A functional model for monitoring equity and effectiveness in purchasing health insurance premiums for the poor: Evidence from Cambodia and the Lao PDR

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\textbf{Abstract}

\textbf{Objectives:} To assess the impact on equity and effectiveness of introducing targeted subsidies for the poor into existing voluntary health insurance schemes in Low Income Countries with special reference to cross-subsidisation.

\textbf{Methods:} A functional model was constructed using routine collected financial data to analyse changes in financial flows and resulting shifts in cross-subsidisation between poor and non-poor. Data were collected from two sites, in Cambodia at Kampot operational health district and in the Lao People’s Democratic Republic at Nambak district.

\textbf{Results:} Six key variables were identified as determining the financial flows between the subsidy and the insurance schemes and with health providers: population coverage, premium rate, facility contact rate, capitation rate, cost of treatment and changes in administration costs. Negative cross-subsidization was revealed where capitation was used as the payment mechanism and where utilisation rates of the poor were significantly below the non-poor. The same level of access for the poor could have been achieved with a lower Health Equity Fund subsidy if used as a direct reimbursement of user charges by the Health Equity Fund to the provider rather than through the Community Based Health Insurance scheme.

\textbf{Conclusions:} Purchasing premiums for the poor under these conditions is more costly than direct reimbursement to the provider for the same level of service delivery. Negative cross-subsidization is a serious risk that must be managed appropriately and the benefits of a larger risk pool (cross-subsidization of the poor) are not evident. Benefits from combined coverage may accrue in the longer term with an expanded base of voluntary payers or when those with subsidized premiums are lifted out of poverty.

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\section{Introduction}

Many low- and middle-income countries (LMICs), particularly in Asia, have entered a path towards universal coverage of their populations with health insurance and other demand-side subsidies to provide equitable access to health services \cite{1-4}. The specific nature of each country’s cultural and economic norms means that universal coverage takes different forms, from single-payer government systems to mixed models comprising a variety of financing mechanisms \cite{5}. While the primary aims are to ensure access to services without financial barriers and to prevent impoverishment from health costs \cite{6}, there is no single formula for universal coverage \cite{7}.

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doi:10.1016/j.healthpol.2011.03.005
In some countries, such as the Philippines or Vietnam [8–10], subsidy schemes for the poor have been incorporated within formal-sector social health insurance (SHI) schemes in which the government purchases health insurance premiums for the poor. In Thailand, the government provides free care for the poor within a multi-agency universal coverage scheme [11,12]. In Rwanda, together with national risk pooling and compulsory insurance membership, the informal sector is covered by local-level mutuelles for the poor supported by government and donor subsidies [13]. Both Cambodia and the Lao PDR are now, to different degrees, building locally based voluntary Community Based Health Insurance (CBHI) schemes for the informal sector and Health Equity Funds (HEF) as subsidy schemes for the poor financed by donor and government funding [14,15]. This ‘mixed’ approach raises practical and policy issues related to fragmentation, fund pooling and risk pooling [16].

One key issue is the means for targeting the poor within the context of health insurance coverage. Using the example of Cambodia, Jacobs, Bigdeli et al. [17] point to the potential advantages and pitfalls of using funds from other social health protection schemes (like HEFs) to purchase CBHI premiums for the poor. The authors argue that this provides a subsidy for premium revenues generally required by new CBHI schemes, that fragmentation of schemes is overcome and efficiencies are increased, and that purchasing power is strengthened. In particular, they discuss the unintended, negative cross-subsidy from the poor to the non-poor that may arise and argue this could be mitigated (and reversed) by discounting the premium rate for the poor and paying additional benefits for ancillary costs such as food and transport.

In this paper, a functional model is developed to measure financial flows between such demand-side financing schemes. Our focus is on providing improved access to health services for the poor and on equity issues related to cross-subsidization rather than broader issues related to pre-payment, insurance coverage and strategic purchasing. The model reflects a situation where the HEF purchases premiums for the poor from the CBHI scheme while the CBHI scheme uses a capitation method for health provider payments. However, the model could be modified or expanded for use more broadly to investigate the relationships between different demand-side financing schemes and may also be used with different provider payment methods.

