported four or more ill household members. If this sub-group is our focus, we find that only 5.8% of these households exclusively used the public sector, 63.5% exclusively used the private sector and around 30% present a mixed public-private pattern of health service utilization. These results are to be interpreted cautiously; mixed public-private patterns would probably be reported more if preventive services were considered as well (see further). However, the very low proportion of households with a preference for public health facilities should be interpreted as an alarming signal to actors willing to set up entitlement schemes giving access to treatment in public services only (e.g. community-based health insurance).

Table 5 cross-tabulates the acute/chronic character of the illness per type of health care provider. This table shows a relationship between the severity of the illness and the category of providers used by the household, as has been reported in the past (National Institute of Public Health *et al.* 2006). The technical level of the health care provider looks particularly influential.

Visiting drug retailers is the favourite strategy for all but the severe types of illness. For light and moderate health problems, other preferred providers (in decreasing order of importance) are private practitioners and public first-line services, as well as the option 'not seeking care'. For severe health problems, another cluster of attractive providers emerges. Private practitioners come out on top, drug retailers remain important, but are now closely followed by public first-line services, private facilities and public hospitals. Still, only 30% of severe health problems are handled in the public or non-profit sector. This is probably much less than what is aimed for by stewards in Cambodia. The contribution of public health centres and hospitals in the handling of chronic diseases is even more limited; this seems to indicate that the public health system is not yet ready to respond to new needs related with the epidemiological transition.

If we zoom in on categories of providers, we learn that public hospitals, non-profit health facilities and private clinics are all specialized in severe health problems. Private practitioners handle illnesses of different levels of severity. The number of individuals that try to deal with 'acute severe' or chronic health problems by relying on drug retailers is baffling. The situation is worrisome particularly in Mongol Borei (24% and 37%, respectively).

The RHS questionnaire also included a set of questions on 'major illnesses' for a 12-month recall period. Among the 4992 (self-assessed) major illnesses reported, 1482 led to some inpatient treatment (29.7%). Table 6 provides the utilization of different health care providers for inpatient care. We can see that the share of the public health sector is much more important for this specific category of care (41.7%). The share

Table 5 Severity/chronicity of the illness (RHS)

	Was the problem?			Chronic	Total
	Acute				
	Light	Moderate	Severe		
Public hospital	54	94	212	63	423
	12.8%	22.2%	50.1%	14.9%	100%
	0.9%	2.2%	10.1%	9.5%	3.10%
Public first-line services	921	692	311	84	2008
	45.9%	34.5%	15.5%	4.2%	100%
	14.5%	16%	14.8%	12.6%	14.90%
Non-profit health facility	44	70	113	15	242
	18.2%	28.9%	46.7%	6.2%	100%
	0.7%	1.6%	5.4%	2.3%	1.80%
Private clinic	121	222	297	67	707
	17.1%	31.4%	42%	9.5%	100%
	1.9%	5.1%	14.1%	10.1%	5.3%
Private practitioner	1036	1051	672	150	2909
	35.6%	36.1%	23.1%	5.2%	100%
	16.4%	24.3%	31.9%	22.5%	21.6%
Drug retailer	3372	1698	335	161	5566
	60.6%	30.5%	6%	2.9%	100%
	53.2%	39.2%	15.9%	24.2%	41.4%
Traditional healer	36	65	46	34	181
	19.9%	35.9%	25.4%	18.8%	100%
	0.6%	1.5%	2.2%	5.1%	1.3%
Other (including treatment abroad)	40	60	42	9	151
	26.5%	39.7%	27.8%	6%	100%
	0.6%	1.4%	2%	1.4%	1.1%
Did not seek care	712	382	79	83	1256
	56.7%	30.4%	6.3%	6.6%	100%
	11.2%	8.8%	3.7%	12.50%	9.3%
Total	6336	4334	2107	666	13 443
	47.1%	32.2%	15.7%	5%	100%
	100%	100%	100%	100%	100%

of inpatients provided for by different public hospitals is particularly impressive in Kirivong district (65.1%). This is probably due to a well-functioning three-tier system: a performing district hospital nearby, a provincial hospital with a superior technical capacity and geographical proximity with Phnom Penh. Still, for 9% of inpatients, hospital care was sought abroad (in neighbouring Vietnam). Particularly striking is the importance of non-profit (paediatric) hospitals in Sotnikum district. Analyses per age group reveal that these non-profit hospitals largely explain the lower utilization of the district hospital (in comparison with Kirivong). In Mongol Borei, the district with the lowest rate of inpatient admissions and where the district hospital is the provincial hospital, private providers fill the vacuum created by inadequate public health services.

