

# SCALING UP CHILD SURVIVAL INTERVENTIONS IN CAMBODIA

## SERVICE DELIVERY COSTS



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**SCALING UP CHILD SURVIVAL  
INTERVENTIONS IN CAMBODIA:  
SERVICE DELIVERY COSTS**

*FINAL REPORT  
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## Executive Summary

In late 2006, a study was carried out by USAID/BASICS and WHO to estimate the cost of national programme resource needs for scaling up key child survival interventions through 2010. The study mainly covered commodity and programme costs, and did not include most of the service delivery and management costs such as salaries and transport. This study complements that programme costing study by providing estimates of the service delivery and management costs.

At the request of the Ministry of Health (MOH) and key partners we costed the complete packages of services at the village, health centre and hospital levels and then estimated the costs of the scorecard activities<sup>1</sup> within the context of those packages. That method should make it easy to relate the scorecard intervention costs to the total costs for the Minimum Package of Activities (MPA) and Complementary Package of Activities (CPA) to be used in the preparation of the second Health Sector Plan. Also at the request of the MOH and key partners, contracted Operational Districts (ODs) were used for the costing because those costs are more likely to reflect the quantities and prices of resources needed to provide services in the future. The MOH also requested us to project the coverage targets and costs through 2015.

The total service delivery cost (excluding drugs) of providing the eleven scorecard interventions for the 2007 coverage targets is US\$6.1 million, comprising US\$0.7 million at the village level, US\$3.0 million at the health centre level, US\$1.1 million at the hospital level, and US\$1.2 million for district management costs. The highest cost interventions are US\$3.3 million for ORT and US\$1.2 million for treating children with antibiotics for pneumonia. The total service delivery cost for the interventions rises to US\$8.1 million in 2010.

The total combined program and service delivery costs for the eleven scorecard interventions come to US\$28.0 million in 2010, rising to US\$36.9 million for projected full coverage in 2015. The highest cost interventions in 2015 are US\$10.5 million for ORT and US\$7.4 million for antibiotics for pneumonia.

For an approximation of the cost of the twelfth scorecard intervention of skilled birth attendance, we can add the preliminary estimates from the draft Reproductive Health cost

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<sup>1</sup> As defined in the Cambodian Child Survival Strategy, the Ministry of Health's twelve "scorecard interventions" comprise targets for: early initiation of breastfeeding, exclusive breastfeeding, complementary feeding, vitamin A coverage, measles vaccine coverage, tetanus toxoid coverage, use of insecticide-treated nets, use of oral re-hydration therapy, antibiotic treatment for pneumonia, malaria treatment, dengue vector control, and skilled birth attendance. Service delivery costs for eleven of these twelve interventions were estimated in this study, with skilled birth attendance being considered in a separate study.

study. These were US\$2.0 million in 2010 for deliveries (US\$2.6 million in 2015) and US\$0.2 million in 2010 (US\$0.4 in 2015) for postpartum care. This would bring the total for the 12 scorecard interventions to US\$30.2 million in 2010 and US\$39.9 million in 2015. However, it should be noted that a significant portion of the skilled birth attendance costs may relate to health centre and hospital staff and may have already been covered in this service delivery study. Thus, the total costs may be slightly overstated. It should also be noted that a review of the plans, as recommended in the programme costing study, could indicate areas where additional costs may be required to reach the targets as well as areas where costs could be saved.

# 1. Introduction

In late 2006, a study was carried out by USAID/BASICS and WHO to estimate the cost of national programme resource needs for scaling up key child survival interventions through 2010<sup>2</sup>. (For convenience that study is called the programme costing study in this document). The study mainly covered commodity and programme costs, and did not include most of the service delivery and management costs such as salaries and transport.

This study complements the programme costing study by providing estimates of those service delivery and management costs.

At the request of the Ministry of Health, the coverage targets and costs were also projected out through 2015, by which time it is anticipated that full coverage will be achieved.

General information on the scorecard interventions and programme costing can be found in the programme costing study and is not repeated in this study.

## 2. Methodology

The service delivery costs comprise the costs of three levels of services – village, health centre and district hospital – and district management costs. The village and health centre services form the Minimum Package of Activities (MPA) and district hospital services form the Complementary Package of Activities (CPA).

We were requested by the MOH and partners to cost the complete packages of services and to then estimate the costs of the scorecard activities within the context of those packages. That method should make it easy to relate the scorecard intervention costs to the total costs for the MPA and CPA, which will facilitate the links to, and development of, the second Health Sector Plan, which the MOH and partners are currently preparing.

The MOH and key partners also requested that contracted ODs be used for the costing because those costs are more likely to reflect the quantities and prices of resources needed to provide services in the future. Contracted services are reportedly often more efficient, of higher quality and better utilized and are also more likely to use appropriate numbers of staff and to pay staff competitive salaries. For example, payments to staff in contracted health centres, hospitals and ODs include incentives and are significantly higher than government salaries (around US\$150 per staff person per month in the contracted facilities).

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<sup>2</sup> Scaling Up Child Survival Interventions in Cambodia: The Cost of National Programme Resource Needs. David Collins, Elizabeth Lewis and Karin Stenberg. The USAID/BASICS Project and World Health Organization (WHO). June 2007

Several contracting organizations were contacted, but only Swiss Red Cross (SRC) provided complete data for all its contracted facilities. The SRC-supported contract covers two operational districts in Takeo Province – Kirivong and Ang ROKAR. The contracting model is a hybrid model, where services are provided by MOH facilities and staff with supplementary service delivery staffing and resources and management support provided by, and through, SRC.

The health centre costing was based in 28 of the 29 health centres in the two districts (one which serves as a small hospital was excluded). The two district hospitals were used as the basis for the hospital costing and the two district management offices were used for district management costs. Separate records are not kept for village-based services and these costs were based on a normative model of village. Visits were also made to a sample of health centres and staff and village volunteers were interviewed. The findings from these visits were used to verify the health centre and village-based service models and costs (a summary report is included as Annex 18).

The method used to determine the total annual service delivery costs was to develop unit costs and multiply them by the coverage targets. Several steps were involved:

- The first step was to determine the total cost of the service package at each service level (village, health centre and hospital).
- These total costs were then allocated to each type of service based on relative weights which were derived from standard numbers of provider minutes. This provides a unit cost per service.
- These unit service costs were then multiplied by the numbers of services in the first year to provide a total cost for each intervention for the year.
- These total costs were then divided by the total target coverage figures for the year to provide a unit cost per person covered<sup>3</sup>.
- The unit costs per person covered were then multiplied by the target coverage figures for each subsequent year to provide the total costs for the scorecard interventions.

The standard numbers of minutes were based on expert opinion. There was not sufficient time to develop these weights in a more participative and accurate way and it is strongly recommended this be done as part of a more comprehensive study of health centre costs<sup>4</sup>.

The figures collected do not include capital or depreciation costs and only reflect costs to the government or donor agencies (e.g. volunteer time and patient out of pocket costs are not included). They also do not include national programme costs, such as per diems related to campaigns. In the case of measles and tetanus toxoid immunizations, staffing

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<sup>3</sup> The number of services may be more than the number of persons covered if each person is expected to suffer from an illness more than once per year or if the person is expected to receive more than one service for each intervention.

<sup>4</sup> This is best done using a tool that allows for the development of standard costs for all health centre services, such as CORE Plus.



costs were reduced because basic salary figures had been taken into account in the programme costing study.

For estimating the total costs used this study, it was not worthwhile trying to break out health centre costs between services provided at the centre and those provided on outreach. This information would, however, be useful for policy makers and planners in considering the cost-effectiveness of both approaches, and should be part of the comprehensive study of health centre costs recommended above.

