
Improving access to safe delivery for poor pregnant women: a case study of vouchers plus health equity funds in three health districts in Cambodia

Por Ir^{1,2}, Dirk Horeman¹, Souk Narin¹ & Wim Van Damme²

Abstract

In many developing countries, maternal mortality rates remain high with huge poor-rich inequalities. Programmes aimed at improving maternal health and preventing maternal mortality often fail to reach poor women. Vouchers potentially are an effective financial mechanism for targeting health services to the poor.

We examine voucher and Health Equity Fund (HEF) schemes for safe delivery in three health districts in Cambodia and draw lessons learned for further improvement and scaling up. Data on voucher and HEF schemes were collected from reports and routine health information system combined with the personal observations of the authors and those from nine focus group discussions.

We found that voucher and HEF schemes increased deliveries in public health facilities. Voucher and HEF beneficiaries accounted for about one third of total facility deliveries and these increased sharply over time without decreasing the number of self-paying deliveries. But, the impact of both schemes on improved access to safe delivery for poor pregnant women remains limited. We outline several limitations of the voucher schemes.

Finally, we conclude that vouchers plus HEFs, if well designed and implemented, have a strong potential to address financial barriers to improved access for poor pregnant women to safe delivery. Yet, they do not overcome many non-financial barriers. To be fully effective, vouchers and HEF should be implemented together with supply-side interventions. More

¹ Belgian Technical Cooperation, Cambodia.

² Department of Public Health, Institute of Tropical Medicine, Antwerp, Belgium. Email: wdamme@itg.be (correspondence should be addressed to this author).

evidence is needed before further scaling up.

Keywords: voucher, health equity fund, access, safe delivery, Cambodia.

Introduction

The Millennium Development Goals set a target of reducing the maternal mortality ratio by three quarters by 2015 (United Nations 2000). However, progress towards this goal has been disappointing. The maternal mortality in many countries, especially in Sub-Saharan Africa and Asia, remains high (Hill *et al.* 2007). Furthermore, there are huge poor-rich inequalities in maternity care and maternal mortality (Houweling *et al.* 2007; Gwatkin *et al.* 2004). To achieve the fifth Millennium Development Goal, it is essential to target interventions toward the most vulnerable - the rural populations and poor people (Ronsmans *et al.* 2006).

The technical interventions to reduce maternal mortality are well known nowadays. Ensuring access to skilled birth attendants and emergency obstetric care are among the priority interventions fundamental to preventing avoidable maternal deaths (Donnay 2000; Liljestrand 2000). Campbell & Graham (2006) propose that the main priority for developing countries should be to offer women the choice to deliver in health centres. It has been estimated that the presence of skilled birth attendants at delivery could reduce between 13 and 33 percent of maternal deaths (Graham *et al.*, 2001). However, in many countries, existing programmes to improve maternal health have been found to be ineffective in preventing maternal mortality. Enabling pregnant women, especially the poor and vulnerable who often face many barriers to access essential maternity care, is a big challenge for developing countries (Houweling *et al.* 2007). Beside transport and time costs, formal and informal fees in public health services in many developing countries still constitute a substantial financial barrier for poor women to access maternal health services (Sharma *et al.* 2005).

To address these financial barriers, various demand-side approaches to financing health care that subsidize directly the consumer of health care are increasingly being implemented in developing countries. Among them, voucher schemes are considered a potentially effective means of targeting health services or health products to specific population groups such as pregnant women and the poor (Ensor 2004; World Bank 2005; Bhatia &

Gorter 2007). Vouchers for health are defined as “a financing mechanism for subsidizing the price of health services and products to target population groups, with the goal of improving access to and utilisation of those services and products” (PSP-One 2006). Although vouchers offer potential for improving access to specific types of health care for the poor and for helping them avoid catastrophic expenditure, so far there has been limited documented evidence on their success (Onwujekwe *et al.* 2004; Worrall *et al.* 2005; Borghi *et al.* 2006).

In Cambodia, maternal mortality is among the highest within South and South-East Asia, at 472 maternal deaths per 100,000 live births and marked by a low percentage of skilled birth attendance (UNFPA 2006a). For these indicators, the gap between the poorest quintile and richest quintile is very large. In 2006, it was estimated that only 6.3% of pregnant women in the lowest quintile delivered at public sector facilities and 20.7% were attended by trained personnel, compared to 42.2% and 89.9% respectively for the richest quintile (World Bank 2006). Since early 2007, the Belgian Technical Cooperation (BTC) and the Ministry of Health have initiated voucher schemes in three health districts in Kampong Cham province together with Health Equity Funds (HEF) and supply-side strategies to improve access to safe delivery for poor pregnant women. We examine these voucher and HEF schemes and draw lessons learned for further improvement and scaling up.

Context

GENERAL CONTEXT IN CAMBODIA

Cambodia is a low-income country in South-East Asia with a total population of 14 million in 2005. More than 80% of the population live in rural areas mainly as subsistence farmers. Per capita gross national income was US\$430 in 2005 (World Bank 2007). In 2004, 35% of the population were extremely poor, living below the national poverty line of US\$0.59 per person per day and rural poverty accounted for almost 90% (World Bank 2006).

In the health sector, despite considerable progress, access to essential health services, including maternal care, remains a problem, especially for the poor. The overall user rates are low and there is a huge difference between the poor and the rich and between urban and rural residents. In

2004, the user rate in government health centres was 0.42 contact per inhabitant and the number of admissions to government hospitals was 23.4 per 1000 inhabitants (Ministry of Health 2005). The Cambodian Socio-Economic Survey in 2004 showed that only 59% of the poorest quintile sought care when ill compared with 75% for the richest quintile. The annual hospital admission rate per 1000 inhabitants was as low as 28 among the poorest quintile, almost six times less than the richest quintile. The Cambodia Demographic and Health Survey 2000 and 2005 (NIS & DG 2001; NIPH & NIS 2006) showed an improvement for most maternal and child health related indicators, except the maternal mortality ratio (Table 1).

Furthermore, health care in Cambodia is relatively expensive and relies heavily on private spending. The out-of-pocket expenditure per capita estimated in 2004 was US\$23.6, the equivalent of 6.7% of GDP per capita (WHO NHA 2006). The failure of exemptions makes user fees in public hospitals a major financial barrier for the poor (Wilkinson *et al.* 2001). User fees in public sector together with out-of-pocket expenditure in private sector amounted to 67% of the total health expenditure, 6 times more than the government health expenditure. High out-of-pocket expenditure on health and health services may throw the non-poor household into poverty and the poor household into destitution. Besides foregoing treatment or accessing low quality care, households are often forced to borrow money with high interest rates or sell or mortgage productive assets (Van Damme *et al.* 2004; World Bank 2006).