Equity in terms of access can be a concern for national or local stewards of the health system. A simple asset index ranked households in socio-economic quintiles. Table 7 lists health seeking behaviours by quintile for the short recall period. The three districts present fairly similar patterns of health seeking behaviour: the poor are over-represented among the people who 'did not seek care' or used 'public first-line services'; the better-off are over-represented in the category of 'private clinics'. Non-profit health facilities, which operate under a free health care policy, are not very pro-poor (this is particularly the case for inpatient care in the 1 year recall period). It is probable that only the better-off from Kirivong and Mongol Borei can afford transport to Phnom Penh or Siem Reap (the two cities hosting charity hospitals). If a more detailed analysis of type of providers is carried out, the impact of distance (and possibly fees) explains also the over-representation of better-off people in the categories 'national hospital in Phnom Penh', 'provincial hospital' and 'seek treatment abroad' (cf. Kirivong, the 'others' category). District hospitals look distinctly pro-poor; this could be due to the presence of a health equity fund—a social assistance scheme assisting the poor in their utilization of hospital services where user fees are charged—in the three hospitals (Meessen *et al.* 2008).

Table 6 Inpatient care reported for major illness (RHS)

	Name of Operational Health District			Total <i>n</i> (%)
	Mongkol Borei <i>n</i> (%)	Sotnikum <i>n</i> (%)	Kirivong <i>n</i> (%)	
National hospital in Phnom Penh	5 (1.1)	12 (2.4)	30 (5.8)	47 (3.2)
Provincial hospital	14 (3.0)	20 (4.1)	79 (15.2)	113 (7.6)
District hospital	113 (24.0)	85 (17.3)	229 (44.1)	427 (28.8)
Health centre	0 (0)	14 (2.8)	17 (3.3)	31 (2.1)
Private clinics	209 (44.4)	91 (18.5)	61 (11.8)	361 (24.4)
Pharmacy	1 (0.2)	0 (0)	2 (0.4)	3 (0.2)
Non-profit health facility	54 (11.5)	191 (38.8)	15 (2.9)	260 (17.5)
Traditional healer	1 (0.2)	19 (3.9)	0 (0)	20 (1.3)
Private practitioner	66 (14)	58 (11.8)	31 (6.0)	155 (10.5)
Seek medical treatment abroad	7 (1.5)	1 (0.2)	48 (9.2)	56 (3.8)
Do not know	1 (0.2)	1 (0.2)	7 (1.3)	9 (0.6)
Total	471 (31.8)	492 (33.2)	519 (35.0)	1482 (100)

Table 7 Socio-economic distribution of health seeking behaviour (HSB) (RHS, 30-day recall period)

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total HSB
Distribution of the HSB per SES strata						
Mongol Borei	13.4	16.8	19.5	23.4	26.9	4897
Sotnikum	25.0	19.5	19.8	20.2	15.4	4577
Kirivong	21.8	24.0	21.3	15.1	17.8	3949
Total	18.7	19.0	20.0	21.0	21.3	13 423
Public hospital						
Mongol Borei	9.2	14.9	24.1	23.0	28.7	87
Sotnikum	17.1	18.9	16.2	20.7	27.0	111
Kirivong	21.8	24.0	21.3	15.1	17.8	225
Total	18.0	20.8	20.6	18.2	22.5	423
Public first-line service						
Mongol Borei	16.9	18.0	23.3	19.0	22.8	378
Sotnikum	27.3	22.5	20.3	16.5	13.4	886
Kirivong	20.6	19.7	22.9	20.4	16.4	742
Total	22.9	20.6	21.8	18.4	16.3	2006
Non-profit health facility						
Mongol Borei	18.4	12.2	16.3	20.4	32.7	49
Sotnikum	19.5	21.8	21.3	21.3	16.1	174
Kirivong	10.5	15.8	26.3	21.1	26.3	19
Total	18.6	19.4	20.7	21.1	20.2	242
Private clinic						
Mongol Borei	7.3	11.0	21.6	21.6	38.4	245
Sotnikum	19.5	11.0	17.0	24.5	28.0	200
Kirivong	13.4	17.9	18.7	17.2	32.8	262
Total	13.0	13.6	19.2	20.8	33.4	707
Private practitioner						
Mongol Borei	12.4	15.5	18.4	24.6	29.1	895
Sotnikum	21.6	19.6	22.0	22.1	14.6	1049
Kirivong	14.2	21.6	20.0	20.9	23.3	963
Total	16.3	19.0	20.3	22.5	21.9	2907
Drug retailer						
Mongol Borei	12.8	17.2	19.5	24.2	26.3	2737
Sotnikum	24.2	18.9	19.2	21.1	16.7	1543
Kirivong	19.1	22.0	20.4	17.6	20.9	1271
Total	17.4	18.8	19.6	21.8	22.4	5551
Traditional healer						
Mongol Borei	17.2	15.5	15.5	17.2	34.5	58
Sotnikum	35.5	14.5	9.7	27.4	12.9	62
Kirivong	16.4	21.3	23.0	21.3	18.0	61
Total	23.2	17.1	16.0	22.1	21.5	181
Other						
Mongol Borei	13.8	17.2	20.7	17.2	31.0	29
Sotnikum	15.4	23.1	46.2	7.7	7.7	13
Kirivong	17.4	16.5	11.0	23.9	31.2	109
Total	16.6	17.2	15.9	21.2	29.1	151
Did not seek care						
Mongol Borei	19.6	20.3	16.9	22.0	21.2	419
Sotnikum	34.7	19.5	18.4	17.8	9.6	539
Kirivong	19.5	22.2	22.2	17.8	18.2	297
Total	26.1	20.4	18.8	19.2	15.5	1255

