Community DOTS Program Evaluation in Cambodia, 2010

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List of Acronyms

BMC	Banteay Meanchey Province
C-DOTS	Community directly observed treatment, short course
CENAT	National Center for Tuberculosis and Leprosy Control
CHC	Cambodia Health Committee
CHV	Community health volunteer
DOTS	Direct Observation TB Treatment, Short course
DW	DOT Watcher
FHI	Family Health International
HC	Health Center
HEAD	Health and Development Alliance
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
JATA	Japan Anti-TB Association
KAN	Kandal Province
KCN	Kampong Chhnang Province
KPC	Kampong Cham Province
KRA	Kratie Province
NGO	Non-Governmental Organization
NIPH	National Institute of Public Health
NTP	National TB Programme
OD	Operational District
OHRP	U.S. Office for Human Research Protection
PFHAD	Partners for Health and Development
PHD	Public Health District
RACHA	Reproductive and Child Health Alliance
SCA	Save the Children Australia
TB	Tuberculosis
USAID	US Agency for International Development
WHO	World Health Organization

Executive Summary

The World Health Organisation (WHO) has classified Cambodia as one of the 22 high burden countries with TB in the world. Directly observed therapy short course (DOTS) is an effective strategy for controlling tuberculosis (TB), and is used worldwide, mainly in developing countries. Implementation of DOTS in Cambodia started in 1994 mainly through the existing hospital network. In 2002 C-DOTS was adopted by the NTP to engage community level volunteers to provide DOTS to TB patients, in particular those who have limited access to the local health facilities. By the end of 2010, 87% of health centres were implementing C-DOTS activities with the support of NGOs funded mainly by USAID and the Global Fund. While the expansion of the C-DOTS programme is thought to have significantly improved access to TB services; concerns and challenges related to quality of C-DOTS implementation have been raised.

The C-DOTS programme evaluation 2010 was conducted from November to December 2010 by the National Centre for Tuberculosis and Leprosy Control (CENAT), TBCAP, and FHI in collaboration with NGO partnsers supporting implementation of C-DOTS in the country. The survey was designed to answer the objectives of the C-DOTS programme which include assessing the contribution of C-DOTS to the overall national TB programme; documenting C-DOTS initiatives; and providing recommendations to C-DOTS stakeholders. To our knowledge, this is the first C-DOTS survey of this magnitude as previous evaluations were limited in geographical scope or did not follow such a comprehensive research strategy and design. It consists of three main areas: health centre assessment, DOT watcher survey and TB patient survey.

Key findings and its current implications

The assessment key findings show that the C-DOTS programme has significantly contributed to key aspects of TB control activities in Cambodia. Health centre data show that the number of TB patients increased significantly and more patients come from far away distances after C-DOTS implementation. Recording at health centres on source of referral significantly improved. Despite the programme was managing a greater number of patients, diagnosis and treatment outcomes improved. After C-DOTS implementation, positive sputum test results decreased significantly at month 0?, which could be due to the fact that the programme is finding cases at an earlier stage of TB disease. After C-DOTS treatment outcome has significantly improved. HIV testing has increased significantly as well as the number of HIV patients on ART and CPT; yet, there were activities going on parallel to C-DOTS programme to

strengthen TB/HIV activities. After C-DOTS implementation, community DOT watchers (DW) became the main DOT provider during TB treatment. This shows that DWs are an acceptable way of delivering treatment to TB patients as they address the main reported barrier from patients which is distance to the HC.

Health centre staff reported that their main factor in DOT inclusion making is distance from patient's house to the HC. The main perceived benefit to HC staff is decreased workload, including easier patient management. HC staff reported to be highly satisfied with the DWs performance and that the patients highly trust the DWs. Overall, the majority of HC staff was satisfied with the C-DOTS programme at their health centres. C-DOTS programme is not only been accepted by the patients themselves but by the HC staff as well.

Most DOT Watchers interviewed were literate. The majority of them were community volunteers or community leaders. DWs reported doing this work for an average of nearly 3 years without receiving a salary. The main reported reason to work as a DW was social responsibility to help others. Most DWs reported receiving adequate support from HC and NGO staff. Overall DWs were well trained and informed about TB disease and symptoms. Reported practices of DWs about TB treatment were very good. Most DWs administer treatment at patient's house and do a home visit within the same day of a missed dose. Most DWs update treatment cards after each treatment dose. TB suspects are actively identified in the community by DWs mainly by conducting regular home visits and health education activities. DWs think that C-DOTS is well accepted in the communities where they work as it has made TB services more accessible to patients and has increased awareness of TB in the DW's communities. DWs reported that their patients trust them and that they have a good relationship with the HC staff.

Most TB patients reported having received health education. Knowledge on TB symptoms was acceptable yet it could be improved. TB patients reported that C-DOTS addresses the treatment challenges faced such as distance, time and transportation. Over half of C-DOTS patients were met by the DW before receiving TB treatment from HC/RH. C-DOTS patients showed more confidence in their health provider's knowledge to attend their illness than non C-DOTS patients. In addition, most C-DOTS patients reported that their health provider was "very likely" available and willing to provide any support to them. Treatment adherence was higher among C-DOTS patients than non-C DOTS patients.

Main key findings:

- HC data shows that the proportion of TB patients referred by DWs (under C-DOTS) has increased significantly after C-DOTS implementation from 5% before C-DOTS implementation to 32% after C-DOTS implementation (P value <0.001).

- HC data shows that treatment outcome has improved significantly before and after C-DOTS implementation from 87% to 93% respectively (P value <0.001).
- After C-DOTS implementation, community health volunteers significantly contributed in case finding. The TB patient survey shows that a greater proportion of suspected TB patients by CHV were among C-DOTS patients (18%) as compared to non C-DOTS patients (4%) (P value <0.001).
- The TB patient survey data shows that that the proportion of referrals by community volunteers was significantly higher among C-DOTS patients as compared to non C-DOTS patients, 48% and 4% respectively (P value <0.001).

Summary Recommendations

Improve record keeping at health centres

In general health centres have improved their record keeping after C-DOTS implementation. However, there are gaps that need to be addressed in order to fully record the TB patient information. Moreover, stronger health information systems need to be in place in order to improve TB outcomes.

Address the barriers faced by DWs

Reported barriers faced by DWs need to be addressed in order to facilitate their work and help them to work in a more efficient manner. Due to the long distance from the DWs home and the patient's home, DWs face difficulties in having access to the patient, which can have a direct negative effect on TB treatment outcome. The lack of appropriate transport is one of the main barriers which needs to be addressed.

Improve targeted BCC/IEC strategies and messages for TB patients and community members

TB patients' reported knowledge on TB symptoms and prevention was moderate. In addition, one of the main barriers reported by DWs is TB misunderstandings in the community. TB patient and community members' knowledge about TB disease needs to be improved through targeted behaviour change communication (BCC) strategies, including health education, community mobilization, and advocacy. At a village level, health education can be done through DW's interpersonal communication with TB patient. Besides interpersonal communication, folk media and mass media can also be used. In addition to health education, community mobilization and advocacy should be undertaken at all levels.

Promote further operational research on C-DOTS programme in Cambodia

C-DOTS operational research on C-DOTS programme in Cambodia is needed due to the fact that C-DOTS is one of the main components of the National Tuberculosis Programme (NTP). Further operational research needs to include the aspects of monitoring and evaluation and programme sustainability.

1. Background

Cambodia is one of the 22 countries in the world classified by WHO with a high burden of tuberculosis. The estimated prevalence of all forms of TB in 2009 was 693/100,000 population; estimated incidence of all forms of TB was 442/100,000 and the estimated mortality is 71/100,000 population. During the last 10 years, cases of TB (all forms) notified under the National TB Control Program (NTP) has increased more than two folds, reaching up to 41,628 cases in 2010. Furthermore, in the era of HIV/AIDS, the impact of TB on HIV/AIDS patients will be of great concern for countries with high burden of TB.

Implementation of DOTS in Cambodia started in 1994 mainly through the existing hospital network. However case notification rates increased only marginally: from 99 per 100,000 (in 1994) to 116 per 100,000 (2001). Involvement of the network of health centers took off in 1999 achieving full coverage of all health centers in 2004.

In its efforts to accelerate DOTS expansion and to improve access of patients to the DOTS network, the National Center for Tuberculosis and Leprosy Control (CENAT) decided to embark on Community DOTS (C-DOTS) activities particularly in remote areas. C-DOTS is a strategy used by the National TB Programme (NTP) to improve case finding through identification and referral of TB suspects by trained community volunteers and to increase treatment adherence by providing DOT to patients in the community, particularly for those with limited access to the Health Centers (due to distance and/or their physical condition). These initiatives are expected to promote early case detection, and improve cure rates by decreasing defaulter cases and minimizing transportation expense for TB patients.

The first C-DOTS pilots were conducted in 3 operation Districts (ODs) in 2002. Following successful pilots, C-DOTS were formally adopted by the NTP as a means to engage community level volunteers in TB control efforts. Guidelines for Community DOTS implementation was issued by the NTP in 2004, following which there was a rapid scale up in implementation. By the end of 2010, 87% of Health Centers (839/964) were implementing C-DOTS activities with the support of NGOs funded mainly by USAID and the Global Fund. C-DOTS is being implemented by NGOs, numbering 13 in 2010, in collaboration with CENAT, provincial health department, operational districts, health centers and community volunteers.

While C-DOTS has been expanded successfully, there are concerns and challenges related to quality of C-DOTS implementation, as also pointed out in the annual NTP report and the joint program review. In addition, C-DOTS has evolved to include other components of the TB programme such as HIV testing of

TB patients, facilitating diagnosis of smear negative TB through referrals, and IEC activities in the communities.

This assessment was undertaken to better understand the quality of C-DOTS implementation, document the contribution of the C-DOTS programme to the national TB programme, and to identify challenges faced during implementation with the purpose of using this knowledge to further improve the programme. It consists of three main areas: Health care assessment, DOT Watcher survey and TB patient survey.

1. HC Assessment

Health centre assessment includes visits by the review team to the selected HCs and interviews to the staff in charge of TB activities. A standard questionnaire form has been used to collect information regarding: (1) their C-DOTS process and activities; (2) their opinions about the C-DOTS contribution, quality and accessibility of the services, as well as motivation and sustainability of the C-DOTS program; (3) and most importantly their suggestions on how to improve the existing C-DOTS programme. The Team will also review the C-DOTS patients' records in the selected HCs and assess the record's quality and completeness.

2. DOT Watchers

DWs in the selected sites have been interviewed to assess: (1) their knowledge about TB and their capability of conducting C-DOTS duties; (2) their motivation of being a C-DOTS watcher and their acceptability of this job; (3) as well as their practices to supervising and referring TB patients.

A standard questionnaire has been designed and used to interview the DWs.

3. TB Patient Survey

The main purpose of the TB patient interviews survey is to compare C-DOTS with non-C-DOTS TB patients in terms of the type of TB treatment they received and their reasons to choose that treatment method. It also aims to assess patient's knowledge about TB disease and to explore factors affecting their health seeking behaviours. This survey will measure the quality of treatment patients received from DOTS and assess satisfaction toward DOTS service among C-DOTS and non-C-DOTS patients.

2. Purpose of the Survey

Objectives

Main objective

The C-DOTS program evaluation aims to assess the contribution of C-DOTS program; to document C-DOTS initiatives; and to provide recommendations to C-DOTS stakeholders.

Specific objectives

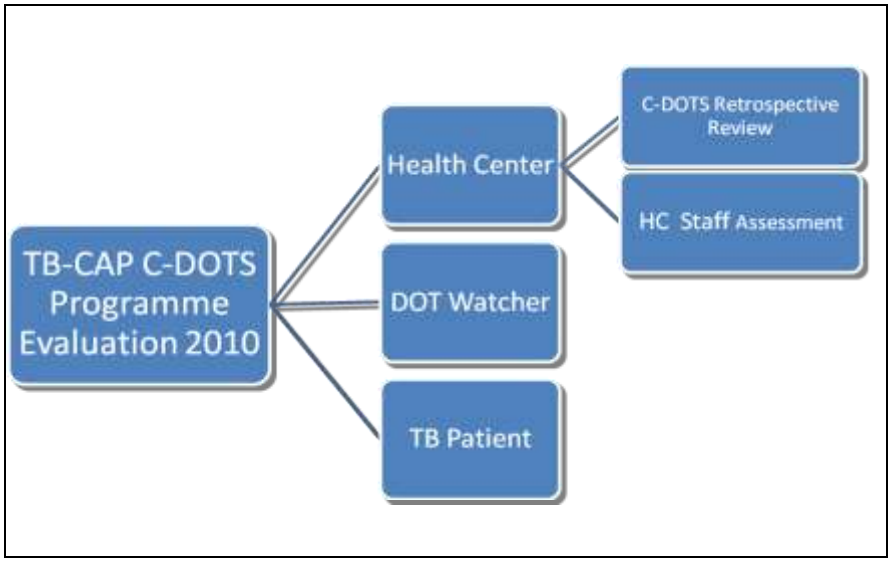
1. To assess the contribution of Community DOTS (C-DOTS) in improving access, promoting earlier case finding, increasing case detection and cure rates of TB patients in Cambodia;
2. To document C-DOTS initiatives, including success stories, lessons learned, and best practices;
3. To provide recommendations for all stakeholders including the NTP, donors, technical agencies, and implementing partners.

3. Methods

Survey design

This assessment is a cross-sectional interview survey. A two-stage cluster sampling design has been used. There are three different domains: the health center staff, the DOT watchers and the TB patients.

Figure 1: Components of the TB Evaluation Survey



Study sites and population

The survey was conducted in five selected provinces: Kampong Cham, Banteay Meanchey, Kampong Chhnang, Kandal, and Kratie.

