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EVALUATION

Report of the End of Project Evaluation of the Evidence-Based Interventions for Improved Nutrition to Reinforce Infant, Child and Maternal Health in Cambodia Project. An Innovative Project for Lasting Behavioral Change And Improvement in Child and Maternal Health and Nutrition

JULY 2014

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For the Final Evaluation Brief and other Child Survival and Health Grants Program materials, please visit http://www.mcsprogram.org/CSHGPproducts

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Report of the End of Project Evaluation of the Evidence-Based Interventions for Improved Nutrition to Reinforce Infant, Child and Maternal Health in Cambodia Project
An Innovative Project for Lasting Behavioral Change and Improvement in Child and Maternal Health and Nutrition

A Project to Decrease Child and Maternal Morbidity and Mortality. This is achieved through Integrated Community-Based Interventions that improve the nutrition of children and mothers, improve community level management of diarrheal disease, promote effective use of both preventive and early treatment services for the common diseases of childhood available at the local Health Center and effective for pregnancy and Family Planning.

September 18, 2014

CSHGP Cooperative Agreement Grant No. AID-OAA-A-10-00052

Report of the End of Project Evaluation of the Evidence-based Interventions for Improved Nutrition to Reinforce Infant, Child and Maternal Health in Cambodia Project an Innovative Project for Lasting Behavioral Change and Improvement in Child and Maternal Nutrition – Executive Summary

This project was funded by the U.S agency for International Development through the Child Survival and Health Grants Program.

September 2014

Evaluation, Purpose, and Evaluation Questions

To assist in addressing the problems of poor maternal and child health in rural Cambodia, International Relief and Development (IRD) was awarded a grant from the USAID Child Survival and Health Grants program under Cooperative Agreement No: AID-OAA-10-00052. The purpose of this report is to present the evaluation of the IRD Evidenced Based Interventions for Improved Nutrition to Reinforce Infant Child and Maternal Health (ENRICH) Project implemented over the period September 30, 2010 to September 29, 2014 in Boribo Operational District, Kampong Chhnang Province, Cambodia. With this evaluation, the achievements and lessons learned from this Project will aid towards improving future projects.

Project Background

The 2010 Cambodia Demographic and Health Survey (2010 CDHS) demonstrated that while maternal and child health are improving in Cambodia there is still much room for improvement especially in rural areas. In 2010 the Infant Mortality rate was 45 per 1000 live births and under-five mortality 54 per 1000 live births. Early attendance and appropriate treatment for common childhood illnesses is also lacking. Only 34 percent of children with diarrhea were given more fluids than usual during their illness. Poor nutritional status in children is a common problem. In 2010, 40 percent of children were found to be stunted and 11 percent wasted. The 2010CHDS also shows that there is much room for improvement in women's health and health care, especially in relationship to pregnancy. In rural areas 48 percent of mothers delivered in a health facility. Forty-four percent of women are anemic and only 57 percent took iron tablets or

syrup for 90 days or more as recommended. Use of modern methods of contraception was 38 percent in 2010.

The target area was Boribo Operational District in Kampong Chhnang Province. This Operational District covers 4 administrative Districts- Boribo, Kampong Leng, Rlear Ph'ir and Teuk Phos. The total population is 106,166 including 49,372 women of reproductive age (15-49 years) and 12, 847 children under age five. The people live in 138 villages each led by a Village Chief. Villages are organized into communes. Key Project personnel had been working in this general area for the four years prior to this Project on a similar project.

Evaluation Questions, Design, Methods and Limitations

Evaluation Questions

1. How well were the Child Survival program activities in the Detailed Implementation Plan and its revision implemented? This includes activities undertaken by the primary implementation partner as well as those done in coordination with the Ministry of Health and local entities participating in the Project, including community feedback on the quality and value of project activities.
2. What progress was made against program indicators, objectives and yearly benchmarks as shown by the KPC survey and other sources?
3. How well were the PD/Health activities implemented?
4. What key lessons were learned based on the Child Survival program experience to inform similar interventions in the future?

Data for the evaluation were collected from several sources. All annual plans, quarterly reports and key reports such as those on Lot Quality Assurance Survey (LQAS) monitoring, Project Work plan, Performance Management Plan, Operational Research Report and Transition Plan were provided by IRD to the consultant and examined by him. An Endline KPC survey had been performed by the Project in association with its partners. This survey had been conducted according to an established protocol using the same survey instruments that had been used in the Baseline KPC survey. The key experienced personnel performing this survey had also led or participated in the baseline survey. The data from this survey was provided to the consultant who conducted quantitative analysis of it using SPSS software. This data includes the anthropometric measurements presented in this report.

Qualitative data was also collected from several sources. Data was collected from 20 focus group discussions covering mothers (8 groups), fathers (8 groups) and Village Health Volunteers (4 groups) using standardized discussion questions. Key Informant interviews were conducted with key personnel: from the Ministry of Health-Provincial and District managers, Health Center staff and local community leaders –commune level representative in charge of Women's and Child Health, Village Chiefs, monks and Achars; and IRD project personnel. The Chief Executive Officers of local NGO partners- PNKA and CPR were also interviewed.

Data collection from these various sources was a dynamic process such that further questions could be added to later focus groups and key informant interviews as data became available from earlier data collected and ongoing KPC survey analysis. Findings concerning the Project were then deduced by triangulating information from all the data sources mentioned above.

Important potential limitations were addressed in the methodology and analysis used. The data was collected and analyzed using standardized methods by experienced personnel and so should

be of reasonable standard. Mothers interviewed in the survey and mothers, fathers and VHVs attending the focus groups were self- selected and may under represent those not at home at time of survey or include mainly those pleased by the Project in the focus groups. Behavior recalled by mothers may reflect the behavior change that they know they are supposed to adopt rather than their actual practice. However, these potential limitations were minimized by seeing how consistent the data was across and within the different data sources examined.

Findings and Conclusions

This Project was well implemented and achieved its planned targets and outcomes in relationship to all its Objectives and key Outputs. Activities were generally well implemented and process targets met. Findings from triangulation of all data collected, both qualitative and quantitative support this conclusion. The rate of underweight in children aged 0 to 23 months of age was decreased from 22.2% to 11.0%, Baseline KPC to Endline KPC. The rate of stunting in children 0 to 35 months was decreased from 40.9% to 24.2%. The Hearth Approach graduated 199 children. The proportion of households of children aged 0 to 23 years that treat water effectively increased from 73.3% to 93.7%. The proportion of mothers who: wash their hands with soap increased from 38.7% to 98.7% and who know all the critical moments for hand washing increased from 36.7% to 63.7%. The percentage of mothers who received 4 antenatal visits increased from 66.7% to 83.3%. The percentage of mothers of children aged 0 to 23 months who are using a modern contraceptive increased from 20.7% to 91.7%.

Results in relationship to the Project's Operational Research study provided good evidence that anemia in pregnancy can be reduced by appropriate protein energy supplementation and raised questions about the prevention of anemia in pregnancy that suggest the need for further study. The Project helped the community to achieve positive change in health related behavior at the household level through: its BCC approach that was delivered equitably down to the household level throughout the Project catchment area; establishment of new community based health providers and governance structures throughout this area and its link to formal health systems at local Health Centers.

While there is evidence that community behavioral changes in health related behavior have been established for the medium to longer term, outside encouragement and facilitation, most likely from the local MOH partners at Provincial, District and Health Center, as appropriate to each level, is needed to maintain systems for ongoing VHV, VHF and Community Council supervision, ongoing education and governance. Key recommendations focused on: strengthening systems of continuing support for the community based health systems established in this Project in the area of supervision, continued quality assurance and earning and adaptation ; follow up of the Project Operations Research Study; dissemination of the evidence concerning the Projects BCC and mobilizations approaches.

Contents

ANNEXES

List of Tables and Figures

ACRONYMS

ARI	Acute Respiratory Infection
ANC	Antenatal Care
BCC	Behavior Change Communication
Baseline	Baseline Knowledge Practice Coverage Survey
CATCH	Core Assessment Tool on Child Health
CPR	Community Poverty Reduction
DIP	Detailed Implementation Plan
Endline	Endline Knowledge Practice Coverage Survey
ENRICH	Evidence-based Interventions for Improved Nutrition to Reinforce Infant, Child, and Maternal Health in Cambodia
EB	Evidence Based
EOP	End of Project
FO	Field Officer
FP	Family Planning
HC	Health Center
IRD	International Relief and Development
IUD	Intra Uterine Device
KCN	Kampong Chhnang
KPC	Knowledge Practice Coverage
LAM	Lactational Amenorrhea Method
LQAS	Lot Quality Assurance Sampling
MCHIP	Maternal and Child Health Integrated Program
MOH	Ministry of Health
MUAC	Mid-Upper Arm Circumference
NA	Not Applicable
NS	Not Significant
NGO	Non-Governmental Organization
NNP	National Nutrition Program
OD	Operational District
OR	Operations Research
ORS	Oral Rehydration Solution

PD	Positive Deviance
PHD	Provincial Health Department
PNKA	Phnom Neang Kongrei Association
SOW	Scope of Work
SPSS	Statistical Package for Social Sciences
TBA	Traditional Birth Attendant
TRM	Technical Reference Materials
USAID	United States Agency for International Development
UNICEF	United Nations Emergency Children's Fund
VAC	Vitamin A Capsule
VHSG	Village Health Support Group
VHV	Village Health Volunteer
WHO	World Health Organization
WRA	Women of Reproductive Age

EVALUATION PURPOSES AND QUESTIONS

Evaluation Purpose

To assist in addressing the problems of poor maternal and child health in rural Cambodia,) International Relief and Development (IRD) was awarded a grant from the USAID Child Survival and Health Grants program under Cooperative Agreement No: AID-OAA-10-00052. The purpose of this report is to present the evaluation of the IRD. Evidenced Based Interventions for Improved Nutrition to reinforce Infant Child and Maternal Health (ENRICH) Project implemented over the period September 30, 2010 to September 29, 2014 in Boribo Operational District, Kampong Chhnang Province, Cambodia. The focus of this evaluation is to document the achievements and lessons learned from this Project towards improving future similar projects. The target audience for this Report included policy makers, project designers, implementers and evaluators of similar community and maternal and child health projects.

Evaluation Questions

5. How well were the Child Survival program activities in the Detailed Implementation Plan and its revision implemented? This includes activities undertaken by the primary implementation partner as well as those done in coordination with the Ministry of Health and local entities participating in the Project, including community feedback on the quality and value of project activities.

