



Social Health Protection Activities in Kampot, Cambodia

2009 Baseline



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The programme is implemented through the two main German cooperation agencies: the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Kreditanstalt für Wiederaufbau (KfW). Both implementing agencies run specific programme modules; GIZ is in charge of the technical cooperation, and KfW supports the financial cooperation.

This report is based on the results of a larger research project examining the overall effects of Sokhaphheap Krousar Yeung (SKY, literally ‘Health for Our Families’) micro health insurance programme, and which was extended to Kampot province with the support of GIZ. Primary data and documentation for the analysis underlying this report were provided by the SKY impact evaluation project (www.skyie.org), which was funded by the Agence Française de Développement (AFD) and BASIS. This impact evaluation was implemented by the University of California, Berkeley (UC Berkeley), and Domrei Research and Consulting.

The original report by Domrei Research and Consulting was commissioned in 2011. Its methods are based on the collaborative work of Professor David Levine and Rachel Polimeni, both from UC Berkeley, and Ian Ramage from Domrei Research and Consulting. The syntax files used to create the datasets for the instrumental variable estimations and the instrumental variable analysis were written by Rachel Polimeni and Francine Chimma Anene. The analysis was processed by Kristine Nilsen, and the report was finalised under the supervision of Ian Ramage.

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List of Acronyms

AFD	Agence Française de Développement (French Agency for Development)
ANC	Antenatal care
BASIS	USAID agricultural research grant project
CBHI	Community-based health insurance
CI	Confidence interval
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRET	Groupe de Recherche et d'Echanges Technologiques
HAZ	Height-for-age Z score (a measure of stunting)
HEF	Health equity fund
HSSP2	Second Health Sector Support Programme
HSP2	Health Strategic Plan 2008 - 2015
IV	Instrumental variable
KfW	Kreditanstalt für Wiederaufbau
KHR	Khmer riel (KHR 4,000 = USD 1.00)
MOH	Ministry of Health
OD	Operational [health] district
OOP	Out-of-pocket expenditure
PNC	Postnatal care
SHP	Social health protection
SHPP	Social Health Protection Project
SKY	Sokhaphheap Krousar Yeung ('Health for Our Families')
USD	United States dollar
WHZ	Weight-for-height Z score (a measure of wasting)
WRA	Women of reproductive age

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Executive Summary

In collaboration with the Cambodian Ministry of Health (MOH), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is implementing the technical modules of the Cambodian-German Social Health Protection Programme for the German Federal Ministry for Economic Cooperation and Development (BMZ) to improve the access of the poor and vulnerable to effective and affordable quality health care, and increase utilisation of services.

In the framework of the German technical cooperation, GIZ implements the Social Health Protection Project (SHPP). The first phase of SHPP started in 2009 following the closure of a previous programme supported by BMZ: the Health Sector Support Programme. SHPP supports three out of five strategic areas of Cambodia's second Health Strategic Plan 2008-2015, namely improvement of health care services, health care financing and health system governance. In the area of health care financing, the project aims at extending social health protection (SHP) mechanisms in Cambodia by providing technical assistance and policy advice at national and provincial level. In particular, the project supports the development of SHP schemes in the provinces of Kampot and Kampong Thom. The present report was commissioned to provide a baseline for the evaluation of the impact of the activities supported through SHPP in Kampot operational [health] district (OD) as from 2009.

In Kampot OD, GIZ supported the Groupe de Recherche et d'Echanges Technologiques (GRET) in the development and implementation of a subsidised micro health insurance scheme from 2007 to 2012. The scheme operated under the umbrella of Sokhaphheap Krousar Yeung (SKY).¹ It provided fully-subsidised coverage for pre-identified poor households, and voluntary enrolment for vulnerable and near-poor households based on prepaid contributions. Pre-identified poor households were exempted from contributions, could access public health services free-of-charge and benefited from additional direct non-medical benefits such as transportation to health facilities. Social, i.e. direct non-medical, benefits were partly financed by the community and managed by faith-based organisations.

Domrei Research and Consulting, in collaboration with the University of California, Berkeley, conducted a longitudinal impact evaluation of the effects of SKY micro health insurance in Kampot, Kandal and Takao provinces from 2008 to 2011. Through secondary analysis of data collected through this evaluation, the present report provides a baseline on key socioeconomic and health indicators of scheme members in Kampot OD as of 2009, where data was collected from 739 households.

Summary of Findings

A set of 20 core indicators were developed and analysed by interest groups such as age range, sex, membership and household wealth. Indicators were measured by analysing the means and proportions among the respondents, with corresponding confidence intervals usually at the 95% level. In the report, confidence intervals for mean estimations are often large, which may be due to the small sample size in Kampot OD.

About 45.7% of surveyed households in Kampot OD experienced at least one health shock 12 months before the survey. A health shock is defined as seven or more days of loss of usual activity due to injury or illness, a death in the household, or more than KHR 400,000 spent on medical treatment. Of those with health shocks who sought treatment, 9% went first to a public health centre. The percentage of scheme members who first sought treatment at a health centre was over twice as high as non-members (14.0% compared to 6.2%). About 12.0% of the very poor sought treatment at a health centre first, compared to 6.3% of the more wealthy (the 'poor' and 'better-off' groups combined). The proportion of patients who ever sought treatment in a public health centre was 15.1%. Findings according to background characteristics on ever sought treatment at a health centre were similar to findings among patients who first sought treatment at a health centre; that is, members and the very poor were much more likely to have ever sought treatment at a public health centre compared to non-members and the poor and the better-off.

1 In English, 'Health for Our Families'.

According to age, children under 5 and adults 15-49 years old were most likely to ever use a health centre, (24.2% and 18.4%, respectively), compared to other age groups. Expressed as odds ratios, children under five and the very poor have 80% and 50% higher odds of ever using a public health centre compared to other age groups and wealth categories, respectively. Patients in Kampot OD were 30% less likely to choose a public health centre than patients in other ODs covered in the impact evaluation.

The average number of days until first treatment for those who went to a health centre first after experiencing a health shock was 2.2 days compared to 2.3 days among those who ever used a health centre. Of all health care providers combined, the average number of days until treatment by patients was 4.7 days. Analysis of this indicator by background characteristics shows that scheme members sought treatment 1.2 days earlier than non-members, and that the very poor tended to delay treatment much longer (8.3 days) compared to the better-off (2.1 days).

Concerning the cost of transport related to seeking treatment, the average cost of travelling to a health centre is one-third the cost of travelling to any other type of health care provider.

The contraceptive prevalence rate (CPR) among women surveyed in Kampot OD was 30.9% for modern methods. Modern contraception was slightly more prevalent among scheme members compared to non-members (32.2% and 30.0%, respectively). CPR according to wealth ranged from 29.9% for the very poor to 31.6% for the better-off. Among women who used any contraception, most used injections (43.0%) followed by the daily pill (23.8%). Other modern contraceptive methods had less than a 10% prevalence rate. The CPR for all traditional methods combined was 11.3%.

During pregnancy, 71.4% of pregnant women surveyed in Kampot OD had at least two antenatal care visits, and 85.7% received at least two tetanus vaccinations. About 56.0% gave birth in a public health facility, and 67.9% had their delivery assisted by a trained midwife or a doctor (at either a public or private provider). Fifty-five per cent of births were followed by at least one postnatal care visit.

