

**WORLD HEALTH ORGANIZATION  
REGIONAL OFFICE FOR THE WESTERN PACIFIC**

***Final Report on Community-Based Intervention Study of Food Safety Practices in  
Rural Community Households of Cambodia***

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**EXECUTIVE SUMMARY**

**PURPOSE AND MISSIONS**

**Objectives:**

*“Report on the establishment of a model process for rural community education on food safety to adapt the WHO Five Keys to Safer Food in Cambodia”.*

*Phase 1 (8 July-11 August 2007)*

(1) Provide training on community-based studies related to food safety focused through a Hazard Analysis Critical Control Point (HACCP) and *WHO Five Keys to Safer Food*, to the National Centre for Health Promotion (NCHP) personnel in Cambodia.

(2) Assist NCHP to develop the implementation plan of a two month study of rural communities to identify high risk food handling practices and pesticide usage practices based on observation of food production practices, food handler hygiene, food handling practices and temperature-time measurements of high risk foods.

(3) Provide training on how to conduct a community-based study related to food safety to 40 volunteer health workers in Cambodia.

*Phase 2 (16 September-9 October 2007)*

(4) Assist NCHP in organizing and conducting workshops with volunteer health workers in Cambodia (i) identify important food safety messages for selected rural communities; and (ii) develop these messages and the means for their transmission.

(5) Provide technical support on the development of suitable food safety training materials and training approaches for rural communities in Cambodia.

*Phase 3 (18 November-12 December 2007)*

(6) Review reports of the community-based studies conducted and assess the factors that may have contributed to or hindered behaviour modification in Cambodia.

(7) Provide a final report with recommendations on how to expand food safety education in rural communities in Cambodia.

## **SUMMARY OF ACTIVITIES, FINDINGS, CONCLUSIONS AND GENERAL RECOMMENDATIONS**

Between July 2007 and November 2007 the writer undertook three Missions to Cambodia to provide technical assistance and support to the National Centre for Health Promotion (NCHP) Cambodia in conducting a community-based food safety intervention study involving rural community households. The project built upon earlier work conducting food safety training workshops for forty Village Health Support Group (VHSG) volunteer health workers from the Provinces of Kampong Chhnang and Kampong Thom.

The current project, which was conducted over five months and in three phases, made further progress towards gaining a sound understanding of high risk food handling practices in rural households. Information gathered from a baseline study engaging VHSG volunteers to observe food safety practices in 200 rural households in villages of Kampong Chhnang and Kampong Thom, formed the basis for developing an evidenced-based approach to food safety education aimed at behaviour change.

Specific activities included: training workshops followed by observation of household food safety practices and completing a food safety checklist tool (baseline assessment and final evaluation); taking time-temperature measurements of selected high risk foods/dishes; using baseline assessment to develop key food safety messages and produce a food safety information poster specifically targeting rural households; dissemination of information materials by VHSG volunteers to rural village households and conducting small group education sessions aimed at changing high risk food safety behaviours; and focus group feedback workshops with VHSG volunteers to assist with identifying factors that contributed to (*enablers*), or hindered (*barriers*) behaviour modification.

The model process developed in this study for food safety education in rural communities of Cambodia involving: (1) Mobilization of VHSG volunteers to conduct education in their villages; and (2) Providing the new food safety information poster targeting rural households (modified *WHO Five Keys to Safer Food* messages); proved to be highly effective in improving household food safety practices. It is strongly recommended that this model process for food safety education in rural communities be adopted throughout Cambodia. Adequate financial resources are required to continue and expand this important work. It is recommended that funding be sought from both Government and International Agencies to ensure food safety education in rural communities is given priority it rightly deserves.

Through sustained effort and action at the grassroots level in rural communities, there is potential to mobilize community action and improve household food safety practices, thereby reducing the burden of foodborne illness in Cambodia.

*“There is a wealth of messengers in communities with the power to draw attention and foster a supportive environment. When used with the mass media these voices can put healthy behaviour on the national public agenda”.* (Source: *Mobilizing For Healthy Behaviour*, WHO 2002).