6. What progress was made against program indicators, objectives and yearly benchmarks as shown by the Knowledge Practice and Coverage (KPC) survey and other sources?

7. How well were the PD/Health activities implemented?

8. What key lessons were learned based on the Child Survival program experience to inform similar interventions in the future?

PROJECT BACKGROUND

The 2010 Cambodia Demographic and Health Survey[1] (2010 CDHS) shows that while maternal and child health are improving in Cambodia there is still much room for improvement especially in rural areas. In 2010 the Infant Mortality rate was 45 per 1000 live births and under-five mortality 54 per 1000 live births. This contrasted with an Infant mortality rate of 66 and under-five mortality of 83 in 2005. In rural areas rates are much higher-- on average an under-five mortality of 75 was found in 2005.

Early attendance and appropriate treatment for common childhood illnesses is also lacking. For example only 59% of children with diarrhea in the two weeks before survey were taken to a health facility and 53% of children with diarrhea treated with either oral rehydration of increased fluid (2010 CDHS). Only 34% of children with diarrhea were given more fluids than usual during their illness. Poor nutritional status in children is a common problem that has not improved much in the past 5 years. In 2010 40% of children were found to be stunted and 11%% wasted.

Women's health and health care, especially in relationship to pregnancy, has improved in the five years prior to the survey but there is still much room for improvement in rural areas. In rural areas 48 % of mothers delivered in a health facility. Forty-four percent of women are anemic and only 57 % took iron tablets or syrup for 90 days or more as recommended (2010 CDHS). Use of modern methods of contraception was 38 % in 2010.

Program Location and Beneficiaries

Boribo OD and Kampong Chhnang province were selected due to high levels of under-nutrition in the province. The 2005 Cambodian Demographic and Health Survey (CDHS) found an under-five mortality rate of 101/1000 in Kampong Chhnang, significantly higher than the national rate of 87. Similarly, infant mortality was found to be 87/1000 compared to 66 nationally. The 2008 Cambodian Anthropometric Survey (CAS) showed an increase in acute malnutrition FROM 2005, with an 11 percent prevalence of wasting in children under five. Furthermore, Boribo OD – the newest OD in the province created only in 2006 – was found to be largely underserved by NGOs in the health sector, despite its immediate health challenges and the fact that it offers enthusiastic leadership willing to pilot new approaches.

Boribo Operational District covers 4 administrative Districts- Boribo, Kampong Leng, Rlear Ph'ir and Teuk Phos. The total population is 106,166 including 49,372 women of reproductive age (15-49 years) and 12, 847 children under age five. The people live in 138 villages each led by a Village Chief. Villages are organized into communes where there are leadership councils with individuals responsible for women's affairs and health. The population is primarily ethnic Khmer but three riverine areas contain Vietnamese and/or Cham (Cambodian Muslim) communities. The local monks and elders (Achar) have influence in the communities. The majority of the populations are dependent on rice farming, with a relatively small amount of income from fishing and selling of vegetables and fruit.

Goals, Objectives and Strategies

The goal of ENRICH is to reduce infant, child, and maternal mortality through evidence-based interventions. The objectives are to:

1. Reduce the prevalence of child malnutrition;
2. Reduce the burden of diarrheal disease in children;
3. Improve pregnancy and newborn outcome;
4. Improve healthy timing and spacing of pregnancies.

Key strategies include:
1) Use of an integrated approach that uses community members as agents of change in a whole family approach;
2) Multi- behavior change communication(BCC)-events, groups and individual counseling based on building messages around positive approaches to maternal and child health and nutrition;
3) Hearth Model nutritional rehabilitation in villages with unusually high levels of malnutrition, complemented by water/sanitation and food security interventions;
4) Promotion of appropriate health care seeking behavior;

5) Establishment of village based teams of community workers, skilled in BCC, regular monitoring of child nutrition and referral to Health Centers(HC) and
6) An Operations Research (OR) Study which was the key focus of Project Innovation.
IRD conducted this study in partnership with the University of British Columbia and the MOH. The study aimed to :
(i) Assess the impact and cost effectiveness of providing pregnant women with a fortified protein-energy supplement (Corn Soya Blend Plus) on maternal weight gain and anemia, birth size, preterm birth, and infant weight at six weeks of age;
(ii) Document the feasibility and impact of establishing hemoglobin measurement as a routine part of antenatal care(ANC) at HC level.

The Project directly contributes to USAID/Cambodia's first Strategic Objective: *Improved health services in HIV/AIDS and other infectious diseases as well as in maternal, child and reproductive health*. More specifically, the project will support Program Component 3: *Improve Maternal and Child Health*. The core strategies utilized by the project will directly address knowledge and practices around infant and young child feeding (IYCF) in an underserved province and OD. Furthermore, IRD is utilizing an integrated, multi-disciplinary implementation model that is consistent with the approach taken by USAID/Cambodia in its bilateral health projects. This model combines IYCF, water and sanitation and healthy timing and spacing of pregnancy interventions into one interlocking package. It also focuses on strengthening linkages between community-level health representatives and the health system.

Operational Research Study

The Operational Research study was the key innovation focus of the Project grant. This study "Investigating strategies to improve nutrition in pregnancy: An operations research study in Kampong Chhnang, Cambodia", focused on maternal nutrition and anemia. The study was conducted in partnership with the University of British Columbia and the Ministry of Health. This study investigated the effects of providing pregnant women with a fortified protein-energy supplement (Corn Soya Blend Plus) on maternal weight gain and anemia, birth size, preterm birth, and infant weight at six weeks of age. As part of the study, improved anemia management through hemoglobin testing and treatment was introduced into routine antenatal care (ANC) services at public HCs. The study enrolled, 547 pregnant women - 333 and 214 in the intervention and control group, respectively - over the period August 2011 to June 2012.

Maternal nutrition and maternal survival is a USAID/Cambodia priority as stated in its existing country strategy. With anemia rates for WRA as high as 64 percent and the prevalence of low birth weight 14 percent, maternal under-nutrition has a direct bearing on infant health and survival. Through this OR the evidence base for approaches to improving maternal nutrition was strengthened. The Ministry of Health (MoH) was considering utilizing HemoCue® devices at the HC level as part of ANC. Project research, therefore, offered highly relevant operational lessons regarding the use of the devices in a HC setting. This research has important program and policy implications for Cambodia and the UN World Food Program(WFP), which is also a collaborator in

the research, in providing evidence for scaling up and how best to implement a food supplement program and effectively identify, treat and monitor anemia in pregnancy.

The estimated level of effort per technical intervention area is: Nutrition 55%, Maternal and Newborn Care 35%, and Control of Diarrheal Disease 10%. The key Project partners included: The Ministry of Planning Phnom Penh; The Ministry of Health through Provincial, Operational District and HC level staff; Latter-Day Saints Committee; and local community partner organizations(NGOs) : The Phnom Neang Kongrei Association (PNKA) and Community Poverty Reduction (CPR). As described under Capacity Building, the Ministry of Health was an active partner in the management and implementation of many project activities from the KPC and Lot Quality Assurance Surveys (LQAS) to training of community health workers and implementation of Family Planning counselling and establishing hemoglobin measurement through the HCs. The Latter-Day Saints helped establish new wells, SODIS water purification, soap manufacture and home gardens. The local NGOs integrated with Project activities through participation at management level and with their field staff doing the same work along Project staff in the field.

Evaluation Methods and Limitations

Data for the evaluation were collected from several sources- Project documents, KPC surveys, Focus Groups discussion and Key Informant Interviews.

Data Quality and Use

Project documents, provided by IRD to the consultant included: all annual plans, quarterly reports on LQAS monitoring, the Project Workplan, Performance Management Plan, Operational Research Report and Transition Plan, Annex IV and XI. These documents were all prepared according to USAID guidelines and found to be of consistent quality. The documents were used in an ongoing manner throughout the consultancy and write up. Initially these documents were examined as background and then all were revisited along with information from all other sources to evaluate achievements of each Objective and their Outputs and cross cutting approaches.

The Endline Survey was conducted in June 2014, using the same survey instruments that were developed and used during the Baseline Survey, Annex X. The survey instruments were consistent with the Project objectives and included key questions concerning the Rapid Catch Indicators presented in Annex V. As the Project targeted children aged from zero to 35 months, two questionnaires were used. One survey was administered to mothers with children aged 0 to 23 months and a second to mothers/ caregivers with a child aged 24 to 35 months. Height or length and weight were measured for the youngest child aged 0 to 23 months for the first survey and of a child aged 24 to 35 months in the second group. As per USAID Maternal and Child Health Integrated Program (MCHIP) guidelines, a sample size of 300 mothers with a child aged 0 to 23 months was chosen for the first survey. A sample size of 150 caregivers was chosen for the second survey of caregivers with a child aged 23 to 35 months.

A two-stage stratified cluster design was used. In the first stage, 30 village clusters were randomly selected from a list of all villages in the Project area, stratified by health center catchment area with

probability proportionate to size. In the second stage, the 15 households needed per cluster, ten with a mother with a child aged 0 to 23 months and 5 with a caregiver of a child aged 24 to 35 months, were selected from a sampling frame of all households in the village. Data collection took place over 10 days (June 2 to 16, 2014) according to an ordered schedule using the standardized questions in Khmer with supervisors on site and daily review to maintain quality. The key experienced personnel performing this survey had also led or participated in the Baseline Survey. However, systematic training of all personnel involved too place and current validity of questions asked assessed.

As the questionnaires were the same as those used in the Baseline Survey, and ambiguous questions modified then, there was minimal need to further revise questions. Data was entered into computer in Kampong Chhnang by two experienced data entry staff working with one supervisor. All data was double entered and cleaned and then exported into SPSS. The SPSS date files, one for each survey, were then analyzed by the external consultant using SPSS software. The original report of the baseline data was used as the source of data for comparison. The final KPC report is in Annex VI.

Qualitative data was also collected from several sources. Data was collected from 20 Focus Group discussions covering mothers (8 groups), fathers (8 groups) and Village Health Volunteers (VHV) (4 groups) using standardized discussion questions prepared by the consultant, Annex X. Each focus group was led by two persons fluent in Khmer. These two rotated between recorder and leader. All discussions were taped and later translated into English and summarized by the consultant, Annex XX. When the consultant took part he stayed in the background and let proceeding continue in Khmer while they were translated for him on the side. As the mood was established he added discussions point per the leaders and translators. The IRD leaders of these groups were experienced and competent. All field workers received refresher training in the use of the Focus Group guides.