The prevalence of wasted children under five years old was 16.8%, and the prevalence of stunted children under 5 years old was 22.2%. We found no correlation between wasting, stunting and wealth in our analysis. This does not necessarily indicate that there is no link. The lack of correlation in this survey may be due to the classification of wealth groups in the composite wealth index used, or that the variation in wealth is too small to observe a statically significant correlation.

About 65.2% of children aged 1-4 years old had a yellow card for immunisations, and 34.8% of children were fully immunised. The percentage of scheme members with a yellow card was 12.8% higher than among non-members, but the percentage of fully immunised children among scheme members was 12.8% lower than among non-members. However, these differences may not be attributable to membership, since most households were members for a very short period at the time of the survey.

About 22.6% of households had health-related debt; for these households, health-related debt represented a quarter of their total debt on average. The average amount of health-related debt among scheme member households was KHR 109,544 and KHR 170,110 for non-members. Scheme members had a 4.8% lower share of health-related debt as a proportion of total debt than non-members (23.1% and 27.9%, respectively). About half of households with health shocks used a strategy other than loans to pay for health care. For example, 9.2% of households sold an asset to cover costs associated with health shocks.

If those affected are the principal income generators of the household, the days lost due to health shocks can have a considerable negative impact on the financial well-being of a household. The average number of days lost to health shocks was high – 28 days for patients and 18 days for caregivers. Scheme members had a lower number of days lost compared to non-members. Days lost to health shocks for patients and caregivers among members was 26 and 17 days, whereas days lost to health shocks among non-members was 29 and 19 days for patients and caregivers, respectively.

Introduction

The Royal Government of Cambodia's Health Strategic Plan 2008-2015 (HSP2) aims to ensure improved and equitable access to, and utilisation of, essential-quality health care and preventative services, with particular emphasis on women, children and the poor. Within this framework, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), in collaboration with the Cambodian Ministry of Health (MOH), is implementing the technical modules of the Cambodian-German Social Health Protection Programme funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) to improve the access of the poor and vulnerable to effective and affordable health care, and increase utilisation of services. Through Social Health Protection Project (SHPP), social protection measures to meet the health care needs of the poorest and most vulnerable groups are supported in a number of provinces through various schemes, including subsidised micro health insurance, voluntary enrolment in health equity funds (HEF), and vouchers for reproductive health (implemented under a financial cooperation module through the KfW Entwicklungsbank (KfW)).

In Kampot operational district (OD), GIZ supported the Groupe de Recherche et d'Echanges Technologiques (GRET) in the development and implementation of a micro health insurance programme between 2007 and 2012. The scheme operated under this programme was called Sokhaphheap Krousar Yeung (SKY; 'Health for Our Families'). It provided fully-subsidised coverage for pre-identified poor households, and voluntary enrolment for vulnerable and near-poor households based on prepaid contributions. Pre-identified poor households were exempted from contributions, could access public health services free-of-charge and benefited from additional direct non-medical benefits such as transportation to health facilities. Social, i.e. direct non-medical, benefits were partly financed by the community and managed by faith-based organisations.

From 2008 to 2011, Domrei Research and Consulting, in collaboration with the University of California, Berkeley, conducted a longitudinal impact evaluation of

the SKY micro health insurance programme in Kampot, Kandal and Takao provinces. The objectives of the impact evaluation were:

- to estimate the impact of the SKY programme on health and economic outcomes and health care utilisation;
- to understand the determinants of uptake of health insurance;
- to identify the potential effects of health insurance on public health care facilities;
- to contribute to the body of knowledge on micro health insurance in developing countries.

Through secondary analysis of data collected through the SKY impact evaluation, this report provides a baseline on key socioeconomic dimensions impacted by SHP mechanisms in Kampot OD as of 2009. It uses data from the SKY micro health insurance impact evaluation follow-up survey (round 2) conducted by Domrei Research and Consulting in Kampot OD between 28 July and 29 December 2009, during which 739 households were interviewed using a structured questionnaire.

Research Questions

This report aims to respond to the following main research question:

- What was the socioeconomic and social protection situation in Kampot OD among scheme members and non-members at the beginning of the first phase of SHPP support?

Secondary research questions include:

- What was the health-seeking behaviour of the interest groups, and how did it differ from national averages (particularly the level and type of utilisation of health services, coping strategies, and provider preferences)?
- What were the levels and frequencies of associated expenditures (e.g. transportation), both direct and indirect (opportunity costs and debt) of health-related expenditures among interest groups?

- What were the levels of incidence of catastrophic health expenditures, health-related debt, and loss of economic productivity in the area of intervention?
- What were the determinants of health service utilisation and economic shocks among interest groups?
- What were the incidence and level of health-related shocks among interest groups?

Methods

Survey Design

The baseline survey of the effects of SHPP support for micro health insurance in Kampot OD was conducted as part of the larger evaluation of the impacts of the SKY micro health insurance programme. This included a longitudinal randomised controlled trial conducted in three provinces (four operational districts) over two rounds: a first round (round 1) conducted in 2008, and a follow-up survey (round 2) conducted in 2009. For this report, we only use data from the 2009 follow-up survey (round 2) only, in order to provide a baseline on key socioeconomic and health indicators in Kampot OD as of 2009 (the start of SHPP support).

Those who choose to purchase insurance typically differ markedly from those who decline insurance. To understand the effects of insurance independently from other factors that may affect a household's decision to enrol in insurance, a randomised controlled trial where all households had access to the insurance was implemented. By subsidising the premiums of a randomly selected group of households, an estimate of the effect of insurance on households was achieved without substantially altering the existing micro insurance scheme.

In total, 245 villages were surveyed, including 33 villages in Kampot OD, where micro insurance was introduced for the first time from December 2007 to October 2008. This was achieved through several steps. First, village meetings were conducted in each location by SKY staff, and lucky draws (lotteries) were held to randomly assign households into one of two groups, with households either receiving a low- or high-value discount coupon for micro health insurance.² Several months later, the research team visited all high coupon holders and a subset of low coupon holders and asked about a range of health and socioeconomic topics. One year later, the follow-up survey was administered in the same households to monitor and meas-

ure any changes in their health, health-seeking behaviour and socioeconomic status.

The overall randomisation of the sample for the SKY impact evaluation survey was tested by comparing findings of selected variables such as age, sex and educational attainment to findings of the rural sample of the Cambodian Demographic Health Survey (CDHS) 2005, a nationally representative survey. The results of these comparisons demonstrated very few differences between the surveyed sample and the CDHS sample. The randomisation of the sample instrument (into high and low-value coupon holders) was examined through clustered t-tests. Of 30 variables tested, only two (lowest ranked wealth group by enumerator ($p < 0.01$) and house made of palm ($p < 0.05$)), were significantly different between the high and low coupon subsamples.³

Data Collection

Data collection for the Kampot OD baseline was conducted from July 2009 to January 2010 as part of the SKY IE follow-up survey (round 2). One team of seven people (consisting of one field supervisor, one data editor, four interviewers and one anthropometric measurer) conducted the fieldwork in Kampot OD. The survey teams received five days of fieldwork training in June 2009, during which time the instrument was also pre-tested under real field conditions (see instrument section).

Research Instrument

The final instrument used for the survey was designed by Domrei Research and Consulting, together with the University of California, Berkeley. The survey was designed to measure household background characteristics, assets, health-related debt, health shocks, preventive care and

2 Low-value coupons were the standard offer of one month free in the first six-month cycle. High coupons gave households five months of free insurance in the first six-month cycle, and three free months in the second six-month cycle.