### 2. Objectives and methods

In Cambodia and the Lao PDR, HEFs are subsidized fee-exemption schemes that use donor and/or government monies to pay supplementary service user charges and ancillary costs for the poor at public health facilities. Community Based Health Insurance schemes rely on payment of voluntary premiums and additional external subsidies. Both schemes tend to be district-based (or in some cases province-based) rather than national and may exist side by side in the same health area. The objectives of the study were to assess the impact on equity of the purchase of insurance premiums for the poor and on the effectiveness of this use of subsidies for the poor. Research questions included: does the purchase of insurance premiums for the poor expand the insurance risk pool? Does it improve the operational efficiencies of subsidy schemes for the poor? Does it have an impact on equity? Is it the best use of subsidies designed to increase access to health services for the poor?

The goal of providing subsidies for the poor through HEFs is to increase equity, defined as improving access to health services for the poor. We may consider both horizontal equity (equal access for the poor for the same health need) and vertical equity (reduced cost for the poor for the same health need). Independent of the relationship with CBHI, the subsidy provided through the HEFs enhances horizontal and vertical equity by reducing financial barriers to access [14,18]. There is normally a trade-off between equity and efficiency in achieving health service outcomes. However, where the benefits to the poor in terms of access and financial protection are the same through both the direct subsidy approach and the purchase of insurance premiums for the poor, efficiency will be achieved where the cost of the subsidy for a given level of benefits is the least.

When channeled through a CBHI scheme, we argue that evidence of negative cross-subsidization would contradict the goals of equity and efficiency by transferring funds allocated to improve access for the poor to the non-poor (i.e., paying a higher cost in subsidies for the same level of benefit for the poor). While most CBHI schemes, at least initially, are unlikely to be financially sustainable without external subsidies, financing these with monies allocated to HEFs would contradict the goals of equity and efficiency unless it can be shown that the poor would benefit additionally through the development of a stronger CBHI system in the longer term.

This paper draws on primary and secondary data collected through a broader Study of Financial Access to Health Services for the Poor. Two rural sites where HEF subsidies have been used to purchase CBHI premiums for the poor were selected for the current analysis, in Cambodia at Kampot operational health district and in the Lao PDR at Nambak district. The current paper principally uses routine data from these sites to investigate issues related to user charges levied by health facilities according to a fee schedule for standard services provided; in Laos, user charges take the form mainly of a payment for pharmaceuticals through a facility-based Revolving Drug Fund, sometimes with additional fees for services provided (diagnostic, accommodation). In both cases, the revenues are used primarily to fund staff incentives and operational costs. The form or user charges may influence policy outcomes but does not affect the net financial flows measured through the functional model.

1. In both Cambodia and the Lao PDR, the HEF and CBHI schemes are available at government health service providers only. These providers receive budget from the government for service provision. The CBHI and HEF schemes do not aim at cost recovery but cover only the incremental costs of supplementary user charges. In Cambodia, these supplementary

2. The Study of Financial Access to Health Services for the Poor was funded by the Australian Government Agency for International Development (AusAID) and conducted in three phases during 2005–2009. The third phase in 2008–2009 investigated the effects of linking between HEF and CBHI at the designated sites in Cambodia and the Lao PDR.
to the flow of funds from government and donors to the social protection schemes, beneficiaries and health service providers. Site visits were made to interview stakeholders, collect routine data on health facility financing and utilisation and the financial arrangements involved in the purchase of CBHI premiums by the HEF, and to interview selected CBHI and HEF beneficiary households. Ethics approval was granted for the research both by the National Ethics Committee for Health Research of the Ministry of Health in Cambodia and by the National Health Research Ethics Committee at the National Institute of Public Health, Ministry of Health, in the Lao PDR.

3. The functional model

To investigate the direction and nature of financial flows between the HEF, CBHI and health providers, and to reveal any unintended cross-subsidies, the authors developed an original functional model based both on data collected at the study sites and on their many years of experience working in Cambodia and Laos. We identified six key variables that together determine the financial relationship between HEF and CBHI schemes linked by the purchase of premiums for the poor. The variables are: population coverage, insurance premium rate, facility contact rate, provider payment rate, the incremental cost of medical treatment (measured as user charges) and changes in scheme administration cost. These are strictly numerical continuous variables aimed at measuring the size of financial transactions.

The functional model uses a series of simple mathematical formula to track the flow of funds between donors, schemes and health service providers. The model deals only with the financial flows associated with the insurance-subsidy arrangements. It includes only public health services – where the government provides the budget for service delivery and user charges are levied by facilities as a supplementary revenue source. The CBHI and HEF schemes meet the cost of these user charges (generally, with additional payments for transport and food costs for the poor, not included in this model). The main assumptions behind the model are: it covers a period of one financial year in one health district; it includes only the user charges; capitation is used as the provider payment method; services are provided by health centres and/or a single district referral hospital.