Key Informant interviews were also conducted with key personnel: from the Ministry of Health-Provincial and District managers and local HC personnel; local community leaders –commune level representative in charge of Women's and Child Health, Village Chiefs, monks and Achars; and IRD project personnel, Annex XI. Data collection from these various sources was a dynamic process such that further questions could be added to later Focus Groups and key informant interviews as data became available from earlier data collected and ongoing KPC survey analysis.

Findings concerning the Project were then deduced by triangulating information from all the data sources mentioned above. Statistical significance for all analyses comparing results is based on whether the Confidence Intervals of the estimates overlap or not.

Limitations

Qualitative data needs to be examined closely to ascertain its consistency. Potential biases may mean that evidence of maternal behavior change derived from the survey and the Focus Groups may not reflect true population behavioral change. Mothers interviewed in the survey and mothers, fathers and VHVs attending the Focus Groups are self-selected and may under represent those not at home at time of survey or include mainly those pleased by the project in the Focus Groups. Time limitations prevented home observation to verify behavior change. Behavior recalled by mothers may reflect the behavior change that they know they are supposed to adopt rather than their actual practice. Some of the data collectors were field staff working for the Project and so may misrepresent mothers' answers.

However, these potential limitations should be minimized by seeing how consistent the data is across and within the different data sources examined. The Endline survey found evidence of consistent achievement across all areas of Project activities that support the veracity and magnitude of Project achievements. Similarly triangulation of the findings of Key Informant Interviews and Focus Groups with those from the KPC survey found no major inconsistencies in relation to major findings.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

An overview of the Project and its general level of achievement can be found by examining Table 1 and the Rapid Catch Indicators for the project, comparing the findings of the Baseline with Endline KPC Surveys presented in Annex VI. These Tables illustrates that the project achieved consistently good outcomes across all indicators. Findings will be presented focusing on the Evaluation Questions but presented in logical order according to the Project Objectives, with their relevant indicators, outcomes and activities presented in the Workplan (Annex IV) and revised ENRICH Performance Management Plan (PMP) February 2013 (Annex XIX). Outcome, output and process indicators are presented in an integrated framework according to Project Objectives.

Findings, analysis and conclusions throughout this section are based on triangulation of data collected from Project reports, the Endline KPC survey compared to the Baseline KPC survey, findings from Focus Groups and key informant interviews. The Project extended the usual focus in this type of project from children aged less than 24 months to also include children aged 24 to 35 months as original discussion at the design stage found that malnutrition extended to this age group. Overall most findings for this older group are similar to those for the younger group and so will not be repeated here unless they differ. Detailed findings for this group can be found in the Endline KPC report(Annex IV).

Table 1. Summary Table of Inputs, Activities and Outputs That Contributed to Key Outcomes

Project Goal: To reduce infant, child, and maternal mortality through evidence-based interventions.			
Project Objective No 1: *Reduce the prevalence of child malnutrition*			
Project Inputs	Activities	Outputs	Outcome
Trainers. VHV,VHF,monks, Achars to be trained BCC materials, videos Cost of mass events and Travel for counselling Costs of cooking events demonstrations, Hearth Weighing scales. VAC	BCC Mass Events on breastfeeding and infant young child feeding Cooking demonstration in non-Hearth Villages Development of local BCC messages. VHV trained to lead group and individual counselling, Monks, Achars trained to lead M & E	BF/IYCF practices better 388 Mass Media Event conducted with 15836 participants 3651 counselled 759 VHVs, 132 VHFs,monk and Achars trained. Two monthly VHV Growth Monitoring . Mothers establish feeding groups.	Decrease in % of underweight children -- aged 0 -35 months from (27.6 to 19.8%) Decrease in % of stunted children -- aged 0 -35 months from (40.9% to 24.2%).Babies put to breast within 1 hr of birth up (55.6 – 76%)
Trainers. Trained VHV, VHF, BCC materials Cooking materials Micronutrient Suppls, and Food	PD Hearth implemented in 30 villages over 7 rounds Monitoring & Evaluation specific for Hearth	Malnourished children at community level rehabilitated 199 Children graduating from PD Hearth.	Of 310 children with moderate malnutrition 74% had improved their nutrition to mild/normal. Of 62 children with severe malnutrition 84% had moved to moderate/better

Project Inputs	Activities	Outputs	Outcome
Project Objective No 2: *Reduce the burden of diarrheal disease in children*			
Trainers,VHV,VHF,Monks, Achar.BCC materials BCC consultant. Cost of Mass Events,Counselling	BCC Research.. Father groups formed. BCC mass events on child care and feeding. Fathers counseled	Involvement of Fathers in child care and feeding increased. 2452 fathers in groups. 2736 mass events	Percent children 0-35 months fed, bathed by males increased (from 50.8% to 94.45)
Trainers VHV, VHF BCC materials. Scales	VHV,VHF trained Mass media and counselling GM screening. Children with chronic disease recognized by mother,VHV	Chronic diseases in malnourished children suspected and referred	23 sick children detected at GM screening referred to HCs. 34% of mothers reported taking a sick child to a HC.
Trainers,BCC materials Cost of Mass Events Counselling. SODIS bottle supplies. Wells and pumps Latter-day Saints persons	Mass education, counselling on purifying water. Training on use of SODIS purification Water supply upgrading	HH that use an improved drinking water source. 813 VHVs trained in SODIS. Community Ed 121 wells supplied by Latter-day Saints	Proportion of households of children aged 0-23 months that treated water effectively increased (73.3 - 92.7%) 8255 HH had improved water.
Trainers BCC materials Cost of Mass Events Counselling Soap making supplies	Mass education, counselling on hand washing Training VHV community sellers on Local soap manufacture	Hand Washing Practice Improved. Percent of mothers who know all the critical moments for hand washing increased (36.7 – 63.7%)	Proportion of mothers who wash their hands with soap increased (38.7 – 98.7%)
Trainers,VHV, VHF, monks, Achars.BCC materials. Cost of Mass EventsCounselling, ORS	Diarrheal treatment kit training for VHV.Mass education, counselling on home management and ORS Referral of children to HCs VERS developed	Home Management of Diarrheal Disease Improved. 291 children with diarrhea referred by VHVs to HCs.	% of children aged 0-23 months with diarrhea in the last two weeks who received ORS and/or recommended fluids increased (21.4 – 53.6%)
Project Objective No 3: *Improve pregnancy and newborn outcome*			
Trainers, BCC materials Cost of Mass Events Counselling .Gardening supplies	Training of community and HC counsellors. Counselling of women Father groups educated Vegetable gardens	Maternal nutrition awareness increased 914 counselors trained 7609 counseling sessions counted. 12693 gardens	% of mothers of children 0-23 months who had 4 antenatal visits when pregnant with youngest child up(66.7 – 83.3%)
Trainers BCC materials	Training of community and HC counsellors Counselling of women	Birth Outcomes Improved	Percent of mothers who delivered last child at a HC raised (68.7 – 78.0)
Iron tablets. Corn Soya Blend Plus supplement Hemocure System.. UBC Partnership &. Ethics clearances	Counselors train mothers on Iron Suppl. ORS study conducted Hemocure system implemented	Anemia in Pregnancy Reduced. Hemocure system implemented in 5 HCs. 547 mothers for study. 300 mothers receive CSB plus in intervention.	Percent of women taking complete 90 iron tablets during last pregnancy increased (53- 79.3%) Anemia in intervention group down 16%
Project Objective No 4: Improve healthy timing and spacing of pregnancies			
Trainers,BCC materials Cost of Counselling	Women of reproductive age receiving birth spacing training per HC	Awareness of optimal timing and spacing of pregnancies increased	% of children 0-23 months born more than 2 years aft last surviving child 83.9%
Trainers, BCC materials Cost of Counselling Partnerships MOH , RHAC	Health personnel and VHV trained on birth spacing counselling. Mothers, Fathers groups educated	Use of Modern Contraceptives increased. 154 counselors trained MOH HC staff and VHVs.	% of mothers of children 0-23months who are using modern contraceptives increased (20.7 – 91.7%)

Objective 1 *Reduce the prevalence of child malnutrition*

Nutritional Outcomes

Outcomes for this objective with their corresponding indicators and activities include the reduction in the prevalence of child malnutrition, improved breast feeding practices, improved infant and child feeding practices, rehabilitation of malnourished children , involvement of fathers in child care and feeding; identification and referral of children with chronic disease and increased coverage of Vitamin A Capsule (VAC) supplementation. Table 2 presents finding on the prevalence of child malnutrition by weight for age in Baseline and Endline surveys compared with End of Project targets.

Table 2 Children Underweight-For-Age Baseline , Endline and EOP target

Proportion of children of this age who are underweight (-2 SD from the median weight-for-age)	Baseline (%) (a)	Endline (%) (b)	% Change (b) – (a)/ (a	EOP Target
Age 0--23 months	22.2	11.0	-42.8	18.2
Age 24 – 35 months	31.8	34.0	2.2	22.4
Age 0 – 35 months	27.6	19.8	-24.5	19.6

Table 2 shows that the rate of underweight decreased by an important magnitude, 11.2%, for children aged less than 23 months, a percentage change of 42.8%. The Project performed LQAS surveys in 2013 and early 2014.[2]While these surveys are not directly comparable with the Baseline and Endline surveys because of different sampling, the LQAS averages in 2013 and 2014 for children who were underweight were 18.7% and 16.4% indicating a general trend towards improved nutrition between the Baseline and Endline Surveys. While the Project target for all children aged less than 35 months was reached, that for those in the 24 to 35 months was not achieved and basically remained unchanged. Overall in the Endline survey only 2.2% of the 450 children were severely underweight and 17.5% moderately underweight.

Findings concerning stunting are presented in Table 3. In the Baseline survey 98(32.7%) of 300 children aged 0 to 23 months were moderately or severely stunted. At Endline 51(17.2%) of 297 children were in the same age group with similar stunting. Stunting was not a Project indicator.

Table 3. Children With Stunting Baseline and Endline Surveys

Proportion of children of this age who are stunted (-2 SD from the median height-for-age)	Baseline(%) (a)	Endline (%) (b)	Difference %	% Change (b) – (a)/ (a)
Age 0-23 months	32.7	17.2	15.5	-47.4
Age 24-35 months	57.5	38.0	19.5	-33.9
Age 0-35 month	40.9	24.2	16.7	-40.8

Table 3 shows that the rate of stunting has been significantly decreased in magnitude for children in all age groups represented. The rate of severe stunting did not vary greatly between genders but moderate stunting was more common in females 21.1% compared with males 14.1%, Annex VI.