## **2. BACKGROUND**

Between July 2007 and November 2007 the writer undertook three Missions to Cambodia to provide technical assistance and support to the NCHP Cambodia in conducting a community-based food safety intervention study involving rural community households. The project built upon earlier work with the National Counterpart conducting rural training workshops on food safety for 40 VHSB volunteer health workers representing 20 villages in the Provinces of Kampong Chhnang and Kampong Thom.

The WHO *Five Keys to Safer Food* messages and information regarding safe pesticide use/ reducing residues on fruit and vegetables were adapted for the rural community and formed the basis of training workshops. An important aim was to seek feedback from the VHSB on the most appropriate and relevant food safety messages for their communities, and the preferred method/s for delivering those messages.

This new project, which was conducted over five months and in three phases aimed to gain a better understanding of actual food handling and hygiene practices in rural households. Insights and knowledge developed through observations of household food safety practices formed the basis for developing and implementing an evidenced-based approach to food safety education with the objective to modify/ change high risk food safety behaviours.

## **3. PROJECT ACTIVITIES AND FINDINGS**

### **3.1 Overview of Activities**

#### ***Phase One: Training and Conducting Baseline Study of Rural Household Food Safety Practices***

NCHP participated in a training workshop with the writer from 9-13 July 2007 to learn how to conduct a community-based intervention study on food safety in rural households of Cambodia. A *Food Safety Checklist Tool* based on the *WHO Five Keys to Safer Food* messages was developed during the workshop and trialled in the rural community (refer Annex A). Temperature measurements of cooked foods were taken using a simple dial thermometer.

Following this initial training, NCHP and the writer conducted two 2 day training workshops for 40 VHSB volunteers from Kampong Chhnang and Kampong Thom. Health Centre staff and the Provincial Health Promotion Unit also attended the workshop, which focused on how to observe household food safety practices and complete the Food Safety Checklist Tool, including taking temperature measurements of cooked foods.

During August 2007, VHSB volunteers worked in pairs to undertake the observational study of food safety practices in 10 village households. Households were randomly

selected and consent to participate in the study obtained. Community Health Centre Chief provided field support to VHSB throughout the food safety intervention study.

***Phase Two: Development of food safety information material and village household education with VHSB Volunteers***

Results of the *Baseline Study* observing rural household food safety behaviours were reviewed with NCHP during the writer's Second Mission. Food safety problems were together identified and the main food handling practices/behaviours needing improvement/ change were selected to address in community education.

The writer worked with NCHP to develop suitable food safety messages addressing behaviour change. The previous project highlighted VHSB preference to use a colourful poster for communicating food safety information to rural householders. Therefore, an A3 full colour poster highlighting the concepts of: '*Clean*', '*Separate*' and '*Cook well done*' was produced by NCHP. A story board was developed and appropriate photographs produced to model the desired food safety behaviours (and provide for householders with low literacy skills). Two thousand copies of the new food safety educational tool were produced for community education and given to the 200 households participating in the study. Extra copies were distributed among neighbours in the village.

NCHP conducted a One-Day Training Workshop for the 40 VHSB volunteers on how to use the food safety information poster for household education. Over a one-month period (October-November 2007) the VHSB volunteers (working in pairs) provided small group education sessions (2x1.5 hours) in their villages. Each of the households was given soap as an incentive/ gift for their participation in this project.

***Phase Three: Final Evaluation of Food Safety Education Intervention in Rural Communities engaging VHSB Volunteers***

Following the food safety education activity, a repeat study observing household food safety practices was undertaken by VHSB volunteers. Results of 200 completed Food Safety Checklist Tool were analysed by NCHP and reviewed with the writer during the Third Mission (November 2007). A half day Feedback Workshop was held with VHSB volunteers to discuss the overall results of the food safety community intervention study, and to seek their views to assist with identifying factors that may have contributed to (*enablers*), or hindered (*barriers*) behaviour modification.