Fig. 1 illustrates the flow of funds between stakeholders. The HEF pays a lump-sum premium to the CBHI (for the cost of premiums purchased) and receives in return the value of medical services delivered to beneficiaries (net of government public health budget). Voluntary members and HEF beneficiaries receive the same medical benefit package from the health provider. The HEF may gain an advantage in reduced administration costs. The CBHI receives premium payments from voluntary members as well as the lump-sum HEF payment and pays out the provider payment and any increased administration cost. The health service provider receives the CBHI provider payment for all those covered by insurance, including both voluntary premium payers and the subsidized poor. The health provider must meet the incremental costs of patient care (or user charges) not already covered by government subsidies and direct user charges from non-insured patients.

The model measures the net financial outcome ($X$ = surplus or deficit on the transactions modeled) for the CBHI scheme, the HEF and health service provider(s) using the following equations.

For the CBHI scheme:

$$X_i = (C_i \times P_i) - (C_i \times F_i) + (C_5 \times F_5) - (C_5 \times F_5) \pm \Delta A_i$$

For the HEF:

$$X_h = (C_5 \times U_5 \times M_5) - (C_5 \times P_5) \pm \Delta A_s$$

(where $X_i$ is negative, cross subsidization will be negative).

For the health service provider(s):

$$X_p = (C_1 \times F_1) + (C_5 \times F_5) - (C_1 \times U_1 \times M_1) - (C_5 \times U_3 \times M_3) \pm \Delta A_p$$

where:

- $C$ = population coverage
- $P$ = premium rate
- $U$ = contact rate
- $F$ = capitation rate
- $M$ = cost of treatments
- $A$ = administration costs

and:

- Subscript $i$ represents the CBHI insurer
- Subscript $s$ represents the HEF subsidy scheme
- Subscript $p$ represents the service provider(s)

Using a standard computer-based spreadsheet (for example, MS Excel), the equations can easily be solved simultaneously to determine the net gains for the CBHI scheme, the HEF and service providers. Through the use of sensitivity analysis, policy makers may use the model to test the implications of different policy settings by making variations in one or more of the six key variables. The model accommodates any number of scenarios and any combination of changes in variables within a single scenario and can be used flexibly and iteratively by policy makers to achieve a ‘best outcome’. In Section 4 below, we first test scenarios based on changes to single variables *ceteris paribus* (that is, holding all other variables constant in order to observe the impact of the modified variable). Hence, for both Nambak and Kampot we test the most common responses that

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3 Here, $M$ is a mean (the annual average of total user fee receipts/number of cases) for the CBHI and HEF members. In the examples here, the average was provided by the insurance agent and is regarded here as an adequate measure of incremental medical costs to provide the basis for calculating net annual financial flows. Commonly, the distribution of medical costs under the insurance scheme is likely to be skewed to the right, indicating higher usage by insurance members (possibly a result of adverse selection). In this model, adverse selection may be revealed in a higher average medical costs for voluntary compared to subsidized CBHI members and may be one area of policy adjustment that requires attention; a more complex model using the same principles could account for this.
have been proposed by Jacobs, Bigdeli et al. [17], by scheme implementers, or by various stakeholders. These are:

Scenario 1 – directly reimburse the providers for HEF user charges instead of paying premiums to CBHI;
Scenario 2 – increase the contact rate of the poor;
Scenario 3 – discount premiums for HEF beneficiaries;
Scenario 4 – adjust the provider payment rate.

The optimal outcome may require a combination of the different scenarios, that is, by adjusting several of the variables simultaneously. We have illustrated this approach in the ‘best outcome’ scenario in the tables below. In practice, scheme implementers and policy makers will want to test different scenarios based on their particular aims and their own best judgment. Here we simply illustrate the possibilities. The model therefore provides a means for identifying the policy settings that would be required to produce a more equitable and effective outcome between the HEF, the CBHI and the health provider.

4. Results

Utilisation and financial returns from the study sites provided the raw data needed to populate the financial model (see Tables 1 and 2 below). The tables show the net gain or loss (revenue – expenditure – change in administration costs) for the CBHI scheme, the HEF and the health provider according to the stated variables.