3 Levine D, Polimeni R, Ramage I. (2011). Insuring Health or Insuring Wealth? An experimental evaluation of health insurance in rural Cambodia. *American Economic Journal*. (Forthcoming). Also published in AFD Ex-post collection. Impact analyses series no. 8 (March 2012).

trust and satisfaction in micro health insurance and public health care providers. In addition, the instrument gathered anthropometric data to measure wasting and stunting among children less than five years old.

There were eight sections included in the instrument:

Section 1: Respondent background

Section 2: Household member list

Section 3: Household assets

Section 4: Health shocks

Section 5: Maternal and child health

Section 6: Trust and satisfaction

Section 7: Selection into insurance

Section 8: Immunisation

The instrument was pre-tested multiple times during the field interviewer training to ensure that the questions were comprehensible and appropriate, and to determine response categories for the final version of the instrument. Pre-testing was conducted in Kandal province with 60 households. The instrument was designed in the Khmer language and the final version (after pre-tests) was then translated into English.

Sampling Methodology

In total there is survey data from 739 Kampot households which completed interviews in 2009. Among these 739 households, 324 received a high-value coupon, 324 received a low-value coupon, and 91 households were later selected to increase the sample. Because scheme enrolment among those who received the low-value coupon was initially very low, the decision was made to over-sample low-value coupon households in the additional sample. An extra 87 low-value coupon holders in Kampot OD who were known to have bought health insurance were added, along with an additional four high-value coupon holders. The additional households were retained in the Kampot 2009 baseline sample, because by increasing the sample size the statistical power is also increased (i.e. estimates are more precise and less vulnerable to statistical fluctuations). This inclusion should not bias the results in an observably significant way.

Data Analysis

Data was entered into a specially designed database in MS Access, cleaned in Microsoft Access, and analysed using Stata 11. A descriptive analysis of data for Kampot OD in 2009, including confidence intervals (CI), is presented in this report.

Table 1: Kampot OD 2009 baseline survey sample, by households (Source: SKY IE follow-up survey).

Sample structure	Type of coupon		
	High-value	Low-value	Total
Interview results			
Complete	328	411	739
Refusal	1	0	1
Absence	13	9	22
Total	342	420	762
Sample			
Original	324	324	648
Additional	4	87	91
Scheme membership			
Member	169	133	302
Non-member	159	278	437
Total	328	411	739

A health shock is defined as seven or more days of loss of usual activity due to illness, a death in the household, or more than KHR 400,000 (approximately USD 100) spent on treatment. Health-seeking behaviour was analysed for those who experienced a health shock in the 12 months preceding the survey.

Indicators were analysed through proportions and mean estimations. They are crude measures, unless otherwise specified. A set of 20 core indicators was developed and analysed by interest groups such as age, membership, wealth status and sex, where applicable. Confidence intervals are given at the 95% confidence level. The intervals are often large, which may be due to the small sample size of the survey. In addition, changes in health-seeking behaviour and health outcomes take time to realise. Because households in the 2009 survey were scheme members for less than one year, any differences between members and non-members may yet not have been significant.

Assumptions and Limitations

Scheme members are defined as households that bought micro health insurance before the 2008 SKY IE round 1 survey. Since then, some households cancelled their insurance coverage. Differences between members and non-members are not necessarily a measure of the impact of micro health insurance, but of the determinants of insurance uptake among households (e.g., risk aversion or a recent health shock).

While all the households were randomly selected among village meeting participants, attendance at the village meetings was not random but rather self-selected. In other words, it was necessary to make some assumptions about the representativeness of the village meeting participants before claiming that the sample was representative of households in Kampot OD.

To decide if the sample was representative of Kampot OD, three assumptions had to be accepted:

1. The village meeting participants are not substantially different from those who did not come to the meeting (i.e. there is no village meeting selection bias);
2. The participation rate is comparable across all villages (i.e. all households in the sample universe have an equal probability of belonging to our sample);

3. Household characteristics and health patterns do not vary significantly across villages in Kampot OD (low social heterogeneity).

These three assumptions offset each other. If village meeting attendants are not different from non-participants, then selection bias is not an issue, irrespective of meeting participation rates. If the participation rates in all of the villages are high, then a hypothetical selection bias would have little effect on the estimates. If differences between villages in regards to our indicators are small, then differing participation rates across villages would have little effect on estimates.

Baseline Indicators

The following lists of key indicators were estimated to document the baseline on key socioeconomic dimensions impacted by SHP mechanisms as from 2009 (see Table 2).

Indicators on health shocks:

1. Proportion who first sought health care in a public health centre (all health shocks combined);
2. Average number of days to first treatment in a public health centre, among household members who sought treatment in a public health centre;
3. Average cost of transport, per health shock, when seeking treatment (all providers combined).

Indicators on maternal and child health were analysed using the entire sample, irrespective of health shocks:

4. Proportion of women aged 15-44 using a modern contraceptive method;
5. Proportion of women aged 15-44 who gave birth and delivered in a government facility, among those who gave birth in the last two years;
6. Proportion of women aged 15-44 who delivered with a midwife or a doctor, among those who gave birth in the last two years;
7. Proportion of women aged 15-44 who had at least two ANC visits at last pregnancy, among those who gave birth in the last two years;
8. Proportion of women aged 15-44 who had at least two tetanus shots at last pregnancy, among those who gave birth in the last two years;

9. Proportion of women aged 15-44 who had at least one PNC visit at last pregnancy, among those who gave birth in the last two years;
10. Proportion of severely wasted children under five years old;
11. Proportion of children aged 1-4 fully vaccinated, according to yellow card.

Indicators on economic outcomes related to health shocks were analysed by examining medical costs, loss of income while ill or incapacitated, sales of productive assets and reductions in household investments.

All households:

12. Proportion of households with health-related debt;
13. Average health-related household debt, in Khmer riel (KHR);
14. Mean share of health-related debt in total household debt.

Health shocks only:

15. Proportion of households that reported a health shock in the last 12 months;
16. Average number of days lost to illness (patient);
17. Average number of days lost to illness (caregivers);
18. Proportion of households that spent more than KHR 400,000 (approximately USD 100) on a health problem in the last 12 months;
19. Proportion of households that sold assets to pay for health expenses;
20. Number of health shocks in the last 12 months, per thousand households.

Table 2: Kampot OD 2009 baseline indicators (Source: SKY IE follow-up survey).