The costs produced in this study were compared with costs produced in other studies. The main comparisons are with a 2003 study by Fabricant<sup>5</sup> and elements in a study by Lane<sup>6</sup> that are based on Fabricant's figures<sup>7</sup>. Comparisons have not been made with costs produced in a recent cost-effectiveness study<sup>8</sup> because of some different assumptions about the provision of care. Also that study does not include some elements of the child survival scorecard – namely malaria treatment and ITNs, dengue vector control and tetanus toxoid immunization. However, the health centre and hospital costs used in the study were derived from the Fabricant study, and, as stated above, comparisons have been made with those figures.

The programme costing study did not include the cost of skilled birth attendance, one of the 12 child survival scorecard interventions, because a separate study of reproductive health costs was to be undertaken. That study has now been completed and a draft copy of the report has been produced. The findings related to skilled birth attendance have been included here even though the figures are not yet regarded as final.

Inflation of 2% per year has been taken into account in arriving at the projected figures.

The costs were developed in model format on spreadsheets and assumptions can easily be changed if necessary.

### **3. Coverage targets**

The target coverage levels for each of the child survival scorecard interventions from 2007 through 2010 were used to estimate the cost of national programme resource needs in the programme costing study (Table 1). The table also shows the scale-up factors

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<sup>5</sup> Cost Analysis of Essential Health Services in Cambodia MOH/WHO Health Sector Reform Phase III Project, S. Fabricant, K. Thavary and S. Kanha, June 2003, WHO/Cambodia.

<sup>6</sup> Scaling Up for Better Health in Cambodia. WHO and Ministry of Health, Kingdom of Cambodia. WHO 2007

<sup>7</sup> Based on costs estimated by Fabricant for 2001 of US\$0.86 for district hospitals in the non-contracting ODs and US\$1.38 for district hospitals in the contracting-out ODs.

<sup>8</sup> Stepwise national priority setting for child survival: A sectoral cost-effectiveness analysis for Cambodia. Final draft paper. Louis Niessen, Robert Scherpbier, Severin von Xylander, Tessa TanTorres. Institute for Health Policy and Management, Erasmus University Rotterdam and WHO.

reflecting the increases in coverage from 2006 through 2010. The largest increase is in the provision of Insecticide Treated Nets (ITNs). These coverage targets were used to estimate the service delivery costs.

**Table 1 Planned coverage figures 2007-2010**

Scorecard Interventions	2006 estimate	2010 target	Estimated actual 2006 coverage	Target 2007 coverage	Target 2008 coverage	Target 2009 coverage	Target 2010 coverage	Scale-up factor 2006 to 2010
Early initiation of breastfeeding	40%	60%	150,587	173,439	197,409	222,215	247,742	65%
Exclusive breastfeeding	62%	80%	233,410	250,524	276,372	303,021	330,323	42%
Complementary feeding	83%	95%	312,468	327,608	347,439	371,706	392,259	26%
Vitamin A	76%	85%	1,650,816	1,785,098	1,885,342	1,989,381	2,081,110	21%
Measles vaccine	84%	92%	316,680	331,462	347,439	363,625	379,872	20%
Tetanus toxoid	73%	80%	2,268,392	2,417,834	2,585,686	2,718,057	2,793,768	28%
Insecticide-treated nets	20%	80%	40,645	166,839	171,190	175,587	179,979	243%
Malaria treatment	31%	95%	62,999	177,267	203,289	208,510	213,725	139%
Dengue vector control	80	10	530,834	544,747	824,077	967,391	991,589	87%
Oral rehydration therapy	59%	85%	1,017,657	1,338,884	1,447,069	1,540,600	1,636,909	61%
Antibiotic for pneumonia	57%	75%	991,563	1,097,884	1,208,944	1,324,540	1,444,331	46%

Coverage targets were also developed for the years through 2015, by which year full coverage is anticipated (Table 2). In most cases, a figure of 90% coverage was used to represent full coverage, based on feasibility. However, a figure of 95% coverage was used for complementary feeding, measles vaccinations and malaria treatment, since the planned 2010 target levels were already over 90%. The table also shows the scale-up factors reflecting the increases in coverage targets from 2010 through 2015. The largest increase relates to the Early Initiation of Breastfeeding.

**Table 2 Projected coverage figures 2011-2015**

Scorecard Interventions	Target 2015 - universal coverage	Target 2011 coverage	Target 2012 coverage	Target 2013 coverage	Target 2014 coverage	Target 2015 coverage	Scale-up 2010-15
Early initiation of breastfeeding	90%	278,760	309,778	340,796	371,815	402,833	63%
Exclusive breastfeeding	90%	344,825	359,327	373,829	388,331	402,833	22%
Complementary feeding	95%	398,850	405,440	412,031	418,622	425,212	8%
Vitamin A	90%	2,153,791	2,226,471	2,299,152	2,371,833	2,444,513	17%
Measles vaccine	95%	387,248	394,624	401,999	409,375	416,751	10%
Tetanus toxoid	90%	2,971,887	3,150,007	3,328,126	3,506,246	3,684,365	32%
Insecticide-treated nets	90%	188,416	196,853	205,290	213,727	222,164	23%
Malaria treatment	95%	217,881	222,038	226,194	230,350	234,507	10%
Dengue vector control	10	1,013,245	1,034,902	1,056,558	1,078,214	1,099,871	11%
Oral rehydration therapy	90%	1,694,020	1,751,131	1,808,241	1,865,352	1,922,463	17%
Antibiotic for pneumonia	90%	1,539,957	1,635,584	1,731,210	1,826,836	1,922,462	33%

## 4. Village health volunteer costs

Village health volunteer service costs were based mainly on the MOH's Village Health Support Group (VHSG) model<sup>9</sup>. A VHSG is comprised of 2 volunteers (one male and one female) and they are expected to provide services in a village with an average of 677 persons (based on 15 villages per health centre and a catchment population of 10,000 per health centre). For the costing, it was assumed that a VHSG volunteer would be active for 5 years.

The average annual cost for a VHSG is estimated at US\$94.40 and mainly represents per diem and transport related to general training and meetings (Annex 1). The per diem and transport rates are based on 2007 rates paid<sup>10</sup>. Note that the health centre's costs relating to training, supervising and supporting the VHSGs are not included here because they form part of the health centre costs. The cost of drugs, vaccines and medical supplies are also excluded since they were included under the programme costing study. The total cost of US\$94.40 comes to 14 US cents per capita (Annex 3a).

The average number of services that should be provided in a village was determined using the full range of activities that a VHSG should undertake. Annual numbers of services were estimated based on the population of a village (Annex 2a), anticipated incidence rates, service delivery share and target coverage levels (Annex 2b). The time needed for these activities was compared with the time that a VHSG is expected to spend in total and appears to be feasible, even with increases in target coverage.

The 2007 target coverage figures were used, which means that costs should fall in later years as the targets increase, assuming VHSG costs stay the same or only increase slightly.

Figures were developed for the estimated normative number of provider minutes for each service based on expert opinion (Annex 3a). The numbers of services were then multiplied by the number of minutes per service to get total numbers of minutes for each type of service. The total cost was divided by the total number of minutes to get an average cost per minute (Annex 3b). The cost per minute was multiplied by the number of minutes for each service and the resulting figure was then divided by the numbers of services to get an average unit cost per service. Unit costs for the basic package of services were estimated for a non-remote village, and unit costs for the expanded package of services were estimated for a remote village<sup>11</sup>.

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<sup>9</sup> In addition, a sample of health centre staff and community volunteers were interviewed and findings were compared with the costing model.

<sup>10</sup> The figure of US\$3 for training and meetings is comprised of per diem US\$2 and transport and snacks US\$1. It is recognized that transport costs for volunteers in remote villages may be much higher than this but this should not make a big difference to the overall costs since the number of remote villages is small.

<sup>11</sup> Since the numbers of persons living in remote villages is small (2%), only the unit costs in non-remote villages were used calculating the total scorecard costs for services in the basic package.

For the scorecard interventions the unit costs ranged from 2 US cents for Vitamin A supplementation to 17 US cents for complementary feeding in a non-remote village, with ARI treatment costing 14 US cents in a remote village.