4.1. Results from Nambak District

Nambak District presents a relatively simple scenario, with CBHI available only at the District Hospital. In the Lao PDR, both the CBHI schemes and the health providers are managed by the Ministry of Health. The HEF in Nambak was managed by a non-government organisation (initially Swiss Red Cross and later Lao Red Cross). There, the CBHI was first implemented in the villages in proximity to the District Hospital. The number of voluntary CBHI payers was well in excess of those enrolled through the HEF. CBHI premiums were purchased by the HEF only for members in proximity to the District Hospital, an average of 532 individuals during the period in 2004–2005 (equal to about 10% of all HEF beneficiaries in the district), compared to an average 2877 fully paid CBHI voluntary members (Table 1).

Data for 2005 indicate that the HEF made an annualized net loss from purchasing premiums of US$1265. There was no saving in HEF administration costs because of the ongoing need for the HEF to administer payments for ancillary costs including food and transport. The main part of the deficit on the HEF was transferred as a subsidy to the health provider (US$1028). Significantly, the large deficit incurred by the District Hospital (medical costs greater than capitation revenues) for CBHI voluntary-members had been recognised by hospital administrators, who sought a renegotiation of the CBHI contract.

It appears that the large deficit for the health provider may have been the result of high contact rates and average treatment costs associated with adverse selection and moral hazard (causing excess utilisation, coupled with the Revolving Drug Fund method of user charges and a small risk pool living close to the facility). The financial sustainability of the CBHI scheme was therefore maintained only by transferring the inherent deficit to the health provider through a capitation payment for voluntary members that did not match the costs of service delivery. This implies that health costs for CBHI voluntary members were in effect subsidized through the government operating budget provided to the District Hospital and through user charges for non-insured patients.

The following four discreet adjustments are represented in Table 1 (bolded numbers in the table represent variable values changed in each new scenario):

Scenario 1 – directly reimbursing the providers for HEF user charges instead of paying premiums to CBHI would remove the HEF deficit through a simultaneous cut in the provider payment to equal the total cost of medical benefits.
including those in areas or dropped-out.


Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>2005 data</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
<th>Best outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nambak District 1 Hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>HEF coverage</td>
<td>( C_v )</td>
<td>532</td>
<td>532</td>
<td>532</td>
<td>532</td>
<td>532</td>
<td>532</td>
</tr>
<tr>
<td>HEF premium</td>
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<td>USD/cap</td>
<td>4.46</td>
<td>0</td>
<td>4.46</td>
<td>2.08</td>
<td>4.46</td>
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<td>HEF capititation DH</td>
<td>( F_v )</td>
<td>USD/cap</td>
<td>4.01</td>
<td>4.01</td>
<td>4.01</td>
<td>4.01</td>
<td>4.01</td>
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<tr>
<td>HEF contact rate DH</td>
<td>( u_v )</td>
<td>/cap/year</td>
<td>1.11</td>
<td>1.11</td>
<td>2.38</td>
<td>1.11</td>
<td>1.11</td>
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<tr>
<td>HEF medical cost DH</td>
<td>( M_v )</td>
<td>USD/case</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
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<td>HEF administration</td>
<td>( \Delta A_v )</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>VOL coverage</td>
<td>( C_b )</td>
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<td>2877</td>
<td>2877</td>
<td>2877</td>
<td>2877</td>
<td>2877</td>
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<tr>
<td>VOL premium</td>
<td>( P_b )</td>
<td>USD/cap</td>
<td>4.38</td>
<td>4.38</td>
<td>4.38</td>
<td>4.38</td>
<td>4.38</td>
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<tr>
<td>VOL capititation DH</td>
<td>( F_b )</td>
<td>USD/cap</td>
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<td>3.93</td>
<td>3.93</td>
<td>3.93</td>
<td>3.93</td>
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<tr>
<td>VOL contact rate DH</td>
<td>( u_b )</td>
<td>/cap/year</td>
<td>3.31</td>
<td>3.31</td>
<td>3.31</td>
<td>3.31</td>
<td>3.31</td>
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<tr>
<td>VOL medical cost/case DH</td>
<td>( M_b )</td>
<td>USD/case</td>
<td>5.31</td>
<td>5.31</td>
<td>5.31</td>
<td>5.31</td>
<td>5.31</td>
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<td>Gains made by each stakeholder (in USD)</td>
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<td>INSURER</td>
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<td>1302</td>
<td>1539</td>
<td>274</td>
<td>–37,727</td>
<td>274</td>
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<td>for Voluntary members</td>
<td>USD</td>
<td>1302</td>
<td>1302</td>
<td>1302</td>
<td>1302</td>
<td>–37,965</td>
<td>1302</td>
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<tr>
<td>for HEF members</td>
<td>USD</td>
<td>237</td>
<td>0</td>
<td>237</td>
<td>–1028</td>
<td>237</td>
<td>–1028</td>
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<tr>
<td>HEALTH EQUITY FUND</td>
<td>USD</td>
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<td>0</td>
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<td>–1265</td>
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<td>–1265</td>
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<tr>
<td>for Voluntary members</td>
<td>USD</td>
<td>–39,266</td>
<td>–39,266</td>
<td>–39,266</td>
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<tr>
<td>for HEF members</td>
<td>USD</td>
<td>1028</td>
<td>0</td>
<td>–237</td>
<td>1028</td>
<td>1028</td>
<td>1028</td>
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</tbody>
</table>

