ព្រះរាជាណាចក្រកម្ពុជា

ជាតិ សាសនា ព្រះមហាក្សត្រ

KINGDOM OF CAMBODIA
NATION RELIGION KING

ក្រសួងសុខាភិបាល

Ministry of Health

អត្ថបទជាភាសាអង់គ្លេស

ENGLISH VERSION

របាយការណ៍ស្តីពីជំងឺរបេងឆ្នាំ២០១១

TUBERCULOSIS REPORT 2011

រៀបរៀងដោយ មជ្ឈមណ្ឌលជាតិកំចាត់រោគរបេង

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I. Introduction

Cambodia is one of the 22 countries in the world with a high burden of tuberculosis. During the last 11 years, cases of TB notified under the National TB Control Program (NTP) have been increased more then two folds, up to 39,667 cases of all forms in 2011. The impact of HIV/AIDS on TB is still a great concern for the country with high burden of TB / AIDS.

TB control has been given high priority by the Ministry of Health. Encouraged by the strong commitment of the Royal Government of the Kingdom of Cambodia with the Prime Minister, HE Samdech Hun Sen, as the Honorable Chairman of the National Anti-Tuberculosis Committee, it is hoped that a combined effort focused on socio-economic development and poverty alleviation will benefit the vast majority of the population affected by tuberculosis.

In line with the Global Plan and strategy of TB control (2011-2015), the National Tuberculosis Control Program (NTP) aims at achieving the objectives set in the 5 years Strategic plan 2011-2015.

The overall objectives of the NPT for 2011-2015 are to ensure universal access to quality TB services, to maintain the high cure rate of more than 85%, to reduce the prevalence and death rate of TB (all forms) by half, contributing to attaining MDG goals by 2015, compared with the figures of 1990.

In order for the NTP to meet its objectives, participation from all parties, including health workers, concerned institutions, partners, local authorities and communities is critically required.

The DOTS expansion to Health centers is believed to help improve the accessibility of the population to TB services which are provided free of charge. It has helped increase case detection rate and maintain the cure rate over 85%, meeting the target.

At the same time, the NTP will focus on improving the management structure, service provision, health information system (HIS), information, education and communication (IEC), research, investment, drugs, financing and partnership with other NGOs, IOs. Staff have been trained locally and also sent abroad for training in various fields in order to upgrade their skills to provide quality health care for the patients.

In 2011, with strong support from the Royal Government of Cambodia as well as the Ministry of Health and developing partnerts, the impressive achievement were obtained in the field of TB Control in Cambodia. These achievements are due to the efforts made by all stakeholders within and outside the government. However, the NTP also face a number of challenges. This document provides the summarized activities in TB control conducted in the year 2011.

II. Epidemiology of Tuberculosis

2.1. TB in the world :

Currently nearly one-third of the global population, i.e. two billion people, is infected with Mycobacterium tuberculosis. In 2011, around nine million people developed active tuberculosis (TB), and about two million died.[1]

More people are dying of TB today than ever before. TB is the biggest curable infectious killer of young people and adults in the world today [2].

More than 90 % of global TB cases and deaths occur in the developing world, where 75 % of cases are in the most economically productive age group (15-54 years). In general, an adult with TB loses on average three to four months of work time. This results in the loss of 20-30 % of annual household income and, if the patient dies of TB, an average of 15 years of income loss.

[1] WHO, Global TB Control 2011
[2] Fight AIDS, Fight TB, Fight Now: WHO

In addition to the devastating economic costs, TB imposes indirect negative consequences such as children leave school because of their parents contracting tuberculosis, and women are abandoned by their families, as a result of their disease.

TB/HIV co-infection significantly increases the risk of developing TB. Hence the number of TB cases will be increased particularly for countries with a high prevalence of both diseases. Multi-drug resistance, which is caused by poorly managed TB treatment, is a growing problem of serious concern in many counties around the world. TB among mothers and children also poses a concern, especially limited services.

The main reasons for the increasing burden of TB globally are:

- poverty and the widening gap between rich and poor
- neglect of controlling the disease (inadequate case detection, diagnosis and treatment)
- collapse of the health infrastructure in countries experiencing severe economic crisis or civil unrest
- impact of the HIV pandemic
- increasing population

2.2. TB in Cambodia:

Cambodia has been classified by the World Health Organization (WHO) as one of the 22 high burden countries with tuberculosis in the world. In 1997, the WHO experts estimated that 64 % of Cambodian population more infected with Mycobacterium tuberculosis. During the past two decades, the morbidity and mortality rate due to tuberculosis have decreased remarkably in Cambodia. Based on the 2011 WHO report for 2010, the estimated incidence rate of tuberculosis was 437/100,000 population, prevalence rate of tuberculosis was 660/100,000 population and the death rate of tuberculosis was 61/100,000 population. Based on the above figure, Cambodia has reached TB death rate target (MDG TB death rate target by 2015= 87/100,000 population) and will, of

course, probably reach the TB prevalence target (MDG TB prevalence target by 2015= 626/100,000 population).

Before 1994, the result of case detection and treatment of tuberculosis were not satisfactory. For instance in 1993, the case detection rate of smear positive pulmonary tuberculosis nationwide was only about 44 % and the cure rate was 69%. So, the priority problem need to be solved at that time was changing the treatment strategy by applying the Short Course Chemotherapy with Direct Observation, called "DOTS"; and then, the solution to the problem of low case detection.

Since 1994, the application of method for treating tuberculosis through Short Course Chemotherapy with Direct Observation (DOT), has made the NTP to achieve the cure rate result of more than 85 % as target plan.

2.3. TB/HIV:

Many people infected with HIV in developing countries developed TB as the first manifestation of AIDS. The two diseases represent a deadly combination, since they are more destructive each together than either disease alone.

- TB is harder to diagnose in HIV/AIDS patient.
- TB develops faster in HIV-infected people
- TB in HIV-positive people is almost certain to be fatal if undiagnosed or left untreated
- TB occurs earlier in the course of HIV infection than many other opportunistic infections.

Worldwide, 14 million people are co-infected with TB and HIV. 70 % of them are concentrated in Africa[3].

TB is the leading killer of AIDS patients. Up to 50 % of the people living with HIV or AIDS with TB infection develop TB.

TB can be successfully treated even if someone is HIV-infected. Treatment of TB can prolong and improve the quality of life for HIV-positive people but cannot alone prevent people from dying of AIDS.

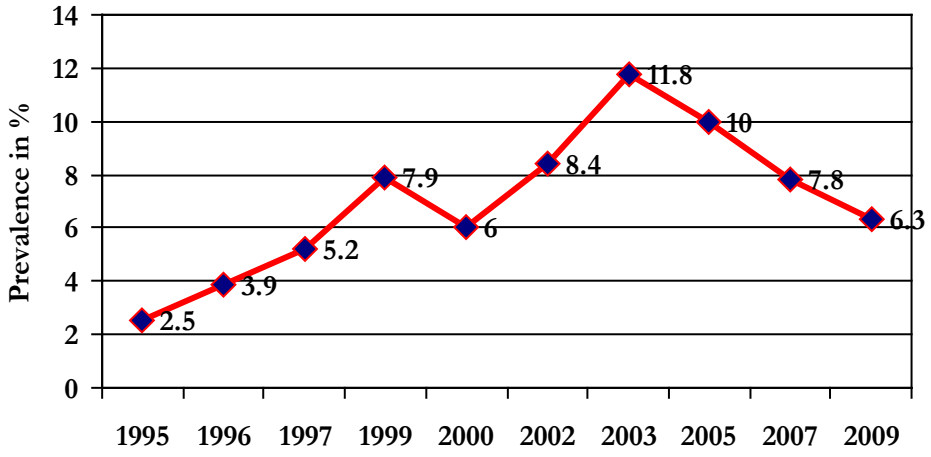
[3] Fight AIDS, Fight TB, Fight Now: WHO

Cambodia is also among the countries with high burden of TB and HIV/AIDS. The surveys showed the increase of HIV sero-prevalence among TB patients as follows :

- 1995 : 2.50%
- 1996 : 3.90%
- 1997 : 5.20%
- 1999 : 7.90%
- 2000 : 6.70%
- 2002 : 8.40%
- 2003 : 11.8%
- 2005 : 10%
- 2007 : 7.8%
- 2009 : 6.3%

The National Tuberculosis Control Programme in collaboration with JICA TB Control Project and partners conducted the National HIV Sero-prevalence Survey among TB patients in 2003 for the 1st round, in 2005 for the 2nd round, in 2007 for 3rd round and more recently with USAID support through TBCAP in 2009 for the 4th round. The result showed that 11.8 %, 10 %, 7.8%, and 6.3% of TB patients respectively were HIV positive.

Trend in HIV Sero-prevalence among TB patients



III. Policies, Strategy and Guidelines

In addition to the number of documents that NTP already developed such as:

- National Policies and strategies for TB control 2011-2015
- National strategic plan for TB control 2011-2015
- National Monitoring and Evaluation plan of the National TB control program, 2011-2015
- Clinical TB/HIV Operational Guideline

In 2011, the National Tuberculosis Control Programme also developed and revised a number of documents such as:

- Tuberculosis Standard Treatment Regimens
- Standard Operating Procedure for TB Control in Prison
- Standard Operating Procedure for referral and case finding for MRD-TB

IV. Capacity Building and Human Resources Development

4.1. Training activities and workshop :

The National Tuberculosis Control Programme (NTP) has organized the trainings and workshops activities in 2011 as follows :

a) Training:

- 22 DOTS strategy training and refresher training courses.
- 09 TB / HIV Training courses.
- 02 TB/ HIV service in prison training courses.
- 02 TB / HIV Training courses through “ Three Is ” strategy.
- 09 Smear Making and Refresher smear making training courses.
- 04 Sputum collection and smear making on MDR-TB training courses.
- 02 Refresher training courses on EQA.
- 20 Second National survey on X-ray reading training courses.
- 01 TB training course on Factory staffs.
- 02 Diagnostic on X-ray reading training courses.
- 03 Clinical on MDR-TB training courses.