Indicator	Mean or proportion (%)	95% Confidence Interval	N
Health shocks			
1. Proportion of patients who sought care in a health centre (among those who sought treatment)	15.1%	11.7 - 18.5	443
2. Days to first treatment, for those who went to a health centre	2.3 days	1.5 - 3.1	67
3. Cost of transport, in KHR*	28,750	20,785 - 36,715	443
Maternal and child health			
4. Modern contraceptive prevalence	30.9%	26.6 - 35.3	433
5. Deliveries in a government facility	56.0%	45.1 - 66.8	84
6. Deliveries with a midwife or doctor	67.9%	57.7 - 78.1	84
7. Deliveries preceded by at least two ANC visits	71.4%	61.6 - 81.3	84
8. Deliveries with at least two tetanus shots	85.7%	78.0 - 93.4	84
9. Deliveries followed by at least one PNC visit	55.0%	45.1 - 66.8	84
10. Prevalence of severe wasting among children under five	4.5%	2.3 - 6.7	338
11. Vaccination rate among children 1-4**	34.8%	29.3 - 40.3	296
Economic outcomes of health shocks			
12. Households with health-related debt	22.6%	19.6 - 25.6	739
13. Health-related household debt, in KHR [§]	145,363	88,470 - 202,257	739
14. Share of health-related debt in total household debt [#]	25.7%	20.1 - 31.2	378
15. Households that had at least one health shock in the last 12 months	45.7%	42.1 - 49.3	739
16. Days lost to illness (patient) in the last 12 months	28 days	22.5 - 33.7	739
17. Days lost to illness (caregivers) in the last 12 months	18 days	14.6 - 21.6	739
18. Households that spent more than KHR 400,000 on a health problem	2.6%	1.4 - 3.7	739
19. Households that sold assets to pay for health expenses	9.2%	7.1 - 11.3	739
20. Health shocks in the last 12 months, per thousand households	82.80	NA	4082

* For those who sought treatment, all providers combined.

** Children whose yellow cards were not available are considered to be not fully vaccinated.

§ Includes households without health related debt.

Households with no debt not included.

Results

1. Health Shocks

In this section, health shock data is examined. A health shock is defined as seven or more days of loss of usual activity due to injury or illness, a death in the household, or more than KHR 400,000 spent on medical treatment. Among the 739 households in the sample, 338 (45.7%) reported at least one health shock in the 12 months preceding the 2009 survey. The most frequent health problems were those that prevented household members from working or going to school for at least seven days (see Table 3).

2. Health-Seeking Behaviour Following a Health Shock

Irrespective of the type of health shock, 15.1% of patients ever sought care in a public health centre, and 9% went to a public health centre first. They did so rather quickly, in about two days on average (Table 4). Among scheme members, 22% of patients sought care in a public health centre, compared to 9.5% of non-members, and 14% of members sought treatment for their health shock from a public health centre first, compared to just 6.2 percent of non-members.

Table 3: Type of health shock, by household (N=739; Source: SKY IE follow-up survey).

Health shock	Per cent (%)	95% CI	N
Unaffordable health care	1.8%	0.9 - 2.9	14
Death	3.7%	2.3 - 5.0	27
Loss of at least 7 days of normal activity	41.0%	37.4 - 44.6	303
Health care expenses greater than KHR 400,000	2.6%	1.4 - 3.7	19
All types combined	45.7%	42.1 - 49.3	338

Table 4: Health-seeking behaviour, by treatment days and transport costs (Source: SKY IE follow-up survey).*

Indicator	Mean or proportion	95% CI	N
Average number of days to first treatment, for those who went to a public health centre	2.3 days	1.5 - 3.1	67
Average number of days to first treatment, for those who first went to a public health centre	2.2 days	1.0 - 3.4	37
Average cost of transport, all providers combined, in KHR	28,750	20,785 - 36,715	443
Scheme membership			
Member	32,080	17,965 - 46,194	
Non-member	26,010	17,285 - 34,736	
To public health centre, in KHR*	10,727	2,477 - 18,977	66
To public health centre, for those who went there first, in KHR	15,216	447 - 29,984	37
Proportion of patients who ever sought care in a public health centre*	15.1%	11.7 - 18.5	443

* Sample size too small to disaggregate by age, sex or wealth.

Table 5: Health-seeking behaviour by sex, age and wealth of patient (Source: SKY IE follow-up survey).

Indicator	Mean or proportion	95% CI	N
Proportion of patients who first sought care in a public health centre*	9.0%	6.4 - 11.7	443
Scheme membership			443
Member	14.0%	9.2 - 18.8	200
Non-member	6.2%	3.1 - 9.2	243
Household wealth**			415
Very poor	12.0%	6.5 - 17.3	142
Poor	8.2%	4.4 - 12.1	194
Better-off	6.3%	0.9 - 11.7	79
Proportion of patients who ever sought care in a public health centre*	15.1%	11.7 - 18.5	443
Scheme membership			443
Member	22.0%	16.2 -27.8	
Non-member	9.5%	5.8 - 13.2	
Household wealth**			389
Very poor	20.0%	13.1 - 26.9	130
Poor	16.6%	11.3 - 22.2	185
Better-off	8.1%	1.8 -14.4	74
Sex[§]			415
Female	14.2%	9.7 -18.6	175
Male	17.7%	12.0 - 23.4	240
Age[§]			415
Children under 5	24.2%	9.4 - 39.1	33
Children 5-14	10.2%	16.1 - 18.8	49
Adults 15-49	18.4%	13.3 - 23.5	223
Adults 50 and older	10.0%	4.4 - 15.6	110

* Among those who sought treatment.

** Does not include 77 households with incomplete wealth data.

§ Does not include health shocks after which the patient died or left the household. See Appendix 1 for more details.

The proportion of patients who went to a public health centre is higher among children under five and adults under 50 years old. The differences are not statistically significant at a 95% confidence level, and this may be partly due to the limited sample size. At an 80% confidence level, children under five are almost two times more likely than all other ages combined to be brought to a public health centre rather than to another provider (odds ratio: 1.8 [1.1 - 3.2] 80% CI).⁴ Differences between the sexes are not statistically significant, even at an 80% confidence level. The proportion of members who sought treatment at health centres is greater than among non-members.

The average cost of travelling to a public health centre (KHR 10,700; approximately USD 2.60) was a third of the average cost of travelling to any provider (KHR 28,750; approximately USD 7.00). If patients chose their health providers according only to geographical proximity and transport costs, then the proportion of patients seeking care at public health centres would be higher than for other provider types.

Patients from poorer households were more likely to go to a public health centre than those from wealthier households. This difference is statistically significant at an 80% confidence level. Patients in Kampot were less likely to go to a health centre than patients in Takeo and Kandal ODs, where SKY was also active. Likewise, when comparing averages, in Takeo and Kandal ODs, women were slightly more likely than men to seek treatment at a public health centre than in Kampot (all non-Kampot ODs combined: odds ratio 1.4 [1.14 - 1.72] 95% CI).⁵ This suggests that women in Kampot may have had a worse perception of their public health centres than women in Takeo and Kandal.

The average number of days that patients with health shocks waited until seeking first treatment was 4.7 days; scheme members waited less time before obtaining treatment than non-members.

While not statistically significant at the 95% confidence level, there were some interesting patterns in the data: very poor households delayed treatment twice as long as households in the poor wealth group (8.3 and 3.6 days, respectively) and almost four times longer than the

better-off group (2.1 days). Differences between scheme members and non-members were not statistically significant. Children were brought to a doctor more quickly than older patients; in two days, rather than five days for adults and six days for the elderly.⁶ There were no differences between sexes.

Patients who sought treatment at the public health centre waited two days less (a difference of more than 50%), on average, than those who sought treatment with another provider. However, the difference is not statistically significant.

4 This statistic is not included in a table.

5 This statistic is not included in a table.

6 Once the poorest patients and the youngest patients were isolated, and compared to all other patients, the differences became statistically significant at 95%

Table 6: Likelihood of seeking treatment at a public health centre, according to patient characteristics (Source: SKY IE follow-up survey).

