

ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ



KINGDOM OF CAMBODIA

NATION RELIGION KING

ក្រសួងសុខាភិបាល

Ministry of Health

សិក្ខាសាលា

ស្តីពី

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អត្ថបទជាភាសាអង់គ្លេស
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TUBERCULOSIS REPORT 2012

រៀបរៀងដោយ មជ្ឈមណ្ឌលកំចាត់រោគរបេច និងហង់សិន

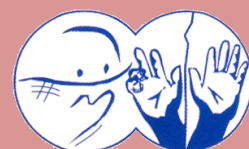


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I. Introduction

Cambodia is one of the 22 countries in the world with a high burden of tuberculosis. During the last 12 years, cases of TB notified under the National TB Control Program (NTP) have been increased more than two folds, up to 40,258 cases of all forms in 2012. 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, Samdech Akka Moha Sena Padei Techo 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, donors/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 planned 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 manage and provide quality health care for the patients.

In 2012, with strong support from the Royal Government of Cambodia as well as the Ministry of Health and developing partners, the impressive achievement were obtained in the field of TB Control in Cambodia. WHO Global TB report 2012 has mentioned that Cambodia as an example country of reducing prevalence rate of smear positive tuberculosis at around 38% between 2002 and 2011 (equal to 4.2% reduction annually), this big reduction is beyond expectation of international TB expert. 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 2012.

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 2012, around nine million people developed active tuberculosis (TB), and about two million died.

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.

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.

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 countries 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 epidemic
- 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 Global TB experts estimated that 64 % of Cambodian population were 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 2012 WHO report, the estimated incidence rate of tuberculosis was 424/100,000 population, prevalence rate of tuberculosis was 817/100,000 population and the death rate of tuberculosis was 63/100,000 population in 2011. Based on the above figure, Cambodia has achieved the Millennium Development Goals (MDG) by 2015, of reducing the prevalence and death rate due to TB by half.

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.

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.

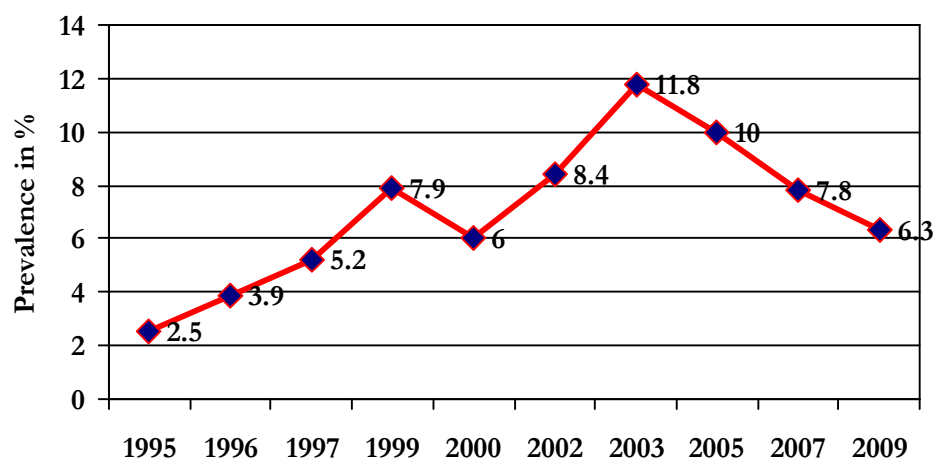
Cambodia is also among the countries with high burden of TB and HIV/AIDS.

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 JICATB 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 a 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 2012, 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
- Guidance on case finding for MRD-TB
- Algorithms for diagnosing Childhood 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 2012 as follows :

a) Training:

- 05 DOTS strategy training and refresher training courses.
- 08 Clinical on MDR-TB training courses.
- 04 TB diagnosis training course among HIV.
- 02 Refresher training courses on TB/HIV.
- 04 TB Children training course.
- 02 Diabetes screening among TB patients training course.
- 03 Diagnostic on X-ray reading training courses.
- 02 Laboratory Culture training courses.
- 01 On-site evaluation on TB Lab training course.
- 01 Sputum collection and smear making training courses.
- 01 Microscopy lab technical training course.