Sampling frame

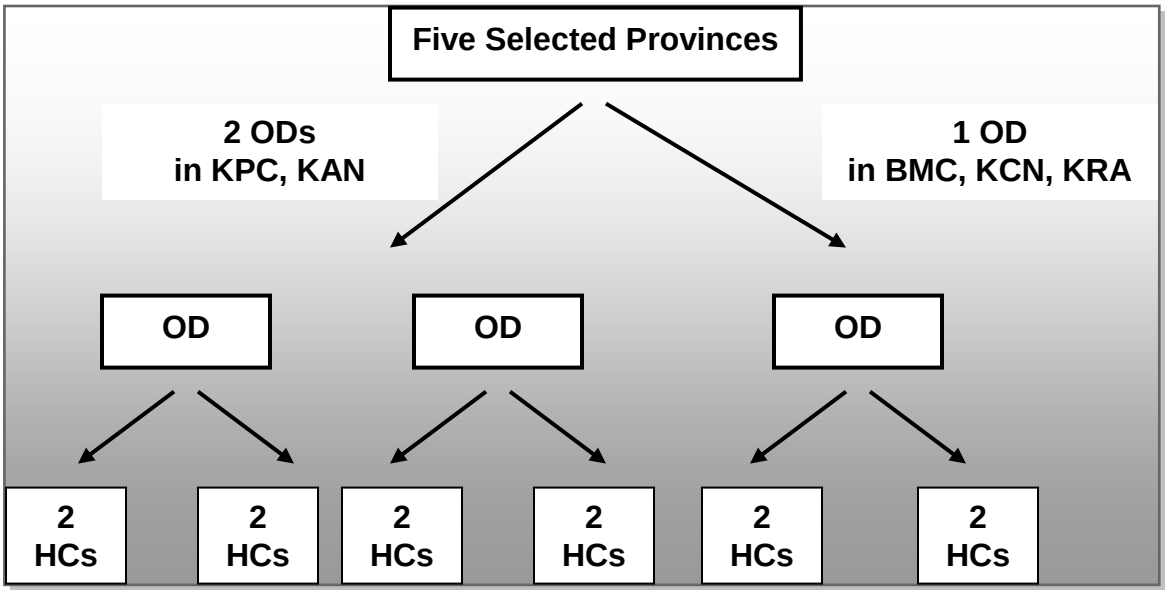
Selection of provinces

The study sites were selected using a simple random sampling method. All provinces were sorted by the number of newly diagnosed smear positive TB patients (based on the 2009 annual TB statistics). Provinces with less 100 TB cases were excluded from this study. A total of 20 provinces were included in the sampling pool. A random number of four was chosen to select the sites. As a result, the following five provinces were chosen: Kampong Cham (KPC), Kandal (KAN), Kampong Chhnang (KCN), Banteay Meanchey (BMC) and Kratie (KRA).

Selection of HCs

The following diagram illustrates the selection process for the HCs:

Figure 2: Five selected provinces for the health center assessment



Two operational districts were randomly selected for provinces with more than 1,000 smear positive patients, such as Kampong Cham and Kandal; otherwise, 1 OD was randomly selected from the other provinces. Within each OD, 4 HCs were randomly selected. A total of 7 ODs and 28 HCs were selected in the five provinces. The sample number for each province was further determined by the proportion of its TB population to the entire survey population and then equally distributed to 4 selected HCs. The final result of sampling is listed in the following table:

Table 1: Sampling table for health centers

Province	OD Name	Health Center	Commune
Banteay Meanchey	Mongkul Borey	Russey Krak II	Russey Kraok
		Kok Balang	Kouk Ballangk
		Soeu	Soeu
		O' Prasat	O' Prasat
Kandal	Takhmao	Rolous	Rolous
		Trapang Veng	Trapang Veng
		Prek Thmey	Prek Thmey
		Prek Ho	Prek Hour
	Koh Thom	Koh Thom "B"	Koh Thom "B"
		Chheu Khmao	Chheu Khmao
		Po Rea Mea	Po Rea Mea
		Leuk Dek	Leuk Dek
Kampong Cham	Kg Cham-Kg Siem	Veal Vong	Veal Vong
		Moha Khnanhong	Moha Khnanhong
		Kra La	Kra La
		Hann Chey	Hann Chey
	Kroch Chmar	Chum Nik	Chum Nik
		Tul Sambo	Tul Sambo
		Svay Khlang	Svay Khlang
		Peam Koh Sna	Peam Koh Sna
Kampong Chhnang	Kampong Tralach	Svay	Svay
		Thlork Vean	Thlork Vean
		Ta Chas	Ta Chas
		Ampil Tek	Ampil Tek
Kratie	Kratie	Sob	Sob
		Sambo	Sambo
		Kan Tout	Kan Tout
		Bos Live	Bos Live
TOTAL	**7 ODs**	**28 HCs**	

Selection of patients

The patient sample has been selected in two stages. In the first stage, 28 health centres in 5 provinces were selected using the method mentioned above. In the second stage, patient sampling has been done using simple random sampling. The sample number in each health centre was calculated proportionate to the number of TB patients in selected health centres; that is, patients were selected with a probability proportionally to size. A list of patients has been used to randomly select patients in each health centre.

Sample Size Calculations

A sample size of 300 patients was determined through the following procedures:

1. Based on the 2009 annual statistics, a total of 3,693 TB patients were reported in the selected five provinces.

2. Based on this estimated survey population size, with an expected 85% cure rate, a sample of 186 was calculated for a two-sided test with 95% confidence interval using STATCALC developed by Epi Info, Inc.

4. The inflation factors for 50% refusal and 10% incomplete record were then added to the calculation.

Table 2: Sampling table for TB patient assessment

Province	OD Name	Total # of TB Patients	Sample #	Health Center	# of patients
Banteay Meanchey	Mongkul Borey	792	65	Russey Krak II	16
				Kok Balang	16
				Soeu	16
				O' Prasat	16
Kandal	Takhmao	795	66	Rolous	16
				Trapang Veng	16
				Prek Thmey	16
				Prek Ho	16
	Koh Thom	431	36	Koh Thom "B"	9
				Chheu Khmao	9
				Po Rea Mea	9
				Leuk Dek	9
Kompong Cham	Kg Cham-Kg Siem	601	50	Veal Vong	12
				Moha Khnanhong	12
				Kra La	12
				Hann Chey	12
	Kroch Chmar	213	18	Chum Nik	5
				Tul Sambo	5
				Svay Khlang	5
				Peam Koh Sna	5
Kompong Chhnang	Kampong Tralach	416	34	Svay	9
				Thlork Vean	9
				Ta Chas	9
				Ampil Tek	9
Kratie	Kratie	388	32	Sob	8
				Sambo	8
				Kan Tout	8
				Bos Live	8
TOTAL	**7 ODs**	**3,693**	**300**	**28 HCs**	**300**

TB patient survey respondent rate

A total of 300 patients were selected for the survey in five provinces. Respondent rate was 68.3% (n=205 respondents). The other 95 TB patients did not participate in the survey due to various reasons such as interviewers could not find patients; patients moved out; patient was too sick to answer the questions; or patients were not available.

Selection of DWs

A list with the DWs information was provided from the different HC's. Fifty percent of eligible DWs were recruited to participate in the survey.

The questionnaires

Three standard questionnaires were developed to collect information during HC staff, DW and patient interviews. Experienced interviewers have administered the questionnaires to each target group after verbal consent was obtained. A team from CENAT has administered the HC staff questionnaire and a team of four interviewers from FHI/Cambodia's Strategic Information (SI) Unit have administer the TB patient and DW questionnaires. Each interview lasted around forty minutes.

Administration of questionnaires

In each interview, trained interviewers asked fixed-choice-questions and fill out the questionnaires in the form of a structured face-to-face interview in a consistent format. All interviewers have attended a training session prior to data collection. This mandatory training session focused on interview skills, tools used for the survey, confidentiality and other key ethical issues. No personal identification information has been recorded in the questionnaires. Interviews have taken place in a private room where only the interviewer and respondent were present.

Language of the questionnaires

The HC staff questionnaires, TB patient and DW questionnaires have been developed in English and then translated into Khmer language (see appendix). The questionnaire's translation has been verified and cross-checked to ensure accuracy.

Pretesting of questionnaires

The questionnaires have been pre-tested in an OD not selected for the survey. Questions that needed further refinement or re-writing or do not add value were identified and the necessary corrections were made.

Inclusion criteria

The inclusion criteria for the interviews of this review study are described as follows:

(a) Health centre staff: person in charge of TB programme at selected health centre

(b) TB patients: (1) Khmer-speaking; (2) 15 years of age and above; (3) started any DOTS during the time period of April 1, 2009 through March 31, 2010; (4) completed TB treatment (including DOTS) by the time of interview.

(c) DOT Watchers (DWs):

   a. Have served as DW to at least one patient in the past 3 yrs.

   b. For new DOT watchers, the patient has completed at least half of the treatment course.

Field team composition

Two types of field visits were conducted by two different teams. Two teams will be organized for field visits. Team 1 will consist of representatives from CENAT, FHI/TBCAP team members, representatives of NGOs implementing C-DOTS in the community, and provincial/district TB supervisors of the site to be visited. The main responsibilities of Team 1 are: (1) to facilitate selection of patients and DOT watchers to be interviewed by Team 2; and (2) to collect relevant data from HC using the data collection form and interview of HC staff.

Team 1

Team 1, which is the review team, has visited the selected ODs for the following purposes:

1. To review the C-DOTS records in selected ODs and HCs
2. To conduct site visits to selected HCs
3. To discuss procedures with C-DOTS program officers in ODs and HCs

Team 2

Team 2, which is the interviewer team, visited the selected HCs to conduct face-to-face interviews with DWs and TB patients. Team 2's major responsibility is to visit the selected HC and interview TB patients and DWs. Members include trained interviewers from previous FHI research projects.

Data collection, management and analysis

Data collection

HCs:

Health centre data collection consisted of two main parts. Firstly, data was collected retrospectively from TB patient files (register books) at selected health centres from two different periods of time: before and after C-DOTS implementation. The HC staff interview data was collected by CENAT staff. The team used pre-tested survey forms to collect the data and entered the data into Epidata.

TB patients and DWs:

Data was collected using standard data collection forms through face-to-face interviews. The Computer-Assisted Survey Instrument (CASI) was used. Interviewers entered the TB patients and DWs answers directly into computer laptops. TB patient data was cross-checked with the patient's health card and HC records. If the information provided by the patient was not consistent, HC register book was used.

Data analysis

Analysis of the quantitative surveys was performed with STATA 11 for Windows where basic frequencies and simple proportions and tests for significance (chi-square and t-test) have been calculated. Tables and graphs have then been developed in Excel.

Ethical Issues

Informed consent was obtained from each interviewee who participated in each survey. Prior to each interview, the interviewer read carefully the consent form. This consent form contains information on the objectives of the survey, the risks, benefits and freedom of the participation, as well as information on confidentiality. Verbal consent obtained from the respondent was recorded on the survey questionnaire.

Collected data, such as the questionnaires on computer files and field notes, has been stored in a locked filling cabinet at the FHI/Cambodia office. FHI will destroy all these materials when the final report is approved by CENAT.

Respondents' incentives

An incentive of a cleaning pack worth $1 (including tooth brush/paste, soap, and detergent) has been provided to survey participants as well as $2 for transportation fee.

4. Results and Interpretation

4.1 Heath Center Assessment Results

4.1.1 C-DOTS Retrospective Review

The retrospective data review comprised of the comparison of two sets of data: baseline year, which is before DOTS implementation, and the period of 1 April 2009 to 31 March 2010, which is after C-DOTS implementation. The main objective of this review is to see whether there are any differences observed in patient satisfaction, service delivery and treatment success rate before and after the implementation of C-DOTS.

TB patients by province

There was a significant increase in the reported number of TB patients by selected province after C-DOTS implementation (P value < 0.001) (see table 3).

Table 3. Number of TB patients by province

General Characteristics	Before C-DOTS (Baseline year) (n=428)	After C-DOTS implementation (n=609)	P-value
	N	N	
Province			< 0.001
Kampong Cham	127	119	
Banteay Meanchey	46	122	
Kampong Chhnang	72	133	
Kandal	129	178	
Kratie	54	57	
Total	**428**	**609**	

General Characteristics

The mean age of the participants treated before C-DOTS implementation was 47 years, and the mean age of participants treated after C-DOTS implementation was 45 years. The distance from the TB patient's home to the HC was greater after C-DOTS implementation (P value <0.001).

Table 4. General characteristics of TB patients from retrospective records in 28 health centres

General Characteristics	Before C-DOTS (Baseline year) (n=428)	After C-DOTS implementation (n=609)	P-value
	%	%	
Male	50.93	55.5	> 0.05
Age (mean)	47	45	> 0.05
Distance to HC			< 0.001
<1km	15.2	7.6	
1-5 km	54.2	54.2	
6-10 km	23.6	24.8	
>11 km	7	13.4	

Source of Referral TB patients

After C-DOTS implementation, C-DOTS increased by 26.6% as a source of referral of TB patients. Health centre records on the source of referral of TB patients increased from 50.9% to 75.9% before C-DOTS and after C-DOTS implementation respectively. The difference observed was statistically significant (P value <0.001).