Scenario 2 – raising the HEF contact rate to 2.38/cap/year would eliminate the HEF deficit, but would slightly increase the deficit incurred by the health provider.

Scenario 3 – the HEF deficit could be eliminated by discounting the HEF premium to US$2.08 per capita, and would require (in effect) that the CBHI use the surplus funds from voluntary payers to subsidize the District Hospital for services provided to HEF beneficiaries.

Scenario 4 – a more than four-fold increase in capitation rates for voluntary members would be needed to remove the health-provider deficit, but this would either transfer the whole deficit to the CBHI (which is unsustainable) or it

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>2009 data</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
<th>Best outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kampot OD 1 Referral Hospital; 12 Health Centres</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEF coverage</td>
<td>( C_v )</td>
<td>11,737</td>
<td>11,737</td>
<td>11,737</td>
<td>11,737</td>
<td>11,737</td>
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<tr>
<td>HEF premium</td>
<td>( P_v )</td>
<td>USD/cap</td>
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<td>3.48</td>
<td>3.48</td>
<td>3.48</td>
<td>3.57</td>
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<td>HEF capititation RH</td>
<td>( F_v )</td>
<td>USD/cap</td>
<td>1.62</td>
<td>1.62</td>
<td>1.62</td>
<td>1.62</td>
<td>1.62</td>
</tr>
<tr>
<td>HEF capitulation RH</td>
<td>( F_b )</td>
<td>USD/cap</td>
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<tr>
<td>HEF contact rate RH</td>
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<td>/cap/year</td>
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<td>0.16</td>
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<tr>
<td>HEF contact rate HC</td>
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<td>/cap/year</td>
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<td>0.89</td>
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<tr>
<td>HEF medical cost/case RH</td>
<td>( M_v )</td>
<td>USD/case</td>
<td>7.33</td>
<td>7.33</td>
<td>7.33</td>
<td>7.33</td>
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<tr>
<td>VOL coverage</td>
<td>( C_b )</td>
<td></td>
<td>5025</td>
<td>5025</td>
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<td>10,000</td>
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<td>( F_b )</td>
<td>USD/cap</td>
<td>1.62</td>
<td>1.62</td>
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<tr>
<td>VOL capitulation RH</td>
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<tr>
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<tr>
<td>VOL contact rate RH</td>
<td>( u_b )</td>
<td>/cap/year</td>
<td>2.94</td>
<td>2.94</td>
<td>2.94</td>
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<tr>
<td>CBHI administration</td>
<td>( \Delta A_v )</td>
<td>USD</td>
<td>0</td>
<td>–10,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Net gain made by each stakeholder:

| INSURER                       | USD      | 11,156    | 21,156     | 11,156     | 22,020     | 5105       | 5105         |
| for Voluntary members         | USD      | 11,156    | 11,156     | 11,156     | 22,020     | 5105       | 5105         |
| for HEF members               | USD      | 0         | 10,000     | 0          | –22,116    | 22,117     | 0            |
| HEALTH EQUITY FUND            | USD      | –22,116   | 8728       | 0          | 0          | –22,116    | 0            |
| REFERRAL HOSPITAL             | USD      | –3351     | –3351      | –19,560    | –11,683    | 0          | 0            |
| for Voluntary members         | USD      | –3416     | –3416      | –3416      | –16,748    | 0          | 0            |
| for HEF members               | USD      | 5065      | 5065       | 11,144     | 5065       | 0          | 0            |
| HEALTH CENTRES                | USD      | 19,417    | 19,417     | 13,509     | 21,759     | 0          | 0            |
| for Voluntary members         | USD      | 2365      | 2365       | 2365       | 4707       | 0          | 0            |
| for HEF members               | USD      | 17,051    | 17,051     | 11,144     | 17,051     | 0          | 0            |
| HEALTH PROVIDERS – total      | USD      | 16,066    | 16,066     | 6050       | 10,076     | –1          | 0            |

would require a corresponding increase in premium levels (which could not be supported).