## 3.2 FINDINGS

### 3.2.1 Observations of Rural Household Food Safety Practices (Baseline Study)

Key issues and food safety problems identified in the Baseline Study

#### (a) *Keep Clean*

Although most (9 out of every 10) food preparers were observed to wash their hands with water before preparing food, only one-third were seen using soap. However, one in four did not wash their hands at all after handling raw ingredients; therefore there is the potential for spreading dangerous bacteria onto other foods.

One in three food handlers did not use clean utensils when preparing food and in just under half of the households observed, pets and pests were seen in the kitchen area. Since one third of households prepared food at or below knee level, there is clearly the risk of contamination by animals present in the food preparing area. It is positive that the majority of households (80%) studied covered food after cooking to prevent potential contamination by flies and dust.

#### (b) *Separate raw and cooked*

One in three food preparers did not separate raw foods from cooked food during preparation, and over half (55%) did not use separate chopping boards for raw and cooked foods. A similar percentage used the same knife (unwashed) for cutting both raw and cooked foods. Clearly, there is a serious problem with cross-contamination from raw to cooked foods both directly and indirectly via dirty cutting boards and knives.

#### (c) *Cook thoroughly*

The temperature measurements of cooked foods showed that nearly all (more than 90%) of the cooked items (soup, rice, fried meats) were heated to 70°C, or above. And most were eaten within two hours of cooking. Few of the rural households ate leftovers. There were however, some households that preferred to undercook their meats, chicken and fish.

#### (d) *Use clean water and raw materials*

One third of households did not use clean, safe water for washing raw fruits and vegetables, or for cooking. One (a single) water source was generally used for all household purposes, thereby providing a major source of microbial (and other) contamination.

### 3.2.2 Change in Rural Household Food Safety Practices Following Community Education with VHSB Volunteers

**Table 1. Summary of Findings: Observation of food safety practices in 200 rural village households**

*“Clean”*

<i>Key message and desired behaviour</i>	<i>Baseline</i>	<i>End line</i>	<i>% Change in behaviour</i>
<ul style="list-style-type: none"> <li>When washing hands always use soap or ash</li> </ul>	32%	85%	↑ 53%
<ul style="list-style-type: none"> <li>Things used for cooking and eating must be washed after use</li> </ul>	66.5%	86.5%	↑ 20%
<ul style="list-style-type: none"> <li>Chopping board and knife must be washed after use:               <ul style="list-style-type: none"> <li>- Separate or washed knife for cooked and raw food</li> <li>- Separate or washed chopping board for raw and cooked food</li> </ul> </li> </ul>	51.5%	91.5%	↑ 40%
	45%	74%	↑ 29%

*“Separate”*

<i>Key message and desired behaviour</i>	<i>Baseline</i>	<i>End Line</i>	<i>% Change in behaviour</i>
<ul style="list-style-type: none"> <li>Do not allow pig, chicken, duck dog, cat, rat, cockroach into kitchen</li> </ul>	46%	48%	No significant change
<ul style="list-style-type: none"> <li>Separate water used for cooking and other household purposes</li> </ul>	65%	93%	↑ 28%
<ul style="list-style-type: none"> <li>Keep cooked food separated from food preparing area</li> </ul>	65%	84.5%	↑ 19.5%

*“Cook well done”*

<i>Key message and desired behaviour</i>	<i>Baseline</i>	<i>End Line</i>	<i>% Change in behaviour</i>
<ul style="list-style-type: none"> <li>Fried meat, pork, chicken, seafood must be cooked well done with no pink or blood (visible)</li> </ul>	<36%	100%	64%

#### 4. Other food safety practices

<i>Observed Behaviours</i>	<i>Baseline</i>	<i>End Line</i>	<i>% Change in behaviour</i>
Washing hands in water dish	67.5%	96%	↑ 28.5%
Wash hands after handling raw ingredients	73%	93%	↑ 20%
Covering cooked food properly	79%	95.5%	↑ 16.5%
Separated kitchen	65.5%	74.5%	↑ 9%