Table 5: Source of referral of TB patients

Source of Referral TB patients	Before C-DOTS (Baseline year) (n=428)	After C-DOTS implementation (n=609)	P-value
	%	%	**<0.001**
Self-referred	44.6	43.5	
C-DOTs	5.1	31.7	
No Record	49.1	24.1	
Other	1.2	0.7	

Sputum Test

Table 6: Sputum test done at 0 month, at 2-3 months and at the end of treatment

Sputum test	Before C-DOTS (Baseline year) (n =363)	After C-DOTS implementation (n =501)	P-value
	%	%	
At 0 Month			**< 0.001**
Positive	81.27	70.26	
Negative	14.33	24.95	
No Record	4.41	4.79	
At 2-3 months			**>0.05**
Positive	2.03%	1.7%	
Negative	94.58%	94.32%	
No Record	3.39%	3.98%	
At the end of treatment			**>0.05**
Positive	0.3	0.3	
Negative	92.5	93.2	
No Record	7.1	6.5	

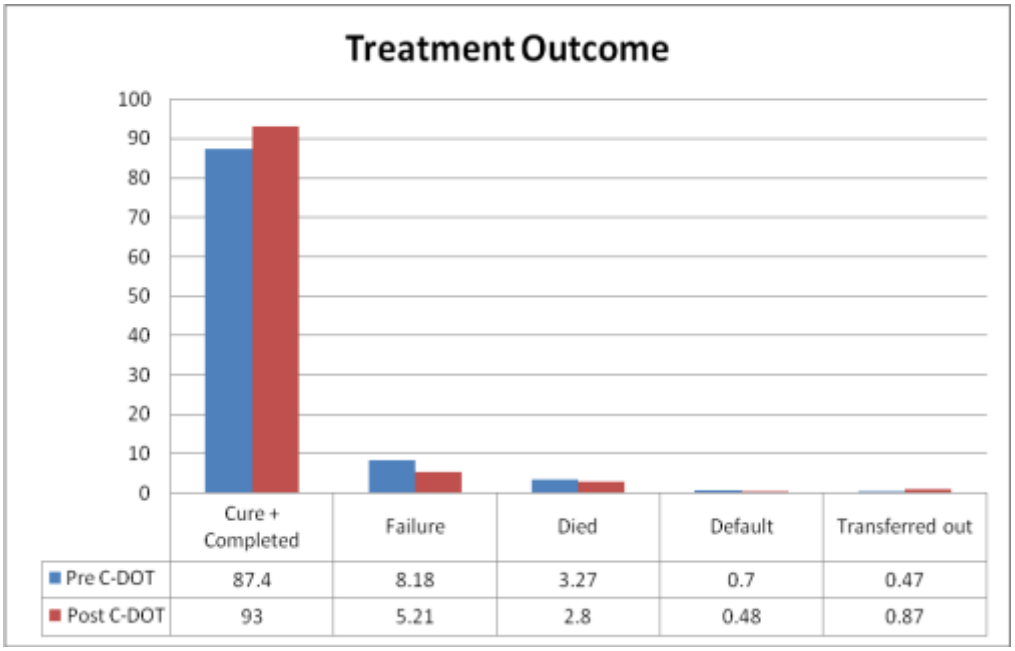
Treatment Outcome

C-DOTS has increased treatment success (cure + treatment completion) in patients. That is, 87.4% of TB patients showed treatment success before C-DOTS implementation as compared to 93% after C-DOTS implementation. The difference observed of 4.6% was statistically significant (P value <0.001). After C-DOTS implementation, treatment failure and case fatality rate (CFR) significantly decreased by 5.1% and 0.8% respectively (P value <0.001).

Table 7: TB patient treatment outcome

Treatment outcome	Before C-DOTS (Baseline year)	After C-DOTS implementation	P-value
	%	%	**<0.001**
Treatment success (Cure + Completed)	87.4	93	
Failure	8.2	3.1	
Died	3.3	2.5	
Default	0.7	0.3	
Transferred out	0.5	1.2	

Figure 3: TB patient treatment outcome



HIV testing

HIV testing increased significantly hence the number of TB-HIV co-infected patients increased from less than 1% to 4.4 %, before and after C-DOTS implementation respectively. The number of unrecorded HIV results decreased from 53.3% before C-DOTS implementation to 20.9% after C-DOTS documentation. This difference observed was statistically significant (P value <0.001).

Table 8. HIV results among TB patients

HIV test result	Before C-DOTS (Baseline year)	After C-DOTS implementation	P-value
	%	%	**<0.001**
Positive	0.9	4.4	
Negative	42.8	74.7	
No Record	56.3	20.9	

HIV+ve on ART

The proportion of TB-HIV patients on ART increased after C-DOTS implementation, from 0.2% before C-DOTS implementation to 2.3% after C-DOTS implementation. The difference observed was statistically significant by Chi-squared test (P value <0.05).

Table 9. HIV-TB patients on ART

HIV+ve, On ART	Before C-DOTS (Baseline year)	After C-DOTS implementation	P-value
	%	%	**<0.05**
Yes	0.2	2.3	
No Record	99.8	97.7	

HIV+ve on CPT

The proportion of TB-HIV patients on CPT increased after C-DOTS implementation, from less than 1% before C-DOTS implementation to nearly 3% after C-DOTS implementation. The difference observed was statistically significant by Chi-squared test (P value <0.05).

Table 10. HIV-TB patients on CPT

HIV+ve on CPT	Before C-DOTS (Baseline year)	After C-DOTS implementation	P-value
	%	%	**<0.05**
Yes	0.5	2.5	
No Record	99.5	97.5	

Type of DOT provider during intensive phase of TB treatment

During intensive phase of TB treatment, the proportion of C-DOT watcher increased significantly after C-DOTS implementation, from 19.4% before C-DOTS to almost 70% after C-DOTS. This difference was statistically significant (P value <0.001). In addition, the proportion of Non-DOT provider reduced significantly before and after C-DOT implementation from 6.4% to only 0.3% respectively (P value <0.001).

Table 11: Type of DOT provider during intensive phase of TB treatment

DOT during TX intensive phase	Before C-DOTS (Baseline year)	After C-DOTS implementation	P-value
	%	%	**<0.001**
C-DOT Watcher	19.4	67.8	
Ambulatory DOT	71.3	27.4	
Hospital DOT	1.4	4.1	
Home care DOT	1.6	0.3	
Non-DOT	6.4	0.3	

Type of DOT provider during continuation phase of TB treatment

During continuation phase, the proportion of C-DOT watcher increased significantly after C-DOTS implementation, from 39.7% before C-DOTS to almost 90% after C-DOTS. This difference was statistically significant (P value <0.001). In addition, the proportion of Non-DOT provider reduced significantly before and after C-DOT implementation from 36.5% to only 6.2% respectively (P value <0.001).

Table 12. DOT provider during treatment continuation phase

DOT during TX intensive phase	Before C-DOTS (Baseline year)	After C-DOTS implementation	P-value
	%	%	**<0.001**
C-DOT Watcher	39.7	86.7	
Ambulatory DOT	15.0	3.1	
Hospital DOT	8.2	3.6	
Home care DOT	0.7	0.3	
Non-DOT	36.5	6.2	

4.1.2 Health Center Staff Survey Results

The majority of the health centre staff who participated in the survey was male (75%). Most of them had received DOTS formal training (82%). Two thirds of the health centre staff interviewed (67%) had received formal DW training. The general characteristics of the 28 health centre staff interviewed are presented in the table below.

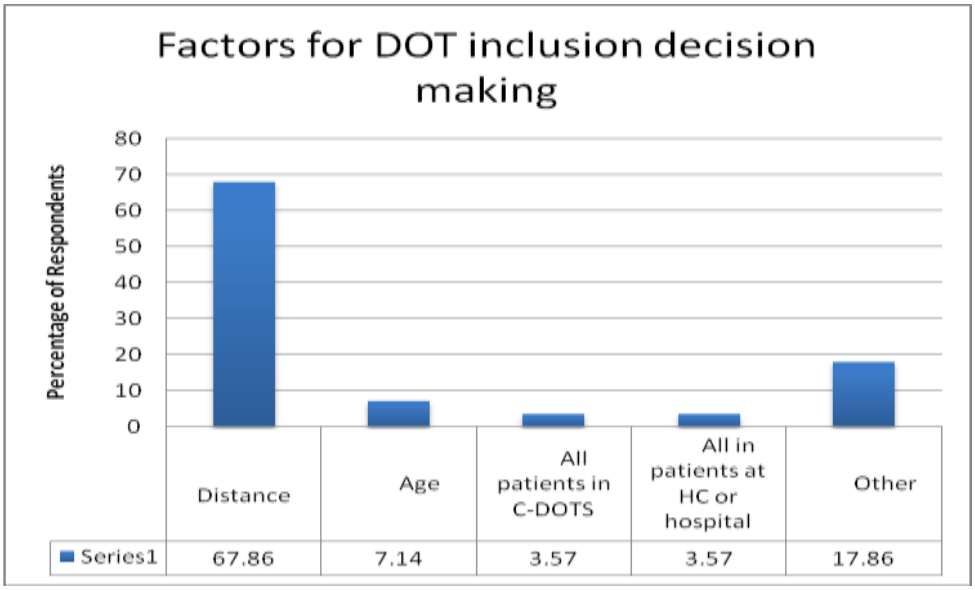
Table 13. General characteristics of 28 health centre staff who participated in the survey

General Characteristics	N and (%)
Male	21 (75)
Qualifications	
Nurse	25 (89.29)
Temporary staff	3 (10.71)
DOTS training	
Formal	23 (82.14)
Informal	4 (14.29)
No training	1 (3.57)
DW training	
Formal	18/27 (66.67)
Informal	3/27 (29.63)
No training	1/27 (3.7)

C-DOTS Processes and activities reported by 28 health centre staff

During the face-to-face interviews that took place at the 28 selected health centres the staff reported key information on the C-DOTS processes and activities conducted at their HCs. The main factor reported for DOT inclusion decision making was long distance from the patient's village to the HC (68%). Other factors that played a key role included patient's age, patients who were staying at the hospital (in patients), patients enrolled in C-DOTS programme among others (see figure 5). On the other hand, the main factor for decision making about treatment at HC/RH was patients who resided nearby the HC/RH (67.8%) as well as commitment from patients. HIV testing was reported to be performed for TB patients usually as part of their routine management under C-DOTS programme (64%). Contact tracing for S+ve patients performed at HC or hospitals was reported to be done as part of C-DOTS programme (35%) likewise under the HC routine patient management (35%). However, at around 20% of HCs contact tracing for S+ve patients was not done regularly along with 10% of HCs were it was not performed. Regular supervisory visits of HC staff (79%) at the different C-DOTS villages were reported.

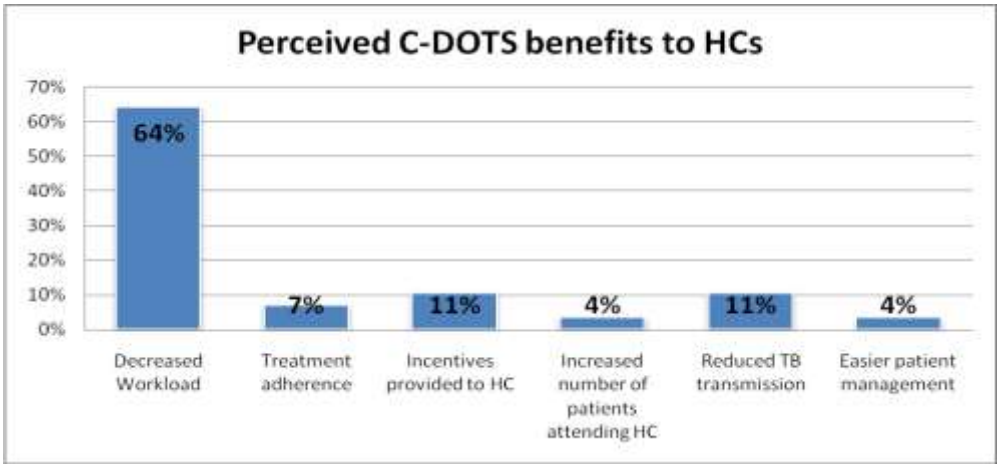
Figure 4. Factors for DOT inclusion decision making



Perceived C-DOTS benefits to HCs

The main perceived benefit to HCs was decrease in workload (64%), followed by the incentives provided to the HC (11%) as well as reduced TB transmission (11%). Others benefits included treatment adherence (7%), easier patient management (4%) and an increase in number of patients accessing HC services (4%) (see figure 6).

Figure 5. Perceived C-DOTS benefits to HCs



Reported health education and TB control activities

Most HCs (68%) reported conducting regular C-DOTS health education activities in their corresponding villages while a quarter of HCs reported (25%) conducting C-DOTS health education activities only occasionally. Only two HCs reported not conducting any C-DOTS health education activities. Most HC staff (82%) reported that TB control activities have increased case detection. Additionally, it was reported that C-DOTS has contributed greatly in terms of TB control on education of staff (50%) and TB reduction (45%), among others.

HC staff satisfaction regarding DW/C-DOTS performance

According to most HC staff (68%), patients highly trust the DWs while (32%) reported that patients somehow trust the DWs. Over 60% of HC staff was highly satisfied by the services provided by the DWs, while others (39%) were moderately satisfied. Nearly 60% of HC staff was highly satisfied with the C-DOTS programme at their HC while the rest were moderately satisfied. In most HCs (89%), HC staff reported that preferential treatment at HCs was given to DWs and their families. About two thirds of HCs reported that stop in current funding will negatively affect current TB related activities.

4.2 DOT Watcher (DW) Assessment Results

Basic characteristics of the respondents in the DOT watcher survey, including the numbers of operational districts and health facilities surveyed are presented in table below. Most DOT Watchers interviewed were literate (88%). The majority of them were community volunteers (70%) or community leaders (16%). DWs reported doing this work for an average of nearly 3 years.