Table 1. Maternal and child health related indicators

Indicators	CDHS 2000	CDHS 2005
Children 12-23 months fully vaccinated (%)	40	60
Use of modern contraceptive method (%)	19	27
Antenatal care at least once by trained personnel (%)	38	69
Deliveries in health facilities (%)	9.9	21.5
Deliveries assisted by trained personnel (%)	34.4	43.8
Total fertility rate	4.0	3.4
Infant mortality per 1,000 live births	95	66
Under 5 mortality per 1,000 live births	124	83
Maternal mortality ratio per 100,000 live births	437	472

Source: Cambodia Demographic and Health Survey 2000 and 2005.

Maternal health service indicators, in particular deliveries in health facilities and deliveries by skilled attendants, have remained low. In 2005, 43.8% of deliveries were assisted by trained health personnel but only 21.5% delivered in a health facility (Table 1). More than half of women still delivered with a TBA at home. Many pregnant women, especially poor pregnant women, could not deliver at a health facility or with assistance of trained health personnel because of many barriers such as absence of trained attendant, distance to health facilities, costs and no family or friends to accompany them (UNFPA 2006b). Hence, increasing access to safe delivery through promoting skilled birth attendance in public health facilities with prompt access to emergency obstetric care has been one of the main priorities for the Ministry of Health (Ministry of Health 2005).

In Cambodia, government health personnel are very poorly paid, which results in low motivation (Van Damme *et al.* 2001). Low staff income is one of main obstacles to facility delivery (UNFPA 2006b). Practically, midwives and health personnel earn much more when they assist a delivery at home than when they do it in a government health facility, creating a disincentive for them to promote facility delivery. To promote delivery in public health facilities, the Cambodian government decided in mid 2007 to provide an

incentive of US\$12.5 to US\$15 to health personnel for each delivery attended in public health facilities. This incentive mechanism was introduced in the whole country, in addition to existing health financing mechanisms such as 'performance-based contracting' and HEF. Although the amount of the incentive may not entirely compensate the income loss for midwives and health personnel to promote facility delivery, the government incentive mechanism, if well implemented, can to some extent address the disincentive problem. Yet, the result of this mechanism needs to be assessed.

CONTEXT IN THE STUDY SITE

The study took place in three health districts in Kampong Cham province in Cambodia: Cheung Prey, Chamkar Leu and Prey Chhor. The public health system in these three districts consists of a total of three referral hospitals, without any operating theatre for surgical interventions, and some 42 health centres, serving a total population of approximately 537,000. Surgical cases, including caesarean sections, are referred to the provincial hospital, located in Kampong Cham town. All the hospitals and health centres charge user fees. Along with the public health system, there is a diverse and unregulated private sector. In Kampong Cham, 12.3% of women delivered in a health facility while 52.6% of women delivered at home with traditional birth attendants. Only 8.2% of deliveries were carried out in public sector facilities (NIPH & NIS 2005).

Since late 2004, the BTC has provided intensive technical and financial support to these three districts and the provincial hospital. BTC uses several supply and demand-side approaches for its support, the main ones being performance-based contracting and HEF.

BTC has progressively implemented performance-based contracting with the government health facilities and management bodies in the three districts and the provincial hospital as a supply-side financing strategy to address the vicious cycle of underpaid health staff, and poorly performing and under-utilised health services. This approach is inspired by the 'Cambodian New Deal' experiment in Sotnikum, which is described in detail elsewhere (Van Damme *et al.* 2001; Meessen *et al.* 2002). In the performance-based contracting arrangements, contracted facilities receive financial subsidies related to some process and output indicators. The facilities distribute these subsidies together with part of the collected user fees to their personnel based on basic criteria such as attendance, fulfilment

of job description, refraining from unofficial payments and poaching patients to private practice. As a result, the performance of the contracted facilities is improving considerably. A minimum quality of services (24 hour services and absence of informal fees) is more or less ensured, but the issue of equity of access for the poor remains.

Since late 2005, BTC has progressively started HEF (see Box 1) in the four government hospitals in the area to address the issue of access to hospital services for the poor. The management of the four HEF schemes was entrusted to a local NGO, Action for Health, playing a role as a third party to purchase health services from the hospitals for the poor. In 2007, another local NGO, Association for Human Resource Development and Health Education took over the management of one HEF scheme in Chamkar Leu referral hospital.

Box 1. Definition of a Health Equity Fund (HEF)

HEF is a demand-side financing mechanism to promote access to priority public health services for the poor in an environment where user fees are charged.

HEF beneficiaries are identified according to eligibility criteria, either at the community level before health care demand (pre-identification) or at the health facilities through interviews (post-identification).

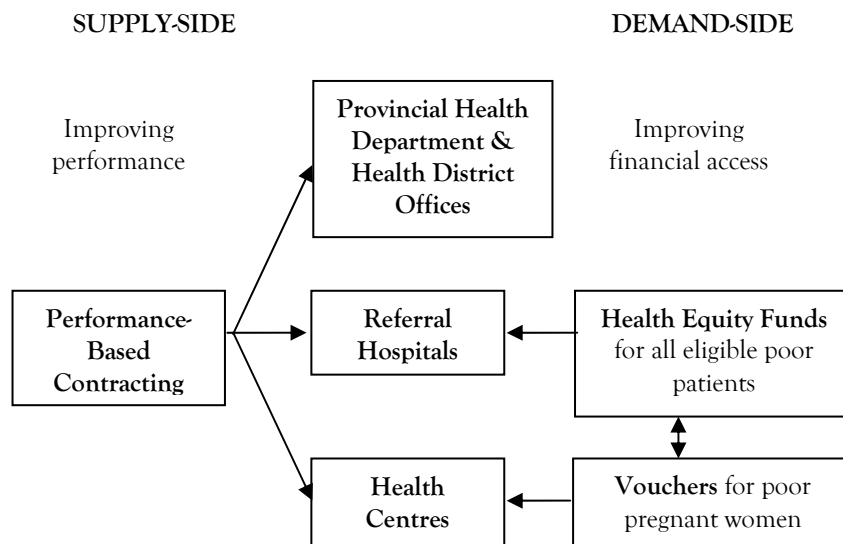
At the health facility, the eligible poor patients get full or partial support from HEF for the cost of user fees, transport cost and other costs incurred during hospitalisation.