Table 8 Utilization of health providers for acute respiratory tract infection (Cambodian Socio-Economic Survey 2004, rural population)

	Minor ARI	Major ARI		
	(1) Cold & cough without rapid or difficult breathing	(2) Cold & cough with rapid or difficult breathing	(3) Bronchitis	(2) and (3) together
Public hospitals (%)	3.7	9.1	25.6	16.6
Public first-line services (%)	8.8	12.0	12.6	12.3
Private hospitals (%)	1.6	6.2	9.0	7.5
Private clinics (%)	8.5	12.4	14.6	13.4
Private practitioners (%)	31.8	31.1	24.6	28.2
Pharmacies (%)	17.4	10.8	3.5	7.5
Other drug retailers (%)	26.3	14.1	6.0	10.5
Others (%)	1.9	4.1	4.0	4.1
No. of individuals	1674	241	199	440

The question of what type of providers households use for specific health problems can be analysed by examining the health seeking behaviour of patients for whom a specific condition is reported. Although rates of missing values are high for 'diagnoses' in most household surveys (59% of missing values in the RHS), this variable is nevertheless quite informative. We have approached the question from two perspectives: is there some specialization at the level of the providers, and where are diseases of interest mainly handled?

Household surveys provide considerable knowledge to stewards on the activities performed by the rather loosely controlled private providers. For example, the RHS dataset shows that every diagnosis is reported by people who went to a private practitioner. Yet, this category of providers seems particularly dominant for 'diagnoses' such as malaria (56% of all malaria diagnoses), dengue (46%), hypertension (39%), heart disease (31%), typhoid fever (51%) and symptoms without clear diagnosis ('unknown fatigue', 'unknown abdominal pain'). Obviously, the limited technological and medical capacity of these providers to diagnose patients appropriately is an issue to keep in mind during the analysis (e.g. probably many false positives in the typhoid fever group), but also a possible point of action for stewards.

Stewards can also identify where households go for specific diseases. The RHS shows for example that 96% of the patients who shared their positive HIV/AIDS status with the surveyors are being managed in public hospitals (71%), public health centres (11%) or non-profit health facilities (14%). This indicates that Cambodia has succeeded in developing appropriate management of patients diagnosed with HIV/AIDS through its national programme. The tuberculosis (TB) picture is less encouraging. The substantial proportion of patients reporting not seeking care (close to 7%), going to drug retailers (5%), to private clinics (9.5%) or private practitioners (11.5%) is worrying, given the poor track record of these categories of providers in terms of TB management in Cambodia (Gollogly 2002). The contrast between the current HIV/AIDS and TB situation in rural Cambodia suggests that the two related national programmes do not reach their target groups to the same extent, despite similar challenges (e.g. the need for an early diagnosis) and strategies (e.g. free health care after

diagnosis). The private sector is also the main actor for malaria treatment (76%). This is an obvious concern for national and even global stewards, as malaria strains resistant to artemisinin-based anti-malarial medicines have recently emerged in Cambodia (Dondorp *et al.* 2009), and many of the artemisinin derivatives sold by drug sellers in Cambodia are fake or sub-standard (Dondorp *et al.* 2004). These findings clearly confirm that malaria control in Cambodia requires active engagement with the private sector, which indeed is the current national strategy (Yeung *et al.* 2008).