Table 14. General characteristics of 95 DWs who participated in the survey

Characteristics	Mean and range/n and (%)
Male DWs	46 (48.5)
Age[1]	48.5 [24–78]
Level of education (school grade)	7 [1-12]
Literacy	
Illiterate	2 (2.2)
Pre-emerging literate	9 (10)
Literate	79 (87.8)
Occupation	
Unemployed	4 (4.2)
Farmer/Fisher	66 (66.3)
Shop seller	1 (1.1)
Government officer	20 (21.1)
Other	7 (7.4)
Distance from DW's house to HC	
<1 km	4 (4.2)
1-5 km	68 (71.6)
6-10 km	13 (13.7)
11-15 km	7 (7.4)
>15 km	3 (3.2)
Distance from DW's house to HC (km)	4.5 [0-35]
Type of DOT worked for	
VHSG	66/90 (69.5)
Family	12/90 (12.6)
Neighbour or friend	1/90 (1.1)
Former TB patient	0/90 (0)
Community leader	15/90 (15.8)
Length of service as a DW in months	34.1 [1-96]
Number of patients served each month	1.6 [1-5]
Number of patients currently looked after	0.8 [0-6]
Training received	
Formal training	32/87 (36.8)
By NGO/HC staff or direct communication	67/87 (77)

[1] expressed as mean and [range]

No training	1/87 (1.1)
Other	2/87 (2.3)
Length of DW's training [2] (mean, range)	19.5, [1 – 80]
Operational Districts	7
Health facilities	28

Knowledge of the DOT Watchers about tuberculosis (TB) disease and treatment

Knowledge on TB disease (signs and symptoms) was acceptable. The most common TB sign and symptom reported by DWs was coughing for 2-3 weeks (98.9%), followed by fever (71.6%) and weight loss (50.5%). Other symptoms include: night sweats, fatigue, loss of appetite, coughing up blood and chest pain. Under two thirds of DWs (62%) were able to break down treatment duration for category one[3] in terms of intensive and continuation phases. However for category two[4], the majority of DWs were not able to break down treatment duration.

The main reason for treatment completion given by the DWs was "to get cured from the disease" (84%), followed by "to stop continued spread of TB" (51%). Yet 15% of the DWs were aware of the importance of treatment completion and TB drug resistance[5]. Knowledge on TB-HIV co-infection was moderate. Nearly half of DWs (48%) reported that TB patients have an increased risk for HIV and nearly 40% of DWs reported that additional interventions are needed for HIV/TB co-infection.

The majority of DWs understood the importance of contact investigation; most of them reported that household contacts are at higher risk of TB (92%). However, 14% of DWs were aware that medicines can be given to prevent TB for people at risk. The majority of DWs could recall less than five side effects of TB treatment.

Reported knowledge on sputum culture conversion by 2 months of intensive phase was rather low. Two thirds of DWs (66%) gave an incorrect answer and 12% did not know the answer or refused to answer. However, nearly one fifth of DWs (18%) gave a correct answer for form one, yet only a small proportion (4%) gave a correct answer for forms 1 and 2.

[2] 9.5% of DWs had not received training
[3] Total 6 months; 2 months for intensive phase.
[4] Total 8 months; 2 months for intensive phase.
[5] 5% of answers included: other, don't know

Attitudes and practices of DOT Watchers about TB treatment

Reported DWs' attitudes and practices about TB treatment were generally good (see table below). Most DWs administer treatment at patient's house (84%) and most do a home visit after a missed dose (81%). The majority (91%) take an action within the same day of a missed dose. Most DWs (94%) update treatment cards after each treatment dose. TB suspects are actively identified in the community mainly by doing regular home visits (74%) and conducting health education activities (60%).

Table 15. Attitudes and practices of DOT Watchers about TB treatment

Attitudes and practices variable	(n = 95) N (%)
Location of provision of TB treatment	
DW's house	33 (34.7)
Patient relative come to DW's house	4 (4.2)
DW goes to patient's house	80 (84.2)
All of the above	20 (21.1)
Other	9 (9.5)
Action taken after missed dose	
No action	1 (1.1)
Phone call/SMS	1 (1.1)
Home visit	77 (81.1)
Request a family member to remind the patient	25 (26.3)
Other	20 (21.1)
Promptness of action taken after missed dose	
Visit on the same day	86 (90.5)
Visit within 2 days	1 (1.1)
Visit within 1 week	1 (1.1)
No action taken	0 (0)
Other	11 (11.6)
How often TB treatment cards are updated	
After each treatment dose	89 (93.7)
Weekly	4 (4.2)
Rarely	1 (1.1)
Don't know	1 (1.1)
Days spent meeting the TB patient (Mean, Range)	6.1, [1-7]
Identification of TB suspects in DW's village/community	
Regular home visits	70 (73.7)
Health education activities	57 (60)
In campaigns conducted by NGOs	6 (6.3)
TB suspects approach DW	12 (12.6)
TB suspects are referred to DW	6 (6.3)
In the DW neighborhood	22 (23.2)
Other	8 (8.4)

DOT Watchers' perspectives on motivations and incentives

DOT Watchers' perspectives on motivations are outlined in the table below. The main reported reason to work as a DW (80%) was social responsibility to help others. Nearly half of DWs said that they would likely continue their activities if incentives are removed. At the same time, two thirds of DWs said that the essential support needed to sustain DW's work is a regular salary. Nearly 60% of DWs identified contribution to TB control as the most important factor for their work.

One third of DWs reported receive "highly adequate" support from HC staff while the other two thirds reported receiving "adequate" support. However nearly one third reported receiving no support form NGOs (28%) where as nearly half of DWs reported receiving "adequate" support from NGO staff.

Table 16. DOT Watchers' perspectives on motivations and incentives regarding TB service delivery

Motivations and incentives variables	(n = 95) N (%)
Reason to work as a DW	
Expected incentives/enablers	3 (3.2)
Social responsibility	76 (80)
Gain reputation in the community	14 (14.7)
Increase knowledge/skills	14 (14.7)
Advised by family or friends	19 (20)
Lack of people who want to do this job	10 (10.5)
Other	21 (22.1)
Would DW continue if existing incentives are removed	
Very Likely	37 (38.9)
Likely	47 (49.5)
Unlikely	4 (4.2)
Very unlikely	2 (2.1)
Refuse	3 (3.2)
Don't know	2 (2.1)
Essential support needed to sustain DW's work	
Incentive	27 (28.4)
Salary	63 (66.3)
Volunteer work	10 (10.5)
Full time job	14 (14.7)
Other's respect	42 (44.2)
Social responsibility	34 (35.8)
TB-related material	16 (16.8)
Most important factor for DWs	
Social responsibility	10 (10.5)
Contribution to TB control	54 (56.8)
People's respect	2 (2.1)
Free service in the HC	1 (1.1)

Financial incentives	4 (4.2)
Non-financial enablers	3 (3.2)
Attainment of new skills/knowledge	7 (7.4)
Other	5 (5.3)
Receive adequate support from HC staff	
Highly adequate	32 (33.7)
Adequate	62 (65.3)
Inadequate	1 (1.1)
Receive adequate support from NGO staff	
Highly adequate	18 (18.9)
Adequate	47 (49.5)
Inadequate	2 (2.1)
No support	27 (28.4)
Don't know	1 (1.1)

DWs' perceptions on C-DOTS acceptability in the communities

DWs reported perceptions on C-DOTS acceptability in the communities were mostly positive as described in the table below. Nearly two thirds (61%) of DWs reported that it is likely that C-DOTS has increased awareness of TB in the DWs' communities whereas over one third of DWs (37%) reported that it is "highly likely". Most DWs strongly agreed that C-DOTS has made TB services more accessible to TB patients (61%) and nearly 40% of DWs moderately agreed. About half of DWs reported that it is "highly likely" that TB patients accept and trust DW to provide TB services while the other half reported that it was "likely".

Table 17. DWs' perceptions on C-DOTS acceptability in the communities

Perceptions on C-DOTS acceptability variables	(n = 95) No. (%)
C-DOTS has increased awareness of TB in the DWs' communities	
Most likely	35 (36.8)
Likely	58 (61.1)
Don't know	2 (2.1)
C-DOTS has made TB services more accessible to TB patients	
Most likely	58 (61.1)
Likely	36 (37.9)
Don't know	1 (1.1)
Patient accept and trust DW to provide TB services	
Most likely	50 (52.6)
Likely	45 (47.4)

Perceived relationship between DWs and Health Centre

The perceived relationship between DWs and the health centre is described in the table below. Nearly half of DWs (44%) think that they have been "very well" accepted by the HC staff and about the same proportion (52%) think that they have been "well" accepted. Most DWs (80%) reported that HCs provide feedback on patients referred by DW, yet over 10% reported that HC refuses to provide feedback.

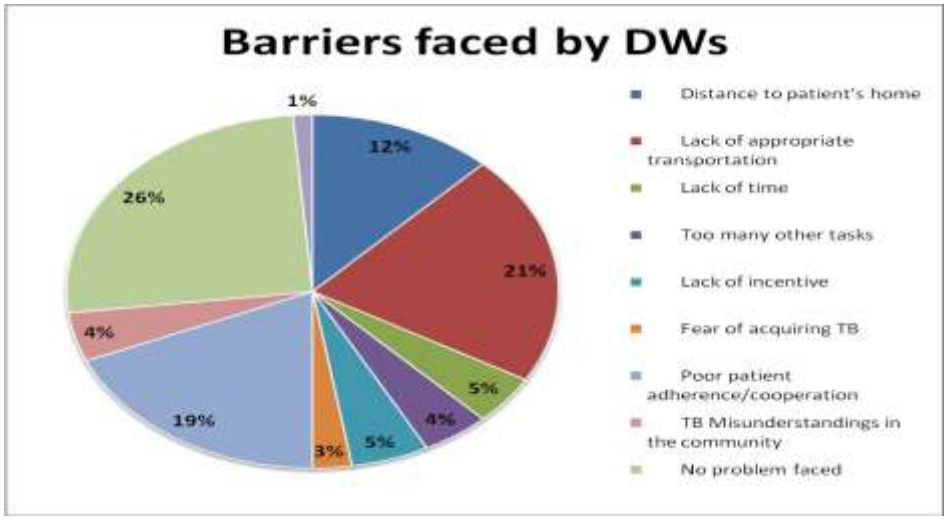
Table 18. Perceived relationship of DW and Health Centre

Perceptions on C-DOTS acceptability variables	(n = 95) N (%)
Do you think HC staff has accepted you well	
Very well	42 (44.2)
Well	49 (51.6)
Don't know	4 (4.2)
Number of TB patients referred to the HC last year (mean, range)	7.5 [0 - 70]
HC provides feedback on patients referred by DW	
Always	76 (80)
Sometimes	6 (6.3)
Refuse	10 (10.5)
Don't know	3 (3.2)

Barriers faced by DWs

The main barriers faced by DWs are the lack of appropriate transport, the lack of patient adherence to treatment and the distance to the patients home; 35%, 31% and 20% of responses respectively (see figure below). Other reported barriers include: lack of time, lack of incentives, fear of acquiring TB and TB misunderstandings in the community. Over a quarter of DWs (26%) reported no problem faced.

Figure 6: Barriers faced by DWs



4.3 TB Patient Assessment Results

Sociodemographic and health characteristics

Basic characteristics of the respondents in the TB patient survey are presented in table 23. Nearly 60% of TB patients were men. The mean age of TB patients interviewed was 51 years old[6]. The mean level of education was 5th grade, primary school; however it ranged from no schooling to 12th grade. Under fifty percent of TB patients were fully literate (49%). The main occupation of TB patients was farmer or fisherman (60%) followed by unemployed (15%). Only 7% of patients were current smokers whereas 44% were previous smokers. The other 50% had never smoked before. Over two thirds of TB patients (77%) were tested for HIV during the course of their TB treatment. Moreover, over 90% of patients had been tested for diabetes. A great majority of patients included in the survey (76.4%) were under C-DOT.

Table 19. Sociodemographic characteristics of all 203 patients who participated in the survey

Characteristics	Mean and range/n and (%)
Males	117/203 (57.6)
Age[7]	51 [17–85]
Level of education (school grade)	5.3 [0-12]
Literacy	
Illiterate	56/203 (27.6)
Pre-emerging literate	50/203 (26.6)
Emerging literate	3/203 (1.5)
Literate	94/203 (46.3)
Occupation	
Unemployed	31/203 (15.3)
Construction worker	9/203 (4.4)
Famer or Fishman	122/203 (60.1)
Store seller	5/203 (2.5)
Government staff	8/203 (3.9)
Other[8]	28/203 (13.8)
Distance from TB patient home to the HC(km)	3.9 [0-45]
Income	355989 [0-4000000]
Tested for HIV during TB treatment	
Yes	156/203 (76.8)
No	43 (21.2)

[6] The survey inclusion criteria was patients > 15 years old

[7] expressed as mean and [range]

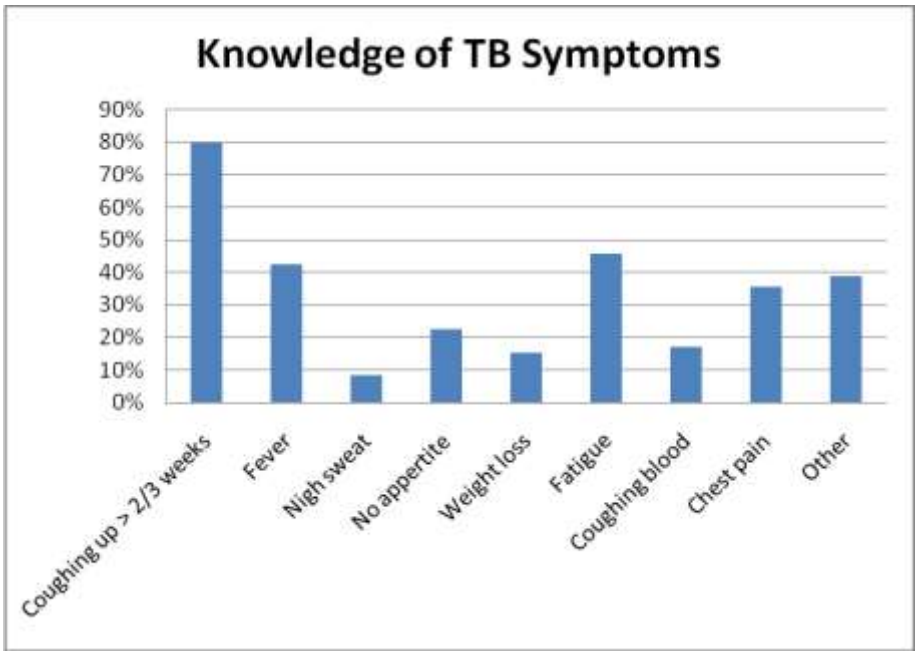
[8] Other include: moto/tuk-tuk driver, taxi/truck private driver, porter cart puller, factory worker, student, security guard, market seller, and don't know.