These summary findings are compiled from results of the *Baseline Assessment* and *Final Evaluation* of rural household food safety practices using the *Food Safety Checklist Tool* (Refer Annex B). Overall, the food safety education intervention in rural communities involving VHSG volunteers and using the new food safety information poster was exceptional in bringing about major improvements in household food safety behaviours. Most notable were:

1. Fifty-three per cent increase (32-85%) in households using soap or ash when washing hands.
2. Forty per cent increase (51.5-91.5%) in households using separate or washed knife for cooked and raw foods.
3. Twenty-nine per cent increase (45-74%) in households using separate, or washed chopping boards for cooked and raw foods.
4. Twenty-eight percent increase (65-93%) in households using separate, clean water for cooking purposes.
5. At least sixty-four percent increase in cooking meats, chicken and seafood well done so no pink or blood visible.

### **3.2.3 Factors contributing to, or hindering, food safety behaviour modification**

#### 3.2.3.1 Enablers

- a) *Education and information.* The primary factor mentioned by VHSG volunteers at the feedback focus group workshop was that food safety was ‘new information’ on a health topic that was interesting to the rural people. Key messages in the poster were clear and easy to understand. The householders liked the new colourful poster, which was displayed in their kitchens/ food preparation area. Neighbours who saw the poster and heard about the VHSG food safety education sessions also wanted to become involved in the activity. Knowledge about correct food handling behaviours for people’s health was seen to be a key factor driving change and leading to improvements in household food safety practices.
- b) *Easy to implement key messages to affect behaviours change.* Key food safety messages promoted in the poster were easy to understand and to put into practice.
- c) *No extra costs involved for households.* The suggested changes in food safety behaviours generally did not require rural families to spend more money putting into practice the desired behaviours (although some households did purchase plastic covers to protect cooked food from pets and pests as depicted in the poster).
- d) *Incentives.* Soap was provided to households involved in the study as an incentive and gift for their participation, which was appreciated. Feedback from VHSG volunteers was that soap is affordable for rural households and would be purchased and used when washing hands after this intervention study.
- e) *Role modelling.* VHSG volunteers are well know and respected in their village. They are elected by the community to perform this honorary function for five years. They are good ‘role models’ for promoting food safety within their communities by having a strong interest in this issue and commitment to health.

- f) *Supportive network.* VHSG volunteers are accessible to village households and can provide basic information on food safety. They form a strong bridge between their village and the local community Health Centre (Ministry of Health).

### 3.2.3.2 Barriers to changing food safety practices

a) *Physical environment.* VHSG volunteers commented that it is difficult for rural households to always keep pets, especially cats, out of the kitchen because of the open plan design (often one large room for the family). Cats are ‘loved’ and seen by rural people to control vermin, hence playing an important role in preventing the spread of diseases.

### 3.2.4 VHSG Volunteers’ suggestions for improving the rural food safety information poster and education sessions for households

- a) Three separate larger (A2) posters, or flip charts addressing: “Clean”, “Separate” and “Cook Well Done” would be easier for workshop participants to see in small group education sessions.
- b) Photographs used in the poster need to provide *complete* images. For example, whole body of person washing their hands, not just showing hands lathered in soap; and cooked food on bench completely covered by protective plastic covering. The photograph of cooked meats (well done) should clearly show no pink/ blood (difficult to distinguish between the raw and cooked meats).
- c) Ideal number of information sessions on food safety for rural households to gain new knowledge and understanding of the key messages would be two to five sessions, each running for around one hour.

## 4. CONCLUSIONS AND RECOMMENDATIONS

### 4.1 General Conclusions

The model process developed in this study for food safety education in rural communities of Cambodia involving: (a) Mobilization of VHSG volunteers to conduct education in their villages; and (b) Providing the new food safety information poster targeting rural households (modified *WHO Five Keys to Safer Food* messages); proved to be very effective in improving rural household food safety practices. Both components are integral to producing the desired behaviour change.