- 01 TOT TB training course.
- 01 Training course on leprosy control.
- 01 Intra and extra pulmonary TB diagnosis training course.
- 04 Fluorescent microscopy examination training courses.
- 02 Fluorescent microscopy management training courses.
- 02 Children Tuberculin skin test training courses.
- 01 TB prison's staffs training course.
- 01 Training course on active and diagnostic TB in children.
- 01 TB patients and blood sending training course.
- 01 Training course on COPD(chronic of pulmonary TB disease)
- 06 TB awareness sessions training courses in Factory.
- 01 Meeting on PPM-DOTS.
- 01 Meeting on TB prevalence survey.

b) Workshops:

- 01 World TB day
- 01 Annual TB Conference for TB control in 2010
- 01 TB Quarterly workshop.
- 01 Workshop on C-DOTS and TB/HIV activities.
- 02 Workshop on Evaluation and sharing the experience between Partners and private clinics.
- 01 Workshop on planning to fight against MDR-TB.
- 01 workshop of Mid-term evaluation on the Second National TB Prevalence Survey.
- 02 Workshops on the Improved Quality of TB diagnosis.
- 05 Workshops on the Improved Quality of Chest X-ray reading.
- 01 Workshop on motivation between private clinic on TB-PPM-DOTS.
- 01 Workshop on the start-implementation of TB/HIV activity in prison (supported by FHI).
- 01 Workshop on the start-implementation of TB/HIV activity in prison (supported by CRS).
- 04 Workshops on TB in prison.
- 03 Workshops on Second line-drug Management.

- 01 Workshop on TB Quality control of Fluorescent Microscopy.
- 04 Workshops on EQA.
- 01 Workshop on Laboratory Management.
- 02 Workshops on TB diagnosis in children.
- 02 Workshops on case Management and care for TB in children.
- 01 Workshop on COPD (Chronic Obstructive Pulmonary Disease).
- 01 Workshop on Isoniazid drug use to prevent TB disease

* NTP also sent the TB staff to attend the international training courses, study tours and meeting/conferences in 2011 as follows:

- Philippine : 1 persons
- Thailand : 9 persons
- Japan : 2 persons
- Viet Nam : 12 persons
- China : 3 persons
- Malaysia : 2 persons
- France : 9 persons
- Switzerland : 4 persons
- Lao PDR : 5 persons
- Singapore : 2 persons
- Netherlands : 1 person
- Ethiopia : 1 person
- Italy : 2 persons
- Korea : 1 person

4.2. Supervision:

To strengthen the TB control activities and improve the capacity of staff at peripheral level, in 2011 NTP conducted the 501 TB supervisory visits throughout the country.

V. Financing

NTP formulated 5-year expenditure framework in accordance with the strategic plan with active consultation with major donors and clear indication of funding gaps. Also, budget plan for 2011 was developed based on annual activity plan. NTP negotiated with potential partners for financing the program. These indicate the improved ability of CENAT in terms of financial mobilization for TB control activities.

Since April 2009, CENAT was charged additionally which new responsibility as Principal Recipients (PR) for GFATM-TB Round 7 managing the financing of 11 sub-recipients (SRs). However, GFATM-TB Round 5 ended in October 2011. NTP has experienced in delay in fund disbursement from GFATM-TB Round 7 Phase II. Because a number of NTP support projects has been finished and some projects will end in near future and since the GFATM-Round 11 is cancelled, NTP will face the tremendous financial shortage in coming 5 to 7 years. The gap for NTP budget plan from 2014 to 2018 will be around 60% to 70%.

VI. Drugs and Lab. Reagents

National Tuberculosis Program (NTP) monitors closely the situation of TB drug consumption, laboratory reagents, estimate future drug requirement and laboratory reagents as well as budget estimation.

TB Drug Management (TBDM) is the one core element of the five elements of DOTS strategy because TB drug is an essential weapon for TB control. If each element has not well functioned, it will affect the greater part of the performance of TB Program.

In order to improve TB Drug Management, NTP in collaboration with Department of Drug and Food, Central Medical Store (CMS) of ministry of health (MoH), and TB partners have done the following activities on TBDM:

- NTP monitors closely the stock situation, distribution and the use of TB drug through monthly report of Central Medical Store, Ministry of Health.

- In September 2011, NTP Cambodia received childhood TB drugs grant from Global Drug Facility (GDF) for the first year of the second term. NTP also has requested TB drugs the quantity of 3 moths period in emergency manner to GDF with aggreement that the drugs will be released to Cambodia at the beginning of 2012.

- In 2011, NTP received TB drugs supported by GFATM Round 7 through direct procurement process and based on forecasting and quantification of TB drug needed for 2012 and 2013 request was submitted to Global Fund.

- NTP always sends its officers to attend regular drug management meetings organized by MOH to report NTP TBDM activities and obtain information on the current national drug management issues.

VII. Service provision

The diagnosis and treatment of tuberculosis are free of charge in all TB services throughout the country. Currently, there are 1,080 health facilities providing DOTS, which include 75 RHs and 960 HCs.

7.1. Case Detection Activity :

TB case detection nationwide in 2011 is as follows:

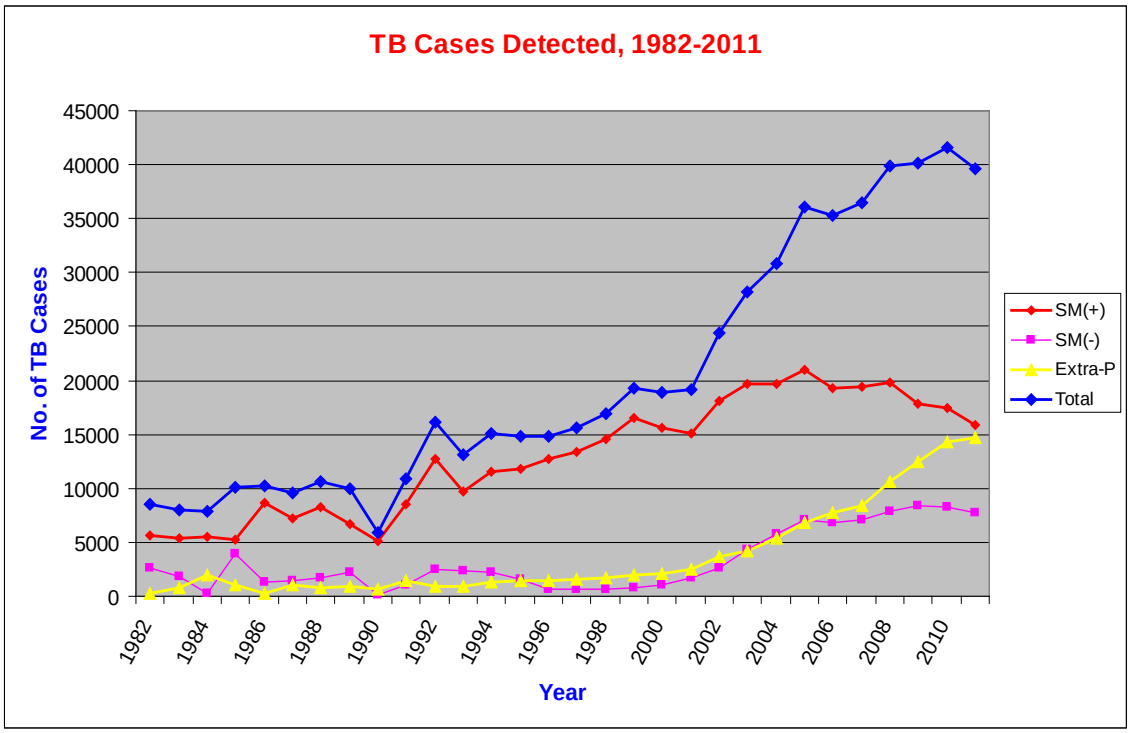
Case Detection in 2009	Number of TB cases
New smear positive pulmonary TB	15,812
Relapse	367
Failure cases	49
Return After Default	30

New smear negative pulmonary TB	7,686
New extra pulmonary TB	14,690
Other Cases	1,036
Total (all form of Tuberculosis)	39,670

The table below shows the age and sex distribution of the new smear positive pulmonary TB case detection in 2011.

Age	0-14	15-24	25-34	35-44	45-54	55-64	> 64	Total	%
M	34	791	1,469	1,557	1,972	1,439	1,339	8,537	54
F	39	690	1,211	1,092	1,528	1,473	1,242	7,275	46
Total	73	1,481	2,680	2,649	3,500	2,912	2,581	15,812	100
%	0.4	9.2	17	17	22	18.4	16	100	