Don't know	4 (2)
Kind of TB treatment	
C-DOT only	155/203 (76.4)
Non C-DOT	48/203 (23.6)

Knowledge of TB patients about tuberculosis disease and treatment

Most TB patients (89%) reported having received health education. The main sources of HE mentioned were: health centre, media (TV, video, or movie), VHSG home visits, NGOs and short drama. Knowledge on TB symptoms was moderate. The most common TB symptoms reported by TB patients were: coughing for more than 2 or 3 weeks (80%), fatigue (46%), fever (42%) and chest pain (36%) (see graph below). The majority of TB patients (97%) think that TB is an infectious disease. The most common answer on TB prevention was "to cover mouth by mask or scarf when coughing or talking" (97%), most of other kinds of TB prevention were not mentioned.

Figure 7. TB patient's knowledge of TB symptoms



4.3.1 Reported benefits of the C-DOTS programme by the 203 surveyed patients:

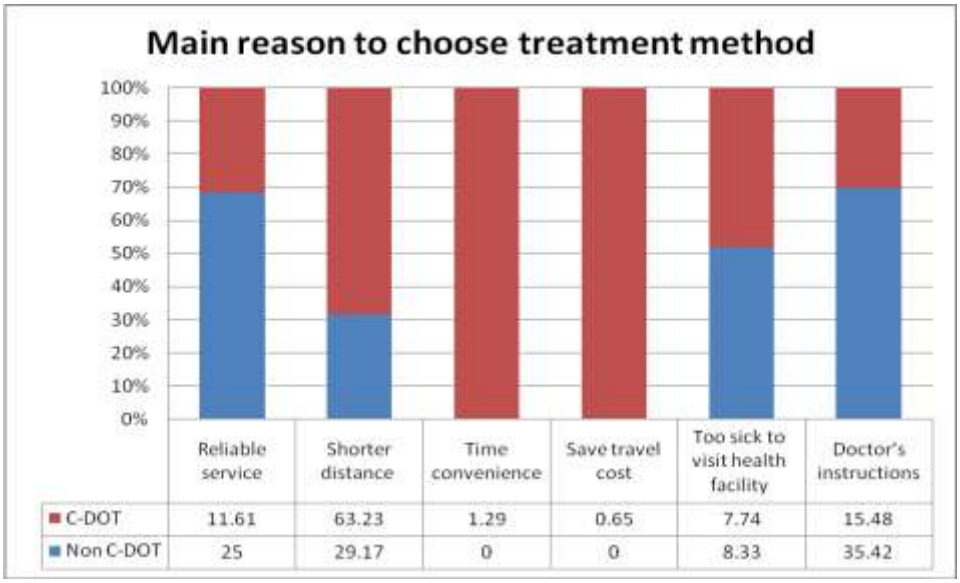
Main determinants for choosing treatment method

Long distances are an issue for TB patients in order to have access to comprehensive treatment. C-DOTS seems to address this issue. The great majority (63.23%) of C-DOTS TB patients choose C-DOTS treatment method because it is shorter distance (P value <0.001). Distance, time and transportation are the main three reasons for patients to choose C-DOTS. The difference was statistically significant (P value <0.001).

Table 20. Main determinants for choosing treatment method

Main determinant for choosing TX method	Non C-DOTS (n=48)		C-DOTS (n=155)		P-value
	N	%	N	%	<0.001
Reliable service	12	25 %	18	11.61 %	
Shorter distance	14	29.17 %	98	63.23 %	
Time convenience	0	0 %	2	1.29 %	
Save travel cost	0	0 %	1	0.65 %	
Too sick to visit health facility	4	8.33 %	12	7.74 %	
Doctor's instructions	17	35.42 %	24	15.48 %	
Other	1	2.08 %	0	0 %	

Figure 8. Main determinants for choosing treatment method



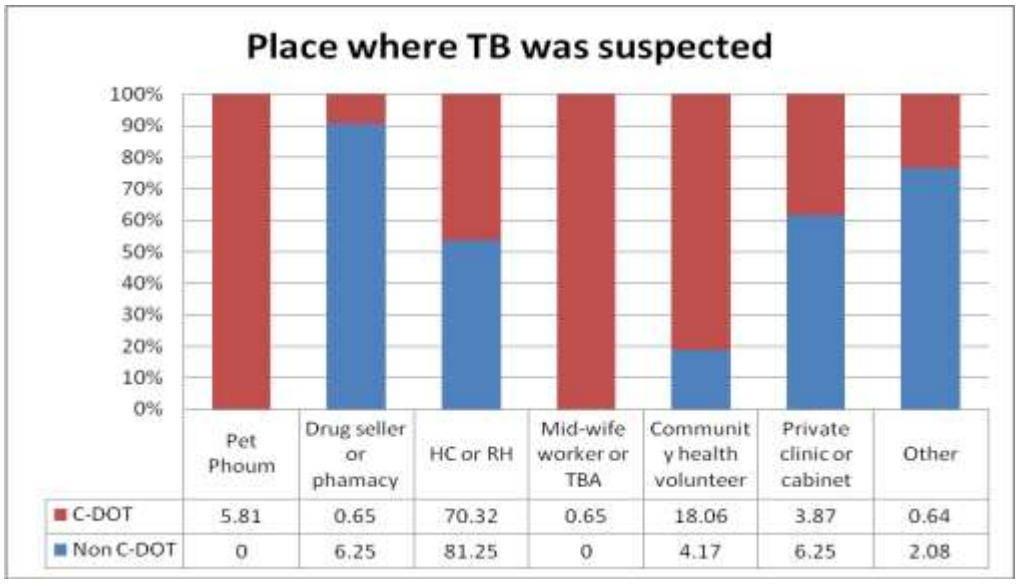
Place where TB was suspected

Nearly one fifth (18 %) of C-DOTS patients, suspected they had TB through community health volunteers as compared to 4.17% of non C-DOTS patients. CHV seem to have a significant contribution in case finding. The difference was statistically significant (P value <0.001).

Table 21. Place where TB was suspected

Place where TB was suspected	Non C-DOTS (n=48)		C-DOTS (n=155)		P-value
	N	%	N	%	<0.001
Pet Phoum	0	0%	9	5.81%	
Drug seller or pharmacy	3	6.25%	1	0.65%	
HC or RH	39	81.25%	109	70.32%	
Mid-wife worker or TBA	0	0%	1	0.65%	
Community health volunteer	2	4.17%	28	18.06%	
Private clinic or cabinet	3	6.25%	6	3.87%	
Other	1	2.08%	1	0.64%	

Figure 9. Place where TB was suspected



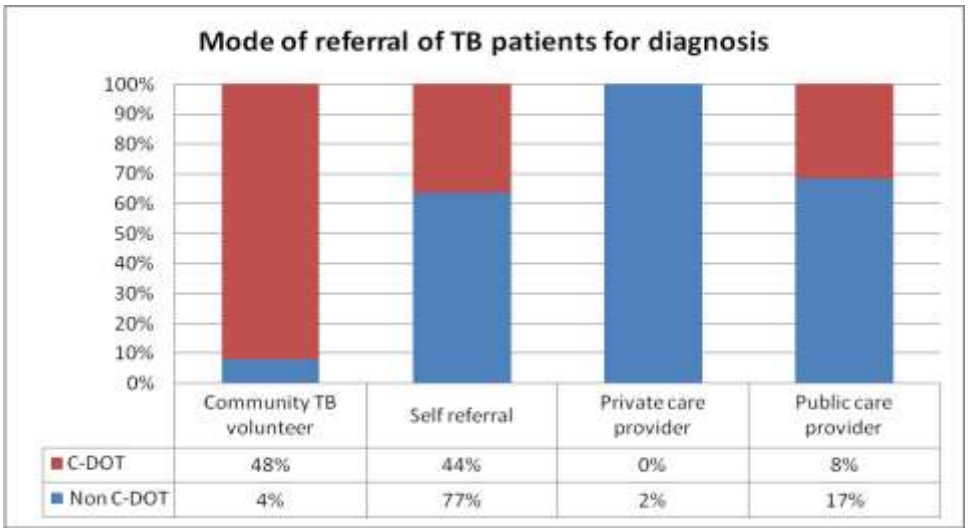
Mode of Referral of TB patients to HC/RH

Case finding is significantly higher through TB volunteers among C-DOTS TB patients (P value < 0.001). This might be due to the fact that distance was reported to be a major factor for DOT inclusion in the decision making among the 28 health centre staff.

Table 22. Mode of referral of TB patients for diagnosis[9]

Mode of referral of TB patients for diagnosis	Non C-DOTS (n=48)		C-DOTS (n=155)		P-value
	N	%	N	%	<0.001
Community TB volunteer	2	4.17%	74	47.74%	
Self referral by friend or family	37	77.08%	68	43.87%	
Private care provide formal and informal	1	2.08%	0	0.00%	
Public care provide hospital worker	8	16.67%	12	7.74%	

Figure 10. Mode of referral of TB patients for diagnosis



[9] percentages have been compared that each value contributes to a total across categories

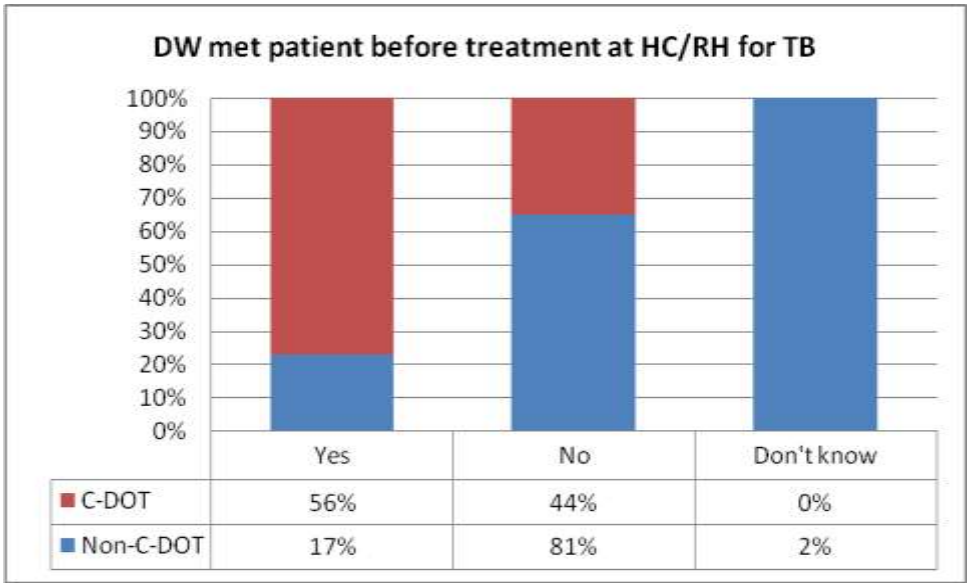
DW met patient before TB treatment at HC/RH

More than 50% of C-DOTS patients were visited by DW before attending the HC/RH for treatment. The difference between non C-DOTS and C-DOTS was statistically significant (P value <0.001).

Table 23. DW met patient before TB treatment at HC/RF

DW met patient before TB treatment at HC/RF	Non C-DOTS (n=48)		C-DOTS (n=155)		P-value
	N	%	N	%	<0.001
Yes	8	16.67%	87	56.13%	
No	39	81.25%	68	43.87%	
Don't know	1	2.08%	0	0.00%	

Figure 11: DW met patient before TB treatment at HC/RF



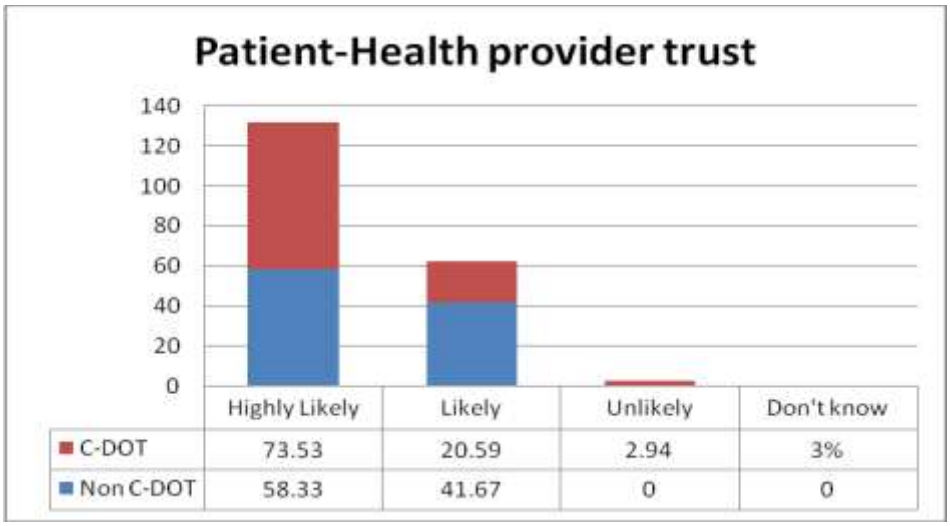
Patient-Health provider trust

C-DOTS patients showed more confidence in their health provider's knowledge to attend their illness (73.53%) than non C-DOTS patients (58.33) (see table below). A greater proportion of C-DOTS patients (74%) expressed that their health facility provider has "very likely" the understanding of their situation in order to provide support to help them get cured than non C-DOTS patients (67%). In addition a greater proportion of C-DOTS patients (68%) reported that their health facility provider was "very likely" available and willing to provide any support to them than non C-DOTS patients (54%). The differences observed in all above observations were not statistically significant.