Health promotion literature emphasises the foundation for having people adopt healthy behaviours is knowledge. What is central is the application of knowledge in the complicated context of culture, social norms and a variety of social influences. “It is only with strategic, people-centred, behaviourally-focused social mobilization and communication that health interventions will move from the shelves to people’s daily lives” (Source: *Mobilizing For Healthy Behaviour*, WHO 2002)

The VHSG volunteer network forms an effective bridge between the village and local community Health Centre throughout most Provinces of Cambodia. They are a rich resource that can be mobilized to improve rural household food safety behaviour. Through sustained effort and action at the grassroots level, there is potential to reduce the burden of foodborne illness in Cambodia

## **4.2 General Recommendations**

4.2.1 *Capacity building and sustainability.* It is strongly recommended that this model process for food safety education in rural communities be adopted throughout Cambodia. Adequate financial resources are required to continue and expand this important health education and promotion work.

4.2.2 It is recommended that funding be sought from both Government and International Agencies to ensure food safety education in rural communities is given priority it rightly deserves.

## **4.3 Specific Recommendations**

4.3.1 It is strongly recommended that this food safety initiative be continued and strengthened in both Kampong Chhnang and Kampong Thom. There is value in capturing the current wave of community interest and build upon success achieved. Rural food safety education activity should be expanded in 2008 to involve a further two Provinces, specifically Takeo and Kampot.

4.3.2 Discussions with the National Counterpart led to agreement that there should be *Training of Trainers* (TOT) for Health Centre staff and Provincial Health Promotion Units in 2008. A step down approach would be adopted, with trained Health Staff providing orientation to VHSG volunteers on key food safety messages and how to use the food safety information poster for rural household education.

4.3.3 The expanded food safety education activity should cover at least 25 percent of Health Centres in the four targeted Provinces, which equates to around 34 Health Centres servicing some 600 villages and comprising 90,000 households.

4.3.4 Funding should be sought to produce at least 40,000 copies of the revised food safety information poster for rural communities (10,000 copies to be made available to each of the four Provinces).

4.3.5 The Food Safety Checklist Tool should be used to evaluate changes in rural household food safety practices/ behaviours following the education intervention. Information obtained should be reflected upon by NCHP to refine the model process for food safety education in rural communities of Cambodia if the need is clearly demonstrated.

## **Acknowledgments**

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- Dr Chim Sopharo, Deputy Chief of Technical Bureau, National Centre for Health Promotion, Cambodia

## ANNEXES

### A. Food Safety Checklist Tool

OBSERVATIONS - <i>WHAT THEY DO</i>	Tick
<b><i>KEEP CLEAN</i></b>	
<b>HAND WASHING</b> <i>When</i> <ol style="list-style-type: none"> <li>1. Food preparer washes hands before preparing food</li> <li>2. Food preparer washes hands after handling raw meats &amp; vegetables</li> </ol> <i>How</i> <ol style="list-style-type: none"> <li>3. Dish of water</li> <li>4. Running water</li> <li>5. Soap/Ash and water</li> </ol>	
<b>FOOD PREPARING SPACE</b> <ol style="list-style-type: none"> <li>6. Separate space for preparing food</li> <li>7. ‘Things’ used for cooking and eating clean</li> <li>8. Food prepared on bench knee level</li> <li>9. Cooked foods covered</li> <li>10. Domestic pest, rats in food preparing area</li> </ol>	
<b><i>SEPARATE RAW AND COOKED</i></b>	
<ol style="list-style-type: none"> <li>11. Raw meats, fish, chicken, shellfish prepared away from cooked food</li> <li>12. Separate cutting boards used for raw meats, vegetables &amp; cooked foods</li> <li>13. Different knives used for cutting raw meats, vegetables &amp; cooked foods</li> </ol>	
<b><i>COOK THOROUGHLY/ KEEP FOOD SAFE TEMPERATURE</i></b> <b>(Record <u>time finish cooking</u> &amp; <u>time start eating</u>)</b>	Record temperature of cooked foods
<ol style="list-style-type: none"> <li>14. Cooked meats, chicken, fish, shellfish <u>well done, no pink meat, no blood</u></li> <li>15. Meats/ fish/ chicken fry in boiling oil</li> <li>16. Soup steaming and bubbles</li> <li>17. Cooked rice steaming</li> </ol>	
<b><i>USE SAFE WATER AND RAW MATERIALS</i></b>	
<ol style="list-style-type: none"> <li>18. Vegetables and fruits washed before eating</li> <li>19. Use separate water for cooking</li> <li>20. Eat raw fish, shellfish, meats</li> </ol>	