Both NGOs use exclusively a post-identification approach to determine the eligible poor. At the hospitals, potentially poor patients are interviewed by NGO staff to determine their eligibility for HEF assistance, using a predefined questionnaire and eligibility criteria as is shown in Appendix 1. Based on the score calculated, the interviewees are classified into four categories of eligibility: very poor, poor, near-poor and non-poor. The latter category is excluded from HEF assistance. According to the eligibility category, patients get a full or partial benefit package, including payment for hospital user fees, payment for cost of transportation between home or health centre and hospital, food allowance during the hospitalization and funeral cost in case of death.

THE VOUCHER SCHEMES

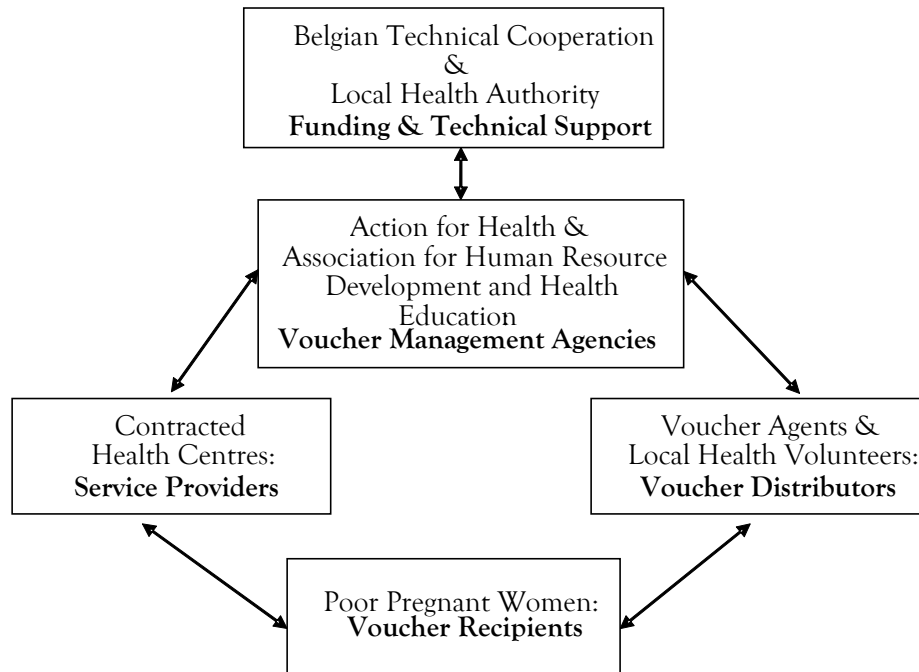
In Kampong Cham, despite significant improvement with performance-based contracting and HEF, many pregnant women, especially the poor, still face many barriers, including financial barriers, to accessing the maternity services in public health facilities. The performance-based contracting helps improve the supply-side performance, but does not address demand-side barriers, in particular the financial barrier. HEF supports only at hospital level. Although in general paying user fees at health centres is not a big barrier for access in Cambodia (Wilkinson *et al.* 2001), fees for delivery are, as it is the most expensive fee and it represents a substantial amount for poor pregnant women (US\$7.5 for a simple delivery). In addition, transport cost to reach health facilities constitutes a significant amount and can be a major financial barrier to accessing health care for the poor (Hardeman *et al.* 2004). Therefore, voucher schemes for safe delivery at the health centre were initiated in an attempt to improve the situation (Figure 1).

Figure 1. Mechanisms used by BTC to improve access to safe delivery



The first voucher scheme was introduced in Cheung Prey health district in February 2007. It was later expanded to Prey Chhor and Chamkar Leu health districts in June and July 2007 respectively. The main objective of the voucher schemes is to improve access to safe delivery for poor pregnant women through promoting deliveries and antenatal and postnatal care with skilled birth attendants at public health centres in the concerned areas, thereby contributing to the reduction of maternal and newborn mortality and morbidity. The organisational structure of the voucher schemes can be schematised as in Figure 2.

Figure 2. Organisational structure of voucher schemes in Kampong Cham



BTC and local health authorities sub-contracted the management of voucher schemes to the NGOs that were already operating HEF in the area, Action for Health and Association for Human Resource Development and Health Education, as voucher management agencies (VMA). The voucher

recipients are poor pregnant women in the catchment area. Selected government health centres are the health service providers. To ensure minimum quality of midwifery services for safe delivery, the local health authorities together with BTC and the VMA applied three main criteria to select health centres for voucher schemes: (1) the health centre should be able to provide all services recommended by the Ministry of Health for a health centre, the so-called Minimum Package of Activities; (2) the health centre should have at least one skilled midwife available at time of need; and (3) the health centre has a record of relatively high utilisation for antenatal care and delivery.

The selected health centres signed contracts with the VMA. The contracts stipulated the health centres' commitment to timely and professionally provision of antenatal, delivery and postnatal care services and arranging for referral services to emergency obstetric care in case of complications, to all voucher recipients who show up at the health centres. In exchange, the contracted health centres would get the user fees for their services paid by the end of each month.

Poor pregnant women are identified by local health volunteers and staff of VMA at their home. All pregnant women reported by local health volunteers as potentially poor are visited and assessed for eligibility for voucher schemes. The home visits are done every three months by VMA staff and local health volunteers. At each home visit, an interview based on the same predefined questionnaire as for HEF (Appendix 1) is administered to determine household socio-economic status. Once identified as eligible poor, a voucher with five detachable coupons (for three antenatal care visits, delivery and one postnatal care visit) is provided with explanation about the use of the voucher. The voucher recipients are encouraged to use all five coupons for their pregnancy, but they still are free to use only one or few of these coupons.

The voucher entitles the woman to (1) round trip transportation costs for antenatal care, delivery and postnatal care at the contracted health centre, (2) referral transportation costs from the health centre to referral hospital in case of complication, and (3) free antenatal care, delivery and postnatal care at the contracted health centre. User fees and other related costs at referral hospitals are the responsibility of HEF. The vouchers are only valid for the current pregnancy.

Payment of transportation cost is done by health centres based on a pre-defined list of prices with an advance cash allowance from the voucher schemes. The list estimates transportation costs for each village in its catchment area to the health centre. These prices take 300 Riels³ per kilometre as unit-based fare, which is the estimated rate for moto-taxis.

BTC and the local health authority have been monitoring the activities of vouchers and HEF schemes as part of their overall project monitoring activities, using quantitative indicators such as number of poor pregnant women identified, number of vouchers distributed, and utilisation of vouchers for ANC, delivery and postnatal care as well as costs of services provided through the voucher schemes. Periodically, they conduct individual interviews and focus group discussions among voucher holders and local stakeholders to understand their perception on the performance of voucher schemes and on the quality of services.

Methods

We collected data on voucher and HEF schemes in 2006 and 2007 from reports by VMA and HEF agents, and from the routine health information system in the three health districts, combined with nine focus group discussions and personal observations of the authors.