General satisfaction with the improvement in the nutrition of children and concurrent changes in their behavior was widespread throughout Focus Groups and key informant interviews. Mothers and fathers state that they now know how to take better care of their children as a result of the project. Many mother and fathers remarked that the children are cleverer, speak faster and are stronger. In all groups the majority of men said that the children had better health, growth and hygiene, Annex XX.

Breastfeeding

Appropriate breastfeeding is an important part of childhood nutrition. The Project helped mothers to achieve a percentage increase in the rate of early initiation of breastfeeding of 34.5% reflecting an important positive increase, 19.4%, in early initiation of breastfeeding at birth. The magnitude of the change in maintenance of breastfeeding at all ages up to 24 months , 9.2%., while not as strong as that for initiation of breastfeeding is also of note. Exclusive breastfeeding behavior of mother for children aged 0 to 6 months increased by 4.0%, Annex VI. Further evidence of mothers' very good knowledge and practice in relation to breastfeeding can be found in Annex VI, and the Focus Groups, Annex XX.

Complimentary feeding

For good complementary feeding the number of times a day a child is fed, the amount a child is fed at each feeding and the variety of foods received are important. The Project carried out extensive health promotion activities in these areas. Comparisons of Baseline with Endline KPC surveys assessed the Project's achievement in relation to all these aspects of complimentary feeding using the National Policy on Infant and Young Child Feeding in Cambodia (2009)[3] as the guidelines for standards. These comparisons found that the Project exceeded its targets in all these areas and made important improvements compared with Baseline, Annex VI.

The variety of food consumed by the children was estimated by their mother's 24 hour recall of their consumption (Annex VI). Foods consumed were representative of all 8 groups listed in the USAID Child Survival Nutritional Guidelines.[4] Few children received fats or oils. These foods were rearranged by food groups and are compared with the corresponding figures from the Baseline survey and EOP Target. The minimum number of food groups per day , according to the above guidelines, for ages 6 to 23 months is three for a breastfed child and four for non-breastfed children. This comparison demonstrated that the proportion of children aged 6 to 23 months who consumed the minimum number of food groups the day prior to the interview has increased from 67.7% at Baseline to 81.0% at Endline, a Percent change of 19.6%. The EOP target of 78.0% had been reached. LQAS survey findings were that the average for receiving three foods groups in 2013 and 2014 were respectively 68.5% and 80.9% . These numbers, taken with those in the last two sentences, are indicative of a gradual improvement in outcome.

Minimum Appropriate Feeding Practices

Minimum Appropriate Feeding Practices, is an overall indicator of complimentary feeding practices. Whether a child is deemed to have been fed according to a minimum of appropriate feeding practices (as per the USAID TRM Nutrition Guidelines), is based on 24 hours recall of a combination of whether the child was breastfeed or not, whether the child was fed solid/semi-solid food a minimum number of times that day and fed the minimum number of food groups. In the Baseline survey 59.7% of children aged 6 to 23 months were fed according to a minimum of appropriate feeding practices compared with 67.9% at Endline and the EOP target of 75%. These figures show a moderate non-significant

improvement of 8.2% and percentage change of 13.7% between the surveys. This achievement would be greater if more women would continue to breastfeed their child to 23 months of age and emphasizes the importance of breastfeeding to 23 months in overall complimentary feeding. Further findings from the Endline KPC and mothers and fathers Focus Groups confirmed that correct knowledge about complimentary feeding was widespread, Annexes VI and XX.

That health promotion about good complimentary feeding was carried out progressively throughout the Project catchment area can be seen from Figure 1.

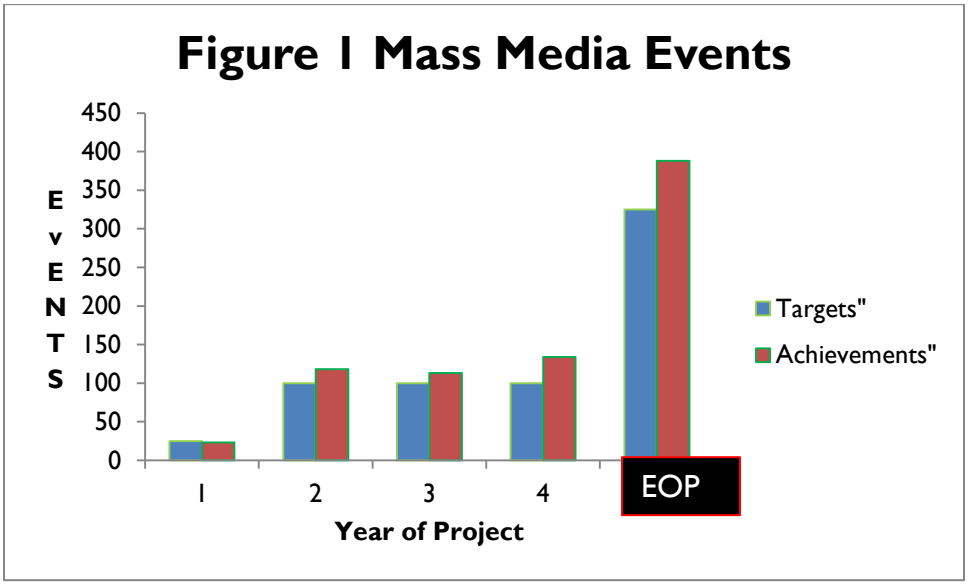

Figure 1 shows the project annual targets against the actual number of mass media events that took place. Project Mass Media events exceeded Project targets each year. By the end of the Project 388 BCC mass events had taken place. This was 113% of the EOP target of 325, Annex IV. The Workplan shows that participation in the mass media events was high throughout the project and throughout exceeded targets. By the end the 15,836 total participations in mass events counted far exceeded the target of 5200. Similarly, counselling of mothers with children aged less than three year exceeded targets in the second and fourth year and, at 3651, met the EOP target. The high numbers of mass meetings planned demonstrated the Project's commitment to equity and plan to give good coverage throughout their catchment area each year. The community mobilization and BCC strategy of the Project will be discussed under Cross Cutting Approaches.

Project field staff lead the above mass media events and trained and retrained 759, compared with a target of 765, VHVs in leading these events, small group meetings and counselling about all aspects of maternal and child health covered in the Project. Similarly the project trained and retrained 132 local monks and Achars, compared to an EOP target of 140. These leaders incorporated key messages about child and maternal nutrition into the regular community meetings. Details about capacity building are under Cross Cutting Approaches.

A commitment to equity determined how many of the VHVs were trained. The plan was to train four per village plus a Village Health Facilitator, VHF, usually a Village Chief . Results of LQAS surveys in 2013

and 2014 found that the average coverage for mothers attending a group health education session led by a VHV at least once in the previous three months were respectively 66.7% and 85.7%. Similarly in 2013 and 2014 respectively, 49.7% and 69.6% of mothers said that they had attended an individual VHV education session over the same period. These findings show a high and increasing rate of attendance.

Preparation of Nutritious Meals

The Project set targets to stage cooking demonstrations promoting child nutrition and the use of porridge enriched with food from the food groups in each of the 138 villages in the Project catchment area at least once every year. Through these sessions, and follow on counselling, mothers learnt to prepare and provide the amount and variety of food they were learning about through the Project's BCC strategy. In non-Hearth Villages cooking sessions focused on all children and a system to maintain child nutrition spread throughout the Project area maintained by the mothers. As Focus Group participants said even the old women contributed food to these groups. Those who could not contribute were also encouraged to take part by their communities as well as the Project. In Focus Groups, mothers in non- Hearth villages said the group feedings would continue after the project since now they had included them as a regular social event. That cooking demonstrations took place in large numbers in non-Hearth villages, 10300 in total, is documented in the Workplan, Annex IV. LQAS surveys in 2013 and 2014 showed that respectively 71.8% and 85.4% of mothers surveyed had attended a cooking demonstration in the last three months of the survey.

PD Hearth and Malnourished Children Rehabilitation

PD Hearth was well implemented as the Project's focus activity to rehabilitate malnourished children. This approach was implemented in 30 villages as planned. Seven rounds of Hearth feeding were undertaken supervised by the Project. Rounds reoccurred every two months. The Project provided all the food and support needed for the first two rounds but for all other rounds all major foods were provided by the women themselves. For all rounds, the Project supervised the growth monitoring of the children, provided 1000 riel per child to cover vegetable oil peanuts, some basic cooking ingredients and micronutrient supplementation and health promotion. The feeding that was promoted was the use of local porridge enriched regularly by foods from all food groups. While the Hearth feeding focused on malnourished children and all data mentioned in this section refers only to them, Health feeding with BCC sessions was open to all children and mothers. The Project documented that each year the numbers of mothers attending these sessions exceeded annual targets so that by EOP 1949 attendances by mothers had been counter, 187% over the target of 1050. Similarly for the VHFs, 141 had attended these sessions, 118% of the 120 target.

There were 372 children enrolled in Hearth in Round 1. Of these, 310 had moderate and 62 severe malnutrition. By round 7; of the 310 who originally had moderate malnutrition (z score – 2 to more than- 3) 16 had normal nutrition, 208 mild malnutrition , 79 moderate and 5 severe malnutrition. In this way 225 (72.5%) of those originally with moderate malnutrition had improved their nutrition status, compared with the EOP target of 75%. Of the 62 who had severe malnutrition (Z score – 3 or less) in Round 1; 3 had normal nutrition, 20 mild malnutrition, 30 moderate malnutrition and 9 severe malnutrition by round 7. In this way 53 (85.5%) of those originally with severe malnutrition had improved their nutritional state, exceeding the target of 74%.

Ongoing progression of the number of graduates from the Hearth rounds also demonstrated Project achievements. As the children increased their weigh by at least 20% and passed from severe to moderate or moderate to mild malnutrition or better they were "graduated" from the feeding rounds. The number of graduates rose as the rounds progressed to produce 132 graduates by end of round 7 which exceeded the Project target of 100. As some of the children still had poor nutrition after round 7 an addition round, round 8 took place. From round 8 an additional 67 children graduated to give a total number of graduates' of 199, Annex IV. Throughout Hearth those few children who persistently did not increase their weight over two rounds were referred to the local HCs for further follow up.

Chronic illness in any child presenting for Hearth rounds was also an indication for referral of that child to the local HC. The Project target was that 65% of these sick children would be referred. By Hearth rounds 7, 75% of these sick children were referred, Annex IV. These findings along with the 23 identified above as being referred from the growth monitoring in non-Hearth villages, provide evidence that referral of sick children identified at growth monitoring was established during the Project.