To achieve a ‘best outcome’ (Table 1), where the negative balance of both the HEF and the health provider for services delivered to voluntary CBHI members were eliminated, would require discounting the HEF premium (US$2.08) along with reducing both the contact rate (1.97) and the average medical cost (US$2.00) for voluntary members. Such an outcome would require a concerted approach by the CBHI and health providers, including a likely expansion of the risk pool, and suggests a significant policy challenge.

4.2. Results in Kampot Operational District

The Kampot model is more complex, covering service delivery at 12 HCs and the RH. In this case, the combined scheme was managed from the start by the CBHI provider (an international NGO known as GRET), which received a lump-sum donor payment for the cost of premiums paid for HEF beneficiaries. Hospital and health centre services were provided through the Ministry of Health. By the end of 2009, the number of HEF members (11,737) was more than twice the number of voluntary payers (5025) (Table 2).

To avoid obvious cross-subsidization from the HEF to the CBHI scheme, the CBHI provider discounted the cost of premiums charged to the HEF to the level of the capitation payment to the facility. In this example, we assume a nominal saving in administration costs for the HEF (effectively, the increased cost that would be incurred if the HEF was to operate separately) but no additional administrative costs for the insurer or health care provider. While in this case the CBHI scheme had achieved break-even in supporting the costs of benefits and administration, its financial viability was also guaranteed by additional management support provided through GRET.

In this example, the HEF pays out net US$22,116 more as a payment to the insurer than it would have had it made a direct reimbursement for user-fee exemptions incurred by HEF members to the health providers rather than through the CBHI. The effect is a negative cross-subsidy that moves not to the insurer but ultimately to the health providers (US$5065 to the referral hospital and US$17,051 to health centres). Voluntary insurance payers utilise the referral hospital and health centres three times more frequently than do HEF members and therefore benefit most from this subsidy to providers. Despite the increased population coverage provided by the HEF the true effect of a risk-pooling arrangement – in which the subsidy moves to those who are poorer and more in need of care – is not evident in this example. Moreover, the referral hospital makes a loss on treating voluntary members while the health centres appear to receive a large subsidy overall.

According to the sensitivity analysis illustrated in Table 2 (bolded numbers in the table represent variable values changed in each new scenario):

Scenario 1 – directly reimbursing the providers for HEF user charges instead of paying premiums to CBHI would incur increased administration costs for the HEF, but would likely remove the HEF deficit and provide cost savings to the insurer to offset the provider deficit on voluntary members.

Scenario 2 – doubling the HEF contact rate at the RH and HCs would eliminate the HEF deficit, but would create a deficit at the RH for the treatment of HEF beneficiaries.

Scenario 3 – further discounting the HEF premium (to about half the capitation rate) would eliminate the HEF deficit, but would create a deficit for the insurer (which is unsustainable). Doubling the coverage of voluntary members would allow the insurer to raise funds to support the HEF premium reduction (implying positive cross-subsidization through the insurer) but would create a larger deficit for the RH.

Scenario 4 – reducing capitation rates for HEF members would eliminate the HEF subsidy to providers and provide funds to the insurer to remove the HEF deficit by further discounting premiums; doubling the RH capitation payment for voluntary members and reducing the HC capitation rate would remove the RH deficit and the HC subsidy. The issue would then be the ability of the providers to deliver services without an external subsidy from government, donors or insurers.

A ‘best outcome’ where the HEF and the health providers break even on the financial transactions could be achieved by raising the HEF capitation rate for the RH (US$2.57) and reducing it for HCs (US$1.00), adjusting the HEF premium accordingly to equal the sum of the capitation rates (US$3.57 – as required by the donor funding the scheme), raising the capitation rate for voluntary members for the RH (US$3.29) and reducing it for HCs (US$1.39), and increasing the HEF contact rate at the RH (0.35) and the HCs (2.2). Again, this implies significant policy challenges, and may require identifying a new source of supply-side subsidy for the health providers.

5. Discussion

The results in Cambodia and Laos show that government and donor subsidies intended for the poor may in fact be captured in part by the non-poor. This is consistent with evidence that individual CBHI schemes may have to focus more on financial sustainability than on equity concerns. As Bennett [19, p. 155] cautions: ‘While getting the poor to join CBHI schemes seems likely to promote their access to basic services, it is not clear that this is the best strategy through which to promote the progressive distribution of subsidies.’ Mills [16, p. 9], notes that, ‘from a systems perspective, community health insurance may result in poorer groups contributing to their health care costs to a greater extent than richer groups who are able to access public services, and thus may be inequitable with respect to payment.’