In the routine health information system, data on deliveries in the three health districts were collected every month from two main sources: the records of health facilities for facility deliveries and reports by village health volunteers for deliveries outside the health facilities. For the latter, health centre personnel organise monthly meetings with village health volunteers - two from each village - from all the villages in the health centre catchment area to gather information on deliveries during the previous month in their respective villages.

To understand the perception of voucher recipients on the performance of voucher schemes, on the quality of services provided at contracted facilities, and on reasons for non-use of vouchers, the third author conducted nine focus group discussions in late 2007 with a total of 87 voucher recipients. Out of the nine groups, five groups included 51 voucher recipients who did not use their vouchers for delivery (non-user group) and

³ Riel is Cambodian currency. The exchange rate is around 4,000 Riels = US\$1.

four groups included 36 voucher recipients who used their vouchers (user group). Participants were randomly selected from the list of voucher recipients and beneficiaries at health centres. The non-user group came from health centres with low utilisation rates of vouchers for delivery while the user group came from health centres with high utilisation rates of vouchers.

Two of the authors (DH and SN) are directly involved in the field operation of voucher and HEF schemes. The findings from the above methods are carefully matched with their personal observations.

To analyse the operational effectiveness of voucher schemes, we split the operational process of voucher schemes in three stages: (1) health centre selection, (2) voucher distribution and (3) voucher utilisation.

We used MS excel and SPSS version 13.0 for windows to analyse quantitative data. The qualitative data from the focus group discussions were manually coded, grouped and analysed.

Results

UTILISATION OF THE VOUCHERS AND HEF

In 2007, a total of 1,093 vouchers were distributed in the three health districts within less than one year of operation (11 months, 6 months and 5 months respectively in Cheung Prey, Prey Chhor and Chamkar Leu health districts). During that period, the vouchers were used by 843 poor pregnant women for ANC1, 635 for ANC2, 474 for ANC3, 402 for delivery and 186 for postnatal care. Of the 402 users for delivery, 107 delivered in referral hospitals; 12 of them were referred by health centres and 95 others went straight to the hospitals possibly on advice given by the health centres during ANC visits. Their numbers per month progressively increased (Table 2).

Table 2. Utilisation of vouchers in the three health districts in 2007

	ANC1	ANC2	ANC3	Delivery at		Postnatal care
				Health centre	Hospital	
February	6	0	0	0	0	0
March	6	5	0	1	2	0
April	4	3	1	1	1	0
May	17	3	2	0	0	0
June	131	37	7	16	2	4
July	210	128	59	24	9	13
August	246	140	99	37	15	24
September	62	146	85	44	17	28
October	26	55	99	53	17	42
November	78	52	62	68	22	43
December	57	66	60	51	22	32
Total	843	635	474	295	107	186

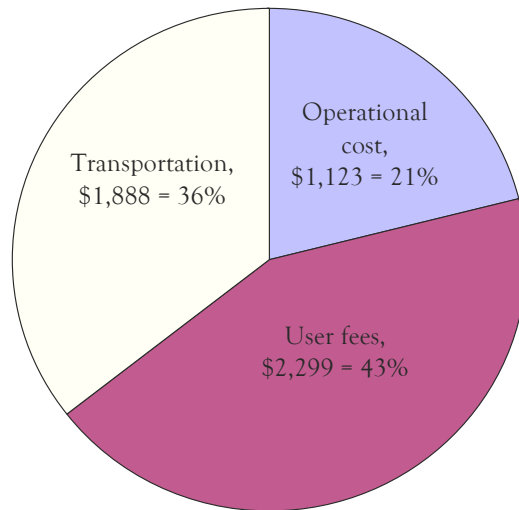
The sharp increase of ANC1 and ANC2 users between June and August could be explained by the start of voucher distribution in Prey Chhor and Cham Kar Leu districts. Many poor pregnant women were identified and given vouchers only in the last trimester of pregnancy. Those women would have missed the opportunity to use their vouchers for all the three ANC visits. This could be a reason for immediate drop of monthly ANC1 and ANC2 visits after the increase between June and July. It could also explain the progressive decrease of voucher utilisation for ANC visits from the first to the third visit. In 2006, HEF supported 132 poor pregnant women who delivered at the three district referral hospitals and 239 in 2007, excluding the voucher holders.

COST OF VOUCHERS

The total cost of the voucher schemes in the three health districts over the study period was US\$5,309. Of this amount, US\$2,299 (43%) was for payment of user fees charged by contracted health facilities, US\$1,888 (36%) for transportation and US\$1,123 (21%) for operational costs, including per-

diem and transport costs for the voucher distributors (Figure 3). The latter does not include staff salary and administration cost of the two VMA, as these expenses were covered in the HEF contracts and were not increased for the voucher schemes. The total direct financial assistance to beneficiaries (for health centre user fees and transportation cost between home and health centres) was US\$4,186 or 79% of the total cost (Figure 3). Per voucher recipient, the average financial assistance was US\$3.83 and total cost US\$4.86. The total cost per supported delivery at health centre was US\$18.

Figure 3. Breakdown of total expenditure for vouchers between January and December 2007



OPERATIONAL EFFECTIVENESS OF VOUCHERS

The whole operational process of voucher schemes can be split into three stages: (1) health centre selection, (2) voucher distribution, which includes pre-selection of potentially poor pregnant women at village level, home visits and interviews to identify the eligible poor pregnant women, and (3) utilisation of vouchers, which also includes detection and referrals of complicated cases. Overall results at different stages are summarized in Figure 4.

(1) **Health centre selection.** By the end of 2007, voucher schemes had been introduced in 329 villages in the catchment areas of 30 health centres. This represents only 67.6% of the total 487 villages in the three districts. Twelve health centres and their catchment villages were not covered because they did not meet the selection criteria (six without building) and were not selected for intervention. Pregnant women living in the catchment areas of these twelve health centres were automatically excluded from the voucher schemes.

(2) **Voucher distribution.** Distribution of vouchers started with pre-selection of potentially poor pregnant women in the target villages by respective village health volunteers and village chiefs. They proposed a list of pre-selected poor pregnant women, who were later interviewed by VMA staff. As a result, 1,093 pregnant women were identified as eligible and provided with vouchers during the period.