In the Hearth Villages the mothers themselves decided that this Hearth feeding should not be limited to identified malnourished children but should include all children. As the Project progressed the VHVs and VHFs built their skills to the point that , as documented in Project Quarterly Reports for 2013 and 2014, these sessions were entirely led by them or by general members of the community. In Focus Group discussions, mothers in Hearth Villages said the group feedings would continue after the project since now they had included them into their normal practice. Fathers in all groups also indicated their ongoing support for these sessions. Indeed as one Father said "*maybe we should have a positive deviant inquiry process to identify good fathers for us to follow"*, Annex XX.

Mobilization of Fathers

As part of its family focused BCC strategy, the project mobilized and educated fathers to increase their involvement in child care and feeding. At the beginning of the project BCC research was undertaken with fathers so that communication given to them about health would be congruent with their motivations and needs. At the time of this formative research in August 2011 the project found that 50.82% of children aged 0 to 35 months were fed, bathed and or looked after by their male relatives. In February 2014 as part of LQAS surveys the Project asked 171 women with children aged 0 to 23 months and 171 with children aged 24 to 35 months the same question and found that 323(94.4%) of the women said that their male relatives did these activities, compared with the EOP target, 60%.

The fathers formed 323 small groups throughout the Project catchment area and participated in the mass events and in their own fathers groups. Father participation in these activities is illustrated in Fig 2.

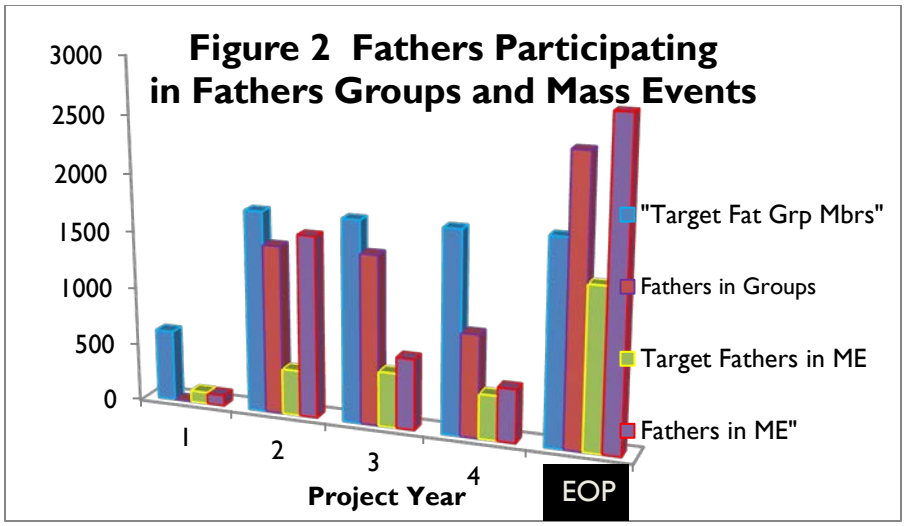

Figure 2 shows that father participation in groups and mass meetings increased greatly in the early years of the project with counted member participation decreasing thereafter. Focus Group findings and Project reports suggest that male participation in the fourth year remainder high and so this apparent decrease is likely to be misleading due to numbers from the last 6 months of the Project not being included. Overall there were 2452 participations of fathers in groups and 2736 in mass events counted exceeding the respective EOP targets by 139% and 200% respectively, Annex IV.

In the Focus Groups of Village Health Volunteers and most key informant interviews, a common finding was that one of the notable achievements of the Project was mobilizing the fathers. Focus Group findings from mothers, fathers, VHVs and key informant interviews provided evidence of the high level and importance of the fathers behavior change towards their children and spouses, Annex XX. Other health issues such as giving up smoking or not smoking around children and spouses, and decreasing alcohol consumption were also part of the health behavior changes that fathers undertook. A decrease in domestic violence in the last two years of the project to the point that it occurred "maybe one or two times a year", was notable.

Vitamin A Capsule Supplementation

Vitamin A Capsule supplementation is an important part of good nutrition for children and mothers in Cambodia, Endline survey found that 146(88.8%) of mothers recalled that their youngest child had received a Vitamin A capsule in the past 6 months a significant improvement over 61.4% at baseline. The EOP target of 72.0% was exceeded. Mothers and Fathers were educated about Vitamin A supplementation through the mass events and consultations illustrated in Figure 2 above.

Objective 2 Reduced Burden of Diarrheal Disease

To achieve this objective the Project planned to improve consumption of safe drinking water, improve hand washing behavior and improve home management of diarrheal disease. These activities are known to decrease child morbidity and mortality.

Improve Consumption of Safe Drinking Water

The Projects approach to improving consumption of safe drinking water had several elements: community education, better supply of water and sterilization of water at the point of usage. The

Project educated community members about the need to consume water from safe sources, boiling and treating it appropriately as part of Mass Education, group education and counselling illustrated in Figure 1. The Project facilitated the provision of more accessible safe water wells by Latter-day Saints. SODIS sterilization of water was also promoted by the project. Latter-day Saints provided 1626 SODIS bottles and cleaning brushes for the training in SODIS water purification. The Project trained 813 VHVs, VHFs and community sellers in use of SODIS over the first two years of the Project to exceed their target of 475 by 181%. However, with sand filters becoming widely available and affordable, as found in Focus Groups, many people did not continue to use SODIS.

The targets for households with improved drinking water source were exceeded each year with the target of 3466 being exceeded by 125% by Year 3 and at 8255 by 235% at EOP. Project activities were aided by improved availability of good Sand filters available at a price affordable to most families from *Clean Water Cambodia* and improved accessibility of water through well construction. Those villages with poor water supply and high rates of child malnutrition were identified as priorities by the Project in association with Latter-Day Saints. Latter-day Saints provided: 121 functioning wells in 59 villages (43% of the Projects 138 villages). They also supported with training and supplies for 320 households in the 32 Hearth villages to help them develop their own home gardens.

Comparison of the proportion of households with children aged 0 to 23 months that treated their water effectively found that 92.7% in the Endline survey did so effectively a significant improvement over the 73.3% at Baseline and an important over reaching of the EOP target of 83.0%

Hand Washing

The Project educated community members about correct hand washing practices through its mass, group and personal education activities The project also trained VHVS, VHFs, and community sellers in Soap Making. Forty persons were trained as targeted. Comparison of the proportion of mothers who knew all the critical moments for hand washing found that 63.7% in the Endline survey did so, a significant improvement over the 36.3% at Baseline and an important over reaching of the EOP target of 50.7%. Focus Groups discussions of mothers, fathers and VHVs and Village Chief interviews confirmed that hand washing had become an established behavior.

Home management of diarrhea

The Project trained community members in the proper management and referral of children with diarrhea to local HCs through its previously mentioned health promotion activities. In parallel with these activities the Project endeavored to make ORS more readily available. Over the Project 138 VHVS, VHFs, and community sellers were trained in the Social Marketing of ORS as targeted.

Appropriate management of diarrheal disease in children has increased through project activities. Comparison of the proportion of children age 0-23 months with diarrhea in the last two weeks who received oral rehydration solution (ORS) and/or recommended home fluids found that 53.6% in the Endline survey did so, a significant improvement over the 21.4% at Baseline and an over reaching of the EOP target of 51.0%. Giving appropriate feeding and fluids also increased significantly from Baseline to Endline, Annex IV. HCs, Private Clinic and Drug Sellers were the most common places were health care was sought by the 53 mothers, in the Endline survey, whose children had had diarrhea in the past two

weeks. .Antibiotics-given in 28(63.3%) of cases, Oralyte 14 (34.1%) and Orasel 8 (19.5%) were the most frequent treatments received.

The Project monitored the number of childhood with diarrhea seem at local HC and the number of children with diarrhea referred to local HCs by VHVs and VHFs. Overall the local HC data was inconclusive, Annex IV . The HC key informants remarked that they were seeking a lot more children for all the common childhood illnesses than before the Project but now they were being seen at an earlier stage. Mothers', Fathers' and VHV Focus Groups demonstrated further that many participants had learnt correct initial management of childhood diarrheal disease. Women in all groups said that they had used ORS and knew how to make it up but only half had it at home since the local supply had run out over the past three months. Only half the fathers groups mentioned ORS at all. All VHV and fathers, and most mothers groups said that taking Zinc tablets was" good to prevent" more diarrhea. Several VHVs mentioned the correct dosage. Overall the use of Zinc does not appear to be widely practiced.

Village Emergency Referral System

The Project surveyed villages to see how many wanted and needed a Village Emergency Referral System to transport the sick, especially children to the local HC. Village Emergency Referral System were established in 7 remote villages as targeted. The Project recorded that these systems worked as planned with 77 referrals taking place.

Other Common Illnesses

The Project logically integrated education about community level management of common illnesses of childhood into its health promotion and education activities mentioned above. The syndromes addressed, in addition to diarrheal disease, were fever, and cough with breathlessness. The key actions promoted being bringing sick children to the HC early; keeping vaccinations up to date; and getting all children to sleep under bed nets. Improvements in relationship to all these areas, Annex VI, demonstrated that, under the influence of the Project, use of health care facilities and the preventive action of bednet usage for children had increased by important magnitudes. No one mentioned traditional healers but up to 28.7% sought treatment from a private drug seller. The relevant Rapid Catch Indicators, Annex V, and Focus Group findings, Annex XX, support the Project's good performance in relation to all these areas.

Objective 3 Improve Pregnancy and Newborn Outcomes

To improve pregnancy and newborn outcomes the Project strived to increase maternal nutritional awareness, improve birth outcomes and reduce anemia in pregnancy. To increase maternal nutritional awareness the project planned to educated mothers through trained nutritional counsellors to improve their own nutrition; encourage mothers to get good antenatal care and VAC supplementation, and mobilize fathers to help maternal nutrition. Home vegetable gardens were also promoted under this Objective. Training Ministry of Health staff, TBAs, religious leaders and VHVs in maternal and child nutrition was a USAID Cambodia operation indicator. In training 914 of these people in two years, the Project nearly reached its EOP then. The Project documented that these counsellors exceeded its annual benchmarks and EOP target, of 3500 in counselling women, the latter by over 217%.