## 5. Health Centre costs

The health centre costs were based on 2006 figures<sup>12</sup> for the 28 health centres in Kirivong and Ang Rokar.

The figures do not include capital or depreciation costs<sup>13</sup> and only reflect costs to the government or donor agencies (e.g. volunteer time and patient out of pocket costs are not included). They also do not include elements included in the national programme costs, such as per diems related to campaigns. The VHSG per diem and other costs used in the village level costing are paid by the health centre and were, therefore, deducted from the health centre costs to arrive at the cost of services provided by health centre staff. The health centre costs do, however, include the time of health centre staff related to training, supervising and supporting the VHSGs.

The total combined costs of the 28 health centres for 2006 come to US\$684,846 (Annex 4a). Based on the catchment populations of those health centres this comes to an average of US\$2.11 per capita (US\$2.13 in Kirivong and US\$2.09 in Ang Rokar). This is higher than the previously estimated cost per capita of US\$1.53 at those health centres in 2005 due to the inclusion of contractor staff and to higher drugs costs and higher incentive payments. The cost per capita is also higher than the cost estimated in 2001 by Fabricant and inflated by Lane to 2007 prices (US\$1.47 for a contracted-in health centre, and US\$1.36 for a contracted-out health centre)<sup>14 15</sup>. However, the Kirivong and Ang Rokar figures are similar to the cost of US\$2.00 per capita for a “well run” health centre in another contracted district<sup>16</sup>.

The average cost per health centre across the two districts comes to US\$24,459 (Annex 4b). Of this, 47% represent staff costs, 6% operating costs and 47% drug costs.

A total of 542,106 services were provided by those health centres in 2006 (Annex 5a). These comprise the MPA package of curative and preventive services and deliveries, and include both child survival scorecard and non-scorecard interventions. This comes to an

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<sup>12</sup> These were assumed to be the same for 2007.

<sup>13</sup> Per the Fabricant study the cost of depreciation is 14% on top of total other health centre costs.

<sup>14</sup> This appears to be mainly due to increases in payments to staff. The health centre costs estimated by Fabricant included an average monthly staff compensation of US\$58, whereas the average figure for Kirivong and Ang Rokar comes to US\$173. Note that the health centres included in the Fabricant study were a mixture of contracted and non-contracted facilities, whereas the health centres included in this study are all contracted facilities.

<sup>15</sup> Scaling Up for Better Health in Cambodia. WHO and Ministry of Health, Kingdom of Cambodia. WHO 2007.

<sup>16</sup> Healthnet provided figures for Kampong Russey health centre, which they regard as an example of a well-run contracted health centre.

average of 1.67 services per capita<sup>17</sup>. The average number of services per health centre for the two districts was 19,361, with 15,048 in Kirivong (1.47 per capita) and 28,467 in Ang Rokar (1.98 per capita)<sup>18</sup> (Annex 5b).

The total costs were apportioned over the services using the relative weights (Annex 6), which were determined by expert opinion based on estimates of the total number of minutes needed for providers to spend on each service<sup>19</sup>. The unit costs exclude the cost of drugs since they were included in the programme costing study. In the case of measles and tetanus toxoid immunizations, staffing costs were reduced because basic salary figures had been taken into account in the programme costing study. The unit costs for the scorecard interventions range from 8 US cents for Vitamin A to US\$1.15 for treatment of diarrhoea, ARI and malaria.

## 6. Hospital costs

The hospital costs were based on 2006 figures<sup>20</sup> for the two contracted district hospitals in Kirivong and Ang Rokar. The average bed occupancy rate for the two hospitals was 80.7% (all beds excluding TB) and 82.6% for paediatric beds, and the average length of stay (ALOS) was 5.9 days (4.7 days for paediatric patients).

The figures collected do not include capital or depreciation costs<sup>21</sup> and only reflect costs to the government or donor agencies (e.g. volunteer time and patient out of pocket costs are not included). They also do not include costs included under the national programme costing study, such as per diems.

The combined cost for the two hospitals for 2005 was US\$ 381,437 (Annex 7). Based on the total population for the two districts, this comes to US\$1.33 per capita (including drugs). This figure includes the cost of Rominh Health Centre, which functions as a small hospital. The cost per capita is between the costs estimated in 2001 by Fabricant and inflated by Lane to 2007 prices of US\$1.00 for non-contracted district hospitals and US\$1.60 for contracted out hospitals<sup>22</sup>.

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<sup>17</sup> It is important to note that the decision of which service figures to include a calculation of the number of services per capita is somewhat arbitrary and to the authors' knowledge there is no standard definition of which services to include in such a calculation.

<sup>18</sup> Access to health centres is more difficult in Kirivong due to flooding,

<sup>19</sup> The author was unable to find any relative weights for these services in Cambodia and used figures developed as part of costing the MPA in South Africa, which were then adjusted by experienced Cambodian medical professionals. It is recommended that an in-depth study of health centre costs be done based on the target utilization levels, MOH service delivery norms and standards, and desired staffing and salary levels. This is best done using a tool that allows for the development of standard costs for all health centre services, such as CORE Plus.

<sup>20</sup> These figures were assumed to be the same for 2007.

<sup>21</sup> Per the Fabricant study the cost of depreciation is 21% on top of total other hospital costs.

<sup>22</sup> Based on costs estimated by Fabricant for 2001 of US\$0.86 for district hospitals in the non-contracting ODs and US\$1.38 for district hospitals in the contracting-out ODs.

The cost of drugs was excluded from the unit cost calculations since they were included under the programme costing study. The staff and operating cost total of US\$195,920 was apportioned over the different services using weights obtained from a study of the contracted districts<sup>23</sup>. This gave a unit cost per inpatient admission of US\$17.15.

The average cost per admission was divided by the average length of stay of 5.9 days, which comes to US\$2.91 per bed day (excluding drugs). If drugs are included, the cost per bed day comes to US\$5.67, which is somewhat higher than the figure of US\$3.50 estimated by Fabricant in 2001<sup>24</sup>.

The resulting figure of US\$2.91 was then multiplied by the estimated length of stay required for each scorecard intervention (Annex 8)<sup>25</sup>. Based on expert opinion of ideal average lengths of stay of 7 days for malaria, 5 days for pneumonia and 2 days for diarrhoea, the average unit cost per admission comes to US\$20.38 for malaria treatment, US\$14.56 for pneumonia treatment and US\$5.82 for diarrhoea treatment.

## 7. Operational District costs

The total cost for running the Operational District Offices in Kirivong OD and Ang Rokar OD was US\$140,915, which is 41 US cents per capita (Annex 9). This comes to 25% of the total health centre and hospital costs of US\$560,848. This percentage was added to the total service delivery costs.

## 8. Total service delivery costs

The unit cost per service excluding drugs for each level of care is summarized in Annex 10, together with the numbers of people served for each intervention. The numbers of services provided are based on the target populations and the share of services across service delivery levels (VHSG, health centre and hospital) (Annex 11)<sup>26</sup>. In the case of ORT and ARI incidence and treatment rates are also taken into account (Annexes 16 and 17). For ORT and ARI it is assumed that the VHSGs would assess but not treat some patients and those assessment costs are included.

The unit cost of providing services by the VHSG appears to be far cheaper than at the health centre. Malaria treatment is an example of this, since treatment at the village level

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<sup>23</sup> Contracting of Health Services – Ang Rokar and Kirivong Operational Districts, Takeo Province, Cambodia. Mid-term Evaluation Report, February 2006. Sheryl Keller, Jean-Marc Thome and Jean-Yves Dekestier.

<sup>24</sup> Millennium Development Goals and Poverty Reduction Strategy: Estimating Costs of Increased Utilization of Health Services by the Poor in Cambodia. Steve Fabricant. W.H.O./Cambodia. FINAL DRAFT, March 2006.

<sup>25</sup> Expert opinion of Dr Rathmony

<sup>26</sup> These are the same assumptions that were used in the programme costing.



- That 5% of the episodes require referral medical attention, and that 40% of these episodes will be treated at a hospital and 60% at a health centre.