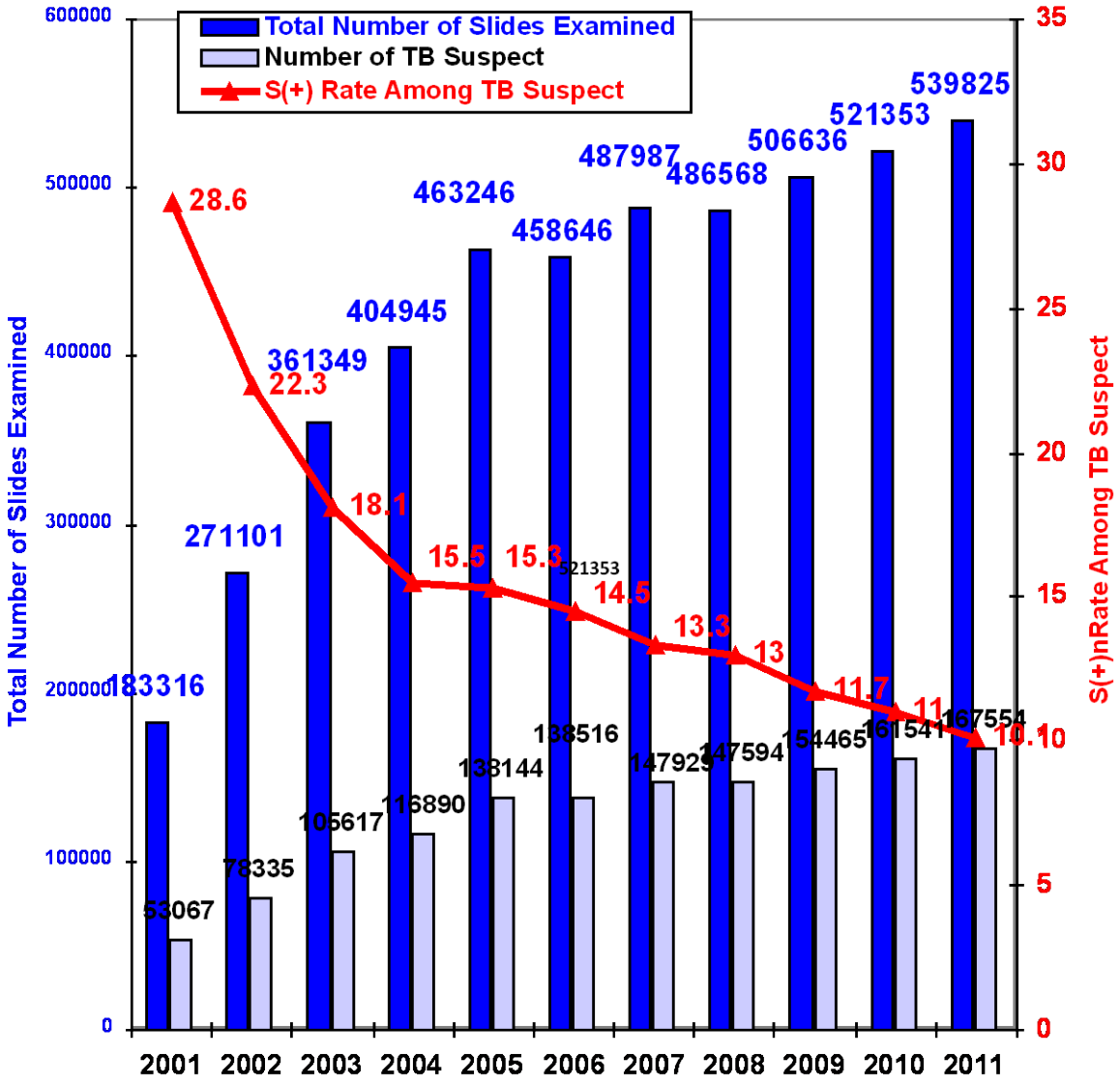
TB Cases Notification, 1982-2011



7.2. Diagnosis by bacteriological examination:

The total slide number that National Tuberculosis Program used for TB smear examination in 2011 was 539,825 (detection and control) of which 492,756 slides were detection. The positive rate among smear detection is 10.1%.

To strengthen the quality of sputum examination, NTP has examined slides again. This is one of the laboratory quality assurance activities. Results showed that false positive rate was 1.9%, false negative 1.6%, and agreement rate 98.4% for the first 3 quarters in 2011. The positive rate among the pulmonary TB suspect patients is around 10.1%.



7.3. Sputum Conversion rate at month 2:

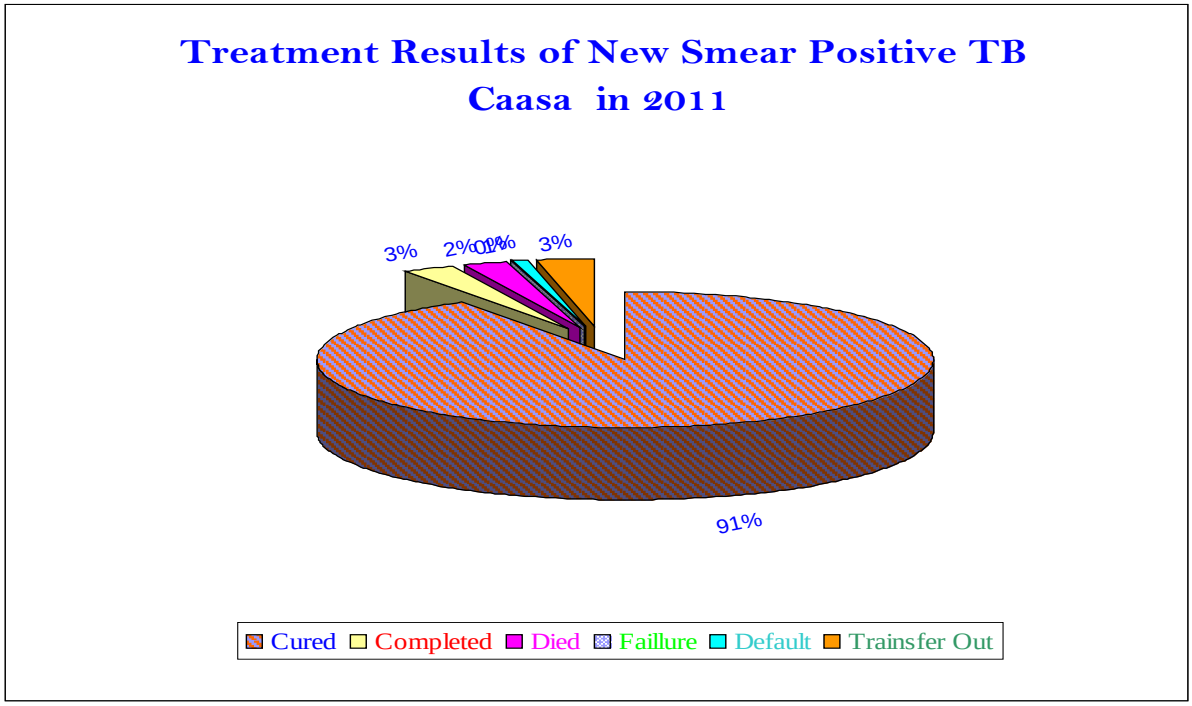
The Conversion rate at month 2 from sputum positive to negative is 95.5 % in 2011.

7.4. Treatment Results:

Due to the existence of good recording and reporting system, the National Tuberculosis Control Program can evaluate the treatment results through Cohort Analysis for TB patients registered under treatment in previous 12 months (2010).

For 17,441 new smear-positive TB patients that received Cat-1 (2RHEZ/4RH) treatment regimen, the treatment results in 2011 are as follows (see table2 in the annex for the details by province).

- Cured : 91 %
- Treatment completed : 3.0 %
- Died : 2.0 %
- Failure : 0 %
- Defaulted : 1.0 %
- Transferred out : 3.0 %



7.5. *DOTS provided by CENAT Home Care DOTS in Phnom Penh* :

CENAT provided Home Care DOTS to 170 TB patients in Phnom Penh in 2011. Of those, 52 were smear-positive pulmonary TB, 44 were smear-negative pulmonary TB, and 74 were Extra-pulmonary TB.

7.6. *Other Activities* :

In 2011, National TB Control Pragram has conducted active case finding of tuberculosis among children in 6 provinces (Kg Chhnang, Kg Speu, Takeo Prey Veng, Bantheay Meanchey and Kg Cham provinces).

In summary, 13,713 children has been examined and tested by tuberculin skin test. Of those 13,713 children, 660 children were diagnosed as active TB cases and put on treatment.

This achievement was due to close collaboration between health workers at provinces, district and health centers together with VHSG.

VIII. DOTS Expansion

In order to increase case detection and to reach MDG 2015 target, the maintenance of HCs DOTS is one of the main activities of the program. In summary, in 2011, there is more than 1,080 health facilities provide TB treatment with DOT nation-wide. The NPT was able to maintain the functioning of these TB care services in a sustainable manner.

IX. Community DOTS

9.1. The Overall Goal of Community DOT implementation :

The Overall Goal of Community DOTS implementation is to improve case finding through referral of TB suspects by community volunteers and to provide TB drug to patients who are unable to take TB drug everyday at Health Center and only less severe patients, and to ensure that TB patients take TB drug

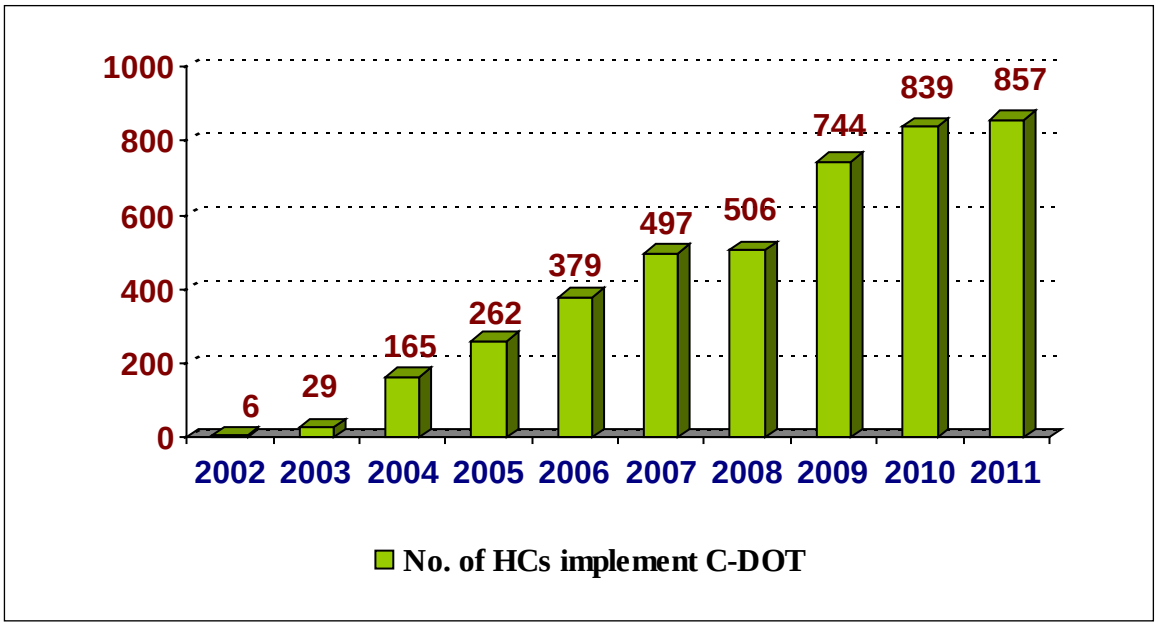
correctly, completely and to support the implementation of the new 6 month treatment regimen with 4 FDCs.

9.2. Background of Community DOTS :

In 2002, in cooperation with CENAT, three ODs began piloting a Community DOTS (C-DOTS) programme – Bakan OD (Pursat Province), O'Chrouv and Preah Net Preah ODs (Banteay Meanchey Province), which were supported by CARE. In 2003, further pilot projects were established in Angkor Chey OD (Kampot province) under support from RACHA, in Svay Rieng and Chipou ODs (Svay Rieng Province) under support from CHC, and Mongkol Borei OD (Banteay Meanchey province) under support from CARE. In 2004, C-DOTS program was nationally scallep up starting from Kratie OD, Kratie Province (in collaboration with PFHD), Kampong Cham Province (in collaboration with SCA) and in Battambang Province (in collaboration with RHAC).

In 2011, the total Health Centers implementing Community DOTS was 857 HCs.

9.3. Expansion of CDOTS Health Center :



Through this Chart :

- By 2002, 6 health centers were implemented C-DOTS
- By 2003, 29 health centers were implemented C-DOTS
- By 2004, 165 health centers were implemented C-DOTS
- By 2005, 262 health centers were implemented C-DOTS
- By 2006, 379 health centers were implemented C-DOTS
- By 2007, 497 health centers were implemented C-DOTS
- By 2008, 506 health centers were implemented C-DOTS
- By 2009, 744 health centers were implemented C-DOTS

In summary, 857 HCs cumulatively have been implementing Community DOT (C-DOT) in 68 ODs by the end of 2011.