It is not possible to estimate exactly how many eligible poor pregnant women were missed at this stage. Using 30‰ crude birth rate⁴ and 37% poverty rate in the coverage area⁵ an estimation of poor pregnant women during the time period would be 4,398. Only 1,093 poor pregnant women (24.9%) were identified as eligible for vouchers, thus excluding 3,305 (75.1%) potentially poor pregnant women from voucher schemes. These exclusion errors could have resulted from the pre-selection and interviews. It was reported that very few poor pregnant women pre-selected by village health volunteers and village chiefs were excluded from voucher schemes by VMA staff after interviews. But the VMA staff failed to make as many home visits for interviews as it was planned. Each target village was expected to be visited by VMA staff together with village health volunteers and village chiefs every three months. It meant 894 visits to the 329 target villages. In practice, only 545 visits (60.9%) were carried out over the study period.

⁴ The crude birth rate in Kampong Cham province in 2007 was officially estimated at 30‰ of the total population. Many observers believe that the real birth rate in the area has fallen considerably over recent years, but probably less so among the poor.

⁵ According to the Cambodia Socio-Economic Survey 2004, the general poverty rate (living below US\$0.59 per person per day) in Cambodia was estimated at 35% while in Kampong Cham the poverty rate was estimated at 37%.

(3) **Voucher utilisation.** Many voucher recipients did not use their vouchers. Among the 1,093 voucher recipients in the list, 786 with clear record on voucher utilisation and estimated date of voucher distribution and expected delivery, indicating that they had delivered already, were selected for analysis at this stage. Out of the 786 voucher recipients, 618 (78.6%) had used their vouchers for ANC1, 484 (61.6%) for ANC2, 369 (46.9%) for ANC3 and 335 (42.6%) for delivery. So, more than half of voucher recipients did not use their voucher entitlement for delivery. Excluding one district which had data missing, of the 467 voucher holders, 143 (30.6%) went for postnatal care at health centres.

Over the study period, 14 pregnant women (about 5.6% of the voucher recipients who delivered at health centres) were found to have complications by health centre midwives and were referred to district hospitals. Four of them were further referred to the provincial hospital. One of them underwent caesarean section.

Figure 4. Results of voucher schemes at different stages of operation

(1) Health centre selection

Total health centres: 42	30 health centres or	(71.4% of the total health centres)
Total villages: 487	329 villages selected for voucher intervention	(67.6% of the total villages)



(2) Voucher distribution

Total expected visits: 894	545 visits to the 329 villages carried out in 2007	(60.9% of the total expected visits)
Total expected poor pregnant women with 37% poverty rate: 4,398	1,093 poor pregnant women have been identified as eligible and provided vouchers	(24.9% of the total expected poor pregnant women in the 329 selected villages)



(3) Voucher utilisation

Sample for ANC and delivery: 786 voucher recipients with clear record	618 voucher recipients have used their entitlement for ANC1	(78.6% of the total sample)
	484 voucher recipients have used their entitlement for ANC2	(61.6% of the total sample)
	369 voucher recipients have used their entitlement for ANC3	(46.9% of the total sample)
	335 voucher recipients have used their entitlement for delivery	(42.6% of the total sample)
Sample for postnatal care: 467 women with clear record	143 voucher recipients have used their entitlement for postnatal care	(30.6% of the total sample)
Sample for referrals: 251 voucher recipients who delivered at health centres	14 complicated deliveries referred to hospitals and one got caesarean section	(5.6% of the total sample)

RESULTS FROM FOCUS GROUP DISCUSSIONS

None of the 87 participants in the focus group discussions had had any previous deliveries in health centres prior to the introduction of the voucher schemes, although about half of them used to seek ANC at health centres. Most of the participants could explain well the use of the vouchers and their benefits. They appreciated the vouchers. Almost all of them, even the non-user group, used vouchers to seek ANC at least once at the contracted health centres.

The voucher user group were in general satisfied with the services provided at health centres. They reported three main reasons why they had used the vouchers for delivery in health centres. First, thanks to vouchers they did not need to pay. Second, they felt safer delivering in health centres than at home with TBAs. Third, they could get their child vaccinated at once.

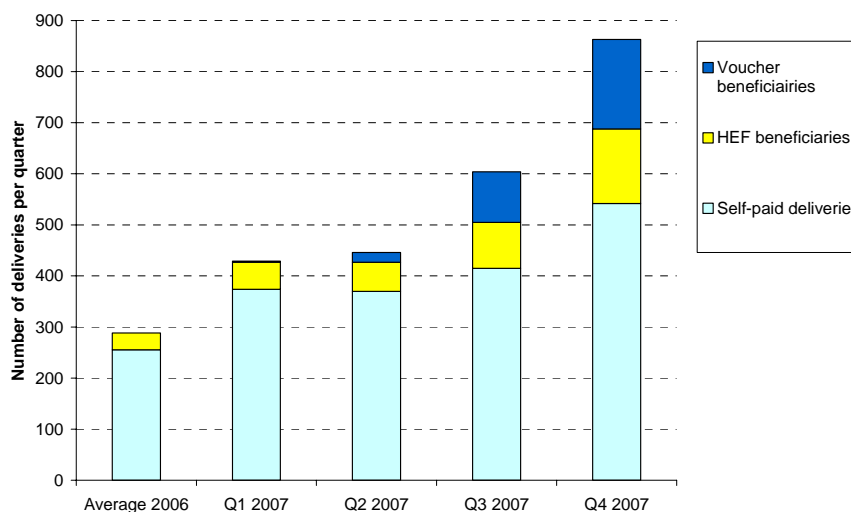
By contrast, many participants in the non-user group expressed their dissatisfaction with health centre staff. Some participants reported poor staff attitude and extra payments. Some stated that midwives did not explicitly request extra payments, but made it difficult for them not to do so. Some doubted the midwife's availability at night time for delivery. Beside supply-side problems, transportation and intra-household constraints were raised as the two main reasons for non-use of vouchers for delivery. First, they are living in remote areas and far away from health centres. The deliveries happened at night time and they could then not find transport means, even knowing that transportation costs would be paid for by the voucher scheme. If they could find the transport, they anticipated that the price would be much higher than the day time price approved by the voucher scheme. Women feared that such higher costs would not be fully covered by the voucher scheme. Second, several intra-household constraints made it difficult for the poor pregnant women to leave home. Many affirmed that if they came to deliver at health centres, nobody would look after their house and take care of their children at home, or that nobody could accompany them to health centres.

IMPACT ON SKILLED BIRTH ATTENDANCE

Midwives in contracted health centres and hospitals are considered skilled birth attendants. So, for the sake of this analysis, we consider deliveries

attended by midwives at the health centres and hospitals (facility deliveries) skilled birth attendance. The number of deliveries in public health facilities in the three health districts increased sharply not only for voucher and HEF beneficiaries, but also for self-paid deliveries. This indicates that voucher and HEF schemes brought new pregnant women to deliver at health centres and hospitals (Figure 5).