Table 24. Patient-Health provider trust

Patient-Health provider trust	Non C-DOTS (n=48)		C-DOTS (n=155)		P-value
	N	%	N	%	>0.05
Highly Likely	28	58.33%	25	73.53%	
Likely	20	41.67%	7	20.59%	
Unlikely	0	0%	1	2.94%	
Don't know	0	0	1	2.94%	

Figure 12. Patient-Health provider trust



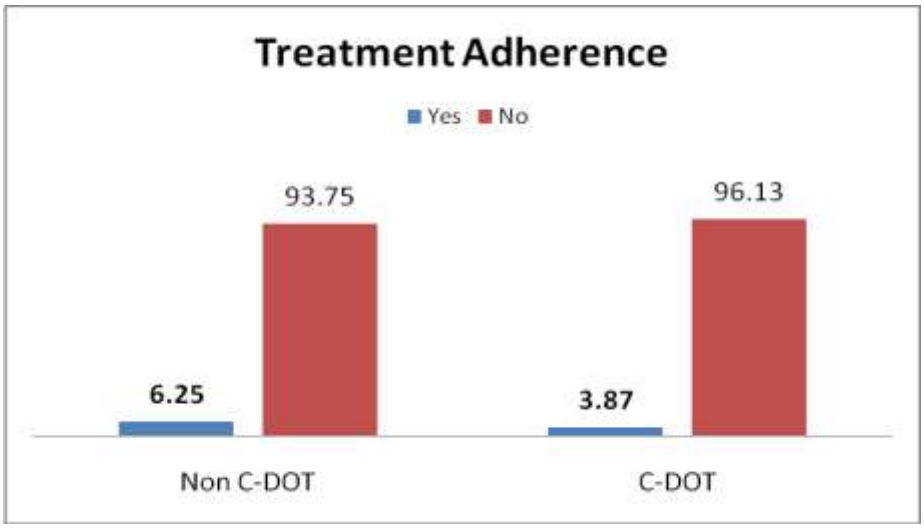
Treatment adherence

Treatment adherence was higher among C-DOTS patients (96.13) than non-CDOTS patients (93.75). Yet, the difference observed was not statistically significant by Chi-squared test.

Table 25. Treatment adherence: TB patients who missed 2 consecutive days of treatment

Missed 2 days of treatment	Non C-DOTS (n=48)		C-DOTS (n=155)		P-value
	N	%	N	%	>0.05
Yes	3	6.25%	6	3.87%	
No	45	93.75%	149	96.13%	

Figure 13. Treatment adherence non C-DOT vs. C-DOT patients[10]



[10] Yes = missed 2 consecutive doses

5. Recommendations

Improve record keeping at health centres

In general health centres have improved their record keeping after C-DOTS implementation. However, there are gaps that need to be addressed in order to fully record the TB patient information, which might subsequently have a positive impact on improved patient management. Moreover, stronger health information systems need to be in place in order to improve TB outcomes.

Address the barriers faced by DWs

Reported barriers faced by DWs need to be addressed in order to facilitate their work and help them to work in a more efficient manner. Some of the barriers mentioned by DWs are the lack of appropriate transport, the lack of patient adherence to treatment, the distance to the patient's home, lack of time, and TB misunderstandings in the community. Due to the long distance from the DWs home and the patient's home, DWs face difficulties in having access to the patient, which can have a direct negative effect on TB treatment outcome. The lack of appropriate transport is one of the main barriers which needs to be addressed.

Improve targeted BCC/IEC strategies and messages for TB patients and community members

TB patients' reported knowledge on TB symptoms and prevention was moderate. In addition, one of the main barriers reported by DWs is TB misunderstandings in the community. TB patient and community members' knowledge about TB disease needs to be improved through targeted behaviour change communication (BCC) strategies including health education, community mobilization, and advocacy. Behaviour Change Communication (BCC) is an interactive process of working with individuals and communities to develop communication strategies to promote positive behaviours as well as to create a supportive environment to enable them to adopt and sustain positive behaviours.

Health education is a key component to increase the patient's knowledge on TB disease and motivate them to change their attitudes and practices towards TB. At a village level, health education can be done through DW's interpersonal communication with TB patient. Besides interpersonal communication, folk media and mass media can also be used. Folk media is essential to help TB patients identify with the message by including the culture and traditions of the local communities. Mass media can be used to reinforce key messages and validate and authenticate messages given at the grass root level by the DOT watchers.

In addition to health education, community mobilization is very important as it develops ownership and empowers communities to play an active role in the programme. Moreover, advocacy should be undertaken at all levels to get the support of key leaders/decision makers for the programme. It reinforces key messages through success stories, acknowledges volunteers and motivates them to work for longer.

Promote further operational research on C-DOTS programme in Cambodia

C-DOTS operational research on C-DOTS programme in Cambodia is needed due to the fact that C-DOTS is one of the main components of the National Tuberculosis Programme (NTP). The present study is the first of its kind to assess the existing C-DOTS programme. Further operational research needs to include the aspects of monitoring and evaluation and programme sustainability. This will facilitate the development of strategies in maintaining the current C-DOT programme over the long term with improved TB treatment outcomes.

References

Community DOTS Guideline, 2004. RHAC

Community Involvement in TB Care and Prevention, 2008. WHO

Community-DOTS and PPM Evaluation in Cambodia, 2008. TBCAP, Cambodia

Five-year Report on Community DOTS and PPM DOTS from 2004-2008, Reproductive Health Association of Cambodia (RHAC)

Guidelines on Community DOTS Implementation, 2004. CENAT, Ministry of Health, Cambodia

Tuberculosis Report 2009. National TB Program, Ministry of Health, Kingdom of Cambodia

Appendixes

Appendix 1. Project timeline

	October				November				December				January				February				March				April				May				June			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Planning with CENAT																																				
Questionnaires																																				
Protocol																																				
CENAT Review																																				
Study SOPs																																				
Interviewer Training																																				
NEC submissions																																				
Data Collection																																				
Site Monitoring																																				
Data Management																																				
Data Analysis																																				
Report Writing																																				

Appendix 2. Informed Consent Forms

Introduction and Informed Consent for TB patients

In collaboration with the National Centre for Tuberculosis and Leprosy Control (CENAT) and other NGO partners, FHI/TBCAP is conducting a study of the Community TB DOTS program in Cambodia to learn how it is being implemented at the community level, to document what works, and how things could be improved. We would like to request your cooperation for about 20 minutes to ask you a few questions. Some of these questions are personal. You are free to refuse to give the answers at any time. All answers are totally confidential. You do not need to reveal your name and there is no way that anyone can identify how you answered these questions. Please be totally truthful in your responses. Your participation is very important and will help Cambodia to improve its health services for people like you.

May we start the interview now?"

☐ 1-Yes

☐ 2-No (if No finish)

Can we take some photos during this interview, which we may use in the report?

☐ 1-Yes (Take photos)

☐ 2-No

Can we access your treatment card from health centre for your TB treatment information?

☐ 1-Yes (go to the last section after the interview is finished)

☐ 2-No

Introduction and Informed Consent for DWs

In collaboration with the National Centre for Tuberculosis and Leprosy Control (CENAT) and other NGO partners, FHI/TBCAP is conducting a study of the Community TB DOTS program in Cambodia to learn how it is being implemented at the community level, to document what works, and how things could be improved. We would like to request your cooperation for about 20 minutes to ask you a few questions. Some of these questions are personal. You are free to refuse to give the answers at any time. All answers are totally confidential. You do not need to reveal your name and there is no way that anyone can identify how you answered these questions. Please be totally truthful in your responses. Your participation is very important and will help Cambodia to improve its health services for people like you.

May we start the interview now?"

☐ 1-Yes

☐ 2-No (if No finish)

Can we take some photos during this interview, which we may use in the report?

☐ 1-Yes (Take photos)

☐ 2-No

CONTACT INFORMATION (to be given to the participants)

If you have any questions or problems about this survey, please contact:

FHI Cambodia office	(Khmer)	023 211 914
Jamie Tonsing	(English)	023 211 914
Chien Samphoas	(Khmer)	023 211 914

Appendix 3. Questionnaires

HC staff interview form

Interview all staff responsible for TB at HC (Fill 1 form for each responder)

Sec 1 General information

Q101 Name of the Health Centre/OD:

Q102 Population covered by the HC:

Q103 Villages covered:

Q104 No of trained DWs attached to this HC:

Q105 Month/Year of starting C-DOTS:

Q106 Gender of interview participant (1 Male, 2 Female)

Q107 Qualification of interviewed staff - 1=Nurse, 2=Doctor, 3=Medical assistant, 4=Others (specify)

Q108 What kind of training did you receive for C-DOTS - 1: Formally organized 1-2 day training; 2: Informally trained by other TB staff/NGO staff using flipcharts or verbally; 3: No training; 4: Others (specify)

Q109 What kind of training is provided for C-DOTS volunteers/DW attached to this HC - 1: Formally organized 1-2 day training; 2: Informally trained by other TB staff/NGO staff using flipcharts or verbally; 3: No training; 4:Others (specify)

Sec 2 C-DOTS: Processes and activities

Q201 How are decisions made on which patients will receive treatment from C-DOT watchers? - 1.Patients from far distance; 2.Patients too old or young; 3. Patients with disability; 4. All patients offered C-DOTS; 5. All patients given IP given at HC/Hospital and CP given by DW; 6: Others- specify. (Multiple Choice, please list answers in terms of priority)

Q202 How are decisions made on which patients will receive treatment at HC or hospital? - 1. Patients who live nearby, 2. Patients who are seriously ill; 3. Others- specify (Multiple Choice, please list answers in terms of priority)

Q203 Is HIV testing of all TB patients conducted at this HC as a routine activity? (1. Yes, part of C-DOTS, 2. Yes, not part of C-DOTS, 3 No)

Q204 Is contact tracing for all S+ve patients being performed? (1. Yes, part of C-DOTS, 2. Yes, not part of C-DOTS, 3. Sometimes, 4. No)

Q205 Are C-DOTS related health education activities and campaigns conducted in the villages covered by the HC? - 1: Yes, 2: No, 3: Sometimes, not regularly

Q206 Are regular coordination meetings for C-DOTS held with community volunteers? - 1: Yes, 2: No, 3: Sometimes, not regularly

Q207 Do you conduct supervisory visits for C-DOTS? (once a week for IP patients, twice a week for CP patients) 1: Yes, 2: No, 3: Sometimes, not regularly

Q208 If No/Sometimes, what is the reason? 1: No time, 2: No funds, 3: Others (specify)

Q209 Does the OD supervisor conduct regular supervisory visit to your HC (once a month at least) - 1: Yes, 2: No, 3: Sometimes but not regular

Q210 Do NGO staff conduct regular supervisory visit to your HC (once a month at least) - 1: Yes, 2: No, 3: Sometimes but not regular

Q211 Do DWs and their families receive preferential treatment at the HC or referral hospital? (1.Yes -User fees waived for DW and family, 2: No, 3: Others- specify)

Sec 3 Contribution of C-DOTS

Q310 We understand that as part of C-DOTS activities, health education activities and campaigns are being organized; community volunteers are identifying and referring TB suspects to the HC.

In your opinion, have these activities contributed to patients perceiving their symptoms as a major illness and thereby seeking care for their symptoms **earlier** ? (1. Very likely; 2 likely; 3: Unlikely, 4: Very Unlikely, 5: Not applicable/Don't know)

Q302 Are C-DOTS activities in the community likely to promote the use of public health facilities (instead of private and informal providers or seeking no care at all) and thereby contribute to **increased** case detection? (1. Very likely; 2 likely; 3: Unlikely, 4: Very Unlikely, 5: Not applicable/Don't know)

Q303 What other ways, has C-DOTS contributed to TB control activities in your area? (please record reply in the way respondent answered the question, use back or additional page if required)

Q304 How has C-DOTS benefited you and your HC? (1.Decreased work load; 2. None; 3. Others -specify) (Multiple choice)

Q305 How do you think C-DOTS has benefited patients? (1.Saves time; 2: Reduced cost for patients; 3: Convenience in terms of flexible timing and closer distance; 4: All of the above, 5: Others -specify)

Sec 4 Quality and acceptability of services

Q401 In your opinion, do patients trust the DW to provide acceptable quality of services? (1. Very likely; 2 likely; 3: Unlikely, 4: Very Unlikely, 5: Not applicable/Don't know)

Q402 Is stigma related to TB, and thereby the chance that patients may not want others to know about his/her TB, likely to be a factor for some patients no to agree to be treated by a

DW from his/her own community? (1. Very likely; 2 likely; 3: Unlikely, 4: Very Unlikely, 5: Not applicable/Don't know)

Q403 Are you satisfied with the overall quality of services provided by DWs? (1. Very satisfied; 2 Satisfied; 3: Unsatisfied, 4: Very unsatisfied, 5: Not applicable/Don't know)

Q405 Are you satisfied with the overall C-DOTS programme in your Health Centre? (1. Very satisfied; 2 Satisfied; 3: Unsatisfied, 4: Very unsatisfied, 5: Not applicable/Don't know)

Sec 5 Motivation and sustainability

Q501 In your opinion, what is the one MAIN motivating factor for DWs ? (1. Social responsibility to help others; 2. Respect from their community; 3. Like to work with the HC/RH staff; 4. Like to work with NGOs; 5. Financial incentives; 6. Enablers/material incentives; 7. Trainings and meeting opportunities; 8. Others- specify)

Q502 If any form of financial incentive for DW were to stop, do you think DWs will continue to perform their duties in the long term? (1.Yes; 2.No; 3. Don't know)

Q503 If current financial and technical support for C-DOTS stops, will it affect TB related activities in your HC? (1.Yes; 2.No; 3. Don't know)

Q504 If yes, how? (please record reply in the way respondent answered the question, use back or additional page if required)

Q505 Besides financial support for C-DOTS which is available through your NGO partner , what other support from your NGO partner is essential to successful implementation of C-DOTS? (1. Technical support; 2. Share work load; 3. Frequent interaction; 4 More responsive/approachable; 5. NGO support not essential; 6. Others-specify)

Q506 If the same financial support is channeled directly from CENAT to the HC through the Govt. channel, would you be able to continue implementation of C-DOTS as before? (1.Yes; 2.No; 3. Don't know)

Q507 Any suggestion to improve C-DOTS? (please record reply in the way respondent answered the question, use back or additional page if required)

DW questionnaire form

DOT WATCHER MODULE

VERSION: 24/11/2010

DOTS Watcher ID Code: .....