9.4. Achievement of CENAT related to CDOTS :

- Guidelines on Community DOTS Implementation was developed in 2004 and have been distributed.
- Guidelines for supporting TB treatment " DOTS Supporter " have been distributed.

9.5. Contribution of Community DOTS implementation :

In addition to the availability of good quality of DOTS services at public health facilities (1,080), community DOTS contributes to improving access to information (place where to receive TB diagnosis and treatment), increasing awareness of tuberculosis and its signs and symptoms, decreasing levels of stigma in the communities, and maintaining good compliance to treatment leading to increase case notification and excellent treatment outcome more than 85% countrywide.

9.6. Health Centers implement C- DOT in 2010 support by NGOs :

In 2011, there are 13 implementers operating C-DOTS in 857 HCs as shown in the table below:

Name of C-DOTS implementers	No of HC
CATA	21
CHC	166
CRS	33
FHI	54
HEAD	93
HU	10
P-FHAD	82
PK	10
RHAC	193
RACHA	122
SCA	60
SHCH	5
VORORT	8
Total	857

9.7. Constaints and Challenges :

- Sustainability of C-DOTS would be questionable after completion of GFATM Round 7.
- Limited Quality of Community DOTS implementation: HC staff's capacity is still limited to arrange C-DOT, to do supervisory visits to the communities, to provide health education to patients and DOT Supporters, and to do completely and accurately recording and reporting relating to C-DOTS.
- Movement of population: TB patients or sometime DOT watcher move seasonally to earn their living, without communicating with HC staff.
- Motivation the HC's staff and OD TB supervisors is limited
- The co-infection of TB / HIV.

X. Collaborative TB/HIV activities:

10.1. Training :

In collaboration with National Center for HIV/AIDS, Dermatology and STD (NCHADS), National Center for TB and Leprosy Control (CENAT) jointly conducted Three I's strategy training and implementation in 35 OI/ART sites by 2011 as listed below:

- Banteay Meanchey (3): Mongkul Borey, Serey Sophorn, and Poipet
- Battambaneg (4): Battambang Referral Hospital, Maung Russey, Sampov Loun and Thmorkol
- Pailin (1): Pailin Referral Hospital
- Pursat (1): Sampov Meas Referral Hospital
- Kampong Chhnang (1): Kampong Chhnang Referral Hospital
- Kandal (1): Chey Chamneas Referral Hospital
- Kampong Cham (4): Kampong Cham Referral Hospital, Tbaung Khmom, Memot and Cheung Prey,
- Prey Veng (3): Prey Veng Referral Hospital, Neakleung and Pearaing
- Kampong Speu (2): Kampong Speu Referral Hospital and Outdong
- Takeo (3): Daunkeo, Kirivong and Angroka
- Svay Rieng (1): Svay Rieng Referral Hospital
- Koh Kong (2): Smach Meanchey and Sre Ambil
- Kampot (1): Kampot Referral Hospital
- Sihanouk Ville (1): Sihanouk Referral Hospital
- Siem Reap (3): Siem Reap Referral Hospital, Sotnikum and Kralanh
- Phnom Penh (2): Hope Center and Social Health Clinic
- Kampong Thom (1): Kampong Thom Referral Hospital
- Kratie (1): Kratie Referral Hospital

With financial support from US-CDC, both National programmes conducted the refresher TB/HIV training to the US-CDC focus provinces. The trained sites are OD Maung Russey, Battambang, Sampov Loun, Pursat, Bakan, Mongkulborey, Preah Net Preah, Poipet, Thmor Kol and Pailin.

10.2. Supervision :

Jointly supervision and coaching of CENAT and NCHADS, US-CDC and FHI have been conducting to the sites where 3Is strategy is implementing. The challenges found to be addressed in the field are 1/work is quite new for them, 2/workload for the staff at the field and 3/shortage of staff who are working at OI/ART and TB as well.

10.3 . TB/HIV Data :

HIV / AIDS Amongst TB Patients, 2011									
Quarter	Number of TB cases registered for treatment (including HIV+)	Number of TB Cases Registered for treatment (excluding HIV+)	Number of TB Cases Referred to VCT for HIV testing	Number of TB Cases tested for HIV at VCT	**HIV+**	**HIV -**	**CPT**	**OI / HBC**	**ARV**
1	10,350	9,995	8,014	7,827	70	7,757	360	332	293
2	10,113	9,770	8,184	7,877	68	7,810	319	322	281
3	9,821	9,494	8,090	7,972	80	7,885	389	360	377
4	9,387	9,011	7,811	7,518	64	7,454	388	357	355
Total	39,670	38,270	32,099	31,194	282	30,906	1,456	1,371	1,306

Based on the above table, 84% (32,099/38,270) of unknown HIV TB patients were referred for HIV testing, then out of them around 97% (31,194/32,099) tested for HIV at VCCT. The positive rate of HIV in unknown HIV status TB patients who were referred and tested at VCCT is around 1% (282/31,194).

Since National TB control program receives budget supports (from TBCAP, GFATM, CHC, and other NGOs) for refer TB patients or refer TB patient blood to VCCT for HIV testing, number of TB patients tested is increasing from 54% in 2008 to 70.59% in 2009, 79.28% in 2010 and 84% in 2011. Cotrimoxazole preventive therapy for co-infected TB/HIV patients is increasing from 65% to 85.5% in 2010 and 2011, respectively. Anti-retroviral

treatment during TB treatment is also increasing from 45% to 78% in 2010 and 2011, respectively.

INH preventive Therapy for people living with HIV/AIDS who are not likely having TB disease is increasing from 172 to 1,043 in 2010 and 2011, respectively.

TB Among PLHIV 2011								
Quarter	Number of HIV + clients registered at VCCT	Number of HIV+ clients at VCCT referred to OI/ART service for TB screening	Number of HIV+ clients screened TB at OI/ART	BK+	BK-	EPTB	Total	Number of HIV+ received IPT
1	1,162	902	1,317	56	112	131	299	277
2	1,214	859	1,302	51	124	99	274	240
3	1,122	935	1,468	96	127	122	345	314
4	902	646	1,193	57	122	90	269	212
Total	4,400	3,342	5,280	260	485	442	1,187	1,043

XI. Multi drug resistant TB (MDR-TB)

11.1. Background :

Cambodia NTP started Programmatic Management of Drug-resistant Tuberculosis (PMDT) since 2006 in collaboration with partners especially Cambodian Health Committee (CHC), Médecin Sans Frontière France (MSF/F), WHO and Medecin Sans Frontière Belgique (MSF-B). The Cambodia PMDT started to expand nationwide in early 2011 with cooperation from partners such as WHO, GFATM, CHC, MSF/F, USCDC/GAP, TBCARE, Pasteur Institute to initiate the MDR diagnosis, and treatment.

By the end of 2011, there are 11 MDR-TB treatment sites with 65 isolations rooms in whole country (see table below).

N°	Treatment Site	Number of Isolation Rooms
1	CENAT	14
2	Mittapheap Khmer-Soviet Hospital	10
3	Battambong	6
4	Takeo	4
5	Siem Reap	2
6	Svay Rieng	2
7	Koh Kong	2
8	Kampong Cham	6
9	Kampong Chhnang	3
10	Kandal	6
11	Banteay Meanchey	10
Total		**65**

11.2. Case finding strategies :

Our project has selected 4 criteria for case finding strategies:

1. All Pulmonary-TB re-treatment cases (Relapse, Failure, Return After Default, and S(-) PTB others)
2. Smear non converter at month 2/3 of TB treatment
3. Symptomatic close contacts of MDR-TB cases (cough for more than 2 weeks)
4. HIV/S(+)PTB patients

   This strategy is conducted for both active and passive case finding activities.

11.3. Diagnosis :

All MDR-TB suspects are requested to submit 3 sputum samples, which were sent to the laboratory to perform:

1. Gene-Xpert
2. Smear microscopy
3. Culture
4. Identification
5. Drug susceptibility testing

11.4. Treatment :

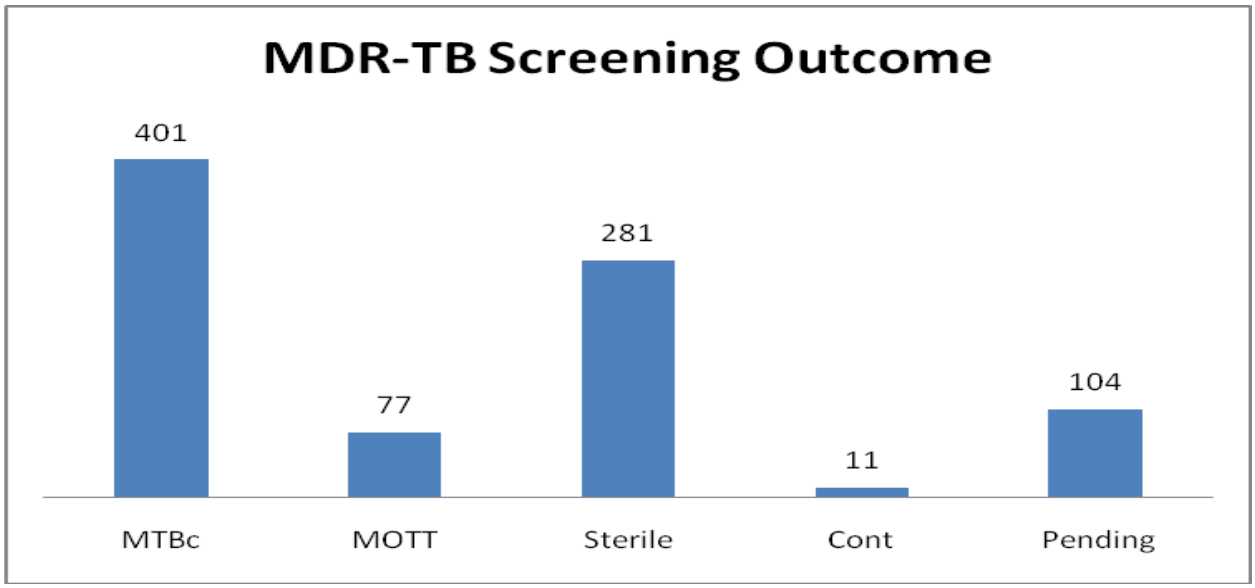
All TB patients eligible for MDR-TB regimen received the standardized category IV treatment regimen as follow:

6 Km (or Cm), Lfx (or Mfx), Eto, Cs (or PAS), Z, E*/ 18 Lfx (or Mfx), Eto, Cs (orPAS), Z, E*

* If still susceptible by drug susceptibility testing.