- 01 Chest X-ray reading on TB diagnosis training course.
- 04 Refresher training courses on EQA.
- 01 Children Tuberculin skin test training courses.
- 01 TB culture on liquid media training course.
- 01 validity investigation of the X-pert machine training course.
- 01 TB/ HIV service in prison training courses.
- 01 e-TB manager training course

b) Workshops:

- 01 World TB day
- 01 Annual TB Conference for TB control in 2011
- 01 Dissemination Workshop on the result of the 2nd National TB prevalence
- 03 TB Quarterly M&E workshop.
- 01 Joint Program Review workshop
- 01 Workshop on Implementation of Gene X-pert
- 01 dissemination on preliminary result of the 2nd National TB prevalence
- 04 Workshop on intensified case-finding and Isoniazid preventive therapy on children
- 02 workshop on private practitioner mobilization on TB control
- 04 workshop on childhood TB case-finding
- 01 workshop on smear-negative TB diagnosis
- 06 Workshops on the Improved Quality of Chest X-ray reading.
- 01 Workshop on TB active case finding
- 03 Workshop on TB/HIV in prison supported by USAID/TB CARE1/FHI 360
- 01 Workshops on EQA.
- 01 Workshop on childhood TB diagnosis and treatment
- 02 Workshop on (Cross-checker) slide rechecking
- 01 Workshop on TB and Diabetes
- 01 Workshop on MDR-TB
- 04 Workshop on TB Planning in prisons
- 01 Annual PPM-DOTS Workshop

- 01 Annual Workshop on National and Provincial TB Lab Planning
- 01 Meeting on 3 Is strategy

* NTP also sent the TB staff to attend the international training courses, study tours and meeting/conferences in 2012 as follows:

- Philippine : 3 persons
- France : 1 person
- Thailand : 1 person
- Switzerland : 1 person
- USA : 1 person
- Bangladesh : 1 person
- Indonesia : 1 person
- Malaysia : 6 person

4.2. Supervision:

To strengthen the TB control activities and improve the capacity of staff at peripheral level, in 2012 NTP conducted the 469 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 2012 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 with new responsibility as Principal Recipients (PR) for GFATM-TB Round 7 managing the financing of 11 sub-recipients (SRs). A New Funding Model recently launched by GFATM is a good opportunity for TB program to request for continuing fund support from GFATM. However, because a number of NTP support projects has been finished, NTP still face financial shortage in coming 5 to 7 years.

VI. Drugs and Lab. Reagents

National Tuberculosis Program (NTP) monitored 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 2012, NTP Cambodia received childhood TB drugs grant from Global Drug Facility (GDF) as well as signed grant agreement for adult TB drugs for the period of 3 years after finishing grant from GFATM Round 7. Overall, NTP will have adult TB drugs at least until the end of 2016.
- In addition, Second Line Drug (SLD) for treating drug resistance TB will be supported to NTP, by 50 cases from MoH, 50 cases from MSF and 50 cases from TBCARE.
- In 2012, NTP received TB drugs supported by GFATM Round 7 through direct procurement process and based on forecasting and quantification of TB drug needed for 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 more than 1,000 health facilities include 83 Referral Hospital and 1046 Health Centers, providing DOTS.