To be entered in the computer by a research team member before the interview:

Date of interview: .....

Name of Interviewer……

NGO / Name: ……

Province: …….

OD: …….

HC: …….

Village/Commune: ……

Introduction: (*Paragraph below is to be read out by the interviewer to the participant/ respondent)*

In collaboration with the National Centre for Tuberculosis and Leprosy Control (CENAT) and other NGO partners, FHI/TBCAP is conducting a study of the Community TB DOTS program in Cambodia to learn how it is being implemented at the community level, to document what works, and how things could be improved. We would like to request your cooperation for about 20 minutes to ask you a few questions. Some of these questions are personal. You are free to refuse to give the answers at any time. All answers are totally confidential. You do not need to reveal your name and there is no way that anyone can identify how you answered these questions. Please be totally truthful in your responses. Your participation is very important and will help Cambodia to improve its health services for people like you.

May we start the interview now?"

☐ 1-Yes

☐ 2-No (if No finish)

Can we take some photos during this interview, which we may use in the report?

☐ 1-Yes (Take photos)

☐ 2-No

SECTION 1: SOCIODEMOGRAPHIC CHARACTERISTICS

No.	Questions and filters	Coding categories	Skip to
Now I would like to ask you some questions related to your personal information.			
Q101	How old are you? (complete age in years)	Number of years:..... Refused 98 Don't know 99	
Q102	What is your gender at birth?	Male 1 Female 2 Refused 98 Don't know 99	
Q103	What is your level of your education?	Never attending school 0 Primary school 1 Secondary school 2 High school 3 Bachelor degree 4 Graduate school degree 5 Refused 98 Don't know 99	
Q104	What is your current job (main source of income)? **(only one response)** *Note: If you are both studying and having a paid job, report your main source of income.*	Unemployed 0 Motor/ tuktuk Driver 1 Taxi/truck/private Driver 2 Construction Worker 3 Porter/Cart puller 4 Factory Worker 5 Farmer/Fisherman 6 Store Seller 7 Street Vendor 8 Office Worker 9 Restaurant/Cafe worker (Waiter/Cook/Bartender) 10 Sex Worker 11 Student 12 Security Guard 13 NGO Staff 14 Other …….. Refused 98	

		Don't know 99	
Q105	What is the distance from your house to the nearest Health Centre	……Kilometres	
Q106	What type of DW are you?	VHSG 1 Family 2 Neighbor/Friend 3 Mid wife or traditional birth attendant 4 Former TB patient 5 Community leaders 6 Other …… Refused 98 Don't know 99	
Q107	How long have you been working as a DW?	Year or months……	
Q108	How many TB patients do you provide DOTS to each month, on an average?	Number..……..	
Q109	For how many patients have you served as a DW so far?	Number..……..	
SECTION 2: KNOWLEDGE AND CAPABILITY			
Q201	Who provided you the training to work as a DW?	Never Trained 0 Health Center 1 NGOs 2 VHSG 3 Both NGO and HC 4 Other …….. Refused 98 Don't know 99	→**204**
Q202	What kind of DOTS training has you received?	Formally organized training 1 Informally trained by HC/NGO staff using Flipcharts or verbally 2 No training 3 Other …….. Refused 98 Don't know 99	

Q203	How long was the training?	..……Specify: minutes/hours/Days	
Q204	What signs and symptoms about TB do you know? **(Don't read the answers - Multiple Choices)**	Cough for 2-3 weeks 1 Fever 2 Weight loss 3 Night sweat 4 Fatigue 5 Loss of appetite Coughing up of blood Other …….. Refused 98 Don't know 99	
Q205	How long is the usual duration for Category 1 TB treatment? Note: Sometimes the treatment is extended for 1m, if patient remains smear +ve at end of 2 m intensive phase	Total 6 months (2m intensive and 4 m continuation phase 1 Incorrect answer 2 Other …….. Refused 98 Don't know 99	
Q206	How long is the usual duration for Category 2 TB treatment? Note: Sometimes the treatment is extended for 1m, if patient remains smear +ve at end of 3 m intensive phase	Total 8 months (3m intensive and 5 m continuation phase 1 Incorrect answer 2 Other …….. Refused 98 Don't know 99	
Q207	How do you provide TB treatment to your patients	Patients visit me 1 Patients relatives visit me 2 I visit patients 3 Mixed of the above 4 Other …….. Refused 98 Don't know 99	
Q208	What do you do about patients who miss their doses of medicines? **(Multiple choices)**	No action 1 Call or SMS them 2 Visit their homes 3 Ask their family to remind them 4 Other…… Refused 98	

		Don't know 99	
Q209	How promptly do you take action when patient miss their doses?	Visit on the same day of missed dose 1 Visit within 2 days of the missed dose 2 Visit within 1 week of the missed dose 3 No action 4 Other …….. Refused 98 Don't know 99	
Q210	What is the importance of completing TB treatment? **(Don't read the answers - Multiple Choices)**	To stop continued spread of TB 1 To stop the development of drug resistant TB 2 To get cured from the disease 3 Other …….. Refused 98 Don't know 99	
Q211	What is the importance of HIV testing for TB patient? **(Don't read the answers - Multiple Choices)**	People with TB have higher risk for HIV 1 HIV/TB co-infection will need additional interventions for HIV 2 Other …….. Refused 98 Don't know 99	
Q212	What is the importance of contact investigation? **(Don't read the answers - Multiple Choices)**	TB is spread by air so close household contacts are at higher risk for TB 1 We can give medicines to prevent TB to those at risk 2 Other …….. Refused 98 Don't know 99	
Q213	What are the side effects of TB medicines? Answer: nausea/vomiting, loss of appetite, stomach discomfort, joint pain, jaundice, deafness, dizziness, skin irritation, vision problems.	DW does not know 1 DW can answer at least 5 of them 2 DW can answer all 3 Other …….. Refused 98	
Q214	Do you know when your patient should get sputum exam? (Right Answer: at least at the end of intensive phase and end of the treatment)	Yes 1 No 2 Refused 98 Don't know 99	

	Definitions: The end of intensive phase is 2m for Cat 1 and 3m for Cat2. The end of treatment phase is 6m for Cat 1 and 8m for Cat 2. Sputum exam schedule: Category 1 patient: at month 0, 2, 5 and 6 Category 1 patient: at month 0, 3, 7 and 8		
Q216	How often do you update the treatment cards? And If available, interviewer may check the treatment card to see if it is filled correctly and up-to date	After each dose of medicine is taken 1 Weekly 2 Few times 3 Rarely 4 Refused 98 Don't know 99	
Q217	Are you confident of performing your duties as a DW?	Very confident 1 Confident 2 Not Confident 3 Not very confident 4 Refused 98 Don't know 99	
SECTION 3: MOTIVATION AND ACCEPTABILITY			
Q301	Why did you agree to work as a DW?	Expected incentive and enablers 1 Social responsibility to help others 2 Gain importance in the community 3 Increase knowledge and skills 4 Asked by family or friends 5 Nobody else wants to do it 6 Other…… Refused 98 Don't know 99	
Q302	Do you like your work as a DW?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	

Q303	How many days in each week do you usually spend on working as a DOTS watcher?	1 day 1 2-3 days 2 4-6 days 3 Whole week 4 Refused 98 Don't know 99	
Q304	What kind of support or incentives do you receive to carry on your duties? Multiple choice	Paid per case referred/detected 1 Per diem for meetings 2 TB Trainings 3 Transportation for visiting HC or patients 4 Capacity-building workshops 5 Paid per case treated successfully 6 Other…… Refused 98 Don't know 99	
Q305	If receiving financial incentive, calculate approximate of your incentive amount per month?	……Riel Per Month Not applicable Refused 98 Don't know 99	
Q306	Do you receive other non financial enablers? Multiple choice	No other incentive 0 Mobile phone card 1 Bicycle 2 T-shirt 3 Hat 4 Handkerchief 5 Bags 6 Other…… Refused 98 Don't know 99	
Q307	Do you receive free treatment at HC because of you work as a DW?	Yes 1 No 0 Refused 98 Don't know 99	
Q308	Do you feel this job has increased your standing in the community?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q309	Are you afraid of catching TB disease from your TB patients?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4	

		Refused 98 Don't know 99	
Q310	Do you think that there is stigma associated with TB in your commune?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q311	Will you continue this task if existing incentives and enablers are no longer available to you?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q312	What support is essential to sustain the work of DW?	Incentive 1 Salary Profile 2 Self Volunteer working 3 A full-time job 4 Other person's respect 5 Social responsibility 6 Got many material 7 Other…… Refused 98 Don't know 99	
Q313	Do you feel that you get adequate support from HC staff to carry on your work?	Very adequate 1 adequate 2 inadequate 3 Very inadequate 4 Refused 98 Don't know 99	
Q314	Do you feel that you get adequate support from NGO staff to carry on your work?	Very adequate 1 adequate 2 inadequate 3 Very inadequate 4 Refused 98 Don't know 99	
Q315	What motivates you to continue your work as a DW? Multiple choice	Social responsibility to help others 1 Contribution to TB control in my community 2 People respect me because of this work 3 Free services in the HC 4 Financial incentives 5 Non- financial incentives/enablers 6 Attain new skills and knowledge 7	

		Other…… Refused 98 Don't know 99	
Q316	What is the MOST important motivating factor for you to work as a DW? Choose one	Social responsibility to help others 1 Contribution to TB control in my community 2 People respect me because of this work 3 Free services in the HC 4 Financial incentives 5 Non- financial incentives/enablers 6 Attain new skills and knowledge 7 Other…… Refused 98 Don't know 99	
Q317	Do you think C-DOTS has increased awareness about TB in his community?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q318	Do you think C-DOTS has made it easier for patients to avail of TB services?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q319	Do you think patients accept and trust you to provide good services as their DW?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q320	Do you think HC staff accept and trust you to be a good DW?	Very likely 1 Likely 2 Unlikely 3 Very unlikely 4 Refused 98 Don't know 99	
Q321	What problems do you face in relation to your work as a DW? **(Multiple choices)**	Longer distance to patient's home 1 No appropriate transportation 2 Not enough time 3 I have too many tasks 4 Lack of incentive 5 Fear of getting TB 6 Poor adherence or cooperation from	

		patients 7 Misunderstanding about TB in the village/commune 8 No problem 9 Other…… Refused 98 Don't know 99	

SECTION 4: PRACTICE FOR REFERRAL

Q401	How do you identify TB suspects in your village/commune	I conduct regular home visits 1 I conduct health education activities 2 During campaigns conducted by NGOs 3 TB suspects know and come to me 4 Other people refer them to me 5 Other……97 Refused 98 Don't know 99	
Q402	What is the number of suspect TB cases you referred to the HC or hospital in the past 1 year?	The number of suspect ……. ----------/per month ----------/per 3 months ----------(others)	
Q403	What are the reasons to keep suspect cases of TB from going to the health facility for diagnosis and treatment?	The patient disagreed 1 Problem of transportation 2 Longer distance 3 Self treatment 4 Treatment with other providers 5 No knowledge of TB 6 Other…… ……97 Refused 98 Don't know 99	
Q405	Does the HC provide feedback to you regarding the TB suspect cases you referred to them?	All the time 1 Sometimes 2 Few times 3 Rarely 4 Refused 98 Don't know 99	
Q406	What data are kept on your referral records? **(Multiple choices)**	No data or record 0 Referral time and frequency 1 Treatment information 2 Follow-up plan 3 Other……	

		Refused 98 Don't know 99	
Q407	Does the patient have to bear any cost for your services as a DW (in kind or cash)? If so what or how much is it?	No 0 Yes, in cash 1 Yes, in kind 2 Yes, both in cash and kind 3 Other……..89 Refused 98 Don't know 99	
Q408	If yes, how much did you receive per patient? Note: please covert into money if the interviewee said she/he has received in kind or both.	……..Riels/patient	

TB patient questionnaire form

TB PATIENT MODULE

VERSION: 17/11/2010

Participant ID Code (Use TB registration Number): .....

To be entered in the computer by a research team member before the interview:

Date of interview: .....

Name of Interviewer……

Province: ……..

OD: ……

HC: ……

Name of Commune ……

Introduction: (*Paragraph below is to be read out by the interviewer to the participant/ respondent)*

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May we start the interview now?"

☐ 1-Yes

☐ 2-No (if No finish)

Can we take some photos during this interview, which we may use in the report?