**B. Results of Baseline Study and Observations of Rural Household Food Safety Practices Following Education Intervention**

Table 1: Location distribution by sample

No.	<i>Provinces</i>	<i>Frequency</i>	<i>Percent</i>	<i>Cumulative Percent</i>
1.	Kampong Chhnang (Pong Ro)	100	50.0	50.0
2.	Kampong Thom (Kor Koh)	100	50.0	100.0

Table 2: Household sewage and garbage management

No.	<i>Time</i>	<i>Frequency</i>		<i>Percent</i>	
		<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
1.	Dumping at rice field	89	95	44.9	47.7
2.	Anywhere around their houses	67	61	33.8	30.7
3.	Bury in digging hole	42	43	21.3	21.6

*Hand washing method*

Table 3: Time of hand washing practice among the samples

No.	<i>Time</i>	<i>Frequency</i>		<i>Percent</i>	
		<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
1.	Before food preparation	181	195	90.5	98.0
2.	After handling raw ingredient	146	185	73.0	93.0

Table 4: Method of hand washing practice among the samples

No.	Method	Frequency		Percent	
		Before	After	Before	After
1.	Water dishes	175	191	67.5	96.0
2.	Tap water or water pouring by someone	7	28	3.5	14.0
3.	Washing with soap or ash	64	170	32	85.0

*Cleanliness of food preparation places*

Table 5: Food preparation places

No.	Food preparation places	Frequency		Percent	
		Before	After	Before	After
1.	Separated kitchen	131	149	65.5	74.5
2.	Cleans utensils	133	173	66.5	86.5
3.	Food preparation at knee level or higher	133	146	66.5	73.0
4.	Covering cooked food properly	158	191	79.0	95.5
5.	Presence of pet, rodent, chicken, duck, pig etc. in kitchen	92	96	46	48

*Separation raw and cooked food*

Table 6: Separation of raw and cooked foods

No.	Activities	Frequency		Percent	
		Before	After	Before	After
1.	Separate raw meat, fish, chicken, sea food, from cooked food	130	169	65.0	84.5
2.	Separate chopping board for raw and cooked food	90	148	45.0	74.0
3.	Separate or wash knife for cooked food and raw food	103	183	51.5	91.5

*Cook well done*

Table 7: Food dishes

No.	<i>Food dishes</i>	<i>Frequency</i>	<i>Percent</i>
1.	Grilled meat, chicken, seafood	113	56.5
2.	Fried meat, fish, chicken, seafood	88	44.0
3.	Soup	145	72.5
4.	Cooked rice	197	98.5
5.	Reheated leftover food	45	22.5

Table 8: Cook well done

No.	<i>Description</i>	<i>Frequency</i>	<i>Percent</i>
1.	No pink or blood inside cooked meat, chicken, fish, or seafood	113	100.0
2.	Fried meat, fish, chicken, seafood in boiling oil	87	98.9
3.	Soup is boiling or fuming	145	100.0
4.	Cooked rice is fuming	197	100.0
5.	Leftover food is reheated before eating	45	100.0

*Clean water and safe raw material for food preparation*

Table 9: Using water and raw material for food preparation

<i>No.</i>	<i>Activities</i>	<i>Frequency</i>		<i>Percent</i>	
		<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
1.	Separate water for cooking purpose from other household	130	186	65.0	93.0
2.	Washing vegetable and fruit before eating	106	145	53.0	72.5
3.	Eating raw fish, seafood, meat, paste-fish	11	28	5.5	14