The treatment of pneumonia has the second highest service delivery cost with US\$1.4 million. This also involves services at the village, health centre and hospital levels, but has different assumptions<sup>29</sup>:

- That the target coverage for 2007 is 61.5%, representing 1.1 million children;
- That although there are 5 episodes of ARI per child per year, care is only sought for 0.97 episodes, of which 0.68 episodes are ARI and 0.29 episodes are ALRI;
- That these 0.97 episodes are assessed by the VHSG;
- That 14.4% of ALRI cases are severe and need to be hospitalized and that the remainder are treated at the health centre or VHSG level;
- That the VHSG-level treatment only relates to the 2.5% of ALRI cases that occur in remote villages.

Although the target number of children for ARI is close to the number for diarrhoea and the number of episodes is much higher, the costs are much less because the proportions assessed and treated by the VHSGs, health centres and hospitals are much less.

The service delivery costs were added to the programme costs (Annex 15) to produce total costs for each intervention (Table 3). For the four years from 2007-2010 the total service delivery costs of US\$28.3 million added to the total programme costs of US\$79.9 million results in a combined cost of US\$108.2 million.

**Table 3 – Combined programme and service delivery costs for 2007-2010 (US\$)**

Scorecard Interventions	2007	2008	2009	2010	Total 2007-10
Early initiation of breastfeeding	487,733	516,099	598,175	670,830	2,272,837
Exclusive breastfeeding	551,812	583,051	668,061	743,679	2,546,603
Complementary feeding	773,375	814,604	896,849	967,501	3,452,329
Vitamin A	990,921	1,005,414	1,093,458	1,165,704	4,255,498
Measles vaccine	3,027,834	1,852,505	1,867,632	1,829,224	8,577,194
Tetanus toxoid	3,228,854	3,041,112	3,074,507	2,954,371	12,298,844
Insecticide-treated nets (ITNs)	4,030,137	3,097,607	3,439,073	2,417,911	12,984,728
Malaria treatment	524,173	516,339	569,797	518,325	2,128,634
Dengue vector control	2,730,883	3,462,566	3,745,995	3,273,283	13,212,726
Oral rehydration therapy (ORT)	6,266,579	6,836,337	7,605,772	8,269,866	28,978,553
Antibiotic for pneumonia	3,680,541	4,038,292	4,656,064	5,162,457	17,537,354
Skilled birth attendance	n/a	n/a	n/a	n/a	n/a
<b>TOTAL</b>	<b>26,292,841</b>	<b>25,763,926</b>	<b>28,215,383</b>	<b>27,973,150</b>	<b>108,245,300</b>

Unit costs were calculated for 2010 based on the total costs and coverage targets for that year. These were then multiplied by the coverage targets for each year from 2011 through 2015 as shown in Table 2 to produce total costs for those years. Inflation of 2% per year was included, but the increases in annual costs relate mainly to increases in coverage targets. The total cost for full coverage in 2015 comes to US\$36.9 million. The

<sup>29</sup> These assumptions are from the programme costing study and were used here for consistency, even though it is recognized that some of them may be out of date.



highest cost intervention is ORT for diarrhoea with a cost of US\$10.5 million in that year.

**Table 4 – Combined program and service delivery costs for 2011-2015 (US\$)**

Scorecard Interventions	Total 2010 unit cost	2011	2012	2013	2014	2015
Early initiation of breastfeeding	2.71	754,820	855,586	960,081	1,068,414	1,180,696
Exclusive breastfeeding	2.25	776,328	825,157	875,628	927,788	981,685
Complementary feeding	2.47	983,757	1,020,013	1,057,326	1,095,723	1,135,233
Vitamin A	0.56	1,206,415	1,272,069	1,339,866	1,409,866	1,482,131
Measles vaccine	4.82	1,864,741	1,938,263	2,013,980	2,091,950	2,172,234
Tetanus toxoid	1.06	3,142,730	3,397,711	3,661,634	3,934,754	4,217,335
Insecticide-treated nets (ITNs)	13.43	2,531,257	2,697,496	2,869,371	3,047,043	3,230,673
Malaria treatment	2.43	528,405	549,254	570,727	592,838	615,605
Denque vector control	3.30	3,344,772	3,484,585	3,628,654	3,777,091	3,930,014
Oral rehydration therapy (ORT)	5.05	8,558,396	9,023,866	9,504,530	10,000,812	10,513,143
Antibiotic for pneumonia	3.57	5,504,253	5,962,970	6,437,834	6,929,307	7,437,864
Skilled birth attendance	na	na	na	na	na	na
<b>TOTAL</b>		<b>29,195,874</b>	<b>31,026,969</b>	<b>32,919,630</b>	<b>34,875,587</b>	<b>36,896,614</b>

na = not available

## 9. Skilled birth attendance

The preliminary findings of the reproductive health costing study<sup>30</sup> provide estimates for the costs of deliveries and postpartum care, although it is not clear if the definitions of services are the same as those used in drawing up the Child Survival Strategic Plan.

The total estimated cost for deliveries using ideal salaries was US\$1,474,669 in 2006, US\$2,048,780 in 2010 and US\$2,649,758 in 2015. The total estimated cost for postpartum care using ideal salaries was US\$199,483 in 2006, US\$246,780 in 2010 and US\$389,208 in 2015. The totals for 2010 and 2015 can be added to the child survival scorecard costs for 2010 and 2015.

The costs were based on coverage rates for deliveries of 43.8%<sup>31</sup> in 2006, 59.4% in 2010 and 78.9% in 2015 and coverage rates for postpartum care of 40.9% in 2006, 58.3% in 2010 and 80.0% in 2015. These coverage rates are lower than the preliminary rates for skilled birth attendance provided by the National Reproductive Health Programme

<sup>30</sup> REPRODUCTIVE HEALTH COSTING, 2006-2015, DRAFT REPORT (2), 12 November 2007. National Reproductive Health Programme, Ministry of Health, Kingdom of Cambodia.

<sup>31</sup> Figure per CDHS 2005.

(NRHP) shown in the Child Survival Strategic Plan, which were 50% for 2006, 55% for 2007 and 70% for 2010.

These translate to numbers of deliveries of 187,019 in 2006, 259,846 in 2010 and 336,045 in 2015, and to numbers of women receiving postpartum care of 174,636 in 2006, 254,937 in 2010 and 340,730 in 2015.

The estimated cost for drugs, supplies and staff time per delivery was US\$4.57 based on current salaries and US\$7.89 based on ideal salaries. The estimated cost for post-partum care was US\$0.36 per woman based on current salaries and US\$1.14 based on ideal salaries. Note that the current salary for a nurse midwife was US\$180 per year and the ideal salary was determined to be US\$1,860 (10 times the current salary).

It is not clear how much of these costs relate to staff, but it is likely that it is a significant portion. To the degree that the staff are based in the health centres and hospitals, these staff costs are likely to have already been covered in this service delivery study.

## 10. Future Steps

A number of future steps were set out in the Programme Costing report, of which this study is one. In the interest of space, the steps can be reviewed in that report and are not repeated here. However, a few key actions are noted here since they may be needed to complete the plans and review the cost estimates.

1. Programme managers should review their individual plans and costs, especially:
  - The feasibility of targets based on current status and ability of the system to absorb resources and expand.
  - Harmonization of coverage targets across interventions that may be delivered as "packages". This includes reviewing the relationship between preventive and curative interventions (such as the targets for the provision of ITNs and for malaria treatment).
  - The contributions of activities to the objectives (e.g., the expected increase in service coverage for each of the ODs involved in the Vitamin A district expansion activity).
  - Areas where costs could be saved with special focus on the high cost activities and resources (e.g., BCC activities).
  - Any additional activities that may be needed to reach the ambitious targets set.
  
2. The programmes need to meet together to review:
  - Common areas where costs could be saved by sharing activities (e.g., outreach, BCC). The NCHP should participate in the rationalization and coordination of BCC activities.
  - The interdependency of intervention plans on each other, including the coordination of targets and activities) (e.g., the RH activities included in the NNP plan, and preventive and curative activities).