7.1. Case Detection Activity :

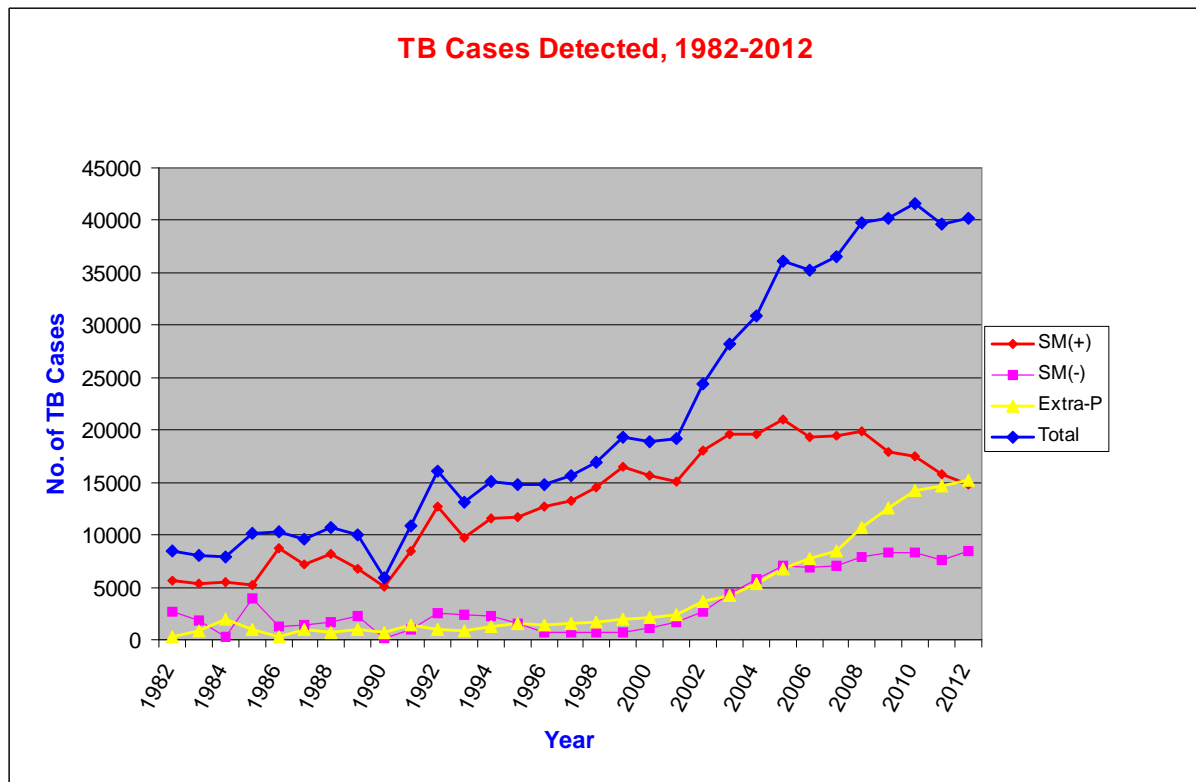
TB case detection nationwide in 2012 is as follows:

Case Detection in 2012	Number of TB cases
New smear positive pulmonary TB	14,838
Relapse	446
Failure cases	51
Return After Default	22
New smear negative pulmonary TB	8,509
New extra pulmonary TB	15,290
Other Cases	1,102
Total (all form of Tuberculosis)	40,258

The table below shows the age and sex distribution of the new smear positive pulmonary TB case detection in 2012.

Age	0-4	5-14	15-24	25-34	35-44	45-54	55-64	> 64	Total	%
M	4	27	673	1,256	1,414	1,904	1,434	1,526	8,235	55
F	1	21	612	1,088	957	1,424	1,302	1,198	6,603	45
Total	5	48	1,285	2,344	2,371	3,328	2,736	2,724	14,838	100
%	0%	0.4%	9%	16%	16%	22%	18%	18.6%	100	