Patient characteristics	Odds ratio per 1000 seeking treatment	Probability	95% CI for odds ratio	Health shocks (N)
Very poor *	1.5	0.151	0.9 – 2.6	389
Female**	0.8	0.327	0.5 – 1.3	415
Children under 5**	1.8	0.163	0.8 – 4.2	415
Kampot OD**	0.7	0.004	0.5 – 0.9	2690

* Does not include patients which have incomplete household wealth data.

** Does not include health shocks after which the patient either died or left the household. The reference group for the very poor is the more wealthy (poor and better-off groups), the reference group for female is male, the reference group for children under 5 is all other age groups and the reference group for Kampot is all other ODs included in the survey.

Table 7: Average number of days until patient sought treatment, according to patient characteristics (Source: SKY IE follow-up survey).

Patient characteristics	Days	95% CI	Health shocks (N)
All providers combined	4.7	2.5 – 6.9	415
Scheme membership			
Member	4.0	2.2 – 5.7	200
Non-member	5.2	1.8 – 8.7	243
Household wealth*			389
Very poor	8.3	1.7 – 15.0	130
Poor	3.6	2.3 – 5.0	185
Better-off	2.1	1.5 – 2.7	74
Sex**			415
Female	4.6	1.5 – 7.8	240
Male	4.8	1.8 – 7.7	175
Age**			415
Children under 5*	2.1	1.4 – 2.8	33
Children 5-14	2.0	1.3 – 2.7	49
Adults 15-49	4.9	1.6 – 8.3	223
Adults 50 or more	6.2	1.6 – 10.8	110
Average number of days to first treatment, for those who ever went to a public health centre	2.3	1.5 – 3.1	67

* Does not include patients for which we have incomplete household wealth data.

** Does not include health shocks after which the patient either died or left the household.

3. Maternal Health

The most popular contraceptive methods were injections (43%), followed by the daily pill (24%).

Table 9: Contraceptive methods used among women of reproductive age currently using a method (N=151; Source: SKY IE follow-up survey).*

Method	Per cent	N
Modern methods	88.7%	134
Daily pill	23.8%	36
Monthly pill	0.7%	1
Injection	43.0%	65
IUD	8.6%	13
Sterilisation	1.3%	2
Condom	3.3%	5
Implant	7.9%	12
Traditional/natural methods	11.3%	17
Calendar	5.3%	8
Withdrawal	6.0%	9
Total combined	100.0%	151

*Sample size insufficient for disaggregation.

Table 8: Maternal health indicators (Source: SKY IE follow-up survey).

Indicator	Per cent	95% CI	N
CPR - Modern Methods	30.9%	26.6 - 35.3	433
Scheme membership			433
Member	32.2%	25.4 - 39.1	180
Non-member	30.0%	24.4 - 35.7	253
Household wealth*			390
Very poor	29.9%	22.3 - 37.4	144
Poor	32.8%	26.1 - 39.5	189
Better-off	31.6%	19.4 - 43.8	57
Deliveries in a government facility**	56.0%	45.1 - 66.8	84
Deliveries with a trained midwife or doctor**	67.9%	57.7 - 78.1	84
Deliveries preceded by at least two ANC visits**	71.4%	61.6 - 81.3	84
Deliveries with at least two tetanus vaccinations**	85.7%	78.0 - 93.4	84
Deliveries followed by at least one PNC visit**	55.0%	45.1 - 66.8	84

* Does not include households with incomplete household wealth data.

** Sample size insufficient for disaggregation.

4. Child Health

In this section, three child health indicators are examined: stunting, wasting and vaccination status.

Wasting is measured by comparing a child's weight with the 'normal' weight of children of the same height. Children who weigh much less than the average child of the same height are very skinny; i.e., 'wasted'. Wasting is an indicator of a recent illness or recent low caloric intake. The prevalence of wasting among children (e.g., the percentage of children who are wasted at a given time) is expected to be high in a population where there was a recent food shortage, an epidemic or very poor sanitary conditions.

Stunting is measured by comparing a child's height with the 'normal' height of children of the same age. A child that is much smaller than the average child of the same age and sex is said to be stunted. Stunting is an indicator of long-term low caloric intake, which stunts their growth, and is usually associated with long-term poverty or chronic ill health. The prevalence of stunting among children is expected to be high in a population where there are regular food shortages, epidemics and inadequate sanitary conditions. Older children are more susceptible to stunting, as they have been exposed to the risk of inadequate nutrition and poor health for a longer time.

Table 10: Stunting and wasting prevalence among children in Kampot OD, by scheme membership, sex and wealth group (Source: SKY IE follow-up survey).

Indicator	Per cent	95% CI	N
Prevalence of stunting among children under 5	22.2%	17.7 - 26.6	339
Scheme membership			
Member	19.5%	13.3 - 25.7	
Non-member	24.6%	18.2 - 31.0	
Sex			339
Male	21.0%	14.7 - 27.2	171
Female	23.4%	16.9 - 29.8	168
Household wealth*			317
Very poor	28.6%	19.9 - 37.3	107
Poor	21.0%	14.6 - 27.4	159
Better-off	18.0%	7.2 - 28.8	51
Prevalence of wasting among children under 5	16.8%	12.7 - 20.8	338
Scheme membership			
Member	14.5%	8.0 - 20.0	
Non-member	18.9%	13.0 - 24.7	
Sex			338
Male	19.8%	13.7 - 25.8	167
Female	13.8%	8.5 - 19.0	171
Household wealth*			316
Very poor	14.3%	7.5 - 21.0	105
Poor	15.3%	9.6 - 21.0	160
Better-off	18.0%	7.2 - 28.8	51

*Does not include households for which we have incomplete household wealth data.

There were no statistically significant differences in wasting or stunting between sexes or wealth groups. Indeed, even when combining data from all the ODs in the SKY impact evaluation (N=1927) there was no correlation between wasting, stunting and wealth. This does not necessarily mean that nutritional status is not linked to wealth; it could be due to the classification of categories in the composite wealth index, or it may suggest that there was too little variation in wealth for a correlation to be observed statistically. It also suggests that in Kampot, as in most of rural Cambodia, the main causes of malnutrition are disease-related (where the likelihood of falling sick and losing weight is similar in most households in rural Kampot) rather than a sign of poor or inadequate nutrition due to poverty.

The vaccination status for BCG, Polio 0, 1, 2 and 3, DPT1 or DPT/Hep B1, DPT 2 or DPT/Hep B2, DPT 3 or DPT/Hep B3, measles, and hepatitis B (either combined with DPT or administered separately) was collected. This data was recorded from each child's immunisation card (also called the 'yellow card'), as this is more reliable than recall. The immunisation status for all children aged one to four years is presented conservatively, by assuming that the 103 (34.8%) children with no yellow card were not fully immunised.

Table 11: Severe stunting and wasting, by sex and wealth group (Source: SKY IE follow-up survey).

Indicator	Per cent	95% CI	N
Prevalence of severe stunting among children under 5	5.1%	2.7 - 7.5	339
Scheme membership			
Member	3.8%	0.7 - 6.8	
Non-member	6.3%	2.7 - 9.9	
Sex			339
Male	6.6%	2.8 - 10.4	171
Female	3.6%	0.8 - 6.4	168
Household wealth*			317
Very poor	7.6%	2.5 - 12.7	107
Poor	5.7%	2.1 - 9.4	159
Better-off	0%	-	51
Prevalence of severe wasting among children under 5	4.5%	2.3 - 6.7	338
Scheme membership			
Member	1.9%	0.2 - 4.0	
Non-member	6.9%	3.1 - 10.6	
Sex			338
Male	6.0%	2.4 - 9.6	167
Female	3.0%	0.4 - 5.6	171
Household wealth*			316
Very poor	3.8%	0.1 - 7.5	105
Poor	3.2%	0.4 - 6.0	160
Better-off	6.0%	0 - 12.7	51

*Does not include households for which we have incomplete household wealth data.