- Training and other activities which involve MOH staff, especially at the health centres, to see if they can participate to the degree expected. This will also need to take into account other expected demands on staff (e.g., under other programmes such as HIV/AIDS).
3. It is also advisable for the programmes to complete the non-scorecard intervention plans and to cost them so that overall programme plans and costs reflect the scaling up of the scorecard interventions.

## Annex 1 – VHSG total cost estimates (US\$)

	Days per activity	Cost per day	Activities per year	Cost per year
<b>VHSG COSTS - 2007</b>				
Intitial general training Y1	5	\$3	0.2	\$ 3.00
Refresher training Y1	2	\$3	0.2	\$ 1.20
Refresher training every 2 years	2	\$3	0.5	\$ 3.00
Health Centre monthly meeting	1	\$3	12	\$36.00
Incentives - t-shirts and sarongs		\$2	2	\$ 4.00
<b>Total cost per year per VHSG member</b>				<b>\$ 47.20</b>
VHSG member per village				2
<b>Total cost per village</b>				<b>\$ 94.40</b>

NOTE: It is assumed that each VHSG member serves for 5 years. Thus the initial general training which is done once every 5 years comes to 0.2 of an activity per year.

## Annex 2a – Village population assumptions

POPULATION ASSUMPTIONS		
Total per village		667
Births	2.68%	18
Under 5	12.43%	83
Child-Bearing Age Women	24.32%	162
Persons per house	5.2	
Households		128

## Annex 2b – VHSg activities

INTERVENTION	ACTIVITY	PROVIDED	INCIDENCE RATE	INCIDENCE #	DELIVERY LEVEL SHARE	TARGET COVERAGE LEVELS	# SERVICES
						2007	2007
<b>VILLAGE HEALTH SUPPORT GROUP PACKAGE PER VILLAGE</b>							
<b>DIRECT ACTIVITIES</b>							
<b>Scorecard Interventions</b>							
<b>Routine - non-remote villages without malaria</b>							
Early initiation of breastfeeding	Education	yes	1	18	100%	45%	8.0
Exclusive breastfeeding	Education	yes	1	18	100%	65%	11.6
Complementary feeding	Education	yes	1	18	100%	85%	15.2
Vitamin A supplementation <5	Mop up	yes	1	83	40%	80%	26.5
Vitamin A supplementation - post-partum women		no	1	18	0%	61%	0.0
ARI assessment	Assessment	yes	5	415	100%	61.5%	254.9
Diarrhea assessment	Assessment	yes	3	249	100%	75%	186.5
<b>Total - scorecard interventions in non-remote villages</b>							
<b>Non-scorecard interventions</b>							
Other health education		yes					128
Monitoring and reporting births and deaths		yes					36
Accompanied referral to HC		yes					6
<b>Total - other interventions in non-remote villages</b>							
<b>Total interventions in non-remote villages</b>							
<b>Activities in villages with special circumstances</b>							
ARI treatment in remote villages	Treatment	yes	4	332	100%	61.5%	204.0
Malaria treatment - in malaria endemic villages	Treatment	yes	1	83	100%	85%	70.5
ITN distribution in malaria endemic villages	Mobilization	yes		83	100%	80%	66.3
Dengue vector control in villages with dengue	Assist	yes		83	100%	59%	48.9
<b>INDIRECT ACTIVITIES</b>							
Mobilization for campaigns during outreach (inc immunizations)		yes					4
Liaison/feedback with HC (monthly meetings)		yes					12

NOTE: The target coverage level of 75% for diarrhea is according to Table 9.1 of the programme costing study, which is different from the figure in Table 3.1.

### Annex 3a – VHSG service unit costs – 2007 (US\$)

INTERVENTION	# SERVICE S	TIME MINS	TOTAL TIME	TOTAL COST - NON-REMOTE VILLAGE	COST PER SERVICE - NON-REMOTE VILLAGE	TOTAL COST - REMOTE VILLAGE	COST PER SERVICE REMOTE VILLAGE
	2007		2007	2007	2007	2007	2007
<b>VILLAGE HEALTH SUPPORT GROUP PACKAGE PER VILLAGE</b>							
<b>DIRECT ACTIVITIES</b>							
<b>Scorecard Interventions</b>							
<b>Routine - non-remote villages without malaria</b>							
Early initiation of breastfeeding	8.0	7.5	60	0.71	0.08824	0.42	0.05162
Exclusive breastfeeding	11.6	7.5	87	1.03	0.08824	0.60	0.05162
Complementary feeding	15.2	15	228	2.68	0.17648	1.57	0.10323
Vitamin A supplementation <5	26.5	2	53	0.62	0.02353	0.37	0.01376
Vitamin A supplementation - post-partum women	0.0						
ARI assessment	254.9	10	2,549	29.99	0.11765	17.55	0.06882
Diarrhea assessment	186.5	10	1,865	21.95	0.11765	12.84	0.06882
<b>Total - scorecard interventions in non-remote villages</b>			<b>4,843</b>				
<b>Non-scorecard interventions</b>							
Other health education	128	15	1,924	22.64	0.17648	13.24	0.10323
Monitoring and reporting births and deaths	36	15	536	6.31	0.17648	3.69	0.10323
Accompanied referral to HC	6	120	720	8.47	1.41183	4.96	0.82584
<b>Total - other interventions in non-remote villages</b>			<b>3,180</b>				
<b>Total interventions in non-remote villages</b>			<b>8,024</b>				
<b>Activities in villages with special circumstances</b>							
ARI treatment in remote villages	204.0	20	4,079			28.07	0.13764
Malaria treatment - in malaria endemic villages	70.5	18	1,268			8.73	0.12388
ITN distribution in malaria endemic villages	66.3	3	199			1.37	0.02065
Dengue vector control in villages with dengue	48.9	3	147			1.01	0.02065
<b>INDIRECT ACTIVITIES</b>							
Mobilization for campaigns during outreach (inc immun	4	240	960				
Liaison/feedback with HC (monthly meetings)	12	240	2,880				
<b>Total - administration</b>			<b>3,840</b>				

### Annex 3b – VHSG unit cost basis – 2007 (US\$)

<b>SUMMARY</b>							
Village population							667
Total direct minutes - interventions in non-remote, non-malaria and non-dengue villages							8,024
Total direct minutes - interventions in remote villages with malaria and dengue							13,717
<b>UNIT COSTS</b>							
Total cost per village							94.40
Total cost per capita							0.14153
Total cost per minute for direct interventions in a non-remote village							0.01177
Total cost per minute for direct interventions in a remote village with malaria and dengue							0.00688

**Annex 4a – Total cost for all health centres for 2006 – Kirivong OD and Ang Rokar OD (US\$)**

	Kirivong HCs	Ang Rokar HCs	Total HCs
<b>Costs</b>			
Staff	191,452	131,163	322,615
Operating costs	33,461	8,852	42,313
<b>Total staff and operating costs</b>	224,913	140,014	364,928
Drugs	190,106	129,812	319,918
<b>Total</b>	415,020	269,826	684,846
<i>Total cost per capita</i>	2.13	2.09	2.11

**Annex 4b – Average cost per health centre for 2006 – Kirivong OD and Ang Rokar OD (US\$)**

	Average per Health Centre	Average per Health Centre	Average per Health Centre	
	Kirivong OD	Ang Rokar OD	Both Ods	
<b>Costs</b>				
Staff	10,076	14,574	11,522	47%
Operating costs	1,761	984	1,511	6%
<b>Total staff and operating costs</b>	11,838	15,557	13,033	53%
Drugs	10,006	14,424	11,426	47%
<b>Total</b>	21,843	29,981	24,459	100%
<i>Total cost per capita</i>	2.13	2.09	2.11	