Antenatal care

The Endline Survey found that of all 300 mothers interviewed 99.7% received antenatal care during the pregnancy of their youngest child. All received this care from a midwife not from TBAs. Of these mothers 250(83.3%) received four or more antenatal visits. This figure exceeded the EOP target of 80% and was a significant increase over the 66.7% at Baseline.

The proportion of women recalling receiving VAC after the delivery of their last child , usually in a HC, decreased from 55.7% at Baseline to 44.4% at Endline and was much below the EOP target of 71%. As pregnancy care was generally improved, these answers may be subject to lack of accurate recall from so long ago or may present an oversight in clinical management that needs correction.

Mothers' Focus Groups found that many mothers had changed their knowledge and behavior about their own nutrition and health. Commonly they said that mothers are not sick as much as before (including no risk of bleeding after delivery, less anemia and malaria), they know about hygiene-hand washing, personal hygiene-and good nutrition and get it; they attend the HC for antenatal care and delivery. Fathers' Focus Groups and Village Chief discussions also confirmed this, Annex XX.

Mobilization of Fathers for Maternal Nutrition

Fathers' Focus Groups presented consistent evidence that they had changed their behavior to become active in supporting the nutrition and health of their wives and that the mothers' behavior had also changed. The findings from the mothers, fathers and VHV Focus Groups suggest that father involvement in maternal nutrition continued to remain high at the time of EOP.

Promotion of Vegetable Gardens

To promote nutrition of mothers and children and food security, the Project promoted home vegetable gardens and fruit trees. Vegetable gardens were already popular before the project with 9299 being counted then. In year two and four of the Project respectively, 2208 and 1186 new gardens were counted to give a total of 12693 which was 88.7% of the EOP targeted 14307 gardens. The most common vegetables grown are Moring Glory, Amaranth and Zucchini. Of the 170 mothers with home gardens at Endline, 95.9% used their vegetables for home consumption. All but a few mothers and fathers in the Focus Group discussions said that they had their own gardens.

In addition to those vegetable above another 52 varieties were grown each by from 5 to 30% of women interviewed, see Annex VI for details. Of the 300 mothers, 81% grew fruit trees. Fifty seven varieties of fruit were mentioned the most common being mango, bananas, papaya and guava. Of these mothers 66.8% grew them for home consumption. Comparison revealed that although a similar number of vegetables and fruits were grown at Baseline, the variety had increased. This indicates that growth of this wide variety of crops is well established and indicative of good food security towards sustainability of child and maternal nutrition.

Birth Outcomes Improved

To improve birth outcomes the Project strived to educate more mothers to deliver in HCs, improve mean birth weights, and maternal weight gain in the antenatal period from antenatal attendance one to four. Findings on place of delivery and attendant at delivery showed good outcomes, The proportion of women who delivered their last child at a HC had increased from 68.7% to 78.0%, Baseline to Endline

and the EOP target on 78.7% achieved. Similarly the proportion of children aged 0 to 23 months whose birth was attended by skilled personnel increased from 89% to 95.3%. Also of these children 99.3% were followed up post-natally within two days compared with 68.3% at Baseline, a percentage change of 45.4%. Similarly post-natal care for mothers improved in quality, Annex VI. Only 160 (55.7%) recalled receiving a Vitamin A capsule postpartum.

Anemia in Pregnancy Reduced

Anemia in Pregnancy was reduced through the Project's promotion of iron supplementation and its operational research study. Taking iron supplementation was promoted during counselling of mothers by those trained to give this counselling above in the community and during antenatal visits to the Health Centre. The proportion of women taking a complete 90 iron tablet course during their last pregnancy increased from 53% at Baseline to 79.3% at Endline. The EOP target of 63% was exceeded.

OPERATIONAL RESEARCH STUDY

This case control study found important findings with implications for future maternal nutrition policy. At baseline, more than 30% of participants were underweight and the prevalence of anemia was approximately 30% in both intervention and control groups. Study results showed "no significant differences in average maternal weight gain, birth weight, length, or head circumference between the two groups. The prevalence of anemia increased substantially during the second trimester in both groups, however a 16% reduction was observed in the intervention group at 36-38 weeks gestation (RR 0.51; (0.34, 0.77). The rate of preterm birth also favored the group provided the food supplement (RR 0.28; (0.11, 0.74), as did infant weight at six weeks of age (RR 0.11; (0.02, 0.19)".

The authors' conclusions are found to be valid. They found that the" *reduction in anemia in the third trimester and lower rate of preterm birth are important and suggest potential benefits of adding essential vitamins and minerals to the maternal diet. Prenatal multiple micronutrient supplements are likely to be a lower cost and more acceptable alternative to non-traditional food products for supporting the nutritional needs of pregnant women in the Cambodian context. The study results also have important implications for improving ANC in Cambodia, particularly with regards to including Body Mass Index screening, weight gain monitoring, and nutrition counseling*."

The study also found that hemoglobin testing was widely accepted by the mothers, implemented to a good standard and operationally feasible "*with appropriate training and uninterrupted supply of testing materials*". The Kompong Chhnang Provincial Health Department has committed to implementing hemoglobin testing using the HemoCue system in all 11 HCs in the province. This improvement in the diagnosis and monitoring of anemia in mothers is a visible outcome with potential long term benefits. If HC staff and community health workers follow up the women identified with anemia and work with their spouses, in the style of the Project, to see that they get the iron supplementation and extra balanced nutrition they need, they should benefit. In the longer term if the MOH follows up the further research recommended better policy towards improved nutritional management of women of reproductive age and in the early stages of pregnancy may follow.

As presented in its Report, this study was well executed with positive practical implications for strengthening maternal care in populations where maternal malnutrition and anemia are common. The

OR was found to be consistent with the Goal and Objectives of the Project. It strengthened local HCs. The MOH was fully involved in the OR through the Provincial Health Director being a co-investigator and health staff at management and local HC levels gaining new skills as they were involved in its implementation. The full report of the study is in Annex XV.

Objective 4 Increase healthy timing and spacing of pregnancies

Key Outcomes and activities under this Objective focused on increasing awareness of optimal timing and spacing of pregnancies and increased use of modern means of contraception. To improve counselling about timing and spacing of pregnancies 154 Health personnel and VHVs were trained and retrained in this area in association with the Reproductive Health Association of Cambodia (RHAC). This represented 122% of the 126 targeted. The Project documented the counselling that the women received about birth spacing within the HCs. Reporting of monitoring of activities in the Workplan demonstrates that targets and EOP targets for counselling about birth spacing were exceeded each year with 4309 women counselled overall, 110% of EOP targets.

The Project educated mothers about birth spacing and Family Planning. Comparison of the proportion of mothers of children aged 0 to 35 months aware to wait more than two years before their next birth found that 95.6% were aware in the Endline survey, an important improvement over the 86% aware at Baseline. This achievement also demonstrated that the EOP target of 95% was achieved. The women were asked about their current Family Planning practice both in the KPC surveys and Focus Groups. A full range of contraceptive methods was mentioned. The most commonly used methods being pills, IUD and injectable contraceptives.

Project targets for modern use of contraceptives had been reached and greatly exceeded . In the Baseline survey the proportion of mothers of children aged 0 to 23 months who were using modern contraceptives was 20.7% this was improved to 91.7% in the Endline survey, over three times the EOP target of 28.0%. Focus Group findings for mothers and father supported these findings from the KPC surveys, Annex XX. Positive attitudes to family planning by fathers were presented by the commonest answers that mother and children have better health, mothers have more energy for their current children and work. A few also said that with few healthy children there is better opportunity for the child to attend school, and for them to grow normally and become clever.

IMPLEMENTATION OF RECOMMENDATIONS, MIDTERM EVALUATION

The Project Midterm Evaluation made a series of recommendations that were outlined in an Action Plan. This plan covered development of a transit plan, and specific recommendations in relationship to each objective. With its partners the Project developed a Transition Plan with many elements that addressed the specific recommendations. Evidence that the Project has implemented all key aspects of these recommendations comes from Project Reports for the last year as detailed in quarterly reports and in the achievement of the process indicators and targets as presented above. To address the specific recommendations under Objective One the Project has continued to train mothers groups, continue Home Coaching and Counselling (HCC), negotiated with Commune Councils and Village Chiefs about maintenance of these activities and conducted the LQAS surveys quoted from above.

The Project has approached local sources of funding to maintain nutrition demonstrations especially in disadvantaged population. For Objective Two, promotion of home gardens, and Village Emergency Referral Systems have continued. A further emphasis on supervision, monitoring and continuing education of VHVs had taken place as described under Capacity Building. For Objective Three and Four, Family Planning has continued to be a part of mass events and HCC and refresher training of VHVs, VHFs, monks and Akhar has taken place. The Project Manager has continued to advocate at the Provincial Technical Working Group for ongoing training of MOH staff on modern contraception and maintenance of HC staff as supervisors of VHVs through regular meetings.

CROSS CUTTING APPROACHES

Community Mobilization and Behavior Change Communication

The approach of the Project to community mobilization and BCC was an essential part of most activities discussed above. Information on the Project approach comes from the Project Manager, Field Officers, Focus Group discussions and review of Project reports. The key components of their approach were:

- A culturally appropriate approach to community engagement using and respecting community structures and involving community leaders in key decision making;
- Using community members as change agents-the trained VHV and VHF, monks and Akhar,; mass meetings and groups in which mothers and fathers helped motivate one another;
- Use of a family centered approach involving the whole family targeting men and women;
- Building the key BCC messages around behavior change research with men and positive practices – through the Positive Deviant Approach with women;
- Use of "adultainment" in mass meetings where key messages where combined with colorful entertainment;
- Use of message saturation-through mass meetings, small group meetings, individual house hold level counselling and incorporating key messages into normal village and commune meetings and in association with religious ceremonies;
- Involving the MOH HC staff as partners at all stages and.
- Use and handouts of colorful posters, leaflets, T shirts and snacks.

The Project engaged the community working through existing community structures, the local commune council and Village Chiefs using culturally appropriate approaches. In-depth interviews for behavioral research were conducted with the men in order to learn their key concerns and develop key communication messages accordingly. In the words of the Project Manager the focus was on "putting ourselves in their shoes", humility and respect for, and valuing, of local culture and norms- hence a family focused approach and involvement of locally selected community health workers and real ongoing community input into decision making about how activities were to be implemented. As the Project Manager said trust, respect and true partnership needed to be established before the communities open to real change and are willing to share that missing part of the evidence base- "what works locally."