The questions raised here are not limited to situations where schemes are decentralised, coverage is limited and the CBHI risk pool is small. For example, in Rwanda the national subsidization of the mutuelles through the government (with donor support) as a means to include poor and
vulnerable groups has raised questions concerning their financial sustainability. The public subsidies have in any case not been adequate to compensate for differences in risk structure within the population (non-poor vs. poor), and the positive cross-subsidization of the risk structure within the population (non-poor vs. poor), case not been adequate to compensate for differences in financial sustainability. The public subsidies have in any vulnerable groups has raised questions concerning their equity (lower income groups nominally paying a lower pre-
mium), but this will be true only where evidence of positive equity (lower income groups nominally paying a lower pre-
mium), but this will be true only where evidence of positive cross-subsidization is clear. As one key informant in our study pointed out, the issue of buying premiums is very context specific while there is always a question of how to cover the poor. Cambodia and Laos have one approach; Thailand and Vietnam, for example, use different approaches within national schemes. Our interest is in the use of HEF subsidies to provide access to health services for the poor. We therefore focus on issues related to cross subsidization and other elements of the HEF–CBHI relation-
ship rather than broader policy issues related to universal coverage.

5.1. Cross-subsidization

Ceteris paribus, negative cross-subsidization is inevitable where the facility contact rate for HEF members is well below that for voluntary members and where the capitation method is used for provider payment. More generally, the challenge of equitably meeting the needs of the poor commonly arise from the general characteristics of CBHI implementation, including a limited risk pool of voluntary members, a tendency towards adverse selection of voluntary members by recruiting populations living closer to facilities, the prevalence of non-financial barriers to access that reduce utilisation amongst the poor, who live predominantly in more remote areas, and use of a provider-payment method linked to membership numbers rather than service utilisation (see, for example [21–24]).

In Cambodia and Laos, the HEF funding agencies were reluctant to cross-subsidize the non-poor. In Nambak this led to the termination of the HEF relationship with the CBHI; and in Kampot there was a donor prerequisite that premiums for HEF members not exceed the capitation rate. The evidence shows it is unlikely that horizontal equity (equal access for the same health need) will be achieved while service utilisation remains lower amongst HEF than voluntary CBHI members. Discounting premiums for the poor may appear to introduce a greater sense of vertical equity (lower income groups nominally paying a lower pre-
mium), but this will be true only where evidence of positive cross-subsidization is clear.

The argument that discounting premiums for the poor could reverse the direction of the cross-subsidy [17] was tested. Despite discounting premiums in Kampot, the negative cross-subsidization appeared nonetheless as a subsidy to the health provider. Importantly, the medical benefit package and quality of care provided to voluntary and HEF members of the CBHI was in each case generally the same. Cross-subsidies will be reversed only where the HEF premium is discounted to a level below that of the provider payment and the insurer uses funds collected from volun-
tary premium payers to subsidize the medical costs of the poor. However, the limited size of the CBHI risk pool may preclude this.

5.2. Expanding the risk pool

Internationally, the difficulties in expanding the CBHI risk pool are well documented [21]. In our examples, the attempt to expand the CBHI risk pool by the addition of subsid-
ized HEF members did not, in fact, improve the ability of the insurance provider to cross-subsidize the poor. Neither in Kampot, where the coverage of the poor through a formal process of pre-identification is extensive and CBHI membership is limited, nor in Nambak, where CBHI voluntary membership, though small, nonetheless exceeded the limited number of HEF beneficiaries, who comprised only the most destitute, was a positive financial outcome achieved. While a large increase in population coverage was evident in Kampot, even three years into the scheme subsidized HEF members still comprised 70% of the combined mem-
bership, and the benefits of an apparently larger risk pool (i.e., cross-subsidization of the poor) were not achieved by the use of HEF subsidies to purchase CBHI premiums for the poor.