As we indicated before, the RHS was not really designed for detailed analysis of all health problems. To validate our approach, we have carried out similar analyses on some recent national surveys, including the Cambodian Socio-Economic Survey 2004. This dataset also presented problems with missing values (7172 symptoms or diagnoses for 11 309 rural persons reporting an illness), and the questionnaire guidelines confuse symptoms and diagnoses. Despite this, the analysis provides interesting information.

In Table 8 we compare different types of acute respiratory tract infections (ARI). The private sector dominates for minor respiratory problems; however, the more severe or serious the disease is, the greater the role taken by the public sector. Within the private sector, we can also discern a shift from low-qualified providers to more qualified providers with the seriousness of the disease. Particularly striking is that households no longer self-medicate, or do so much less (i.e. use pharmacies and other drug retailers), when diseases are more severe. A further look at the survey confirms this pattern of self-medication for managing symptoms or minor illnesses (headaches, fever, and cold and cough without rapid or difficult breathing make up almost 70% of health seeking behaviours to shops). A reasonable stance for stewards could be to acknowledge the role currently played by informal drug outlets in the country, but restrict the range of drugs they are allowed to sell.

As in most low-income countries, improving maternal health indicators is one of the greatest public health priorities in Cambodia, and consequently one of the main assignments for the public health system. As the RHS was not very useful in this respect, we resorted to the DHS 2005 (rural population only), re-organizing the categories slightly and assuming that

Table 9 Health seeking behaviour for reproductive health (DHS 2005, rural population)

	Abortion (%)	Contraception (%)	Antenatal care (%)	Tetanus toxoid vaccine (%)	Delivery (%)
Public hospitals	6.5	5.5	11.9	4.6	6.8
Public first-line services	3.5	49.8	73.6	93.5	5.8
Private hospitals	1.4	0.9	0.5	0.0	0.3
Private clinics	21.2	7.4	4.4	1.3	1.7
Private practitioners	42.4	9.9	9.2	0.0	20.4
Pharmacies	0.0	0.0	0.0	0.0	0.0
Other drug retailers	0.0	19.5	0.0	0.0	0.0
Others (incl. traditional birth attendants)	24.9	6.9	0.4	0.6	65
Total	100	100	100	100	100

all activities assisted by a professional health practitioner outside a health facility (i.e. most of the time at the patient's home) were in fact activities carried out as a private practitioner. We put the traditional birth attendants in the category 'others'.

Table 9 provides interesting insights. First, we see some evidence of market segmentation. For each activity, one or two types of providers dominate the 'market'; the private sector is specialized in lucrative activities (abortion and deliveries), whereas the public sector has been relegated control over preventive services, which are highly subsidized. A second interesting insight concerns the place where activities take place. Both abortions and deliveries tend to occur outside health facilities (respectively, 56% and 85%), though for different reasons. As abortion is legal in Cambodia, the problem in this case is probably one of social acceptance (of the pregnancy or of interrupting a pregnancy). For deliveries, it is probably more a matter of convenience and physical barriers. Yet in both cases, regardless of the skills of the practitioners, practice at home involves less formal infrastructure, technical support or peer scrutiny, and therefore a greater risk of poor practice. For stewards concerned with maternal mortality, this highlights the need for strong action.

Lessons for stewards of the Cambodian health system

The main motivation of this study was to assess whether household surveys are useful sources of information for stewards of a health system. The study confirms that the health system in Cambodia is today highly pluralistic, and that the great majority of health-seeking behaviours take place outside the public health system. Our analysis of the survey also adds something to this well-known picture: it shows that the population's disaffection with public health facilities varies across places, socio-economic groups, health problems and severity of the health problems. Furthermore, the close look at trajectories for health care revealed that households who look for a second treatment mainly come from the public sector and quit the public sector after a first encounter.

We believe that such an enriched view on the composition of the health care delivery system could assist Cambodian policy

makers and local health managers in several respects. The following are recommendations inspired by the analysis.