**Annex 5a– Total services provided in all health centres in Kirivong OD and Ang Rokar OD in 2006**

	Services	Services	Services
	Kirivong OD	Ang Rokar OD	Total
<b>KEY SERVICE STATISTICS</b>			
Population	195,022	129,244	324,266
<b>CURATIVE</b>			
Diarrhea	8,449	6,189	14,638
ARI	46,721	58,783	105,504
Malaria	178	698	876
STDs	2,687	2,713	5,400
Other curative consultations	61,907	60,681	122,588
<b>Total consultations</b>	<b>119,942</b>	<b>129,064</b>	<b>249,006</b>
<b>DELIVERIES</b>			
Deliveries at HC	1,895	1,588	3,483
Deliveries at home with HC staff	286	72	358
<b>Total deliveries attended by HC staff</b>	<b>2,181</b>	<b>1,660</b>	<b>3,841</b>
<b>PREVENTIVE</b>			
ANC (excluding nutrition counseling & TT)	13,317	10,924	24,241
Nutrition counseling with ANC			
TT for pregnant women inc in ANC	7,679	20,203	27,882
Postpartum care (excluding nutrition counseling)	6,563	3,844	10,407
Nutrition counseling with postpartum care			
BCG vaccine	4,740	3,404	8,144
Hep B vaccine at birth	1,796	2,933	4,729
TT for non-pregnant women 12-44	11,789	13,966	25,755
Total FP clients in the month	39,704	18,586	58,290
Measles	4,168	2,914	7,082
OPV and DPY/Hep B 1,2 and 3	24,959	18,178	43,137
Vit A <5 and lactating women	49,065	30,527	79,592
<b>Total Preventive services</b>	<b>163,780</b>	<b>125,479</b>	<b>289,259</b>
<b>Total services</b>	<b>285,903</b>	<b>256,203</b>	<b>542,106</b>
<i>Total services per capita</i>	<i>1.47</i>	<i>1.98</i>	<i>1.67</i>



**Annex 5b – Average services per health centre provided in Kirivong OD and Ang Rokar OD in 2006**

	Average per Health Centre	Average per Health Centre	Average per Health Centre
	Kirivong OD	Ang Rokar OD	Both Ods
<b>KEY SERVICES</b>			
Number of health centres included	19	9	28
Population	10,264	14,360	11,581
<b>CURATIVE</b>	-	-	-
Diarrhea	445	688	523
ARI	2,459	6,531	3,768
Malaria	9	78	31
STDs	141	301	193
Other curative consultations	3,258	6,742	4,378
<b>Total consultations</b>	<b>6,313</b>	<b>14,340</b>	<b>8,893</b>
<b>DELIVERIES</b>	-	-	-
Deliveries at HC	100	176	124
Deliveries at home with HC staff	15	8	13
<b>Total deliveries attended by HC staff</b>	<b>115</b>	<b>184</b>	<b>137</b>
<b>PREVENTIVE</b>	-	-	-
ANC (excluding nutrition counseling & TT)	701	1,214	866
Nutrition counseling with ANC	-	-	-
TT for pregnant women inc in ANC	404	2,245	996
Postpartum care (excluding nutrition counseling)	345	427	372
Nutrition counseling with postpartum care	-	-	-
BCG vaccine	249	378	291
Hep B vaccine at birth	95	326	169
TT for non-pregnant women 12-44	620	1,552	920
Total FP clients in the month	2,090	2,065	2,082
Measles	219	324	253
OPV and DPY/Hep B 1,2 and 3	1,314	2,020	1,541
Vit A <5 and lactating women	2,582	3,392	2,843
<b>Total Preventive services</b>	<b>8,620</b>	<b>13,942</b>	<b>10,331</b>
<b>Grand total</b>	<b>15,048</b>	<b>28,467</b>	<b>19,361</b>
<i>Total services per capita</i>	<i>1.47</i>	<i>1.98</i>	<i>1.67</i>

## Annex 6 – Estimation of Unit Costs for Health Centre services (2006) (US\$)

	Cambodia	Cambodia	Weighted numbers of services	Avg Cost per service	Avg Cost per service	Avg Cost per service	
	Total			Both ODs			Total staff
	Mins	weights	Total	Staff	Op costs	Staff & Op	& Op costs
<b>KEY SERVICES</b>							
Population							
<b>CURATIVE</b>							
Diarrhea	30	1.000	14,638	1.02	0.13	1.15	16,866
ARI	30	1.000	105,504	1.02	0.13	1.15	121,564
Malaria	30	1.000	876	1.02	0.13	1.15	1,009
STDs	21	0.700	3,780	0.71	0.09	0.81	4,355
Other curative consultations	18	0.600	73,553	0.61	0.08	0.69	84,749
<b>Total consultations</b>							
<b>DELIVERIES</b>							
Deliveries at HC	300	10.000	34,830	10.19	1.34	11.52	40,132
Deliveries at home with HC staff	300	10.000	3,580	10.19	1.34	11.52	4,125
<b>Total deliveries attended by HC staff</b>							
<b>PREVENTIVE</b>							
ANC (excluding nutrition counseling & TT)	18.5	0.617	14,949	0.63	0.08	0.71	17,224
Nutrition counseling with ANC	15	0.500	12,121	0.51	0.07	0.58	13,966
TT for pregnant women inc in ANC	4	0.133	3,718	0.14	0.02	0.15	4,284
Postpartum care (excluding nutrition counseling)	21	0.700	7,285	0.71	0.09	0.81	8,394
Nutrition counseling with postpartum care	15	0.500	5,204	0.51	0.07	0.58	5,996
BCG vaccine	4	0.133	1,086	0.14	0.02	0.15	1,251
Hep B vaccine at birth	4	0.133	631	0.14	0.02	0.15	727
TT for non-pregnant women 12-44	4	0.133	3,434	0.14	0.02	0.15	3,957
Total FP clients in the month	10.05	0.335	19,527	0.34	0.04	0.39	22,500
Measles	4	0.133	944	0.14	0.02	0.15	1,088
OPV and DPY/Hep B 1,2 and 3	4	0.133	5,752	0.14	0.02	0.15	6,627
Vit A <5 and lactating women	2	0.067	5,306	0.07	0.01	0.08	6,114
<b>Total Preventive services</b>							
<b>Grand total</b>			316,715				364,928

## Annex 7 – Hospital costs (2006) (US\$)

	Unweighted services	Weights	Cost and weighted services	Unit cost per service	Total cost
Drugs			185,517		
MOH Staff and operating costs			150,291		
SRC and requested extra MOH staff			45,629		
Total costs			381,437		
Add Rominh Health Centre			73,844		
Total costs inc Rominh Health Centre			455,281		
<i>Total cost per capita</i>			1.33		
<b>UNIT COSTS FOR 2 HOSPITALS (excluding drugs)</b>					
Staff and operating costs			195,920		
OPD	7,203	1	7,203	2.45	17,646
IPD admissions	7,580	7	53,060	17.15	129,988
Surgical interv.	522	30	15,660	73.49	38,364
BS users	-	1	-	2.45	-
ANC2	-	1	-	2.45	-
Rouvax	-	1	-	2.45	-
Deli. Facility	810	5	4,050	12.25	9,922
Deli.at Home	-	4	-	9.80	-
Total Output	16,115		79,973		
Total Cost per weighted contact (OPD equivalent)			2.45		
<b>Total</b>					195,920

## Annex 8 – Hospital unit costs (2006) (US\$)

Hospital stays	Avg cost for all admissions	ALOS	Average cost per day	ALOS for scorecard interventions	Avg weighted cost per admission
Malaria				7	20.38
Pneumonia				5	14.56
Diarrhoea				2	5.82
Total	17.15	5.9	2.91		

### **Annex 9 – Operational District costs (2006) (US\$)**

Health centre costs		364,928
Hospital costs		195,920
Total health centre and hospital costs		560,848
OD costs		140,915
OD costs as % of total health centre and hospital costs		25%