The Project's approach to BCC was an example of learning and adaptation. The Project Manager and senior staff had worked in a similar IRD project in the same general area for the four years prior to this Project. The lessons learned from that project included: the need to know your audience well; visual aids with pictures worked best; facilitation must be active with audience participation and keep messages short and concise. Also as the Project progressed while the key content of messages did not change messages were adapted, on the basis of ongoing feedback, on current knowledge and concerns.

How Project activities were to be conducted was worked out with local communities while preserving the key scientific aspects of interventions. For example the feeding stage of Hearth was changed from the usual 10 day feeding cycle to two 5 day feeding cycles as requested by the women so that they could meet the demands of doing field work. As the Hearth cycles were completed the program was changed to include all children not just the malnourished ones as mothers wanted. Flowing on from ongoing community consultation and the research above key messages were originally developed in Khmer rather than in English involving VHVs, community members and Project staff. The English translation of the Khmer key messages is presented in Annex V11. While the translated word content does not appear remarkably different from the usual public health messages, in Khmer the difference matters and local ownership of the messages by the VHV and local communities was established. The above approaches gradually built community ownership of the Project activities and the behavior changes adopted as their own.

Capacity Building

The Project met all its training Targets as outlined under each Objective above. Capacity Building took place in relation to management skills according to the individual's role; health promotion and communication skills; and in addition for VHVs in identification of the common signs and symptoms of common childhood illnesses and child growth monitoring and referral. In training the VHVs and VHFs the Project worked with MOH personnel many of whom would be their local supervisors and ongoing educators. HC staff were also trained in counselling about family planning and use of the HemoCue System. Adult learning approaches were used routinely.

Systems for sustainability, supervision and basic continuous quality assurance were established. Local VHV teams were developed usually lead by the local VHF. As a group they met weekly or biweekly, as they decided locally, planned their local activities mainly household visiting, and small group sessions and two monthly growth monitoring. Project Field Staff met and worked with them at least once a month and carried out field supervision and training. By the end of the project each team was meeting on a monthly basis with its long term supervisor and continuing educator, from the local HC. Every three months they meet together at the commune level. The CHW training matrix is in Annex VII.

Consistent with the recommendations of the Midterm Evaluation the Project has established a system of ongoing supervision, quality assurance and training through the local Commune Councils to maintain VHV knowledge and skills. Fifty five Commune Council members, of which 33 are female, have been trained to implement this system in the last year of the Project. These Council members gradually became confident in leading training, review and planning meetings for VHV and VCs over this period. In total these trainers trained 460 VHVs and VCs from 138 villages in late 2013. The average scores for training sessions have been good-averaging 85.5% and 95.5% for pre and post-tests respectively. Of note is that 227(49.3%) of the above VHVs were female. The VHVs and VCs have also undertaken to

conduct one to two hour quarterly meetings where they will report their activities to their peers. Taken together the VHVs and their supervisors and trainers have many of the characteristics of a learning organization through which they could adapt and change to deal with local health problems.

Project Partners

Facilitation of the development of management and survey skills took place at higher management levels through the Project. At the district and provincial level, Project staff met regularly with MOH and local NGO managers from *PNKA and CPR.* Senior Project staff were members of the Provincial Technical Working Group. By establishing close and regular collaboration, Project staff were able to get good MOH cooperation, with key Project activities such as conduct on the KPC and LQAS surveys, Mass Events, the Operations Research study and linkage of VHVs and VHFs to local HCs. At the same time MOH and local NGO personnel were involved in relevant training and their skills were strengthened.

Monitoring and Evaluation

The Project developed a practical monitoring system that recorded and gave feedback on all project activities. All VHVs were trained to record all their activities and growth monitoring results and give these to the local VHF. Project field officers then collected this information on their visits and brought it back to the Project Office for computer entry, collation and regular reporting according to USAID guidelines. Results were fed back to Field Officers during Project weekly meetings; from Field Officers to the local VHFs and through them to their communities and commune during their regular meetings.

After the Project, all VHFs will take the reports of local activities to their HC supervisors monthly as well as the Commune Councils. Also each patient that a VHV refers to their local HC is sent with a small referral form. Feedback from these referrals is meant to be sent back with the patient to the local VHV and local health needs discussed during monthly feedback and education meeting. How well this system of reporting local activities and illness works very much depends on how enthusiastic local HC staff are. However, the Commune Council facilitators referred to in the previous section along with the regular feedback meeting that have begun could have a key role in maintaining and applying local findings. Similarly such meetings give MOH staff an opportunity to feedback findings from the MOH Health Information to the community members.

DISCUSSION

The Project goal, objectives, activities, and key strategies matched the needs of mothers and children in rural Cambodia outlined under Background. The findings in this Report similarly demonstrate the Project achievements worked well towards addressing these needs. The findings presented in the body of this report provide consistent evidence on triangulation that the Project achieved or exceeded all its key targets in relationship to all Objectives. The sources of data on which the findings in this Report are bases are of reasonable quality and consistency as a group for evaluative findings and conclusions to be made. The Project has contributed towards important improvement in the health of mothers and their children. That ongoing improvement in Project Outcome indicators parallel the level of implementation of Project Activities, as detailed in this report provide good evidence that good Project outcomes are linked to good implementation of the relevant Project activities.

There is good evidence that the community based interventions that the Project used are effective in reducing child morbidity and mortality.[5678] Also the role of antenatal care, maternal nutrition, iron and folate supplementation and Family Planning in reducing maternal morbidity and mortality are commonly accepted. However, in reviewing many of the interventions found to be effective in addressing child morbidity and mortality an almost hidden element common to all is that they work and are sustained in the longer term to the extent that community members come to internalize them and adopt the behavior changes necessary for their effective implementation as their own. Through its general culturally respectful, community mobilization and BCC approach, this Project addresses this element.

The strength of this project is the community mobilization and BCC strategy which were key to achieving Project Outcomes in relationship to all Project Objectives. Through the Project's community mobilization and BCC strategy communities were effectively engaged, existing community structures strengthened and new structures built to provide health services in an ongoing way. Through basing key messages on behavioral research that identified the key concerns and triggers of behavior of father (as described in the Core group Behave Framework), the Project was able to develop more relevant and effective communication[9].[10] Recent publications are consistent with the psychology involved in the Project communications approaches used. In her just published book Erin Meyer writes that the important points for cross cultural communication are "putting yourself in their shoes"; being humble and curious or showing a general interest in those you wish to communicate with cross-culturally.[11]

Just published systematic reviews of community engagement and mass media interventions for Child Survival in Low and Middle Income Countries provide evidence in support of the Project's approach. Both good community engagement and good mass media approaches are needed. The first establishes how the mass media messages are received. For Community Engagement to enhance Child Survival a systematic review found that programs " *working collaboratively with the community*" can lead to "cost-effective transformation" and lasting behavior change that lead to reduce poor health outcomes.[12] For mass media a systematic review found that the better evaluations provide evidence that *"mass media-centric campaigns can positively impact a wide range of child survival health behaviors"*[13]

With the above messages for fathers developed and those previously established for mothers through the MOH, the Project was able to apply its "message saturation" techniques to produce the behavioral changes often mentioned in Focus Groups and key informant interviews. A just published review of the evidence found that involvement of fathers and mothers in an integrated framework, has been found to be effective. "Evidence was most compelling for empowerment approaches (i.e. participatory action for maternal and child health;..,..)"[14]

Quality of services provided by VHVs and VHFs was maintained through the Project staff during the Project. In the last year of the Project, Commune Council members had their skills strengthened to supervise and train them. The regular meetings at which VHVs can give one another feedback on their own performance should help maintain VHV skills. Similar approaches have been found to be effective with community health workers elsewhere[15]. Governance structures for community health were established by the Project by incorporating them into traditional structures-Village Chief, Commune Councils- and linking these community health workers to the mainstream health services. Clinical supervision was also provided by HC staff. Links to and use of MOH services were strengthened as use of HCs for referral for common illness, use of preventive services and pregnancy related care were a

key part of most interventions promoted. Together all these actives led to increased access to and coverage of quality and equitable MNCH services and behavior change.

The Project's BCC, nutrition promotion and community organizational structures developed, lend themselves to scale up and sustainability. Indeed the Project reproduced its strategy for BCC based on a family focus, extended to a village and then the commune level many times as total coverage was extended across 138 villages. Detailed costing analysis is beyond this Report. However, the amount of equipment, supplies and recurrent training costs involved in Project activities would suggest that costs of scale up for the activities involved may not be too expensive for local MOH implementation. Only a detailed cost analysis could answer this question. Apparently VHV turnover is of the order of 10% per year. Systems to recruit new VHVs already work, according to the Project Quarterly reports. It is important to remember that even when VHVs cease working their knowledge and skills remain within their community and informally address health behavior.

While Community Councils do have some limited funding for health activities further outside sources of funding will probably be necessary to continue cooking demonstrations in poorer communities where not all food can be provided by community members. The Project is pursuing other sources of outside funding for poorer communities. Motivation for VHVs to continue to work unpaid is internal and desire for remuneration not a major factor at this stage with most workers being appreciated by the community and working only two to four hours a week. Sustainability of project activities also appears to be reasonable in the short to midterm, if the Commune Council governance and supervision structures are maintained. In the longer term, the MOH in association with the communities, will need to reviewed community health needs and realigned health activities accordingly.

The Project had a reasonably developed monitoring and evaluation system established that allowed for ongoing review, learning and adaptation. A less detailed system is in place that supports reporting of VHV team activities to the local Commune Councils and HCs. A system of regular meetings between VHV team members, Village Chiefs, Commune Councils, and HC staff has been established for after the Project. This system has some key elements in common with previous systems of governance long established for general community matters.

The Project has educated community leaders and health workers in basic evidence-based approaches for decision making in health matters. However, for these to be developed and maintained periodic outside facilitation from the MOH will be necessary. At all level, including the VHV village team level, ongoing learning and adaptation is taking place in daily matters. This learning will be shared with others at the regular quarterly meetings. At these meetings new approaches can be introduced by the MOH and implemented as the evidence-base changes. However, systems for better recording of this learning need to be developed since it appears that a lot of what happens is not written down or recorded.

An important finding was that while mothers were taking their children for treatment for diarrhea to health facilities, they were also receiving oral antibiotics. Antibiotic treatment of diarrhea without blood is generally not recommended treatment because, most diarrheal illness resolves without antibiotics, drug resistant bacteria are promoted and unnecessary side effects may be endured. Education of health providers in private and public settings, and of parents so they do not demand them, needs to be undertaken to curb this practice.