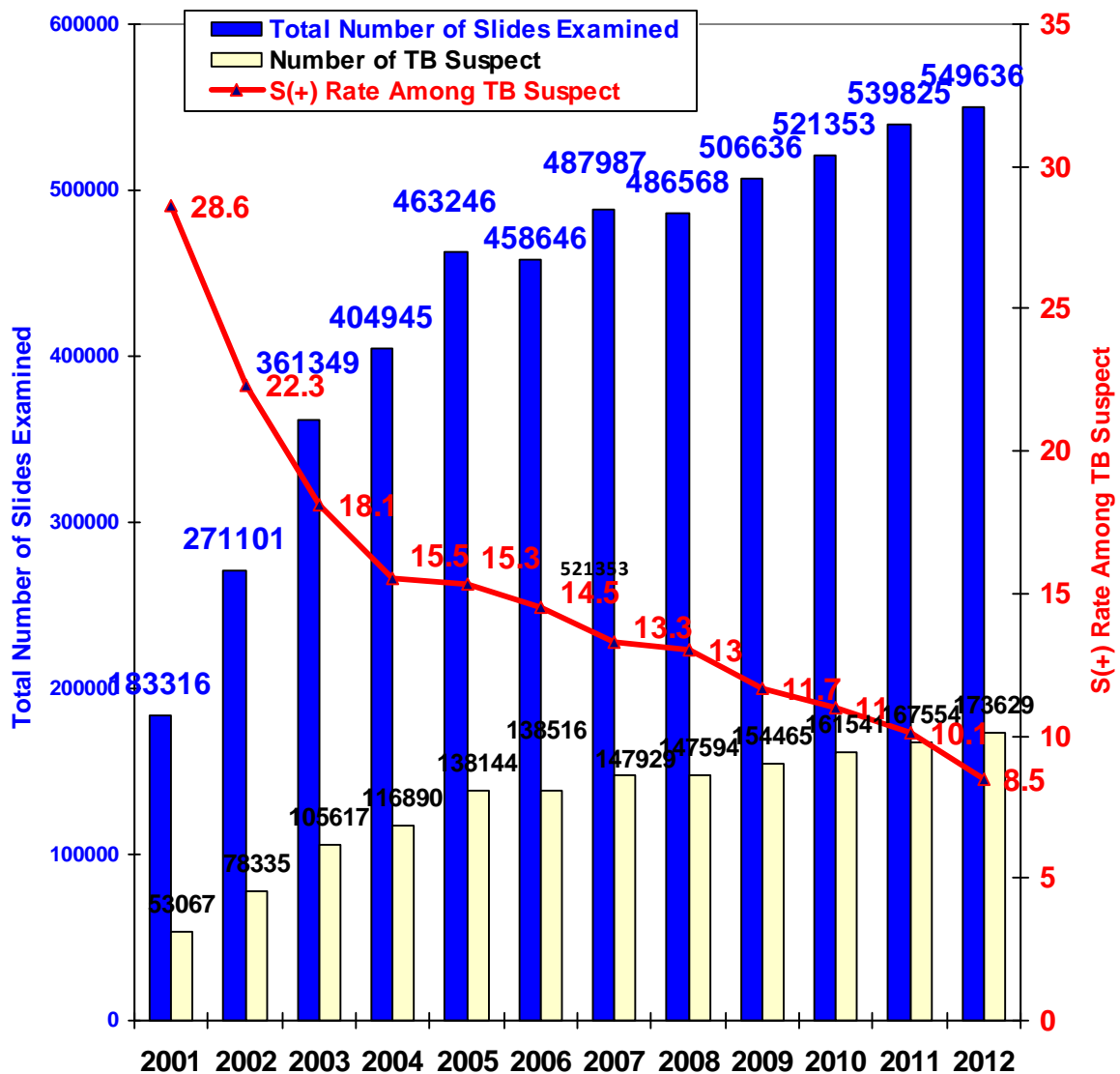
TB Cases Notification, 1982-2012



7.2. Diagnosis by bacteriological examination:

The total slide number that National Tuberculosis Program used for TB smear examination in 2012 was 549636 (detection and control) of which 509101 slides were detection. The positive rate among smear detection is 8.5%.

To strengthen the quality of sputum examination, NTP has examined slides again. This is one of the laboratory quality assurance activities. Results showed that agreement rate 98.1%, false positive rate was 3.4%, and false negative 1.8% for the first 3 quarters in 2012.