☐ 1-Yes (Take photos)

☐ 2-No

Can we access your treatment card from health center for your TB treatment information?

☐ 1-Yes (go to the last section after the interview is finished)

☐ 2-No

SECTION 1: SOCIODEMOGRAPHIC CHARACTERISTICS

No.	Questions and filters	Coding categories	Skip to
Now I would like to ask you some questions related to your personal information.			
Q101	How old are you? (in complete age in years)	Number of years:..... Don't know 99	
Q102	What is your gender at birth	Male 1 Female 2 Refused 98 Don't know 99	
Q103	What is highest grade of education that you complete?	Grade:……..……. Record 0 If never attended school Under graduated or graduated Level 87 Post graduated level 88 Notice: if the participant was engaging in the old education system, before 1980, the grade should be converted to current education system.	
Q104	How many years did you complete at school?	Number of year: ..... **<u>Recode 0</u> if** never attending school. No response 98 Don't know 99	
Q105	What is your current job (main source of income)? **(only one response)** *Note: If you are both studying and having a paid job, report your main source of income.*	Unemployed 0 Motor/ tuktuk Driver 1 Taxi/truck/private Driver 2 Construction Worker 3 Porter/Cart puller 4 Factory Worker 5 Farmer/Fisherman 6 Store Seller 7 Street Vendor 8 Office Worker 9	

		Restaurant/Cafe worker (Waiter/Cook/Bartender) 10 Student 11 Security Guard 12 NGO Staff 13 Other …….. Refused 98 Don't know 99	
Q106	How much money do you make every month?	Amount of money (in Riel): …… No Response 98	
Q107	Does you income meet with your expenditure?	Yes 1 No 0 Refused 98 Don't know 99	
Q108	What is the distance from your home to the nearest Health Center that you were receiving TB treatment? (Interviewer should ask HC staff to assess distance if patient does not know)	…… Kilometers	
SECTION 2 : CLINICAL CHARACTERISTICS			
Q201	Have you been treated for TB in the past? Note: Patients should have started treatment between April 2009 and March 2010	Yes 1 No 0 Refused 98 Don't know 99	**0→End**
Q202	Do you smoke any form of tobacco?	Never smoked Past smoker Current smoker Refused 98	
Q203	Are you suffering from Diabetes?	Yes 1 No 0 Never Tested 2 Refused 98 Don't know 99	
Q204	Now we need you to tell us where you received the TB	C-DOTS only 1	

	treatment. What kind of DOT treatment *(explain by interviewer)* did you get? *Interviewer has to explain each method below to the participant*	C-DOTS Plus 2 Non-C-DOTS 3	
	1. C-DOTS only means the patient received treatment through Community DOT watcher (DW) for the entire 6-8 months of treatment. **2. C-DOTS plus** means patient received treatment through DW for majority of treatment duration (≥4 months for Cat1& III, ≥5 months for Cat II), but for some time was also receiving treatment through other means such as hospitalized DOT, ambulatory DOT or Home care DOT. **3. Non-C-DOTS** means patient never received care from DW but was treated at public health facility as hospitalized DOT, ambulatory DOT or Home care DOT for the entire duration of treatment. Also includes Non-DOT patients.		
Q205	What was the **MAIN** reason for you to choose this treatment method?	Service is reliable 1 Shorter distance 2 Convenient for my time 3 Incentive 4 Travel cost not needed 5 Too sick to visit health facility 6 Doctor said so 7 Other …….. Refused 98 Don't know 99	
If Q204='3' then skip to Q212			
Q206	If you received treatment at HC or hospital before getting treatment from DW, how long were you treated at that HC or hospital before the C-DOT?	Less than 1 Month 1 2 Months 2 3 months 3 4 months 4 Not Applicable (C-DOTS only) 5 Refused 98 Don't know 99	
Q207	Were you given the option to choose your own DW?	Yes 1 No 0 Refused 98 Don't know 99	

Q208	Who was your DW for TB treatment?	VHSG 1 Family 2 Neighbor/Friend 3 Mid wife or traditional birth attendant 4 Former TB patient 5 Community leaders 6 Other ……89 Refused 98 Don't know 99	
Q209	Did your DW come to your house or you go to DW's house for taking medicines?	I went to DW 1 DW visited me 2 Both 3 Refused 98 Don't know 99	**2 or 3→Q211**
Q210	How did you go to DW's home to get your medicines?	Walking 1 By bicycle 2 By personal motor 3 By personal car 4 By HC or NGO car 5 My family member brings 6 Other ……. Refused 98 Don't know 99	
Q211	How did this DW come to your home to give you the medicines?	Walking 1 By bicycle 2 By personal motor 3 By personal car 4 By HC or NGO car 5 Other ……. Refused 98 Don't know 99	
Q212	Do you get any material support to avail of services for TB?	No 0 Yes 1 Refused 98 Don't know 99	**0→Q301**
Q213	What kind of material support did you get for TB services? **(multiple choices)**	Transportation cost 1 Incentive ($) to complete the treatment 2 Gifts to complete the treatment 3 Food 4 Other89	

		…… Refused 98 Don't know 99	
SECTION 3: HEALTH SEEKING BEHAVIOR & HEALTH SERVICES RECEIVED			
Q301	What kind of health education activities related to TB have you been exposed to? **(Multiple choices)**	None 0 Visit by community volunteers 1 Health education campaigns by NGOs 2 Seen IEC materials (flip-chart, posters, banners, brochures etc) 3 Drama show 4 Video or movie show 5 Refused 98 Don't know 99	
Now, we are asking you to think about what happened when you found out that you had TB symptom.			
Q302	Prior to getting this disease, which TB symptom did you know? **(Multiple choices)**	coughing more than 2 or 3 weeks 1 fever 2 Night sweat 3 No apetite 4 Weight loss 5 Fatigue 6 Coughing up of blood or chest pain 7 Other …….. Refused 98 Don't know 99	
Q303	Did you know that free TB treatment is available at the Health Centre?	Yes 1 No 0 Refused 98 Don't know 99	
Q304	Is TB contagious disease?	Yes 1 No 2 Others…… 3 Don't know 99	
Q305	How to prevent TB transmission from patients to other people?	Cover mouth by mask or scarf when coughing or talking 1 Do not share eating materials together 2	

	(Don't read the answers - Multiple Choices)	Do not sleep together 3 Others……4	
Q306	Where/Whom do you usually consult for your health problems? **(Multiple choices)**	Pet Phoum 1 Drug seller or Pharmacy 2 Health Center or referral hospital 3 Traditional Healer 4 Mid-wife worker or TBA 5 Community Health Volunteer 6 Private lab 7 Private Clinic or cabinet 8 Other …….. Refused 98 Don't know 99	
Q307	Where/Whom did you first approach when you fell ill with TB?	Pet Phoum 1 Drug seller or Pharmacy 2 Public facility (HC or hospital) 3 Traditional Healer 4 Mid-wife worker or TBA 5 Community Health Volunteer 6 Private lab 7 Private Clinic or cabinet 8 Other …….. Refused 98 Don't know 99	
Q308	Have any community volunteers for TB (DW) visited you before you went to HC or hospital for TB treatment?	Yes 1 No 0 Refused 98 Don't know 99	
Q309	Who referred you to the Health Centre/hospital to get tested for TB? **(Multiple Choice)**	Community TB volunteers (anybody trained by C-DOTS programme) 1 Self referral (includes if referred by friends, family) 2 Private care providers (both formal and informal) 3 Public care providers (VCCT, hospital worker etc) 4 Other…… …….. Refused 98 Don't know 99	**if answer <> 2 →Q311**
Q310	If self referred, how did you know this could be TB and that you needed to go to the HC to get tested?	Didn't know it could be TB 1 Knew about TB because of health education activities in the community 2 Other…… …….. Refused 98 Don't know 99	

Q311	Why did you choose to go to HC by your self instead of being referred by community TB volunteers?	I know the HC/hospital 1 HC/hospital easily accessible (nearby) 2 Don't want anyone to know 3 Other…… …….. Refused 98 Don't know 99	
Q312	Number of days between onset of symptoms to the contact with the first provider, if provider is a non public facility? Linked to question 305	<1 week 1 1-2 weeks 2 2 weeks to 1 month 3 > 1 months 4 Not applicable (if patient first provider is public facility) 5 Refused 98 Don't know 99	
Q313	Number of days between onset of symptoms to first contact with the public facility (HC or hospital)	<1 week 1 1-2 weeks 2 2 weeks to 1 month 3 1 - 3 months 4 3 - 6 months 5 > 6 months 6 Refused 98 Don't know 99	
Q314	Number of days between first consultation at public facility, and initiation of treatment (include time for diagnostic tests)	<1 week 1 1-2 weeks 2 2 weeks to 1 month 3 1 - 3 months 4 3 - 6 months 5 > 6 months 6 Refused 98 Don't know 99	
Q315	How much (approximate) did you spend before(for onset of symptom, can be 1 year or 6 months) you came to public health facility for TB treatment?	……..Riel Refused 98 Don't know 99	
Q316	Did you think this cost is reasonable to you?	Very reasonable 1 reasonable 2 Unreasonable 3 Very Unreasonable 4 Refused 98 Don't know 99	

SECTION 4:TREATMENT PROVISION

Q401	When you started TB treatment, what were you told about treatment procedure for TB? Multiple choice	Nothing 0 Type of medicine 1 Treatment duration 2 Side effects of medicine 3 Sputum exam schedule 4 Refused 98 Don't know 99	
Q402	Did you know how long will you receive TB treatment to be completed or cured)?	Number of months: …… Don't know	
Q403	Have you missed any dose for more than 2 days during the treatment?	Yes 1 No 0 Refused 98 Don't know 99	
Q404	Have you ever missed the appointment for sputum examination?	Yes 1 No 0 Refused 98 Don't know 99	
Q405	Have your other family members been examined for TB at the HC or hospital?	Yes 1 No 0 Not told to have them examined Refused 98 Don't know 99	
Q406	What is your HIV status?	Positive 1 Negative 2 Never Tested 3 Refused 98 Don't know 99	 →**Q501** →**Q501** →**Q501** →**Q501**
Q407	If you had both TB and HIV, were you referred to HIV facilities or home based care team?	No 0 Yes 1 Refused 98 Don't know 99	
Q408	If you are HIV + and had or have TB, are you on ART or CPT treatment?	No 0 Yes 1 Refused 98 Don't know 99	
SECTION 5: PATIENT SATISFACTION **For C-DOTS patient (look back to Q204)**			
Q501	Available: Was your DW available and willing to provide any support/advice you may	Very likely 1 likely 2 Unlikely 3	

	need?	Very Unlikely 4 Refused 98 Don't know 99	
Q502	Accessible: Was it convenient for you to visit or communicate with your DW as necessary?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98 Don't know 99	
Q503	Acceptable: Did you think your DW has the necessary knowledge to attend to your illness?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98 Don't know 99	
Q504	Acceptable: Did you think your DW has the understanding of your situation to provide support to help you get cured?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98 Don't know 99	
Q505	Were you satisfied with the services you received from DW for TB?	Very satisfied 1 Satisfied 2 Unsatisfied 3 Very Unsatisfied 4 Refused 98 Don't know 99	
SECTION 5: PATIENT SATISFACTION **For non C-DOTS patient (look back to Q204)**			
Q501	Available: Was your health facility provider available and willing to provide any support/advice you may need?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98 Don't know 99	
Q502	Accessible: Was it convenient for you to visit or communicate with your health facility provider as necessary?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98 Don't know 99	
Q503	Acceptable: Did you think your health facility provider has the necessary knowledge to attend to your illness?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98	

		Don't know 99	
Q504	Acceptable: Did you think your health facility provider has the understanding of your situation to provide support to help you get cured?	Very likely 1 likely 2 Unlikely 3 Very Unlikely 4 Refused 98 Don't know 99	
Q505	Were you satisfied with the services you received from health facility provider for TB?	Very satisfied 1 Satisfied 2 Unsatisfied 3 Very Unsatisfied 4 Refused 98 Don't know 99	

SECTION 6: COST FOR TB DIAGNOSIS AND TREATMENT

Q601	What was the amount spent before finally being diagnosed (including cost related to doctor shopping)	……..riels Refused 98 Don't know 99	
Q602	What was the amount spent at the HC/RH for additional tests and medicines not provided free of charge	……..riels Refused 98 Don't know 99	
Q603	Were you able to meet the cost of your treatment (including travel cost and time)?	Very likely 1 likely 2 Unlikely 3 very Unlikely 4 Refused 98 Don't know 99	
Q604	What do you think about Community-DOTS ? Any suggestion to improve this service?	Very likely 1 likely 2 Unlikely 3 very Unlikely 4 Refused 98 Don't know 99	

THANK YOU VERY MUCH FOR YOUR TIME
(END OF INTERVIEW)

SECTION 7: TB FORM AND TREATMENT (FROM HC RECORDS)
Refer to HC register and Patient Treatment Card
ONLY WHEN THE PATIENT AGREES

Q701	What type of TB was the patient diagnosed with?	Smear positive pulmonary TB 1 Smear negative pulmonary TB 2 Extra- pulmonary TB 3 Don't know 99	
Q702	What treatment category did the patient receive?	Category 1 Category 2 Category 3	
Q703	What is this patient's treatment outcome?	Cured 1 Treatment completed 2 Failed 3 Defaulted 4 Transferred out 5 Don't Know 99	
Q704	Did this patient miss any dose for more than 2 days during the treatment?	Yes 1 No 0 Refused 98 Don't know 99	
Q705	Did this patient ever miss the appointment for sputum examination?	Yes 1 No 0 Refused 98 Don't know 99	
Q706	What is the HIV status recorded in the HC register	Positive 1 Negative 2 No record 3	