Figure 5. Facility deliveries in the three districts by type of beneficiary

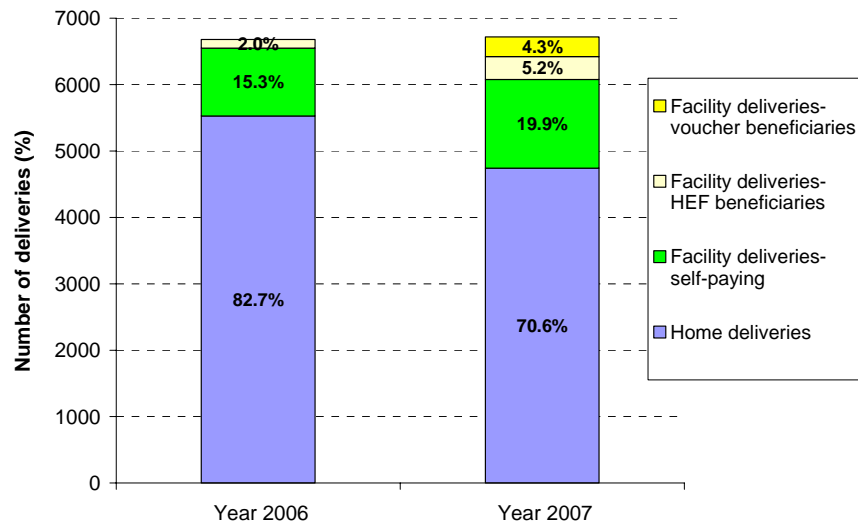


Based on the routine health information system, a total of 6,681 deliveries were reported in 2006 and 6,718 in 2007 from 329 targeted villages in the three health districts. Of the reported deliveries in 2006, 1,154 (17.3%) were deliveries in public health facilities and 5,527 (82.7%) were home deliveries versus 1,975 (29.5%) and 4,727 (70.6%) respectively in 2007. This shows that deliveries in the public health facilities almost doubled in 2007 compared to 2006, while the number of deliveries at home proportionally decreased (Figure 6).

Among the 1,975 deliveries in public health facilities in 2007, 1,373 (69.5%) were in health centres and 602 (30.4%) were in referral hospitals. Vouchers supported 295 (21.5%) of the total health centre deliveries while HEF supported 346 (57.5%) of the total hospital deliveries. In total,

vouchers and HEF together supported 641 (32.5%) of the total 1,975 deliveries in public health facilities. The total number of beneficiaries of the voucher schemes (4.3%) and of the HEF schemes (5.2%) represented 9.5% of the total 6,718 deliveries reported in 2007. Along with voucher and HEF beneficiaries, the number of women who delivered in the public facilities and paid the delivery related costs by themselves, or 'self-paying' deliveries, also increased considerably from 15.3% in 2006 to 19.9% in 2007 (Figure 6).

Figure 6. Deliveries in the 3 districts: facility deliveries versus home deliveries



Based on 37% poverty rate, the total voucher and HEF beneficiaries accounted for 25.8% of the reported deliveries among poor pregnant women in the 329 targeted villages in 2007. But the total deliveries might have been under reported by the village health volunteers. If we use 30‰ crude birth rate, the total estimated pregnancies in this area in 2007 would be 11,887, almost double the reported number of deliveries. In this case, the percentage of voucher and HEF beneficiaries would be 5.4% of the total deliveries and 14.6% of the deliveries among poor pregnant women. The impact of voucher and HEF schemes on improved skilled birth attendance is summarised in Table 3.

Table 3. Impact of voucher and HEF schemes on improved skilled birth attendance

	Report by routine health information system	Estimation by crude birth rate (30‰)
Total deliveries in 2007	6,718	11,887
Expected poor pregnant women (based on 37% poverty rate)	2,486	4,398
Total number of beneficiaries of vouchers and HEF schemes	641 (9.5% of total deliveries) (25.8% of total deliveries among poor pregnant women)	641 (5.4% of total deliveries) (14.6% of total deliveries among poor pregnant women)

Discussion

In the three health districts in Kampong Cham, the introduction of voucher schemes alongside HEF schemes seemed to effectively improve access to safe delivery for poor pregnant women. The number of voucher and HEF beneficiaries represented a large share (32.5%) of total reported facility deliveries and increased sharply over time, without decreasing the number of self-paying deliveries. Furthermore, the focus group discussions indicated that all poor pregnant women who used vouchers to deliver at health centres and hospitals did this for the first time, as they used to deliver at home with TBAs. Voucher schemes thus brought new pregnant women to public health facilities for delivery.

However, it is difficult at this stage to measure the impact of voucher and HEF schemes on improved access to safe delivery for poor pregnant women for many reasons. First, it is too early to see the full effect of the intervention since the schemes have been fully implemented for less than one year. Second, there are many other financing schemes under implementation in the area. Third, we do not have enough reliable data, including the total number of deliveries and number of poor pregnant women in the area.

The increase of self-paying deliveries could be partly explained by the overall improvement of supply-side performance thanks to performance-based contracting and government incentives for deliveries, the two supply-side mechanisms implemented in the study area. These mechanisms could play an important role in the increase of self-paying deliveries as well as overall facility deliveries. Yet, the real impact of these mechanisms still needs to be assessed. Other factors such as, improvement of road access, increasing awareness on safe delivery by women, which were found in a survey in Cambodia as important determinants for increased facility delivery (UNFPA 2006b), could also play a role. It is important to recognise that the Cambodia Demographic and Health Survey 2000 and 2005 (Table 2) already showed an increasing trend for deliveries in health facilities in the country.

There are two possible scenarios to estimate the number of poor pregnant women and their deliveries during the study period: (1) we apply 37% poverty rate to the total reported deliveries in the area, though the village health volunteers may have under reported the number of deliveries in their villages; and (2) we apply the 37% poverty rate to the total expected pregnancies in the area estimated based on 30‰ crude birth rate. It is believed that the 30‰ crude birth rate is higher than the reality, but it may be realistic for the poor since the poor often have a higher fertility rate.⁶ Based on the first scenario, voucher and HEF schemes supported about 25.8% of poor pregnant women. This figure decreases to about 14.6% with the second scenario. This low coverage of voucher and HEF schemes among the poor indicates that their impact on improved access to safe delivery for poor pregnant women remains limited.

The operational effectiveness analysis of voucher schemes showed that many poor pregnant women were excluded from the schemes at three stages of operation - health centre selection, voucher distribution and voucher utilisation - because of some non-financial barriers, including organisational barriers, supply-side barriers and intra-household barriers. This suggests that overall effectiveness of voucher schemes would have been much better if these barriers were well addressed.