- (1) Although the present analysis does not provide the full picture on health seeking behaviours, it offers enough evidence to confirm that many Cambodian households 'shop around' for health services. In fact, the private sector is, in many cases, the preferred option of rural Cambodian households, both as first and second recourse. This pattern could be better taken into account by the stewards of the health systems.
- (2) This preference for the private sector is problematic from a public health perspective, mainly because of the dominant role taken by the numerous low-end providers active at community level (e.g. drug peddlers, private practitioners). Private providers with a 'high' diagnostic capacity—charity hospitals and private clinics—bring a real contribution, but it is a relatively specialized one. This high fragmentation of the private sector will be a challenge for the stewards.
- (3) This heterogeneous health-seeking behaviour pattern questions health policy strategies which assume households' loyalty to the public health system. It could partly explain the poor coverage achieved so far by several pilot community-based health insurance schemes and raises serious doubts on the prospects for any health insurance scheme relying exclusively on public provision. The study of trajectories for health care has revealed a major outflow of patients from the public sector to the private sector, both for purchasing drugs and for treatment. This calls for decisive action. The options of expanding the essential drug list at health centre level and of the development of outpatient departments at hospital level should be assessed. One possible new activity would be chronic illness management (Janssens *et al.* 2007).
- (4) One strategy to control the unregulated private health sector would involve building a strong public health sector. The comparison across the three districts indicates that a well-performing health district can displace self-medication (Krivong and Sotnikum versus Mongol Borei).
- (5) Some of our analyses show that the health market is segmented. The good news is that the public sector still occupies major niches of the health system, namely services with a public good dimension (e.g. immunization,

HIV/AIDS) and hospital care. One could argue that one strategy for policy makers could be to acknowledge this de facto division of labour and to let the public sector play to its strengths. However, this approach should be consistent with national health priorities. The case we have made with maternal health—an area where the public sector should arguably have a much stronger role—shows the limits of such logic. Furthermore, the emerging attention to the objective of social protection should remind stewards of the need to also closely follow up developments in the private sector (cf. chronic illnesses).

- (6) Our study confirms that paediatric charity hospitals are much appreciated by the rural population of Cambodia. Their integration into the national health system could probably be improved. They could, for instance, serve as national referral hospitals for paediatric care. For some of them, this would require first that they accept to adhere to some strategies adopted by the national health authorities. This process could be an interesting first step in the better integration of more private hospitals and clinics in the health system. If such a strategy is adopted, it will be important to develop mechanisms for ensuring that poor people living in remote areas have the means to use these hospitals; the expansion of existing benefit packages of health equity funds seems the logical strategy.
- (7) One can expect that several segments of the health market will remain occupied by low-end providers, especially in remote areas. Drug shops should thus receive more attention from stewards in Cambodia (just like in many other low-income countries). One option would be to focus regulatory efforts on a limited list of drugs for which risks are substantial, such as anti-malarials or corticoids. The problem of counterfeit drugs sold by these providers also requires policy action.
- (8) Another trend that will have to be closely monitored by national stewards is the emergence of 'medical tourism' (for major illnesses only). If the quality of care does not drastically improve in Cambodia, more and more households will go to neighbouring countries for diagnosis and treatment. If in our data the phenomenon is so far only visible in Kirivong (close to the Vietnamese border), plenty of anecdotal evidence indicates that the 'medical tourism' option is gaining popularity among the urban middle-class. Such health seeking behaviours convey at least two threats for Cambodia: first, they may undermine support among the middle-class for risk pooling mechanisms aiming at establishing solidarity among different socio-economic groups; and second, they may lead to a significant outflow of foreign currencies from the national economy.
- (9) Stewardship of mixed health systems is also about 'supporting innovative models that can serve as "stepping stones" to broader reforms' (Lagomarsino *et al.* 2009). It is well known in Cambodia that Sotnikum and Kirivong have been places of major innovations in terms of health care financing both on the supply side with performance-based financing (Van Damme *et al.* 2001; Meessen *et al.* 2002; Soeters and Griffiths 2003; Jacobs *et al.* 2009) and on the demand side with the health equity fund (Hardeman *et al.* 2004; Jacobs and Price 2006). Whereas this study is not an

impact evaluation of the strategies adopted in Kirivong and Sotnikum—a major confounding factor is the amount of aid received—it consolidates the idea that developing solutions on both the supply and the demand sides is beneficial to the population (Van Damme *et al.* 2004; Annear *et al.* 2008). The fact that these lessons have been only partly transferred across districts (see for example the situation in Mongol Borei, an area receiving less donor support), indicates that coordination between the government and its technical and financial partners could be better.

Discussion

The increasing pluralistic character of the health care delivery system in low-income countries raises new challenges for national health authorities. The mere fact that households use a variety of health care providers expands the authorities' responsibility considerably. For instance, they have to develop the institutional arrangements that will ensure that all health care providers active in the country abide by a minimum quality standard. Establishing health authorities in their new role of steward of the health system is a daunting task; in many countries, a road map still has to be developed (Lagomarsino *et al.* 2009). As a first step, health authorities should be provided with a clearer view on the institutional and technical composition of the health care delivery system. In this paper, we have assessed the extent to which secondary data analysis of household surveys could contribute to this objective.