11.5. Achievement :

In 2011, NTP has screened 874 MDR-TB suspects. Out of them, 401 were confirmed as Mycobacterium Tuberculosis complex (MTBc), and 77 were Mycobacterium Other Than Tuberculosis (MOTT).



Gene-Xpert: Total tested 84:

- MTB detected: 44
    - Rifampicin resistant detected: 13 (among them DST already confirmed as MDR-TB: 5).
    - Rifampicin resistant not detected: 31
- MTB not detected: 40

In 2011, 83 patients were enrolled on Category IV treatment regimen:

- Confirmed MDR-TB: 50
- Rifampicin resistant detected by Gene-Xpert: 6
- Any resistant: 25
- Empirical treatment: 2

11.6. Treatment Outcome :

MDR-TB treatment in Cambodia has a good treatment outcome among MDR-TB confirmed within the past few years cohort.

Cohort	2007	2008	2009
Success	9 (64%)	33 (70%)	36 (78%)
Died	2 (14%)	7 (15%)	8 (18%)
Defaulted	3 (22%)	6 (13%)	2 (4%)
Failed	0	1 (2%)	0
TO	0	0	0
No outcome assigned	0	0	0
Total	**14**	**47**	**46**

11.7. Challenges :

- Budget for MDR-TB Control Project is limited.
- Inadequate staff knowledge concerning documents for MDR-TB case finding.
- Death rate is still high (>15%).
- Staff's capacity on programmatic and clinical management (include side effect management) is still limited.
- Incentives for health staff working with MDR-TB patients are not inadequate.
- Isolation rooms are not sufficient.

XII. Public-Private Mix DOTS (PPM-DOTS)

Public-Private Mix DOTS is an intervention of DOTS Expansion of the National Tuberculosis Program (NTP). This first model of PPM-DOTS is to refer TB suspect from Private Sector (including pharmacy, consultation room, clinics…) to Public Health Facility to diagnose and treat TB. With strong support from managements at all levels and in collaboration with WHO, USAID, TB CARE1, FHI360 RHAC, RACHA, JICA, PATH, URC, and from both private and public providers; in 2011, PPM-DOTS activities are shown in the table below:

Year	Province	OD	No. of Private implementing PPM-DOTS	No. of TB suspects referred from private	No. of TB suspects received by public	Total TB Cases Treated
2005	2	3	287	314	242	46
2006	8	15	755	1,989	1,154	244
2007	11	38	980	5,562	2,763	533
2008	11	38	1,690	4,212	1,882	301
2009	10	38	1,735	9,781	5,540	769
2010	10	37	1,735	7,612	4,280	851
2011	10	37	1,547	5,024	2,920	691

In summary, the PPM-DOTS activities contribute for increase in case detection by 691 TB cases (6%) among 11,657 cases detected in operational districts with PPM-DOTS. This PPM-DOTS project also contributes to stop pharmacy selling Anti-TB drugs and thus preventing MDR-TB from happening. In 2011, the achievement is low compare to last year because of the follows reasons:

- Some Private Sectors without license are stopped from this model.

- Funding for the implemented activities are delayed due to changing implementing partners.
- Low staff motivation due to reducing financial support.

XIII. TB in prison

In recent year, NTP has focus on congregated settings such as jail where TB transmission is high. Standard Operating Procedure for TB control in prison has been revised and finished and will be published in Khmer and English version in early 2012. With strong support from Ministry of Health, Ministry of Interior and close collaboration between National Center for Tuberculosis and Leprosy Control and Department of Prison and other partner (WHO, ICRC, CCJAP, UNODC, USAID, TBCAREI, FHI360, CRS, AHEAD, Caritas, MSF, Prison Fellowship….); good progress has been made through TB health education to prisoners, referral of inmates suspecting of having TB to Health Centers or Referral Hospitals for diagnosis and treatment with DOTS strategy to be performed at Health Post in Prison.

In summary, by 2011, achievement of activities are shown in the below table:

Year of implementation	Number of prisons	TB cases	TB/HIV cases
2009	8	203	26
2010	11	315	26
2011	19	342	19

Also in year 2011, with strong support from US-AID/TBCARE I/FHIV360, National TB Program has conducted active case finding in 9 prisons (CCC3, Kg Cham Prison, Kg Speu, Sihanouk, Kandal, Takeo and Koh Kong) where 8,462 inmates are screened and 249 TB cases are detected. It shown that TB case is 7 times more higher than general population in community (3,000/100,000 population).

XIV. TB in Factory and Enterprise

Factory and enterprise are the place where workers work closely in-group and provide more chance for TB transmission, when TB case is present. With strong support from partners, Especially from CATA; National TB program work closely with Ministry of Labor and Vocational training have conducted TB DOTS strategy in 6 factories and enterprise as pilot in 2007. The main focus is to raise TB awareness among health staff working at dispensary located at factory and enterprise. The trained health staff referred TB suspect workers to Health Centers for diagnosis. Supervision and quarterly meeting are routinely conducted to motivate staff in making good action plan for coming quarters. Currently, 19 factories and enterprises have been providing TB DOTS services at workplaces.

The results are shown in the table bellow:

Year of implementation	2007	2008	2009	2010	2011
Number of workers	10,900	22,701	15,740	21,077	25,171
Referred TB suspect	44	149	102	99	107
TB cases	6	22	10	24	15

NTP and CATA work closely to conduct active case finding in factories where 510 female workers are screened and 10 TB cases are detected. This figure indicates that TB is 5 times more than general population (1,960/100,000). It is proving that closed setting such as prison, factory, enterprise… TB transmission is significantly high.

XV. IEC and Advocacy

In 2011, the activities and achievements related to IEC and Advocacy conducted by NTP are as follows:

15.1. Capacity building for TB staff :

- All training and refresher training courses and also Programs or Projects for TB activities are included ACSM strategies, such as TB-HIV, C-DOTS, PPM DOTS, MDR, Infection Prevention and Control Health Care Facilities, TB in prison and TB in Factory.
- These above courses were initiated by National Center for TB and Leprosy control in collaboration with GFATM, USAID, CDC, FHI and CATA, technically and financially.

15.2. IEC material Production and Dissemination :

In good collaboration with developing partners such as WHO, USAID, FHI, JICA and CATA, CENAT provided technical skill in producing and disseminating the IEC materials to population, for instance, Posters, leaflet, Annual report and Quarterly report and newsletter...

15.3. Comunicating Messages :

- General System Media: Radio, TV, Newspapers, Magazine
- Face to Face: Posters and leaflets.
- In addition, the program provided the updated information on TB situation to MoH and other organizations so as to make them aware of the TB situation as well as the program activities in Cambodia and sought for support to the program.

15.4. World TB Day nationwide :

NTP has promoted the World TB Day from central to peripheral level throughout the country.

XVI. Information System

NTP has developed the standardized recording and reporting system for the program monitoring and evaluation. Through this system, the program can analyze and evaluate the TB situation in Cambodia. TB Bulletin, Quarterly TB Report and Annual TB Magazine are regularly published and disseminated to all related agencies.

XVII. Research

In 2011, the NTP conducted the second National TB Prevalence Survey nationwide, which already finished the field operation by October 2011. The preliminary results showed that the prevalence of smear positive TB was declined around 36% in 2011 compared to the first National TB Prevalence Survey nationwide in 2002.

In this year, NTP has conducted participatory research on Prevalence survey of Chronic Respiratory Disease with Dokkyo University Japan to determine the prevalence of chronic obstructive pulmonary disease (COPD) and Asthma in Phnom Penh, Cambodia and this research has already implemented and the result will be reported by 2012.

XVIII. Partnership

Mechanism of coordination with other partners in TB control was established with the set-up of a committee called Inter-agency Coordination Committee for TB Control (ICC) in 2001. This committee is now called the Sub-Technical Working Group (Sub-TWG) for TB Control. The main terms of reference of the committee are to technically advice on the program management and to assist the program in coordination as well as resources mobilization. So far the ICC has been functioning very well through its regular and ad-hoc meeting.

NTP also has collaborated with organizations, and research institutes abroad. Through this mechanism, we can identify areas of cooperation and funding for the program.

In addition, the National TB Control Programme (NTP) has a number of partners/organizations involving in the fight against tuberculosis. Those partners are listed as below:

1. World Health Organization (WHO)
2. United Sates Agency for International Development (USAID)
3. United Sates Centers for Disease Control and Prevention (US CDC)
4. Japan International Cooperation Agency (JICA)
5. Research Institute of Tuberculosis, Japan (RIT)
6. TBCAP
7. World Food Programme (WFP)
8. Medecin Sans Frontier-French (MSF-F)
9. Medecin Sans Frontier-Belgique (MSF-B)
10. Pasteur Institute
11. Cambodia Anti-tuberculosis Association (CATA)
12. Cambodia Health Committee (CHC)
13. Catholic Relief Service (CRS)
14. Family Health International (FHI)
15. Health Alliance Development (HEAD)

16. Health Unlimited (HU)
17. Partner for Health and Development (P-FHAD)
18. Ponleu Komar (PK)
19. Reproductive Health Association of Cambodia (RHAC)
20. Reproductive and Child Health Alliance (RACHA)
21. Save the Children Australia (SCA)
22. Sihanouk Hospital Center of HOPE (SHCH)
23. VOR ORT

XIX. Annexes

Cure rate by Provinces , year 2011

Table 1

Nº	Province	Cure Rate
1	Kandal	93%
2	Svay Rieng	96%
3	Phom Penh	91%
4	Pursat	97%
5	Battambang	90%
6	Pailin	78%
7	BMC	92%
8	Siem Reap	89%
9	Oddar MC	92%
10	Kg Thom	94%
11	Takeo	91%
12	Kg Speu	94%
13	Kampot	97%
14	Kep	90%
15	Kg Som	86%
16	Koh Kong	85%
17	Prey Veng	95%
18	Kg Chhnang	93%
19	Kratie	86%
20	Kg Cham	83%
21	Stung Treng	92%
22	Preah Vihear	96%
23	Modulkiri	71%
24	Rattanakiri	60%
Total		**91%**

ANTI-TUBERCULOSIS ACTIVITIES BY PROVINCES, 2011 (NTP)