At the first stage - health centre selection - twelve of the 42 health centres did not meet the selection criteria because of the unavailability of skilled

⁶ The Cambodia Demographic and Health Survey 2005 showed that the total fertility rate among the lowest quintile was 4.9 versus 2.4 for the richest quintile.

midwives and poor infrastructure and were not included in the intervention. This automatically ruled out about 29% of poor pregnant women from the scheme. One can argue that these women would have not been excluded if alternative providers had been chosen. A competitive voucher scheme allows the recipients to choose among a number of different providers they like and at their greatest convenience. This choice not only raises satisfaction amongst voucher recipients, but also creates competition among participating providers to improve quality of their services to attract more voucher clients (World Bank 2005). Instead of government health centres monopolising vouchers, BTC and local authorities could consider contracting some good private providers for service delivery, at least in the areas where there is no qualified government health centre. However, the feasibility of this approach depends on the availability of the private providers in the area, on their willingness to enter in a contractual relationship on terms acceptable for the purchaser and on political acceptability for the key stakeholders.

The second stage - voucher distribution - was limited by some targeting constraints. In general, there are three targeting methods: individual targeting, group or categorical targeting and self-selection (Coady *et al.* 2004). The voucher scheme is a targeting mechanism that uses one or more of these methods (Hanson *et al.* 2006). The voucher schemes in Kampong Cham use all three targeting methods. They use group targeting to target pregnant women for maternal services. By selecting only the 'poor', the voucher schemes also use individual targeting. Moreover, by choosing only public health centres as service providers, to some extent self-selection is automatically introduced. It means that non-poor pregnant women for some reasons may not want to deliver at public health centres even when there is no cost for it. This self-selection seems to make individual targeting unnecessary, since it tries to exclude the non-poor from the benefits that they would not want to claim for even if they were allowed to do so. Targeting helps improve efficient use of subsidies for the most needy, but it has a cost (Coady *et al.* 2004). The individual targeting in Kampong Cham may induce unnecessary cost to identify the non-poor pregnant women and delay the distribution of vouchers. With the estimate based on 37% poverty rate and 30‰ crude birth rate in Kampong Cham, more than two thirds of the potentially poor pregnant women in the intervention area were excluded from receiving vouchers. One obvious cause of this exclusion was that VMA staff failed to conduct regular home visits to interview and identify poor

pregnant women. Only 61% of the expected home visits were performed. For this reason, one could suggest rather systematically distributing vouchers to all pregnant women in the area regardless of socio-economic status to improve the coverage of voucher distribution. But, targeting the poor is crucially important to meeting the efficiency, equity and poverty-reduction objectives of subsidies. Alternatively, VMA could just distribute vouchers through village health volunteers without systematic interviews, but randomly cross-check to avoid fraud and errors, or introduce systematic identification of all eligible poor households in the area as part of an overall targeting strategy for not only vouchers, but also for HEF and other social transfers.

At the third stage - voucher utilisation - many voucher recipients did not use their vouchers for recommended services at health centres. Yanagisawa and colleagues (2006) showed that previous contact with a skilled birth attendant through antenatal care was a significant determinant in facility deliveries in rural Cambodia. But in the case of vouchers in Kampong Cham, the majority of voucher recipients did use their vouchers for ANC while more than half did not use them for delivery because of several remaining barriers which were not or not fully addressed by vouchers. Many deliveries happen at night time during which it is difficult to arrange transportation to health centres and to expect the presence of midwives at the health centres. In many cases, women decided to deliver at home because there was nobody to accompany them to health centres and to look after the children at home. Some health centre staff and midwives showed bad behaviour towards voucher holders and charged them extra fees. This could partly result from their low-income and disincentive to deliver in the health centre as discussed in the context. To address this problem requires more effective measures toward improving supply-side performance. The issue of disincentive for facility delivery can be addressed by linking voucher schemes with the government incentives for deliveries. To facilitate transportation for pregnant women during night time, a local arrangement by the communities should be developed. The project can also make use of village health volunteers by providing them some resources and incentives to arrange transport and accompaniment for pregnant women to deliver at health centres. Last but not least, more promotion for safe delivery at the public health facilities may further improve voucher utilisation.

Conclusion

Finally, even with the limitations of this study, we can conclude that vouchers together with HEFs, if well designed and implemented, have a strong potential to improve access for poor pregnant women to safe delivery services by addressing financial barriers. Yet, many non-financial barriers cannot be addressed. To be fully effective, vouchers and HEF should be implemented together with other supply-side interventions. More evidence is needed to prove the effectiveness and impact of the voucher and HEF schemes and to provide lessons for further scaling up.

Acknowledgements

We thank the field staff of the Ministry of Health and Belgian Technical Cooperation and village health volunteers in Kampong Cham for their hard work in project implementation and data collection. We are very grateful to Anna C Gorter, Bruno Meessen, Kristof Decoster and César Antonio DP Sousa for their comments on previous drafts of this paper. We also thank the reviewers and editors.

References

- Bhatia MR & Gorter AC (2007) Improving access to reproductive and child health services in developing countries: are competitive voucher schemes an option? *Journal of International Development* **19**(7), 975-81.
- Borghji J, Ensor T, Somanathan A, Kissner C & Mills A (2006) Mobilising financial resources for maternal health. *Lancet* **368**, 1457-65.
- Campbell MRO & Graham JW (2006) Strategies for reducing maternal mortality: getting on with what works. *Lancet* **368**, 1284-99.
- Coady D, Grosh M & Hoddinott J (2004) Targeting of transfers in developing countries: Review of Lessons and Experience. World Bank, Washington.

Donnay F (2000) Maternal survival in developing countries: what has been done, what can be achieved in the next decade. *International Journal of Gynaecology & Obstetrics* **70**, 89-97.

Ensor T (2004) Consumer-led demand side financing in health and education and its relevance for low and middle income countries. *International Journal of Health Planning and Management* **19**, 267-285.

Graham W, Bell JS & Bullough CHW (2001) Can skilled attendance at delivery reduce maternal mortality in developing countries? *Studies in Health Services Organisation & Policy* **17**, 97-129.

Gwatkin DR, Bhuiya A & Victora CG (2004) Making health system more equitable. *Lancet* **364**, 1273-80.

Hanson K, Worrall E & Wiseman V (2006) Targeting services towards the poor: A review of targeting mechanisms and their effectiveness. Health System Resource Guide.

Hardeman W, Van Damme W, Van Pelt M, Ir P, Kim Van H & Meessen B (2004) Access to health care for all? User fees plus a health equity fund in Sotnikum, Cambodia. *Health Policy and Planning* **19**, 22-32.