5.3. Operational efficiencies

While the HEF may have gained from savings in admin-
istration costs (which are not always guaranteed), where funds from the HEF effectively subsidized health providers to the benefit of non-HEF members, the financial position of the CBHI was jeopardised. The operational efficiency of the HEF would be enhanced only if surplus funds from voluntary CBHI members were used to discount the HEF member premiums. However, where HEF premiums are heavily discounted, the insurer has in general no financial incentive to continue the CBHI–HEF relationship and its participation rests on other factors, such as a commitment to help the poor, a possible reduction in per capita administration costs or hope for expanding the insurance base for future activities (this is less relevant in Laos where payment of 90% of premiums to the health providers is mandated).

5.4. Targeting of subsidies for the poor

The use of funds earmarked for the poor to subsidize insurance premiums adds a new dimension to existing frameworks for understanding CBHI; both donor contrib-
utions and government subsidies used to extend CBHI coverage to poorer groups may in fact constitute a general subsidy that simply enhances benefits for CBHI members.

[19] Under the assumptions used in our two examples, the combination of the HEF and CBHI schemes produced a less effective use of donor and government subsidies for the poor, in the sense that a higher HEF subsidy was required for a given quantity and quality of health service provided to HEF members. The comparator for cost-effectiveness – direct reimbursement of user charges by the HEF to the health provider – requires a simple administrative change that delivers to HEF beneficiaries the same services in the

same circumstances (as with almost all other HEF arrangements in Cambodia and Laos).

5.5. Practical outcomes

In practice, a proposal by the HEF at Nambak to discount premiums was rejected by the Ministry of Health as CBHI manager, leading eventually to a discontinuation of the relationship and a return to directly reimbursing the health provider for services provided to HEF members (Scenario 1). The sensitivity analysis indicates that only by expanding CBHI voluntary coverage geographically to areas further distant from the facility and diversifying the risk pool of voluntary members – and hence reducing the unusually high per capita facility contact rate of voluntary members – could the negative cross-subsidization be reduced and a more equitable and efficient use of funds allocated to the poor and used to purchase premiums possibly be achieved. Without expanding coverage, at Kampot a more balanced outcome could be achieved by further increasing the HEF contact rate at the RH and HCs and by readjusting HEF capitation and premium rates, with a further adjustment to capitation rates for voluntary members (Scenario 4).

6. Conclusions

The functional model is of principal value as a tool for policy analysis and should not be considered as a means for reducing these questions to an accounting of who wins and who loses. Our focus has been on the purchase of insurance premiums for the poor, presented as one example of a broader range of options for HEF–CBHI linkage. In planning to combine HEF and CBHI schemes along the road to universal coverage, the short-term costs of negative cross-subsidization may have to be discounted against the longer-term benefits of extended insurance coverage. Ultimately, a positive outcome for all stakeholders demands careful management of policy settings related to the six key variables identified here.

There are, clearly, limitations in the use of the model in this form. The two cases presented in this analysis are not directly comparable. The differences include the context (in scale and coverage), the structure of the health system (particularly the provision of pharmaceuticals) and the method of user charges (fee schedule and vs. revolving drug fund). The functional model does not account for questions related to increasing the demand for services, providing leverage and increased purchasing power, or the impetus provided for raising the quality of service delivery. The model measures neither the full cost of service delivery, the full cost of HEF or CBHI administration, beneficiary pre-identification costs, costs for ancillary benefits (such as food or transport), other donor programs or supply-side subsidies from the government health budget. Nor does it account for other beneficiary benefits, such as a reduction in uncertainty, an enhanced community reputation for the insurance scheme or the potential benefits of increased contacts at service providers’ clinics. In principle, the model could be adjusted to accommodate a more comprehensive accounting of these insurer and provider costs.

This financial analysis gives rise to a series of broader policy questions that themselves require a more thorough analysis. These issues include the impact of combining schemes on the quality of service delivery, the best use of limited administrative capacities, using price differentials carefully calculated to influence provider behaviours (in quantity and quality of care) and the benefits that may be anticipated in the longer term from overcoming fragmentation in demand-side health financing arrangements. These wider policy implications are beyond the scope of the current article and are the proper subject of a fuller study.

Conflict of interest

There are no conflicts of interest.

Acknowledgements

The research for this article was supported by an Australian Development Research Award from the Australian Agency for International Development (AUSAID). Partners involved in this research included: the Globalism Research Centre at RMIT University, Melbourne, Australia; World Health Organization Cambodia Office; the Ministries of Health in Cambodia and Laos; the National Institutes of Public Health in Cambodia and Laos; and the Royal University of Phnom Penh. The research was supervised by Professor Paul James, RMIT University. Valuable comments were made on the original draft by Sachiko Ozawa, Jean-Marc Thomé and Adelio Fernandez Atunes.

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