Secondary analysis of primary data from household surveys to document the mixed nature of health care delivery systems is not new; DHS have been particularly useful to reveal the role of private providers in many low-income countries (with the inherent DHS focus on maternal and child health) (Berman and Rose 1996; Bustreo *et al.* 2003; Limwattananon 2008). The originality of this paper lies in its focus on one country and the effort to extract key information that can be useful for stewards of national and local health systems.

Our study has several limits. A first set of limits is linked to the nature of the data we used. The missing data for symptoms and diagnoses formed a recurrent problem across the three surveys. Using symptoms and diagnoses as reported by the patient (or another household member) and understood by enumerators has limits from a medical perspective. Additionally, diagnoses tend to be provider-dependent. Diagnoses provided by a medical doctor in a health facility with technological diagnostic capacities are probably far more reliable than those given by informal providers in a remote village. Finally, stigmatized diseases such as HIV/AIDS and sexually transmitted infections more generally are probably under-reported.

A second constraint was that none of the three household surveys used in this analysis was designed primarily to study the composition of the health system. With hindsight, we suggest that researchers pursuing such an objective in the future and able to design their own surveys should probably: (1) integrate pre-identified categories for symptoms and diagnoses in the household questionnaire; and (2) develop a typology of providers sufficiently rich to capture the different challenges that their practices raise for stewards of the health

system. Pre-testing these questions will be particularly important. Researchers interested in studying trajectories of health seeking behaviour should certainly add questions on motivations to go to another health care provider.

Because of length constraints, this paper focuses on describing the pluralism of the health care market in Cambodia. Researchers studying this research question can of course deepen their analysis with other techniques. First, many household surveys allow researchers to hypothesize on causal relationships by observing correlations (e.g. thanks to regression models). Second, the analysis can probably be enriched by secondary analysis of other datasets (e.g. some weaknesses of the public sector could be better understood thanks to the health information system). Third, it would probably be useful to collect primary data through other research methods. For instance, visits to a sample of providers to assess their technical capacity and willingness to be overseen by the health authorities could help to improve the typology. In their report, Lagomarsino and colleagues propose several interesting tracks in terms of combining methods (Lagomarsino *et al.* 2009).

Yet, in our opinion, the most promising step would be greater consideration for the documentation of the composition of the health system in recurrent national household surveys—DHS in particular. This greater consideration could take shape in at least two ways. First, DHS could be enriched by a set of questions to document health seeking behaviours beyond the health problems already covered; a particularly useful add-on would be an in-depth look at a few non-communicable diseases. These are emerging health problems in most low-income countries, especially among elderly people. However, these health problems are not really covered today by the public health sector in most countries; it is unclear whether they are correctly handled by the private sector. DHS could contribute greatly to boosting awareness of this issue. We acknowledge that there will probably still be under-reporting and some misreporting of these health problems for quite a while, yet knowledge on the places where people seek diagnoses when they have the related symptoms would already be useful. Second, we would also recommend sponsors of DHS to push in each country report for a specific chapter on the composition of the health system. To our knowledge, this crucial aspect is today scattered across chapters covering different health problems. Whereas the curious reader may already find a lot of information by scanning the report, a chapter fully dedicated to the topic would greatly improve the visibility of this information for stewards. Variation across regions and time would have to receive particular attention.

More generally, we believe that the analysis of the composition of the health care system could become a standard practice at country level, not unlike current practice with national health accounts. Surely, committed stewards could gain a lot of insight from these two exercises, if both happened on a regular basis. A great advantage of the ‘composition exercise’ is its simplicity: the cross-tabulation approach used in this paper is straightforward enough to be used by experts not familiar with statistical techniques. Participatory interpretative workshops involving health authorities at peripheral level would probably be a powerful strategy to raise awareness at all levels.

International agencies with a country office (e.g. the World Health Organization) could play a role there, especially in countries where these agencies also have to catch up in terms of a broader vision on the health care system. It is time for them to go beyond vague statements recommending the government to engage with the private sector. Our recommendation to these international agencies would be to facilitate the exercise, certainly not to undertake it themselves or to subcontract it to international consultants.

The involvement of these agencies would also help to systematize data collection and analysis across countries. This would allow more advanced research programmes: if we have a common index measuring the mixed character of the health care sector in a given country, we could look at the correlation of this variable with some key outcome variables (e.g. child mortality rate, catastrophic health care expenditure) across countries. This could be a useful step in the major debate on the exact role that the private sector should have in the health sector in low-income countries (Hanson *et al.* 2008)

In parallel, we can expect that the international scientific community will make further progress in the understanding of how different providers can be better aligned on the objectives pursued by stewards of the health system. Instead of moving too rapidly to normative stances, more descriptive work seems urgently required. In this respect, we lack a framework which could help us integrate all the parallel studies on different components of the health system. We certainly also require more sophisticated classifications than the binary ‘public-private’ used so far. In this paper, we have advocated for looking at least at: (1) the technical capacity of providers to contribute to the goals pursued by stewards, and (2) the characteristics that will determine the transaction costs to enforcing the best alignment of the different providers on these goals. There may be other approaches.