Children from scheme member households were more likely to have vaccination cards (68.5%) than those from non-member households (55.7%). Barely more than a third of the children were fully immunised. Scheme members were less likely to be fully immunised (31.5%) than children from non-member households (44.3%). However, this difference might not be linked to scheme membership status, since most households at the time of the survey were only members for a short time.⁷ There were no differences in vaccination status between boys and girls, or between wealth groups.

7 Note that differences between members and non-members are not necessarily a measure of the impact of SKY; see limitations in section 1 of this report.

Table 12: Vaccination status of children aged 1-4 (Source: SKY IE follow-up survey).

Indicator	Per cent	95% CI	N
Proportion of children aged 1-4 with yellow card	65.2%	59.7 – 70.7	296
Scheme membership			
Member	68.5%	62.0 – 74.9	
Non-member	55.7%	49.7 – 61.7	
Fully immunised children aged 1-4*	34.8%	29.3 – 40.3%	296
Scheme membership			
Member	31.5%	25.1 – 38.0	
Non-member	44.3%	38.3 – 50.3	
Sex			
Male	33.8%	26.1 – 41.4	151
Female	35.9%	28.0 – 43.8	145
Household wealth*			272
Very poor	37.4%	27.3 – 47.4	91
Poor	34.8%	26.8 – 42.8	138
Better-off	34.9%	20.4 – 49.4	43

* Children whose yellow cards were not available are considered as not fully vaccinated.

** Does not include households which have incomplete household wealth data.

5. Economic Effects of Health Shocks

Households were asked in detail about their assets and liabilities. Among the 739 households in the Kampot OD sample, 22.6% had health-related debt (see Table 13). For these households, health-related debt represented on average a quarter of their total outstanding debt. Assuming causality and direction of effect, health insurance or free health care would decrease household debt by 25%, or an average of KHR 145,000 per household.⁸

Not all health shocks increased household debt; while 45% of households had at least one health shock in the last year, only 22.6% had an outstanding health debt. This suggests that about half of the households who had a shock had enough savings to cover the expenses, or were able to quickly repay the debt incurred for health costs. Indeed, 9.2% of all households sold assets to pay for health expenses.

However, while many households were able to pay their health expenses directly, many then had to go into debt for another reason, after spending a substantial amount of their savings on the health shock. Moreover, there were seasonal variations in the level of health-related household debt, since in rural Cambodia both income and health epidemics are seasonal. It is there-

fore expected that these figures represent conservative estimates of the direct financial costs of health shocks in Kampot. The actual financial burden of health shocks may be greater.

Households are also penalised indirectly when income earners or caretakers stop working because of a health shock (the opportunity costs due to loss of income). This cost was estimated indirectly by counting the average number of days lost: 28 days on average for patients; and 18 days on average for caretakers (Table 13). These were cumulative losses, e.g. a household could have lost 46 days' (a month and a half) worth of income if both the patient and the caretaker were primary income earners. In any case, the loss of income – and in some cases, the loss of a job or a harvest - could have contributed to increasing debt without necessarily being reported as health-related debt. Another indication that direct health expenses do not provide the full picture is that only 2.6% of households reported a health shock that cost over KHR 400,000.

There were no statistically significant differences between households that bought micro insurance and those that did not.

8 Approximately USD 35

Table 13: Household vulnerability to health shocks, according to selected indicators (Source: SKY IE follow-up survey).

Indicator	Mean or proportion (%)	95% CI	N
Households with health-related debt	22.6%	19.6 - 25.6	739
Health-related household debt, in KHR*	145,363	88,470 - 202,257	739
Share of health-related debt, in total household debt**	25.7%	20.1 - 31.2	378
Households that had at least one health shock in the last 12 months	45.7%	42.1 - 49.3	739
Days lost to illness (patient) in the last 12 months	28 days	22.5 - 33.7	739
Days lost to illness (caregivers) in the last 12 months	18 days	14.6 - 21.6	739
Households that spent more than KHR 400,000 on a health problem	2.6%	1.4 - 3.7	739
Households that sold assets to pay for health expenses	9.2%	7.1 - 11.3	739
Health shocks/ household population in the last 12 months, per thousand	82.8		4082

* Includes households with no health debt.

** Households with no debt not included.

Table 14: Health-related household debt (Source: SKY IE follow-up survey).

Indicator	Mean or proportion (%)	95% CI	N
Households with health-related debt	22.6%	19.6 – 25.6	739
Members	23.2%	18.4 – 28.0	
Non-members	22.2%	18.3 – 26.1	
Health-related household debt, in KHR*	145,363	88,470 – 202,257	739
Members	109,554	72,262 – 146,846	
Non-members	170,110	77,436 – 262,784	
Share of health-related debt, in total household debt**	25.7%	20.1 – 31.2	378
Members	23.1%	14.5 – 31.6	
Non-members	27.9%	20.5 – 35.2	

* Includes households with no health debt.

** Households with no debt not included.

Table 15: Prevalence of health shocks and their economic costs (Source: SKY IE follow-up survey).

Indicator	Mean or proportion (%)	95% CI	N
Households that had at least one health shock in the last 12 months	45.7%	42.1 – 49.3	739
Members	49.3%	43.7 – 55.0	
Non-members	43.2%	38.6 – 47.9	
Days lost to illness (patient) in the last 12 months	28 days	22.5 – 33.7	739
Members	26 days	19.4 – 33.1	
Non-members	29 days	21.2 – 37.7	
Days lost to illness (caregivers) in the last 12 months	18 days	14.6 – 21.6	739
Members	17 days	12.8 – 20.6	
Non-members	19 days	13.8 – 24.4	
Households that spent more than KHR 400,000 on a health problem	2.6%	1.4 – 3.7	739
Members	3.0%	1.1 – 4.9	
Non-members	2.3%	0.9 – 3.7	
Households that sold assets to pay for health expenses	9.2%	7.1 – 11.3	739
Health shocks in the last 12 months, per thousand households	82.8		4082

Annex 1: Survey Data Structure and Indicators

This section describes the structure of the data, and then explains how each indicator was computed. The figure below shows how the SKY impact evaluation database was structured (follow-up survey data only).