Table 2

PROVINCES	CASES FINDING ACTIVITIES													DETECTION RATE				
	NC									BK+(%)	(%)	(%)	(%)	New S(+)	S(+)	Smear(-)	EP/	TOTAL
	BK+	Relap	Fail	RAD	ReTt	BK-	EP	OTER	Total	New	ReTt	BK-	EP	100,000 habitants				
KANDAL, 8 (OD)	1,200	28	1	0	29	626	1,353	31	3,239	37%	1%	19%	42%	95	97	49	107	256
SVAY RIENG, 3 (OD)	763	19	0	0	19	712	917	264	2,675	29%	1%	27%	34%	158	162	147	190	554
PHNOM PENH 4 OD and National Hospital	1,260	62	20	5	87	801	1,122	106	3,376	37%	3%	24%	33%	95	100	60	85	254
PURSAT, 2 (OD)	518	17	0	0	17	150	485	20	1,190	44%	1%	13%	41%	130	135	38	122	300
BATTAMBANG, 5 (OD)	908	24	7	0	31	370	739	39	2,087	44%	1%	18%	35%	89	91	36	72	204
PAILIN, 1 (OD)	90	2	0	14	16	41	109	3	259	35%	6%	16%	42%	128	131	58	155	367
BANTEAY MEANC. 4 (OD)	713	21	5	1	27	465	1,027	87	2,319	31%	1%	20%	44%	105	108	69	152	342
SIEM REAP, 4 (OD)	1,368	19	0	0	19	933	762	55	3,137	44%	1%	30%	24%	153	155	104	85	350
ODORMEANCHEY,1 (OD)	328	4	2	0	6	37	110	13	494	66%	1%	7%	22%	177	179	20	59	266
KOMPONG THOM, 3 (OD)	992	4	0	1	5	188	262	10	1,457	68%	0%	13%	18%	157	158	30	41	231
TAKEO, 5 (OD)	1,063	32	0	1	33	420	640	159	2,315	46%	1%	18%	28%	126	130	50	76	274
KOMPONG SPEU, 3 (OD)	995	17	3	1	21	393	702	25	2,136	47%	1%	18%	33%	139	141	55	98	298
KAMPOT, 4 (OD)	631	20	0	1	21	245	358	71	1,326	48%	2%	18%	27%	108	111	42	61	226
KEP, 1 (OD)	46	0	0	0	0	11	22	0	79	58%	0%	14%	28%	129	129	31	62	221
KOMPONG SOM, 1 (OD)	189	7	0	0	7	66	233	12	507	37%	1%	13%	46%	85	89	30	105	229
KOH KONG, 2 (OD)	94	0	0	0	0	45	50	3	192	49%	0%	23%	26%	80	80	38	43	163
PREY VENG, 7 (OD)	1,441	20	0	0	20	855	2,817	44	5,177	28%	0%	17%	54%	152	154	90	297	546
KOMPONG CHHNANG, 3 (OD)	662	9	0	0	9	119	428	3	1,221	54%	1%	10%	35%	140	142	25	91	258
KRATIE, 2 (OD)	186	6	1	0	7	56	168	1	418	44%	2%	13%	40%	58	60	18	53	131
KOMPONG CHAM, 10 (OD)	1,935	50	10	6	66	1,084	2,190	86	5,361	36%	1%	20%	41%	115	118	65	130	319
STUNG TRENG, 1 (OD)	127	1	0	0	1	4	118	0	250	51%	0%	2%	47%	114	115	4	106	224
PREAH VIHEAR, 1 (OD)	189	1	0	0	1	52	50	0	292	65%	0%	18%	17%	110	111	30	29	171
MODULKIRI,1 (OD)	37	1	0	0	1	3	9	4	54	69%	2%	6%	17%	61	62	5	15	88
RATANAKIRI, 1 (OD)	77	3	0	0	3	10	19	0	109	71%	3%	9%	17%	51	53	7	13	72
24 PROVINCES	15,812	367	49	30	446	7,686	14,690	1,036	39,670	40%	1%	19%	37%	118	121	57	110	296

ANTI-TUBERCULOSIS ACTIVITIES BY PROVINCES, 2011 (NTP)

Tabe 3

PROVINCES	NEW CASE ACTIVITIES OF BK+ BY AGE																		
	0-4Y		5-14Y		15-24Y		25-34Y		35-44Y		45-54Y		55-64Y		>=65Y		TOTAL		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	TOTAL
KANDAL, 8 (OD)	0	0	1	4	46	43	111	96	83	92	117	112	113	116	123	143	594	606	1,200
SVAY RIENG, 3 (OD)	0	0	1	1	36	30	58	65	76	57	66	109	57	79	53	75	347	416	763
NATIONAL HOSPITAL	0	1	0	2	42	34	79	47	53	22	48	18	35	24	31	20	288	168	456
PHNOM PENH, 4 (OD)	0	0	0	1	71	36	111	98	87	41	126	44	53	48	49	39	497	307	804
PURSAT, 2 (OD)	0	0	3	2	30	35	48	48	47	41	49	64	53	63	50	49	216	302	518
BATTAMBANG, 5 (OD)	1	0	2	3	49	41	86	51	92	48	144	70	99	72	68	82	541	367	908
PAILIN, 1(OD)	1	0	0	0	4	5	16	10	8	8	7	3	13	5	5	5	54	36	90
BANTEAY MEANCHEY. 4 (OD)	0	0	1	0	35	27	78	51	80	60	103	55	94	52	37	40	428	285	713
SIEM REAP, 4 (OD)	0	2	1	2	60	46	147	92	169	90	181	143	138	144	77	76	773	595	1,368
ODORMEANCHEY 1 (OD)	0	0	1	1	9	20	38	18	37	20	59	48	29	21	13	14	186	142	328
KOMPONG THOM, 3 (OD)	0	0	1	2	44	55	89	84	105	65	124	112	75	94	82	60	520	472	992
TAKEO, 5 (OD)	0	0	1	1	43	35	71	58	103	70	136	105	96	92	130	122	580	483	1,063
KOMPONG SPEU, 3 (OD)	0	0	4	2	52	62	63	90	109	94	128	78	83	92	74	64	513	482	995
KAMPOT, 4 (OD)	0	0	3	0	33	16	57	48	59	44	90	48	63	63	58	49	363	268	631
KEP, 1 (OD)	0	0	0	0	1	1	5	6	3	2	7	4	7	2	6	2	29	17	46
KOMPONG SOM, 1 (OD)	0	0	0	0	12	15	24	20	15	7	20	17	16	19	16	8	103	86	189
KOH KONG, 2 (OD)	0	0	0	0	7	6	18	7	14	6	11	3	9	3	8	2	67	27	94
PREY VENG, 7 (OD)	0	0	3	5	51	59	104	98	101	110	163	187	113	174	140	133	675	766	1,441
KOMPONG CHHNANG, 3 (OD)	0	0	1	2	32	24	47	42	51	51	61	81	58	84	66	62	316	346	662
KRATIE, 2 (OD)	0	0	0	0	8	12	22	15	19	10	23	17	12	17	15	16	99	87	186
KOMPONG CHAM, 10 (OD)	1	0	6	5	105	76	164	137	194	134	235	170	181	170	200	157	1086	849	1,935
STUNG TRENG, 1 (OD)	0	0	2	2	9	6	8	9	14	8	16	15	12	16	8	2	69	58	127
PREAH VIHEAR, 1 (OD)	0	0	0	1	10	2	10	11	22	8	31	14	20	19	22	19	115	74	189
MODULKIRI,1(OD)	0	0	0	0	1	2	7	6	6	1	11	2	1	0	0	0	26	11	37
RATANAKIRI, 1 (OD)	0	0	0	0	1	2	8	4	10	3	16	9	9	4	8	3	52	25	77
24 PROVINCES	3	3	31	36	791	690	1,469	1,211	1,557	1,092	1,972	1,528	1,439	1,473	1,339	1,242	8,537	7,275	15,812

0

Table 4

TB Cases Notified by Operational District in 2011

Operational District (OD) of Province	AFB pos					AFB neg	EP	OTHER	
	New	Re	Fail.	RAD	ReTt				TOTAL
KANDAL :									
TAKMOV (OD)	158	4	1	0	5	310	255	11	739
SAANG(OD)	244	4	0	0	4	30	62	5	345
KOH THOM(OD)	173	1	0	0	1	147	26	3	350
KIEN SVAY(OD)	198	7	0	0	7	78	564	2	849
KHSACH KANDAL(OD)	113	1	0	0	1	15	252	1	382
MOUK KAMPOL(OD)	63	3	0	0	3	10	89	0	165
PONHEA LEU(OD)	103	2	0	0	2	16	43	0	164
ANG SNOUL(OD)	148	6	0	0	6	20	62	9	245
subtotal	**1,200**	**28**	**1**	**0**	**29**	**626**	**1,353**	**31**	**3,239**
SVAY RIENG									
SVAY RIENG (OD)	470	16	0	0	16	344	585	172	1,587
ROMEAS HEK(OD)	153	3	0	0	3	94	112	22	384
CHIPOU (OD)	140	0	0	0	0	274	220	70	704
subtotal	**763**	**19**	**0**	**0**	**19**	**712**	**917**	**264**	**2,675**
NATIONAL HOSPITAL									
CENAT	319	42	17	4	63	238	382	39	1,041
IOM	21	0	0	0	0	0	0	0	21
PREAS KOSMAK HOSPITAL	15	0	0	0	0	10	21	0	46
HOPE HOSPITAL	62	8	3	1	12	47	70	35	226
NORODOM SIAHNOUK	32	4	0	0	4	43	67	9	155
PREAH KET MELEAH	6	0	0	0	0	38	68	0	112
NATIONAL PEDIATRIQUE	1	0	0	0	0	52	67	0	120
subtotal	**456**	**54**	**20**	**5**	**79**	**428**	**675**	**83**	**1,721**
PHNOM PENH									
CENTER (OD)	74	0	0	0	0	28	71	2	175
NORTH(OD)	217	6	0	0	6	83	95	6	407
SOUTH(OD)	268	1	0	0	1	175	162	12	618
WEST(OD)	245	1	0	0	1	87	119	3	455
subtotal	**804**	**8**	**0**	**0**	**8**	**373**	**447**	**23**	**1,655**
PURSAT									
SAMPOVMEAS (OD)	347	11	0	0	11	105	336	18	817
BAKAN (OD)	171	6	0	0	6	45	149	2	373
subtotal	**518**	**17**	**0**	**0**	**17**	**150**	**485**	**20**	**1,190**
BATTAMBANG									
BATTAMBANG (OD)	323	9	2	0	11	105	318	17	774
THMAR KOUL (OD)	167	4	0	0	4	36	43	4	254
MAUNG RUSSEY (OD)	**148**	**7**	**5**	**0**	**12**	**160**	**307**	**14**	**641**
SAMPOEV LONE (OD)	140	3	0	0	3	43	40	4	230
SANG KE (OD)	130	1	0	0	1	26	31	0	188
subtotal	**908**	**24**	**7**	**0**	**31**	**370**	**739**	**39**	**2,087**
PAILIN CITY									
PAILIN (OD)	**90**	**2**	**0**	**14**	**16**	**41**	**109**	**3**	**259**