Hill K, Thomas K, AbouZahr C, Walker N, Say L, Inoue M & Suzuki E (2007) Estimates of maternal mortality worldwide between 1990 and 2005: an assessment of available data. *Lancet* **370**, 1311-19.

Houweling AJT, Ronsmans C, Campbell MRO & Kunst EA (2007) Huge poor-rich inequalities in maternity care: an international comparative study of maternity and child care in developing countries. *Bulletin of the World Health Organization* **85**, 10.

Liljestrand J (2000) Strategies to reduce maternal mortality worldwide. *Current Opinion in Obstetrics & Gynaecology* **12**(6), 513-17.

Meessen B, Van Damme W, Ir P, Van Leemput L & Hardeman W (2002) *The New Deal in Cambodia: The second year*. MSF Phnom Penh, Cambodia.

Ministry of Health (2005) *Joint Annual Performance Review 2005*. Phnom Penh, Cambodia.

Ministry of Planning (2006) *Cambodia Socio-Economic Survey 2004*. Phnom Penh, Cambodia.

NIPH & NIS (2006) *Cambodia Demographic and Health Survey 2005*. Phnom Penh, Cambodia

NIS & DG (2001) *Cambodia Demographic and Health Survey 2000*. Phnom Penh, Cambodia.

Onwujekwe O, Hanson K & Fox-Rushby J (2004) Inequalities in purchase of mosquito nets and willingness to pay for insecticide-treated nets in Nigeria: challenges for malaria control interventions. *Malaria Journal* 3, 6-13.

PSP-One (2006) *Vouchers for health: A focus on reproductive health and family planning services*. Primer for policy makers.

Ronsmans C & Graham WJ (2006) Maternal mortality: who, when, where, and why. *Lancet* 368, 1189-200.

Sharma S, Smith S, Sonneveldt E, Pine M & Dayaratna V (2005) Formal and informal fees for maternal health care services in five countries: policies, practices, and perspectives. Futures Group International, POLICY Project. POLICY Working Paper Series No 16.

UNFPA (2006a) *Maternal and neonatal health in East and South-East Asia*. Bangkok, Thailand.

UNFPA (2006b) Obstacles to deliveries by trained health providers. Power Point presentation. <http://cambodia.unfpa.org/publications.htm> (accessed 14/06/2008).

United Nations (2000) United Nations Millennium Declaration, Resolution A/RES/55/2. New York.

Van Damme W, Meessen B, von Schreeb J, Heng TL, Thome JM, Overtoom R & Ir P (2001) *Sotnikum New Deal, the first year*. MSF Phnom Penh, 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 and International Health* 9(2), 273-80.

WHO NHA (2006) <http://www.who.int/nha/country/KHM-E.pdf> (accessed 14/06/2008).

Wilkinson D, Holloway J & Fallavier P (2001) The impact of user fees on access, equity and health provider practices in Cambodia. Ministry of Health, Cambodia.

World Bank (2005) *A guide to competitive vouchers in health*. Private sector advisory unit, The World Bank Group: Washington DC.

World Bank (2006) *Halving poverty by 2015? Cambodia poverty assessment 2006*. Phnom Penh, Cambodia.

World Bank (2007) *World Development Statistics, updated 2007* <http://devdata.worldbank.org/external/CPProfile.asp?PTYPE=CP&CCODE=KHM> (accessed 14/06/2008)

Worrall E, Hill J, Webster J & Mortimer J (2005) Experience of targeting subsidies on insecticide-treated nets: what do we know and what are the knowledge gaps? *Tropical Medicine and International Health* 10(1), 19-31.

Yanagisawa S, Oum S & Wakai S (2006) Determinants of skilled birth attendance in rural Cambodia. *Tropical Medicine and International Health* 11(2), 238-51.

Appendix 1. Questionnaire and eligibility criteria for HEF

Q1 – Housing	Score	Q6 – Farm assets	Score
A. Roof: Thatched/Leaf/Tent	0	A. None	0
Tiled/Zinc/Tin sheet	1	B. Plough	1
B. Wall: None/Leaf/Bamboo	0	C. Draft animals (oxen, buffaloes)	2
Wood	1	D. Water pump	3
Cement	2	F. Tractor/ Tiller machine	4
C. Floor: None	0	Q7 – Livestock	Score
Bamboo	1	A. None	0
Wood	2	B. 1 adult pig/<30Chickens/Ducks	1
Cement/Tile	3	C. 2 Adult pigs/>30Chickens/Ducks	2
D. Condition: Bad	0	D. >2Goats/1 cow/ox/buffalo	3
Good	1	E. >2 Oxen/ buffaloes/horses	4
Very good	2		
Q2 – Electronic tools	Score	Q8 – Cash income/Person/Day)	Score
A. None , Radio	0	A. <2,000 Riels*	0
B. Tape/TV (Black & White)	1	B. 2,000R to 4,000 Riels*	1
C. TV (Colour)	2	C. 4,100R to 8,000 Riels*	2
D. ICOM Radio/Cell phone	3	D. 8,100R to 16,000 Riels*	3
		E. >16,000 Riels*	4
Q3 – Electricity	Score	Q9 – Dependents	Score
A. None, Kerosene	0	A. >2 Elderly/Disable/Orphans	0
B. Battery < 50 Ampere	1	B. One Elderly/Disable/Aphelion	1
C. Electric buying	2	C. None	2
D. Owner ship of generator	3		
Q4 – Transportation means	Score	Q10 – Length of severe illness last year	Score
A. None	0	A. >30 days	0
B. Bike/ Small Boat	1	B. 15-30 days	1
C. Horse/Oxcart	2	C. 5-15 days	2
D. Motor boat/Motorbike	3	D. <5 days	3
E.Vehicle/Power Tiller	4		
Q5 – Productive Lands	Score	Q11 – Household health expenditure last year	Score
Size A:None	0	A. >500,000 Riels*	0
B:<01 Hectare	1	B. 200,000 to 500,000 Riels*	1
C:01-02 Hectares	2	C. <200,000 Riels*	2
D:>02 to 05 Hectares	3		
E:> 05 Hectares	4		

Quality A-Third Category	0	Q12 - Borrowing for health care	Score
B- Second Category	1	A. Used to borrow for health care	0
C- First Category	2	B. Never borrowed	1
TOTAL SCORE AND ELIGIBILITY CRITERIA			
A:	Score between 0-10	Very poor	
B:	Score between 11-14	Poor	
C:	Score between 15-18	Near poor	
D:	Score equal or above 19	Non-poor and rejected from support	

* Riel is Cambodian currency. The exchange rate is around 4,000 Riels = US\$1