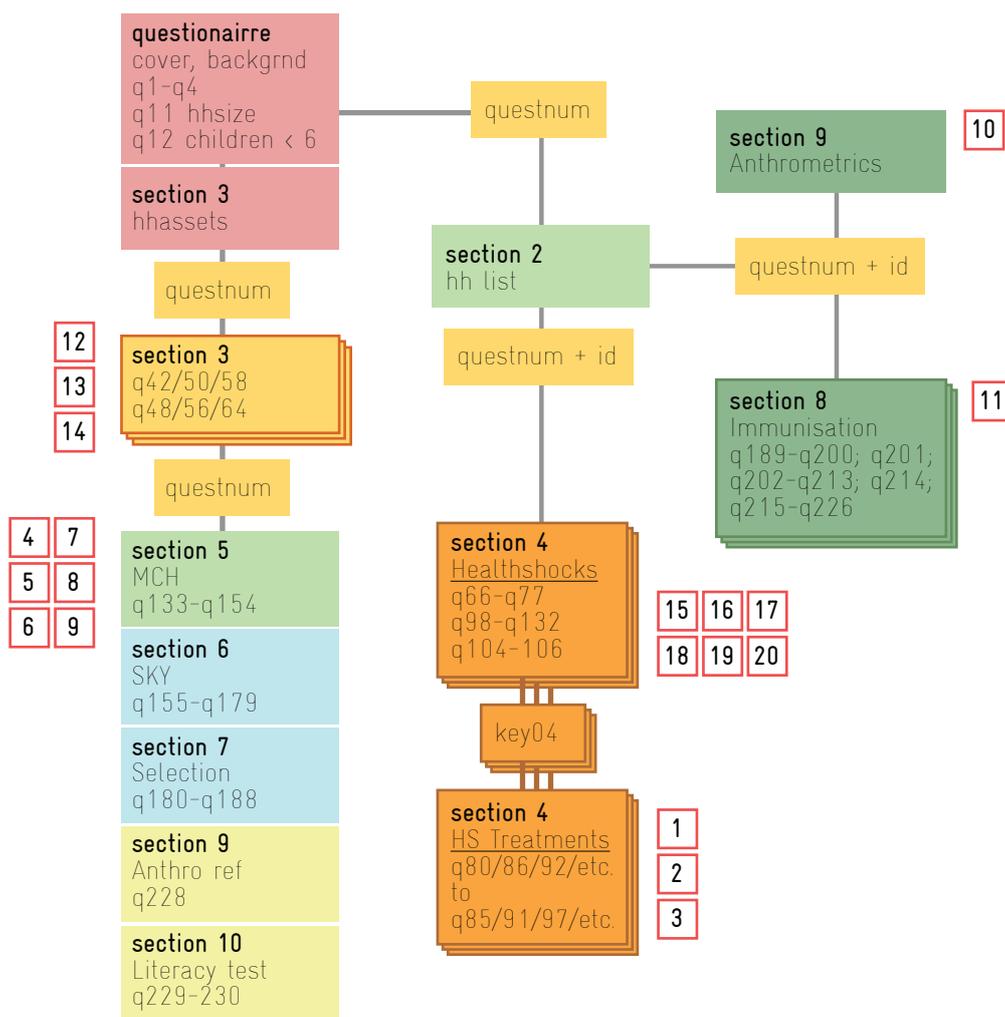
The numbered boxes each represent an indicator, positioned next to the data file required for the calculation. The field named 'questnum' is the questionnaire number and

uniquely identifies each household for round 2. The field named id is the line number on the household list (section 2) and, concatenated with questnum, uniquely identifies each individual in the dataset.

The indicators were computed using the data collected in the following sections of the round 2 SKY impact survey questionnaire:

- **Cover page:** house type and interviewer opinion on household wealth status (variables used to compute the composite wealth index);

Figure 1: Survey data structure, SKY IE follow-up survey.



- **Section 1:** type and number of toilets (variable for composite wealth index);
- **Section 2:** household list: age and sex of patients, age of respondent;
- **Section 3:** household assets (for composite wealth index), household debt and health-related debt;
- **Section 4:** health shocks (1 observation = 1 shock) and for each shock, treatment data (1 obs = 1 treatment). Treatments are linked to shocks using the identifying variable 'key04';
- **Section 5:** respondent contraceptive use and data on pregnancy and delivery (linked to household list by variable questnum);
- **Section 8:** vaccination status of all children under 6 years old in the household (1 obs = 1 child), linked to household list by questnum and id (for sex and age) and to household data (e.g. wealth group) by questnum;
- **Section 9:** anthropometric status of all children under 6 (1 obs = 1 child), linked to household data by questnum and to child data from section 2 by questnum and id.

Most indicators can be computed following different methods and yield the same result. Indeed, it is good practice to check each result using a different procedure. The simplest method is described below. The difficulty lies more in the preparation of the datasets than the actual computation. The syntax for Stata is provided for the more complicated procedures, as examples. To keep it simple, instructions on handling missing values due to filters, unknown codes in numerical fields, etc. were not included, as these are standard data processing issues. Complete Stata syntax 'do files' used to compute the indicators and statistics presented in this report are available on request.

Health shocks

Health shocks were defined in the report (see page 9). The following three indicators were computed for all shocks and their treatments in the last 12 months preceding the interview, but when disaggregated by sex and age they did not include shocks leading to a death or shocks for which the patient left the household, as those patients' ages and sexes were not known (they were not, by definition, on the household list).

1. Percent who seek first health care in a public health centre (all health shocks combined)

For each health shock: determine if patient first sought care in a public health centre (wheretreat or q80). If yes (q80=4) then PHC=1, if no PHC=0. Compute mean and CI of PHC. As there are many shocks that have more than one associated treatment, sort by treat_id, group by key04 and create a dummy variable PHCfirst that takes the value of 1 if PHC=1 AND if the treatment record is the first for the associated shock. The procedure in STATA is provided below as an example.

Merge shock records (section 4) with treatment data – 1 obs=1 treatment:

```
merge 1:m key04 using "sky_round2_section4treatment.dta"
drop if _merge!=3
```

Create dummy variable PHC

```
gen PHC=.
replace PHC=1 if wheretreat_r2==4
replace PHC=0 if wheretreat_r2!=4 & wheretreat_r2!=.
Identify treatment records for which PHC is first treatment:
```

```
genPHCfirst=.
replacePHCfirst=0 if PHC!=.
bysort key04 : replace PHCfirst=1 if _n==1 &
PHC==1
```

Collapse back into shocks (1 obs = 1 shock)

```
#delimit ;
collapse (sum) costtravelcosttreat paytreatasset_r2
PHC PHCfirst treatments
(mean) delatrr_r2 daystodr_r2 days_r2 totaldaysa-
way_r2
questnum province sex age_r2 age4, by(key04) ;
#delimit cr
```

Some patients went more than once to a public health centre, so the sum of PHC can be greater than one. A new dummy variable was therefore created – PHConce – to identify health shocks where the patient went at least once to the PHC, regardless of whether it was a first treatment. This is to compute statistics for all patients who went to the public health centre. PHCfirst is still valid for statistics on PHC as first provider.

```
genPHConce=0
replacePHConce=1 if PHC>0 & PHC!=.
```

Compute the proportion and associated 95% CI of shocks for which the patient sought treatment at PHC first (PHCfirst) and at least once (PHConce)

meanPHCfirstPHConce if province==0
meanPHConce if province==0

2. Average # days to first treatment in a public health centre among those who sought treatment in a public centre

For each health shock where PHC=1: compute mean and CI of q78 using the same data as above.

3. Average cost of transport, per shock, when seeking treatment (all providers combined)

Link the treatment records with shock records using key04. Sum, for each shock, the total cost of transport for this treatment and return (q82). Compute the mean and CI of sum_q82 (same process as above).

Maternal and child health

The following indicators use section 5 data, linked by questnum to household characteristics (interview date, province, wealth from questionnaire dataset) and id to individual sex and age data extracted from section 2 (household list). For all respondents id=1.