Table 4 (continued)

TB Cases Notified by Operational District in 2011

Operational District (OD) of Province	AFB pos					AFB neg	EP	OTHER	
	New	Re	Fail.	RAD	ReTt				TOTAL
BANTEAY MEANCHEY:									
MONGKOL BOREI (OD)	189	3	1	0	4	149	311	19	672
PREANEATPREAS (OD)	126	7	2	0	9	128	510	53	826
OCHROV (OD)	221	9	2	1	12	121	172	15	541
TMORPOUK(OD)	177	2	0	0	2	67	34	0	280
subtotal	**713**	**21**	**5**	**1**	**27**	**465**	**1,027**	**87**	**2,319**
SIEM REAP									
SIEM REAP (OD)	507	0	0	0	0	258	306	0	1,071
SOTNIKUM(OD)	381	8	0	0	8	96	112	27	624
ANGKOR CHUM	263	3	0	0	3	417	175	14	872
ANGKOR CHILD HOSPITAL (OD)	4	0	0	0	0	9	41	2	56
KRALANH (OD)	213	8	0	0	8	153	128	12	514
subtotal	**1,368**	**19**	**0**	**0**	**19**	**933**	**762**	**55**	**3,137**
ODOR MEANCHEY									
SAMRONG (OD)	**328**	**4**	**2**	**0**	**6**	**37**	**110**	**13**	**494**
KOMPONG THOM									
KG THOM (OD)	454	3	0	1	4	130	178	3	769
BARAY (OD)	348	1	0	0	1	49	56	7	461
STUNG(OD)	190	0	0	0	0	9	28	0	227
subtotal	**992**	**4**	**0**	**1**	**5**	**188**	**262**	**10**	**1,457**
TAKEO									
DAUNKEOV (OD)	268	12	0	0	12	58	162	2	502
BATI (OD)	188	6	0	0	6	78	119	43	434
PREY KABAS (OD)	306	0	0	0	0	170	231	113	820
ANGROKA (OD)	118	4	0	0	4	78	69	0	269
KIRIVONG (OD)	183	10	0	1	11	36	59	1	290
subtotal	**1,063**	**32**	**0**	**1**	**33**	**420**	**640**	**159**	**2,315**
KOMPONG SPEU									
KOMPONG SPEU (OD)	509	12	1	1	14	197	320	12	1,052
KARNG PISEY(OD)	302	5	0	0	5	95	301	12	715
OUDONG(OD)	184	0	2	0	2	101	81	1	369
subtotal	**995**	**17**	**3**	**1**	**21**	**393**	**702**	**25**	**2,136**
KAMPOT									
KAMPOT (OD)	187	2	0	1	3	58	125	1	374
ANGKOR CHEY(OD)	122	4	0	0	4	51	52	11	240
KOMPONG TRACH(OD)	158	2	0	0	2	58	52	12	282
CHHOUK(OD)	164	12	0	0	12	78	129	47	430
subtotal	**631**	**20**	**0**	**1**	**21**	**245**	**358**	**71**	**1,326**
KEP									
KRONG KEP (OD)	**46**	**0**	**0**	**0**	**0**	**11**	**22**	**0**	**79**
KOMPONG SOM									
PREASIHANOUK(OD)	**189**	**7**	**0**	**0**	**7**	**66**	**233**	**12**	**507**

Table 4 (continued)

TB Cases Notified by Operational District in 2011

Operational District (OD) of Province	AFB pos					AFB neg	EP	OTHER	
	New	Re	Fail.	RAD	ReTt				TOTAL
KOH KONG									
SMUCH MEANCHEY(OD)	55	0	0	0	0	38	37	2	132
SRE AMBIL(OD)	39	0	0	0	0	7	13	1	60
subtotal	**94**	**0**	**0**	**0**	**0**	**45**	**50**	**3**	**192**
PREY VENG									
PREY VENG (OD)	224	10	0	0	10	183	661	0	1,078
KAMCHEY MEAR(OD)	156	0	0	0	0	92	259	0	507
PEARING(OD)	329	1	0	0	1	113	198	10	651
KG TRABECK(OD)	129	1	0	0	1	33	110	3	276
MESANG(OD)	207	4	0	0	4	109	651	6	977
PREAH SDACH(OD)	222	3	0	0	3	15	394	6	640
NEAK LOEUNG (OD)	174	1	0	0	1	310	544	19	1,048
subtotal	**1,441**	**20**	**0**	**0**	**20**	**855**	**2,817**	**44**	**5,177**
KOMPONG CHHNANG									
KG. CHHNANG (OD)	290	7	0	0	7	61	97	2	457
KG TRALACH (OD)	184	1	0	0	1	36	171	0	392
Bar Bo (OD)	188	1	0	0	1	22	160	1	372
subtotal	**662**	**9**	**0**	**0**	**9**	**119**	**428**	**3**	**1,221**
KRATIE									
KRATIE (OD)	114	2	0	0	2	35	134	0	285
CHHLAUNG(OD)	72	4	1	0	5	21	34	1	133
subtotal	**186**	**6**	**1**	**0**	**7**	**56**	**168**	**1**	**418**
KOMPONG CHAM									
KG CHAM (OD)	334	29	8	5	42	205	307	41	929
KRAUCH CHMAR (OD)	105	0	0	0	0	57	58	0	220
TBONG KHMUM(OD)	151	1	0	0	1	135	100	2	389
CHOEUNG PREY(OD)	333	4	0	1	5	296	669	21	1,324
SREY SANTHOR(OD)	99	1	2	0	3	150	50	14	316
CHAMCAR LEU(OD)	291	0	0	0	0	63	680	0	1,034
PREY CHHOR (OD)	233	3	0	0	3	24	40	1	301
PONHEA KREK(OD)	196	7	0	0	7	97	156	0	456
ORAING OV(OD)	81	2	0	0	2	25	85	5	198
MEMOT(OD)	112	3	0	0	3	32	45	2	194
subtotal	**1,935**	**50**	**10**	**6**	**66**	**1,084**	**2,190**	**86**	**5,361**
STUNG TRENG									
STUNG TRENG (OD)	**127**	**1**	**0**	**0**	**1**	**4**	**118**	**0**	**250**
PREAH VIHEAR									
TBENG MEAN CHEY(OD)	**189**	**1**	**0**	**0**	**1**	**52**	**50**	**0**	**292**
MONDOLKIRI									
SEN MONORUM(OD)	**37**	**1**	**0**	**0**	**1**	**3**	**9**	**4**	**54**
RATTANAKIRI									
BANLUNG (OD)	**77**	**3**	**0**	**0**	**3**	**10**	**19**	**0**	**109**
TOTAL	**15,812**	**367**	**49**	**30**	**446**	**7,686**	**14,690**	**1,036**	**39,670**

Table 5

Treatment Outcomes of New Smear Positive TB Cases by Operational District in 2011

Operational District (OD) of Province	patients	Cure	%	Complete	%	Death	%	Failure	%	default	%	Trans	%
KANDAL :													
TAKMOV (OD)	262	246	94%	4	2%	3	1%	1	0%	1	0%	7	3%
SAANG(OD)	258	249	97%	0	0%	3	1%	1	0%	0	0%	1	0%
KOH THOM(OD)	205	199	97%	0	0%	2	1%	0	0%	0	0%	4	2%
KIEN SVAY(OD)	268	243	91%	8	3%	12	4%	0	0%	3	1%	2	1%
KHSACH KANDAL(OD)	105	92	88%	9	9%	4	4%	0	0%	0	0%	0	0%
MOUK KAMPOL(OD)	79	67	85%	11	14%	1	1%	0	0%	0	0%	0	0%
PONHEA LEU(OD)	125	111	89%	7	6%	4	3%	0	0%	3	2%	0	0%
ANG SNOUL(OD)	162	156	96%	2	1%	3	2%	0	0%	1	1%	0	0%
subtotal	**1,464**	**1,363**	**93%**	**41**	**3%**	**32**	**2%**	**2**	**0%**	**8**	**1%**	**14**	**1%**
SVAY RIENG													
SVAY RIENG (OD)	496	483	97%	1	0%	10	2%	0	0%	0	0%	2	0%
ROMEAS HEK(OD)	167	163	98%	0	0%	2	1%	0	0%	2	1%	0	0%
CHIPOU (OD)	218	198	91%	6	3%	12	6%	0	0%	0	0%	2	1%
subtotal	**881**	**844**	**96%**	**7**	**1%**	**24**	**3%**	**0**	**0%**	**2**	**0%**	**4**	**0%**
NATIONAL HOSPITAL													
CENAT	324	271	84%	7	2%	3	1%	14	4%	6	2%	23	7%
HOPE HOSPITAL	53	34	64%	1	2%	3	6%	1	2%	9	17%	5	9%
NORODOM SIAHNOUK	42	18	43%	5	12%	6	14%	0	0%	5	12%	8	19%
PREAH KET MELEAH	12	12	100%	0	0%	0	0%	0	0%	0	0%	0	0%
NATIONA PEDIATRIQUE	1	0	0%	0	0%	1	100%	0	0%	0	0%	0	0%
subtotal	**432**	**335**	**78%**	**13**	**3%**	**13**	**3%**	**15**	**3%**	**20**	**5%**	**36**	**8%**
PHNOM PENH													
CENTER (OD)	97	89	92%	0	0%	4	4%	0	0%	3	3%	1	1%
NORTH(OD)	154	150	97%	0	0%	3	2%	0	0%	0	0%	1	1%
SOUTH(OD)	212	184	87%	11	5%	4	2%	1	0%	1	0%	11	5%
WEST(OD)	190	174	92%	3	2%	1	1%	1	1%	0	0%	10	5%
subtotal	**653**	**597**	**91%**	**14**	**2%**	**12**	**2%**	**2**	**0%**	**4**	**1%**	**23**	**4%**
PURSAT													
SAMPOVMEAS (OD)	373	360	97%	3	1%	5	1%	0	0%	0	0%	5	1%
BAKAN (OD)	125	123	98%	0	0%	2	2%	0	0%	0	0%	0	0%
subtotal	**498**	**483**	**97%**	**3**	**1%**	**7**	**1%**	**0**	**0%**	**0**	**0%**	**5**	**1%**
BATTAMBANG													
BATTAMBANG (OD)	342	292	85%	4	1%	15	4%	7	2%	10	3%	14	4%
THMAR KOUL (OD)	210	195	93%	1	0%	9	4%	2	1%	2	1%	1	0%
MAUNG RUSSEY (OD)	162	145	90%	1	1%	7	4%	5	3%	1	1%	3	2%
SANG KE (OD)	101	96	95%	0	0%	4	4%	0	0%	1	1%	0	0%
SAMPOVLOUN (OD)	127	119	94%	2	2%	0	0%	0	0%	4	3%	2	2%
subtotal	**942**	**847**	**90%**	**8**	**1%**	**35**	**4%**	**14**	**1%**	**18**	**2%**	**20**	**2%**
PAILIN CITY													
PAILIN (OD)	**88**	**69**	**78%**	**9**	**10%**	**2**	**2%**	**0**	**0%**	**2**	**2%**	**6**	**7%**