## Annex 10 – Unit Service Delivery Costs and Services per Scorecard Intervention (US\$)

Scorecard Interventions	Per Service			Population served		
	Village unit cost	HC unit cost	Hospital unit cost	Village	HC	Hospital
Early initiation of breastfeeding	0.088	0.576		173,439	173,439	
Exclusive breastfeeding	0.088	0.576		250,524	250,524	
Complementary feeding	0.176	0.576		327,608	327,608	
Vitamin A <5	0.024	0.077		615,908	923,861	
Vitamin A post partum women	-	0.077			245,329	
<i>Vitamin A total</i>						
Measles vaccine	-	0.115			331,462	
Tetanus toxoid	-	0.115			2,417,834	
Insecticide-treated nets	0.021			166,839		
Malaria treatment	0.124	1.152	20.38	24,860	151,343	1,064
Dengue vector control	0.021			544,747		
Oral rehydration therapy	0.118	1.152	5.82	3,914,066	1,487,345	78,281
Antibiotic for pneumonia - assessment	0.118			1,061,288		
Antibiotic for pneumonia - treatment	0.138	1.152	14.56	6,902	266,910	44,574

### Notes:

1. The unit cost for measles and tetanus toxoid vaccinations at the health centre level was reduced from US\$0.15 to US\$0.115 in relation to the staff salaries and overtime that were already included in the programme costs study.
2. The assumed division of services across service delivery levels is shown in Annex 11.
3. The figures for ORT services and pneumonia treatment are shown in Annexes 16 and 17.

## Annex 11 – Service Delivery Level Assumptions

Intervention	Service	Level
Early initiation of breastfeeding	Education	Provided to all new mothers by VHSGs and HCs
Exclusive breastfeeding	Education	Provided to all new mothers by VHSGs and HCs
Complementary feeding	Education	Provided to all new mothers by VHSGs and HCs
Vitamin A supplementation <5	Provision	60% provided through HCs as part of outreach and 40% by VHSGs as mop-up of missed children
Vitamin A supplementation for post-partum women	Provision	50% at HC and 50% on outreach
Measles vaccination	Provision	50% at HC and 50% through campaigns
Tetanus Toxoid vaccination	Provision	50% at HC and 50% through campaigns
ITNs	Mobilization	VHSG mobilizes families. ITNs provided through campaigns.
Malaria treatment - non-remote villages	Treatment	99.4% of cases are treated at HC and the rest are treated at hospital
Malaria treatment - remote villages	Treatment	99.4% of cases are treated by the VHSG and the rest are treated at hospital
Dengue vector control	Mobilization	VHSG mobilizes families. Vector control provided through campaigns.
Management of ARI	Assessment	VHSGs assess all patients
Management of ARI – non-remote villages	Treatment	86% treated at HC and 14% at hospital
Management of ARI – remote villages	Treatment	86% treated by VHSG and 14% at hospital
Management of diarrhoea	Assessment	VHSGs assess all patients
Management of diarrhoea needing medical attention	Treatment	60% at the health centre and 40% at the hospital

## Annex 12 – Total Service Delivery Costs excluding drugs for 2007 (US\$)

Scorecard Interventions	Total Cost by service delivery level			Total cost	OD costs	Total cost
	Village unit cost	HC unit cost	Hospital unit cost	VHSG, HC and hospital	25%	
Early initiation of breastfeeding	15,304	99,920	-	115,225	28,951	144,175
Exclusive breastfeeding	22,106	144,330	-	166,436	41,818	208,254
Complementary feeding	57,816	188,739	-	246,555	61,948	308,503
Vitamin A <5	14,493	70,966	-	85,459	21,472	106,931
Vitamin A post partum women	-	18,845	-	18,845	4,735	23,580
<i>Vitamin A total</i>	<i>14,493</i>	<i>89,811</i>	<i>-</i>	<i>104,304</i>	<i>26,207</i>	<i>130,511</i>
Measles vaccine	-	37,959	-	37,959	9,537	47,497
Tetanus toxoid	-	276,894	-	276,894	69,570	346,464
Insecticide-treated nets	3,445	-	-	3,445	865	4,310
Malaria treatment	3,080	174,382	21,675	199,137	50,034	249,171
Dengue vector control	11,247	-	-	11,247	2,826	14,073
Oral rehydration therapy	460,501	1,713,757	455,806	2,630,064	660,813	3,290,876
Antibiotic for pneumonia - assessment	124,863	-	-	124,863	31,372	156,236
Antibiotic for pneumonia - treatment	950	307,541	648,850	957,341	240,535	1,197,876
<b>TOTAL</b>	<b>713,804</b>	<b>3,033,334</b>	<b>1,126,331</b>	<b>4,873,469</b>	<b>1,224,476</b>	<b>6,097,945</b>



**Annex 13 – Unit cost per person covered for combined service delivery costs excluding drugs for 2007-2010 (US\$)**

<b>Scorecard Interventions</b>	<b>Unit Cost 2007 US\$</b>	<b>Unit Cost 2008 US\$</b>	<b>Unit Cost 2009 US\$</b>	<b>Unit Cost 2010 US\$</b>
Early initiation of breastfeeding	0.83	0.85	0.86	0.88
Exclusive breastfeeding	0.83	0.85	0.86	0.88
Complementary feeding	0.94	0.96	0.98	1.00
Vitamin A <5	0.07	0.07	0.07	0.07
Vitamin A post-partum women	0.10	0.10	0.10	0.10
Measles vaccine	0.14	0.15	0.15	0.15
Tetanus toxoid	0.14	0.15	0.15	0.15
Insecticide-treated nets	0.03	0.03	0.03	0.03
Malaria treatment	1.41	1.43	1.46	1.49
Dengue vector control	0.03	0.03	0.03	0.03
Oral rehydration therapy	2.46	2.51	2.56	2.61
Antibiotic for pneumonia	1.23	1.26	1.28	1.31

## Annex 14 - Total service delivery costs excluding drugs for 2007-2010 (US\$)

<b>Scorecard Interventions</b>	<b>Total Cost 2007</b>	<b>Total Cost 2008</b>	<b>Total Cost 2009</b>	<b>Total Cost 2010</b>	<b>Total Cost 2007-10</b>
Early initiation of breastfeeding	144,175	167,383	192,184	218,547	722,289
Exclusive breastfeeding	208,254	234,335	262,070	291,396	996,055
Complementary feeding	308,503	333,721	364,171	391,993	1,398,388
Vitamin A <5	106,931	114,072	121,646	128,163	470,813
Vitamin A post-partum women	23,580	26,955	30,573	34,885	115,993
Measles vaccine	47,497	50,782	54,211	57,766	210,255
Tetanus toxoid	346,464	377,927	405,220	424,837	1,554,448
Insecticide-treated nets	4,310	4,511	4,719	4,934	18,474
Malaria treatment	249,171	291,463	304,927	318,805	1,164,365
Dengue vector control	14,073	21,715	26,001	27,184	88,972
Oral rehydration therapy	3,290,876	3,627,923	3,939,661	4,269,664	15,128,123
Antibiotic for pneumonia	1,354,112	1,520,913	1,699,665	1,890,450	6,465,140
<b>TOTAL</b>	<b>6,097,945</b>	<b>6,771,699</b>	<b>7,405,048</b>	<b>8,058,623</b>	<b>28,333,315</b>