Conclusion

In many low-income countries, the health care delivery system is today highly pluralistic. Our modern societies tend to value pluralism over monopolies and there are indeed good reasons to believe that a variety of actors in the same industry could be efficiency enhancing (Besley and Ghatak 2005). So this diversity is an asset. Yet one should not underestimate the importance of bringing some order in this heterogeneity of providers: the health care market is full of imperfections and the spontaneous order brought by the ‘invisible hand’ is often far from ideal. Pluralism in the health care delivery system will be only beneficial to the population if we manage to incorporate the decentralized actors in an efficient and equitable health system.

This will require the establishment of an intricate web of institutional arrangements, including new contracts, regulations and social norms. It will take some time and effort. As a preliminary step, we have to develop a much better view on the composition of the health care delivery system in each country. This paper argues that household surveys already provide some interesting insights. The methodological challenge is rather limited; data are available. Far more crucial are coalitions of actors ready to push forward this agenda. Unequivocal support

by the international community—international agencies and researchers—would be consistent with their earlier recommendation to governments and Ministries of Health to take up responsibility beyond their public health services.

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Conflict of interest

None declared.

References

- Annear PL, Bigdeli M, Eang C, Jacobs B. 2008. Providing access to health services for the poor: health equity in Cambodia. In: Meessen B, Pei X, Criel B, Bloom G (eds). *Health and Social Protection: Experiences from Cambodia, China and Lao PDR*. Antwerp, Belgium: ITG Press, pp. 189–225.
- Barber S, Bonnet F, Bekedam H. 2004. Formalizing under-the-table payments to control out-of-pocket hospital expenditures in Cambodia. *Health Policy and Planning* **19**: 199–208.
- Berman P, Rose L. 1996. The role of private providers in maternal and child health and family planning services in developing countries. *Health Policy and Planning* **11**: 142–55.
- Besley T, Ghatak M. 2005. Competition and incentives with motivated agents. *The American Economic Review* **95**: 616–36.
- Bigdeli M, Annear PL. 2009. Barriers to access and the purchasing function of health equity funds: lessons from Cambodia. *Bulletin of the World Health Organization* **87**: 560–4.
- Bloom G, Standing H. 2001. *Pluralism and marketisation in the health sector: meeting health needs in contexts of social change in low and middle-income countries*. Brighton, UK: Institute of Development Studies. IDS Working Paper 136.
- Bustreo F, Harding A, Axelsson H. 2003. Can developing countries achieve adequate improvements in child health outcomes without engaging the private sector? *Bulletin of the World Health Organization* **81**: 886–95.
- Chakraborty S, Harding A. 2003. Conducting a private health sector assessment. In: Harding A, Preker A (eds). *Private participation in health services*. Washington, DC: World Bank, pp. 75–156.
- Dondorp AM, Newton PN, Mayxay M *et al.* 2004. Fake antimalarials in Southeast Asia are a major impediment to malaria control: multinational cross-sectional survey on the prevalence of fake antimalarials. *Tropical Medicine & International Health* **9**: 1241–6.
- Dondorp AM, Nosten F, Yi P *et al.* 2009. Artemisinin resistance in *Plasmodium falciparum* malaria. *New England Journal of Medicine* **361**: 455–67.
- Gollogly L. 2002. The dilemmas of aid: Cambodia 1992–2002. *The Lancet* **360**: 793–8.
- Grundy J, Khut QY, Oum S, Annear P, Ky V. 2009. Health system strengthening in Cambodia—a case study of health policy response to social transition. *Health Policy* **92**: 107–15.
- Guillou AY. 2001. *Les Médecins au Cambodge. Entre élite sociale traditionnelle et groupe professionnel moderne sous influence étrangère*. Paris: EHESS.
- Hanson K, Gilson L, Goodman C *et al.* 2008. Is private health care the answer to the health problems of the world’s poor? *PLoS Medicine* **5**: e233.
- Hardeman W, Van Damme W, Van Pelt M *et al.* 2004. Access to health care for all? User fees plus a Health Equity Fund in Sotnikum, Cambodia. *Health Policy and Planning* **19**: 22–32.
- Ir P, Men C, Lucas H *et al.* 2010. Self-reported serious illnesses in rural Cambodia: a cross-sectional survey. *PLoS One* **5**: e10930.
- Jacobs B, Price N. 2003. Community participation in externally funded health projects: lessons from Cambodia. *Health Policy and Planning* **18**: 399–410.
- Jacobs B, Price N. 2006. Improving access for the poorest to public sector health services: insights from Kirivong Operational Health District in Cambodia. *Health Policy and Planning* **21**: 27–39.
- Jacobs B, Thome JM, Overtom R *et al.* 2009. From public to private and back again: sustaining a high service-delivery level during transition of management authority: a Cambodia case study. *Health Policy and Planning* **25**: 197–208.
- Janssens B, Van Damme W, Raleigh B *et al.* 2007. Offering integrated care for HIV/AIDS, diabetes and hypertension within chronic disease clinics in Cambodia. *Bulletin of the World Health Organization* **85**: 880–5.
- Kenjiro Y. 2005. Why illness causes more serious economic damage than crop failure in rural Cambodia. *Development and Change* **36**: 759–83.
- Lagamarsino G, Nachuk S, Kundra SS. 2009. *Public Stewardship of Private Providers in Mixed Health Systems: Synthesis report from the Rockefeller Foundation-sponsored initiative on the role of the private sector in health systems*. Washington, DC: Results for Development Institute.
- Limwattananon S. 2008. *Private-Public Mix in Woman and Child Health in Low-Income Countries: An analysis of demographic and health surveys*. Bangkok: International Health Policy Program.
- Lucas H, Ding S, Bloom G. 2008. What do we mean by ‘major illness’? The need for new approaches to research on the impact of ill-health on poverty. In: Meessen B, Pei X, Criel B, Bloom G (eds). *Health and Social Protection: Experiences from Cambodia, China and Lao PDR*. Antwerp, Belgium: ITG Press, pp. 29–53.
- Meessen B, Van Damme W, Ir P, Van Leemput L, Hardeman W. 2002. *The new deal in Cambodia: the second year – Confirmed results, confirmed challenges*. Phnom Penh: MSF Cambodia.
- Meessen B, Chheng K, Decoster K, Heng TL, Chap SC. 2008. Can public hospitals be pro-poor? The health equity fund experience in Cambodia. In: Meessen B, Pei X, Criel B, Bloom G (eds). *Health and Social Protection: Experiences from Cambodia, China and Lao PDR*. Antwerp, Belgium: ITG Press, pp. 469–90.
- Ministry of Health. 2008. *Health Strategic Plan 2008–2015: Accountability, Efficiency, Quality, Equity*. Phnom Penh: Royal Government of Cambodia.
- National Institute of Public Health, National Institute of Statistics, ORC Macro. 2006. *Demographic and Health Survey Cambodia 2005*. Phnom