Table 5 (continued)

Treatment Outcomes of New Smear Positive TB Cases by Operational District in 2011

Operational District (OD) of Province	patients	Cure	%	Complete	%	Death	%	Failure	%	default	%	Trans	%
BANTEAY MEANCHEY													
MONGKOL BOREI (OD)	241	224	93%	1	0%	6	2%	1	0%	1	0%	8	3%
PREANEATPREAS (OD)	164	145	88%	11	7%	2	1%	1	1%	1	1%	4	2%
OCHROV (OD)	274	249	91%	4	1%	11	4%	0	0%	3	1%	7	3%
TMORPOUK(OD)	150	144	96%	1	1%	3	2%	0	0%	2	1%	0	0%
subtotal	**829**	**762**	**92%**	**17**	**2%**	**22**	**3%**	**2**	**0%**	**7**	**1%**	**19**	**2%**
SIEM REAP													
SIEM REAP (OD)	540	465	86%	1	0%	16	3%	5	1%	6	1%	47	9%
ANGKOR CHUM (OD)	321	286	89%	21	7%	7	2%	0	0%	3	1%	4	1%
SOTNIKUM(OD)	385	347	90%	27	7%	6	2%	1	0%	2	1%	2	1%
KRALANH (OD)	225	216	96%	2	1%	4	2%	0	0%	1	0%	2	1%
subtotal	**1,471**	**1,314**	**89%**	**51**	**3%**	**33**	**2%**	**6**	**0%**	**12**	**1%**	**55**	**4%**
ODOR MEANCHEY													
SAMRONG (OD)	**358**	**328**	**92%**	**10**	**3%**	**6**	**2%**	**1**	**0%**	**5**	**1%**	**8**	**2%**
KOMPONG THOM													
KG THOM (OD)	485	454	94%	2	0%	13	3%	1	0%	5	1%	10	2%
BARAY (OD)	367	352	96%	4	1%	7	2%	0	0%	4	1%	0	0%
STUNG(OD)	221	205	93%	6	3%	6	3%	0	0%	3	1%	1	0%
subtotal	**1,073**	**1,011**	**94%**	**12**	**1%**	**26**	**2%**	**1**	**0%**	**12**	**1%**	**11**	**1%**
TAKEO													
DAUNKEOV (OD)	252	230	91%	6	2%	6	2%	0	0%	0	0%	10	4%
BATI (OD)	198	164	83%	27	14%	1	1%	0	0%	0	0%	6	3%
PREY KABAS (OD)	404	379	94%	20	5%	5	1%	0	0%	0	0%	0	0%
ANGROKA (OD)	97	88	91%	1	1%	6	6%	0	0%	2	2%	0	0%
KIRIVONG (OD)	241	227	94%	0	0%	8	3%	0	0%	2	1%	4	2%
subtotal	**1,192**	**1,088**	**91%**	**54**	**5%**	**26**	**2%**	**0**	**0%**	**4**	**0%**	**20**	**2%**
KOMPONG SPEU													
KOMPONG SPEU (OD)	679	650	96%	6	1%	8	1%	0	0%	6	1%	9	1%
KARNG PISEY(OD)	320	291	91%	12	4%	7	2%	2	1%	7	2%	1	0%
OUDONG(OD)	187	178	95%	0	0%	4	2%	1	1%	0	0%	4	2%
subtotal	**1,186**	**1,119**	**94%**	**18**	**2%**	**19**	**2%**	**3**	**0%**	**13**	**1%**	**14**	**1%**
KAMPOT													
KAMPOT (OD)	183	177	1	0	0	3	0	0	0	2	0	1	0
ANGKOR CHEY(OD)	151	148	98%	0	0%	3	2%	0	0%	0	0%	0	0%
KOMPONG TRACH(OD)	152	151	99%	0	0%	1	1%	0	0%	0	0%	0	0%
CHHOUK(OD)	172	165	96%	0	0%	5	3%	1	1%	0	0%	1	1%
subtotal	**658**	**641**	**97%**	**0**	**0%**	**12**	**2%**	**1**	**0%**	**2**	**0%**	**2**	**0%**
KEP													
KRONG KEP (OD)	**20**	**18**	**90%**	**2**	**10%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
KOMPONG SOM													
PREASIHANOUK(OD)	**190**	**164**	**86%**	**11**	**6%**	**7**	**4%**	**1**	**1%**	**2**	**1%**	**5**	**3%**

Table 5 (continued)

Treatment Outcomes of New Smear Positive TB Cases by Operational District in 2011

Operational District (OD) of Province	patients	Cure	%	Complete	%	Death	%	Failure	%	default	%	Trans	%
KOH KONG													
SMUCH MEANCHEY(OD)	89	82	92%	2	2%	2	2%	0	0%	0	0%	3	3%
SRE AMBIL(OD)	37	25	68%	5	14%	1	3%	0	0%	2	5%	4	11%
subtotal	**126**	**107**	**85%**	**7**	**6%**	**3**	**2%**	**0**	**0%**	**2**	**2%**	**7**	**6%**
PREY VENG													
PREY VENG (OD)	351	329	94%	3	1%	11	3%	0	0%	3	1%	5	1%
KAMCHEY MEAR(OD)	147	136	93%	3	2%	5	3%	0	0%	1	1%	2	1%
PEARING(OD)	313	296	95%	3	1%	7	2%	1	0%	2	1%	4	1%
KG TRABECK(OD)	106	100	94%	0	0%	3	3%	0	0%	2	2%	1	1%
MESANG(OD)	242	231	95%	0	0%	10	4%	0	0%	0	0%	1	0%
PREAH SDACH(OD)	293	289	99%	0	0%	2	1%	0	0%	2	1%	0	0%
NEAK LOEUNG (OD)	271	248	92%	19	7%	1	0%	0	0%	0	0%	3	1%
subtotal	**1,723**	**1,629**	**95%**	**28**	**2%**	**39**	**2%**	**1**	**0%**	**10**	**1%**	**16**	**1%**
KOMPONG CHHNANG													
KG. CHHNANG (OD)	303	273	90%	11	4%	13	4%	0	0%	2	1%	4	1%
BARBO (OD)	181	176	97%	2	1%	3	2%	0	0%	0	0%	0	0%
KG TRALACH (OD)	210	198	94%	0	0%	8	4%	0	0%	1	0%	3	1%
subtotal	**694**	**647**	**93%**	**13**	**0**	**24**	**0**	**0**	**0**	**3**	**0**	**7**	**0**
KRATIE													
KRATIE (OD)	187	167	89%	11	6%	1	1%	2	1%	5	3%	1	1%
CHHLAUNG(OD)	116	94	81%	10	9%	3	3%	1	1%	5	4%	3	3%
subtotal	**303**	**261**	**86%**	**21**	**7%**	**4**	**1%**	**3**	**1%**	**10**	**3%**	**4**	**1%**
KOMPONG CHAM													
KG CHAM (OD)	298	207	69%	18	6%	15	5%	6	2%	14	5%	38	13%
KRAUCH CHMAR (OD)	92	86	93%	4	4%	3	3%	0	0%	4	4%	13	14%
TBONG KHMUM(OD)	196	100	51%	45	23%	14	7%	0	0%	1	1%	36	18%
CHOEUNG PREY(OD)	302	290	96%	0	0%	7	2%	0	0%	3	1%	2	1%
SREY SANTHOR(OD)	137	123	90%	6	4%	3	2%	3	2%	2	1%	0	0%
CHAMCAR LEU(OD)	477	469	98%	2	0%	3	1%	0	0%	2	0%	1	0%
PREY CHHOR (OD)	215	211	98%	0	0%	2	1%	0	0%	0	0%	2	1%
PONHEA KREK(OD)	214	144	67%	35	16%	3	1%	0	0%	1	0%	31	14%
ORAING OV(OD)	93	62	67%	27	29%	2	2%	0	0%	1	1%	1	1%
MEMOT(OD)	116	92	84%	0	0%	2	5%	1	1%	9	4%	12	6%
subtotal	**2,140**	**1,784**	**83%**	**137**	**6%**	**54**	**3%**	**10**	**0%**	**37**	**2%**	**136**	**6%**
STUNG TRENG													
STUNG TRENG (OD)	**172**	**158**	**92%**	**12**	**7%**	**2**	**1%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
PREAH VIHEAR													
TBENG MEAN CHEY(OD)	**224**	**214**	**96%**	**3**	**1%**	**7**	**3%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
MONDOLKIRI													
SEN MONORUM(OD)	**38**	**27**	**71%**	**5**	**13%**	**1**	**3%**	**0**	**0%**	**5**	**13%**	**0**	**0%**
RATTANAKIRI													
BANLUNG (OD)	**86**	**52**	**60%**	**21**	**24%**	**5**	**6%**	**0**	**0%**	**3**	**3%**	**5**	**6%**
TOTAL	**17,441**	**15,862**	**91%**	**517**	**3%**	**415**	**2%**	**62**	**0%**	**181**	**1%**	**417**	**2%**

XX. Acknowledgement

Impressive achievements obtained by the National TB Program, regarding especially maintaining the high cure rate of tuberculosis of more than 85 %, 100 % DOTS coverage as planned, and the total TB cases detected were 39,670 in 2011, have been associated with the support from the Royal Government of Cambodia as well as the Ministry of Health who have given high priority to TB Control. These achievements have also related to active participation of all health workers throughout the country together with the support and collaboration from various other partners including local authorities, community and financial and technical partners encompassing International and Non Governmental Organizations.

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