## Annex 15 – Programme costs (per Programme Costing Study) (US\$)

Scorecard Interventions	2007	2008	2009	2010	Total 2007-10
Early initiation of breastfeeding	343,558	348,716	405,991	452,283	1,550,548
Exclusive breastfeeding	343,558	348,716	405,991	452,283	1,550,548
Complementary feeding	464,872	480,883	532,678	575,508	2,053,941
Vitamin A	860,410	864,387	941,239	1,002,656	3,668,692
Measles vaccine	2,980,337	1,801,723	1,813,421	1,771,458	8,366,939
Tetanus toxoid	2,882,390	2,663,185	2,669,287	2,529,534	10,744,396
Insecticide-treated nets (ITNs)	4,025,827	3,093,096	3,434,354	2,412,977	12,966,254
Malaria treatment	275,002	224,876	264,870	199,520	964,269
Dengue vector control	2,716,810	3,440,851	3,719,994	3,246,099	13,123,754
Oral rehydration therapy (ORT)	2,975,703	3,208,414	3,666,111	4,000,202	13,850,430
Antibiotic for pneumonia	2,326,429	2,517,379	2,956,399	3,272,007	11,072,214
Skilled birth attendance	n/a	n/a	n/a	n/a	n/a
<b>TOTAL</b>	<b>20,194,896</b>	<b>18,992,226</b>	<b>20,810,335</b>	<b>19,914,527</b>	<b>79,911,985</b>

## Annex 16 – Calculations of numbers of ORT services

CALCULATIONS	General areas	Remote areas	Total
Total number of Diarrhoea episodes	5,083,755	135,000	5,218,755
Number of Diarrhoea episodes requiring ORT only and NO medical attention (ideal 100% coverage)	3,050,253	81,000	3,131,253
Number of Diarrhoea episodes requiring ORT AND medical attention (ideal 100% coverage)	1,779,314	47,250	1,826,564
Number of Diarrhoea episodes requiring ORT and IV (referral) (ideal 100% coverage)	254,188	6,750	260,938
Target %	75%	75%	
Number of Diarrhoea episodes requiring ORT only and NO medical attention (at annual target coverage set)	2,287,690	60,750	2,348,440
Number of Diarrhoea episodes requiring ORT AND medical attention (at annual target coverage set)	1,334,486	35,438	1,369,923
Number of Diarrhoea episodes requiring ORT and IV (referral) (at annual target coverage set)	190,641	5,063	195,703
Total number of episodes based on target coverage			3,914,066
<b>LEVEL OF CARE</b>			
<b>Number of Diarrhoea episodes requiring ORT AND medical attention (at annual target coverage set)</b>			
% Health centre	100%	100%	100%
Number treated at health centre	1,334,486	35,438	1,369,923
<b>Number of Diarrhoea episodes requiring ORT and IV (referral) (at annual target coverage set)</b>			
% Health centre	60%	60%	60%
% Hospital	40%	40%	40%
Number treated at health centre	114,384	3,038	117,422
Number treated at hospital	76,256	2,025	78,281
Total number treated at health centre	1,448,870	38,475	1,487,345

Source: Spreadsheets used in estimation of costs for Programme Costing Study.

## Annex 17 – Calculations of numbers of ARI services

	General areas	Remote areas	Total
<5 population in need	1,740,178	45,000	1,785,178
Target coverage - 2007	61.5%	61.5%	
Target <5 population	1,070,209	27,675	1,097,884
% Cases treated	96.67%	96.67%	
Total cases treated	1,034,536	26,753	1,061,288
Total cases treated for cough/cold	724,175	18,727	742,902
Total cases treated for non-severe ALRI	266,910	6,902	273,812
Total cases treated for severe and very severe ALRI	43,450	1,124	44,574
% total cases treated for cough/cold			70.0%
% total cases treated for ALRI			30.0%
% total cases that are non-severe ALRI			25.8%
% total cases that are severe and very severe			4.2%
% ALRI cases that are non-severe			86%
% ALRI cases that are severe and very severe			14%

Source: Spreadsheets used in estimation of costs for Programme Costing Study.

## Annex 18 – Summary report on visits to health centres

A sample of health centres was visited and staff and village volunteers were interviewed. Two health centres were chosen from 5 provinces. Two of the provinces are supported by USAID projects, two by UNICEF, and the fifth contains the two contracted districts from which data were drawn for the costing. The 5 provinces and 10 health centres are as follows:

- Kg Speu Province: Treang Trayeung HC and Kraing Skus HCs in Kampong Speu OD,
- Svay Rieng province: Chantrey HC in Romeas Heak OD and Daun Sar HCs in Svay Chrum OD,
- Battambang province: Mornng Russey and Prey Svay HCs in Mornng Russey OD,
- Pursat province: Prey Nhy HC in Sampov Meas OD and Chhuk Meas HC in Krakor OD,
- Takeo province: Kampong krasang HC in Kirivong OD and Trapeang Angdeak in Ang Rokar OD

The manager or deputy manager of each health centre was interviewed. Village health volunteers from a nearby village were invited to the health centre and were interviewed. The visits and interviews were conducted by Ms Kun Reth, consultant. David Collins participated in the visit to the first health centre and to a nearby village.

The main findings are as follows:

- All of the health centres and villages have support from an NGO.
- Most health centres do not have referral transport to get patients to hospital.
- Most health centres do not have transport for outreach and staff use their own motor cycles.
- 6 of the 10 health centres are open 5 days a week and 4 are open 7 days a week.
- 8 of the 10 health centres are only open in the morning, one is open all day, and another has staff on call in the afternoon.
- The furthest villages from the health centres are two hours or more by vehicle.
- Every health centre makes outreach visits, mostly each day in the afternoon. Each village is visited once per month.
- The health centres have between 5 and 9 staff each.
- The average non staff cost per health centre is between US\$384 and US\$1,080.
- The amount collected from user fees varies from US\$20 to US\$40 per month.
- The number of training courses for health centre staff varies between 2 and 8 per year.
- Staff receive per diem for a number of special activities, mainly vaccination, peer education, Vitamin A, ANC, measles, tetanus, home-based care, TB DOTS, bednet distribution and dengue control.
- The time that staff and volunteers say they spend on interventions varies considerably. For example the time spent on counseling a woman on nutrition reportedly varies from 2 minutes to 15 minutes.
- Most of the village volunteers meet for refresher training and/or meetings every months.
- The village volunteers are involved in nutrition counseling, Vitamin A distribution and giving vaccinations.

## Annex 19: People consulted

### MINISTRY OF HEALTH<sup>32</sup>

Professor Sann Chan Soeung, Deputy Director General for Health  
Dr Hong Rathmony, Vice Director, Communicable Disease Control Department  
Dr Ork Vichet, National Immunization Programme  
Dr Sok Kanha, Deputy Director, Dept of Planning and Health Information  
Dr Ou Kevanna, National Nutrition Programme Manager NMCHC  
Dr Ngan Chantha, National Dengue Control Programme Manager  
Ph Ngov Vann Thon, Chief Pharmaceuticals Office, CNM  
Dr Chea Nguon, Deputy Director, CNM, VMW  
Dr Uy Vengky, Executive Administrator Health Sector Support Project MoH  
Dr Lo Veasnakiry, Director of Planning and Budget

### UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT, CAMBODIA

Dr Hen Sokun Charya  
Kate Crawford  
Dr Sek Sopheanarith

### WHO, CAMBODIA COUNTRY OFFICE

Dr Niklas Danielsson, Medical Officer, Child and Adolescent Health and Development  
Maryam Bigdeli, Health Economist  
Benjamin Lane, Macroeconomics and Health Project Advisor  
Dr Susan Jack, Medical Officer - Child Survival

### WHO, GENEVA

Dr Robert Scherpbier, Medical Officer, Department of Child and Adolescent Health and Development  
Karin Stenberg, Health Economist, Department of Child and Adolescent Health and Development

### UNICEF/CAMBODIA

Dr Viorica Berdaga, Project Officer, Mother and Child Health  
Dr Rasoka Thor, Project Officer, Child Health

### UNFPA/CAMBODIA

Sok Sokun, Programme Manager, Reproductive Health

### USAID/BASICS, CAMBODIA

Dr Steve Solter, Country Representative  
Prateek Gupta, Monitoring and Evaluation Advisor  
Dr Meas Pheng, Child Health Specialist

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<sup>32</sup> The persons interviewed at the health centre and village levels are too numerous to be listed here but these names can be provided on request.

REPRODUCTIVE AND CHILD HEALTH ALLIANCE (RACHA), CAMBODIA

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Hong Chanlida, Maternal and Child Health

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HEALTHNET

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