- Penh and Calverton, MD: National Institute of Public Health, National Institute of Statistics and ORC Macro.
- Noirhomme M, Meessen B, Griffiths F *et al.* 2007. Improving access to hospital care for the poor: comparative analysis of four Health Equity Funds in Cambodia. *Health Policy and Planning* **22**: 246–62.
- Saltman RB, Ferroussier-Davis O. 2000. The concept of stewardship in health policy. *Bulletin of World Health Organization* **78**: 732–9.
- Soeung SC, Grundy J, Morn C, Samnang C. 2008. Evaluation of immunization knowledge, practices, and service-delivery in the private sector in Cambodia. *Journal of Health, Population and Nutrition* **26**: 95–104.
- Soeters R, Griffiths F. 2003. Improving government health services through contract management: a case from Cambodia. *Health Policy and Planning* **18**: 74–83.
- Van Damme W, Meessen B, von Schreeb J *et al.* 2001. *Sotnikum new deal, the first year – Better income for health staff; better service to the population*. Phnom Penh: MSF Cambodia.
- Van Damme W, Van Leemput L, Ir P, Hardeman W, Meessen B. 2004. Out-of-pocket health expenditure and debt in poor households: evidence from Cambodia. *Tropical Medicine & International Health* **9**: 273–80.
- Vyas S, Kumaranayake L. 2006. Constructing socio-economic status indices: how to use principal components analysis. *Health Policy and Planning* **21**: 459–68.
- WHO. 2000. *The World Health Report 2000. Health Systems: Improving Performance*. Geneva: World Health Organization.
- Yeung S, Van Damme W, Socheat D, White NJ, Mills A. 2008. Access to artemisinin combination therapy for malaria in remote areas of Cambodia. *Malaria Journal* **7**: 96.