4. Percent of women aged 15-44 using a modern contraceptive method (codes 1-8)

Consider the following methods as modern: daily pill (1), monthly pill (2), injection (3), IUD (4), sterilisation (5), condom (6), implant (7), and vasectomy (8). Create dummy variable modern=1 if q134 is between 1 and 8, else q134=0. Compute the mean and CI for modern among all observations where age < 45 (in the sample all respondents are over 15 but it is good practice to not take our word for it and double check). The contraceptive prevalence for WRA 15-49 can also be computed by including all respondents where age < 50 in the calculation of the mean for modern.

5. Percent of women aged 15-44 who gave birth and delivered in a government facility, among those who gave birth in the last two years.

Extract from the dataset used to compute the previous indicator all observations where the difference between the date of interview intdate and the date of last birth q136

is less than 24 months. Create a dummy variable government where government=1 if q137=3, and government=0 in all other cases. Compute the mean and CI of government among all observations where intdate-birthdate<24 months. The time of reference can be changed, for example, to one year or to three years by computing the mean of government among the relevant set of observations; i.e., for intdate-birthdate<12 months or intdate-birthdate<36, respectively.

6. Percent women aged 15-44 who delivered with a midwife or a doctor, among those who gave birth in the last two years.

Using the same dataset used to compute the previous indicator, create dummy variable docmidwife, where docmidwife=1 if q138=3 or =4, else docmidwife=0. Compute the mean and CI of docmidwife among the observations of your choice; e.g., where intdate-birthdate<24 months.

7. Percent women aged 15-44 who had at least two ANC visits at last pregnancy, among those who gave birth in the last two years.

Same method as above, using q139.

8. Percent women aged 15-44 who got at least two tetanus shots at last pregnancy, among those who gave birth in the last two years.

Same method as above, using q142.

9. Percent women aged 15-44 who had at least one PNC visit at last pregnancy, among those who gave birth in the last two years.

Same method as above, using q144.

10. Percent of severely stunted and wasted (-3Z scores) of children under 5.

Stunting is measured by comparing a child's height with the 'normal' height of children of the same age. Children who are too short for their age (when their height-for-age is more than -2 or -3 standard deviations from the norm), are moderately (<-2 Z scores) or severely (<-3 Z score) stunted.

Wasting is measured by comparing a child's weight with the 'normal' weight of children of the same height. Children who are too light for their height are skinny, and when their weight-for-height is more than -2 or -3 standard deviations from the norm they are moderately (<-2 Z scores) or severely (<-3 Z score) wasted. Wasting is an indicator of an immediate illness or low calorie intake.

Z scores for wasting (weight for height) and stunting (height for age) are computed on EpiInfo nutrition programme EpiInfo (TM) 3.5.3 that uses the World Health Organization CDC2000 recommended norms. EpiInfo computes from and adds the individual nutritional Z scores to the data in Microsoft Access. Once the Z scores are computed, extract HAZ (height for age Z score) and WHZ (weight for age Z score) from section 9 dataset that was used to compute the Z scores. Check for outliers (use EpiInfo generated flag variables). For this report, all observations where a z score was greater than 6 or smaller than -6 were dropped. Create dummy variables wasted and stunted where, for example wasted=1 if $Z\text{-WHZ} \leq -3$, and wasted=0 if Z score for wasting > -3 . Compute the mean and CI for wasted and stunted among all observations where age < 5 . Anthropometric norms are sex-specific, so the indicator aggregates boys and girls status into one value. EpiInfo also computes the biological age in months is computed by subtracting the birth date from the date of measurement and dividing the result by 30.5. For more details on anthropometric norms, calculation procedures, safeguards and flags, refer to the EpiInfo nutrition programme manual (<http://www.cdc.gov/epiinfo>).

11. Proportion of children aged 1-4 fully vaccinated, according to yellow card (section 8).

Link section 8 data with section 2 using questnum and id, and the resulting data set with questionnaire dataset using questnum. Create a dummy variable fully, where fully=1 when all variables from q191 to q200 are a date between the child's birthdate (q06) and the date of interview (intdate). Compute the mean and CI of fully among observations where age $q07 \geq 1$ and $q07 < 5$. While we recommend to include in the denominator all the children with no vaccination card (fully=0), the same indicator can be computed among all children with a vaccination card by computing the mean and CI of fully among all children aged 1-4 with a vaccination card ($q190=1$, age > 1 , age < 5). Note that there are no differences between boys and girls in the availability of a vaccination card, so neither computational method introduces a gender bias in the vaccination rate estimate.

Table 16: Yellow card availability, by sex (Source: SKY IE follow-up survey).

Sex	N	% with card	[95% Conf. Interval]
Boys	151	66.2	58.6 - 73.9
Girls	145	64.1	56.2 - 72.0
Both sexes combined	296	65.2	59.7 - 70.7

12. All households (data from section 3):

To compute indicators 12, 13 and 14, link debt records from debt dataset (a subset of section 3 where one observation is one debt) with household level section 3 data with identifier variable questnum.

13. Health shocks only (data from section 4):

To compute the following indicators 15 to 20, use the same datasets and procedures as for indicators 1, 2 and 3.

Annex 2: Composite Wealth Index

This index was developed by Domrei Research and Consulting and tested in over 15 surveys (corresponding to a combined sample over 25,000 Cambodian households). It correlates well with social and health indicators (e.g. literacy, educational attainment, nutritional status, etc.). It is designed to provide a quick, simple yet robust and reliable system to rank and classify household in comparable samples (e.g. in a rural population), and to contrast the situations of very poor and better-off households.

In this survey, respondents were categorised into three groups to assess possible inequities in health. Cut-off points were quartile values of a wealth score in the Kampot OD sample. Households were ranked by wealth, from lowest to highest, using the following data: housing type, assets, animals, and type of toilet). The interviewers also observed and ranked each household in three categories: very poor, poor and better-off.

The algorithm below was used to attribute points for each answer and compute the wealth score for each household by adding these points. Scores ranged from 0 to a maximum of 14 points. In the algorithm used to attribute a wealth score to a household, an asset indicator was generated where: no assets is worth 0; ownership of at least one radio is worth 1; ownership of a TV, a bicycle, or a refrigerator is worth 2; ownership of a boat or oxcart is worth 3; and ownership of a car is worth 4. A livestock indicator was also generated, where animal=0 if the household does not own any animals. In any other case:

$$\text{animal} = \text{round}((\text{poultry}/2 + \text{pig} + \text{goat})/2 + (\text{cow} + \text{buffalo})/2).$$

The wealth score was computed by adding the asset and animal indicators with house type, toilets, and interviewers' subjective wealth assessments:

$$\text{wscore} = \text{housetype} + \text{assets} + \text{animals} + \text{toilets} + \text{wealth}.$$

Figure 2: Distribution of households according to wealth scores, 2008 and 2009 (Source: SKY IE round 1 and follow-up (round 2) surveys).



Two cut-off points were then selected, such that the very poor category corresponded as closely as possible to the lowest 15%, and the better-off category corresponded to the highest 15%. The very poor category was defined as having a wealth score of 0-5 points, and the better-off as having a score of 10-14 points, which corresponds to 15.0% and 16.5% of households, respectively. Wealth score and wealth groupings for the Kampot households were attributed using the whole 2009 SKY IE dataset, to allow for comparisons between provinces, and to ensure households had the same rank and score across all studies.

The few households with missing values for a variable used to compute the wealth index were excluded from analyses involving wealth, but were included when computing the baseline indicators. This explains why the number of observations (n) was slightly smaller when an indicator was disaggregated by wealth.



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