In order to strengthen complimentary feeding it is worthwhile giving an ongoing emphasis on continuing breast feeding until children are at least 23 months of age. Recommendations for young children in Cambodia follow the standard WHO guidelines with specific feeding recommendations.[1617] A non-breastfed child should receive an additional one to two meals per day. In our analysis of the extent to which the recommendations for minimum appropriate complementary feeding practices were met we found that not being breastfed was a major reason why children did not meet these recommendations.

Project findings suggest that parents should sell some of their fruits and vegetables as practical and use the money to purchase oil and fats for their children's diet. While children received a good variety of food including vegetables and protein sources in their diets, their diets were low in oils and fats. Low fat intake may also effect absorption of fat soluble vitamins, such as Vitamin A. Analysis of Cambodian diets suggests that low energy intake is partially due to a lack of fat, far below current standards for young children.[18] The Food Agriculture Organization data indicates that only 15% of energy comes from fat in Cambodia and recognizes that this is half what a young child needs. Low energy intake is the main dietary cause of poor growth and it is difficult for young children to meet their energy needs on a diet high in rice or noodles.[1314]. The greater Project achievements in relationship to stunting as opposed to malnutrition can be explained by the Project helping its beneficiary children increase their general nutrition and therefore growth while not increasing caloric intake as much.

The contribution of other activities conducted in parallel with Project activities to Project achievements is difficult to assess. Improved access to water and sanitation was provided through the Clean Water and Sanitation Project II implemented in parallel in the Project area by the Latter-day Saints Charities. Improved affordable water sand filters were made available throughout the Project area beginning in 2010 by Clean Water Cambodia. Improved access to government provided health care by local HCs became available during the time of the Project through wide availability of means tested ID Poor Cards that enabled free care for the poor who qualified. Given the consistent achievement of Project targets across all Objectives especially in relationship to behavioral changes it is assessed that the influence of these factors, while not negligible, does not detract greatly from Project achievements. Project members are well versed in how best to disseminate Project findings to each of the stakeholder groups. Appropriate close-out and handover meetings should take place for each of these groups.

CONCLUSIONS

This Project was well implemented and achieved its planned targets and outcomes in relationship to all its Objectives and key Outputs in the Detailed Implementation Plan. Similarly good progress was made against program indicators, Objectives and yearly benchmarks as shown by KPC surveys and progress indicators presented in the Workplan. Examination of these with findings from Focus Group interviews, key informant interviews and document review enabled triangulation of all data collected to draw these conclusions.

The Hearth Approach similarly produced good outcomes. Project targets for graduation of malnourished children were exceeded. Knowledge about and practice of good complimentary feeding was established throughout the Project area. Positive healthy behavioral change was widely established. Systems to identify malnourished children early, address their malnutrition and if indicated refer them

to HCs were established. The involvement of mothers and VHVs progressed to establish and continue to conduct their own group feeding, health education and nutrition sessions. This provides evidence of the good implementation and sustainability of the Hearth approach used, as well as the feeding and education sessions in non-Hearth villages.

Results in relationship to the Project's Operational Research study provided good evidence that anemia in pregnancy can be reduced by appropriate protein energy supplementation and raised questions about the prevention of anemia in pregnancy that require further study. Similarly outcomes in relationship to increased rates of use of modern family planning and increased awareness of optimal timing and spacing of pregnancy were clearly positive.

The Project helped the community to achieve positive change in health related behavior at the household level through: its BCC approach that was delivered equitably down to the household level throughout the Project catchment area; establishment of new community based health providers and governance structures throughout this area and its link to formal health systems at local HCs.

While there is evidence that community behavioral changes in health related behavior have been established for the medium to longer term, outside encouragement and facilitation, most likely from the local MOH partners at Provincial, District and HC, as appropriate to each level, is needed to maintain systems for ongoing VHV, VHF and Community Council supervision, ongoing education and governance. Some outside financial support will probably be needed to maintain activities in poorer villages.

LESSONS LEARNED

- Local evidence of what works here, usually not published, is essential to add to that published in the evidence-based literature to maximize community mobilization and project success. At the community level, communities need to be effectively engaged in decision making and project implementation so that they input the evidence of what works locally within their communities. Appropriate attitudes are needed towards the value of local knowledge and ownership.

- BCC based on local behavioral behavior research involving community members is effective in mobilization of community members and behavior change.

- Good relations , regular consultation and collaboration with all key stakeholders involved in local community health , especially the MOH, locally active NGOs, businesses and leaders (here Commune Councils and Village Chiefs), is essential for good project implementation.

- If it part of project activities to strengthen the skills of MOH and partner NGOs personnel, this can best be done through first building collaborative partnerships with the relevant local managers and have your staff work with them as equals appropriate to skill levels.

- Local authority cannot be bypassed and commitments to turn up must be met even if not always reciprocated. As relations are established and trust built problems can be solved together.

- An inflexible "blue print" approach is unlikely to be successful. A reasonably flexible approach is necessary based on regular communications with local leaders so that activities can be implemented when the community members desired will come and participate.

- Project activities need to be integrated into the normal overall practice of communities to get good community participation. Projects are usually only a small part of people's lives.

RECOMMENDATIONS

For the Ministry of Health

Systems of continuing support for the community based health systems established in this Project should be strengthened by the Provincial Health and Operational Health District. The Provincial Health Director and Boribo Operational Health District Director have been very supportive partners in this Project and through their collaboration contributed to its successes. The health system continues to benefit from the Project through better use of HCs by community members and it is important to preserve that benefit. Systems of ongoing engagement, motivation and practical supervision from the HC to the community need to become part of standards of good HC practice.

The Project Operations Research study be examined by the National Nutrition Program, National Maternal and Child Health Center to ascertain if further follow on research into improving maternal nutrition is indicated.
Through its Operations Research activity the Project strived to address the problems of poor maternal nutrition and anemia. This activity found that there were potential benefits of adding essential vitamins and minerals to the maternal diet and important implications for improving ANC. The Project proposed further research to follow on from this study.

That Vitamin A supplementation and a recording system per clinical records to monitor its receipt be strengthened as part of routine protocols at HCs. The Endline Survey results raised doubt about whether mothers were routinely receiving this supplement post natally. This supplement is important for rural Cambodian mothers and as most mothers now deliver in local HCs receipt of this supplement could be included into routine procedures.

Training into the appropriate use of antibiotics be developed by the MOH for private practitioners, drug sellers, HC staff , VHV and community members.
The Endline KPC study found that antibiotics were commonly misused for the treatment of diarrheal disease. Inappropriate use of medications is also a factor in the control of malaria and pneumonia. If this use persists long-term it will have consequences for the management of all common diseases in Cambodia. The MOH may choose to address this at a national level.

That the MOH through its HCs works with local community workers to promote the more consistent availability and use of Zinc and an oral rehydration solution

Focus Group discussions revealed that mothers sometimes did not use an oral rehydration solution because it was not available. Zinc was mentioned in a number of discussions but apparently not systematically used or widely available. Local economics and logistics are important to determine whether these should be most readily accessible through local community sellers, markets or the HCs. Zinc should be provided most consistently through the HCs since now that they are readily used by communities most severe cases of diarrhea would be seen there.

For USAID

That the issue of the importance of community engagement in successful evidence-based interventions continues to be a key topic of discussion

An evidence-based approach to community-based primary health care is producing good results. However, it is important that we use approaches that respect community knowledge and mobilize communities so they input that local knowledge that leads to successful program outcomes and sustained positive health behavior change. What is needed is a positive project personnel and donor attitude to community knowledge, participation and collaborative decision making. Expert knowledge is essential but alone without this local community input, will not produce the best outcomes. I write attitude rather than knowledge because this community knowledge is local, (and so too variable on a large scale to practically document); usually not written and about: past experiences, local issues concerning local compliance; and what the communities perceive are the attitude of project personnel and donors to them and to what extent they will trust or not.

For Communities, IRD and other INGOs

That written systems for supervising, documenting and maintaining the skills of VHVs, VHFs and Community Council Trainer/Supervisors be maintained

It is recognized that these basic systems have been began by the Project. However, it is important that they be maintained and developed to a non-complex practical level that covers key knowledge and skills for all community health workers in all communes. Basic Checklist or similar would help in ongoing objective quality assurance by supervisors and act as aids for the VHV and VHF peer feedback sessions. HC staff previously involved in training would supervise the Community Council trainers of VHVs. These systems could be integrated with those that need to be strengthened for HC supervision of community level health workers mentioned above.

That exchange visits of Community members including community health workers and their own personnel, be arranged so that other communities may benefit from the successes of this Project

The successes of this Project are such that other communities could benefit from visiting communities involved in this Project and mutual dialogue. Through this process ownership and sustainability of the Project by the communities would also be reinforced.

Table 4 Recommendations, Their Basis, Actions and Persons Responsible

Finding	Conclusion	Recommendation	Action	Who Is Responsible
1)HC staff showed no systemic approach to VHV-VHF supervision. 2) New systems for Commune level supervision of VHVs just established	Systematic positive supervision of VHV is lacking from HC Documented systems for regular training & supervision needed HC level, Community Councils, VHV teams	Establish practical systems for regular sustained supervision from HC level down Basic Standards, checklist Motivate staff to use these.	Develop, include in basic and ongoing HC training, use, feedback Develop written job descriptions, check lists, regular systems of supervision/training	Ministry of Health Provincial, District level, HC level, Community Councils, VHV teams Provincial role VIP in motivating and supervising all.
Operational Research supplement improved maternal nutrition	Supplementing diet may benefit mothers	Further investigation to assess if policy change	Review of findings, research if indicated	Ministry of Health NNP, National MCH Center
VAC not received & or recorded PNatal	Need to establish system to do so	Establish System to give and record at HC	Develop, include in HC training , feedback	Ministry of Health Provincial, District
Antibiotics given to children with diarrhea	Knowledge, attitude antibiotic use bad	Educate health profession proper use of antibiotic	Develop/ implement education program	Ministry of Health Provincial, District
ORS and Zinc not always available/used for child diarrhea	Supplies of these need maintaining all Need ZINC Ed	Zinc be supplied per the HC. ORS provision investigated/improved	Guidelines for Zinc use established & use monitored HC. ORS investigated/ improved	Ministry of Health local HCs working with communities
Project community engagement approach contributed to good sustained outcomes achieved	Good Community engagement key to good project BCC and community adoption of changes	Promotion of role of community engagement in producing good sustained results for Evidence Based interventions.	Include Community Engagement as essential part of well-designed projects at district and community level	USAID Child Survival Policy Makers

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