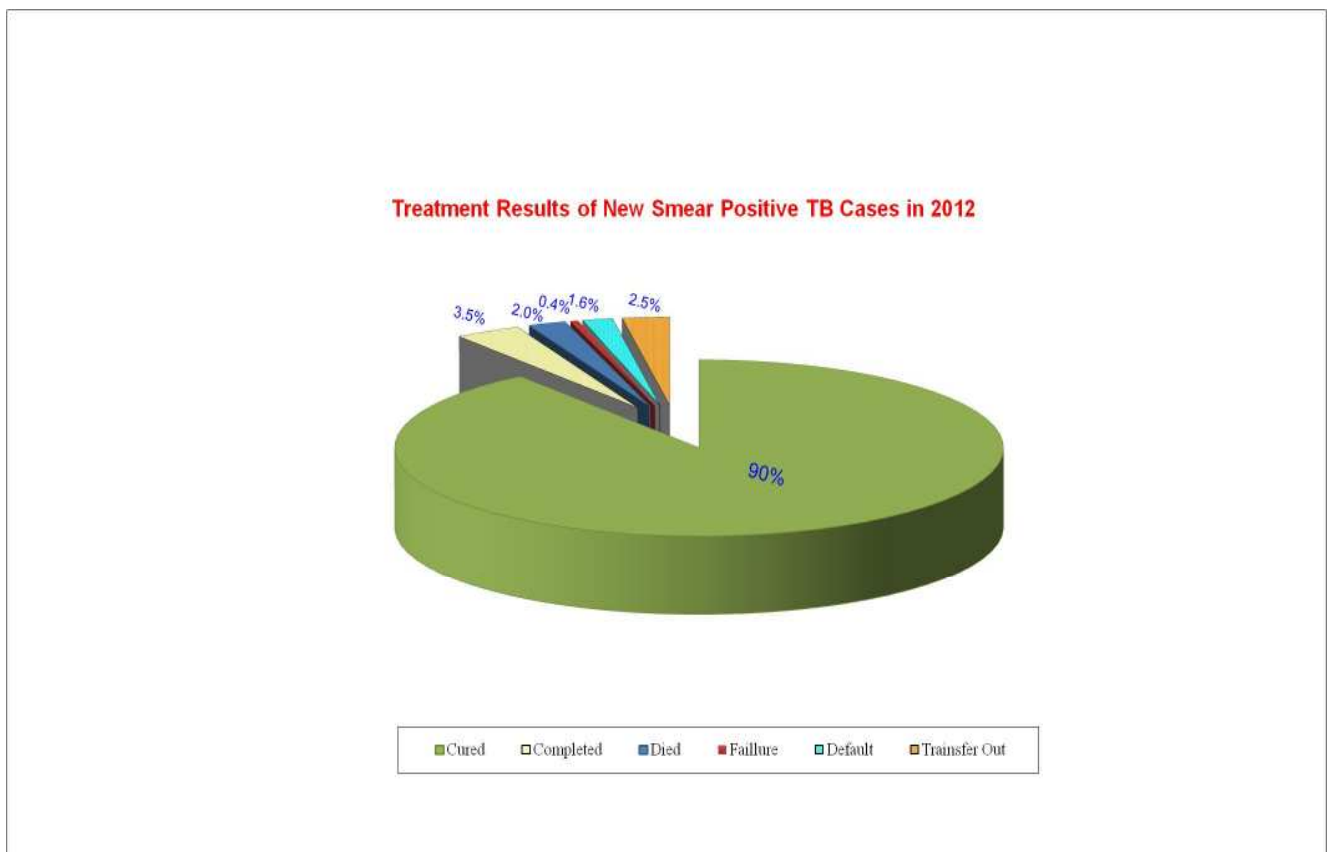


7.3. Treatment Results:

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 (2011).

For 15,884 new smear-positive TB patients that received Cat-1 (2RHEZ/4RH) treatment regimen, the treatment results in 2012 are as follows (see table2 in the annex for the details by province).

- Cured : 90 %
- Treatment completed : 3.5 %
- Died : 2.0 %
- Failure : 0.4 %
- Defaulted : 1.6 %
- Transferred out : 2.5 %



7.4. Childhood TB :

In 2012, 17 Operational Districts located in Kg Cham province, Pursat, Bantey Meanchey, Battambang, Kg Speu Kg Chhnang, and Siem Reap has actively carried out the case finding on children who live with the smear-positive TB patients. As a result, 28,865 has been examined and

received Tuberculin Skin Test (TST). Of which, 4,078 were diagnosed to have active TB, and put then on treatment. Moreover, NTP performed the preventive therapy with Isoniazid on children aged under 5 year with good health conditions in 3 ODs (Kong Pisey, Svay Antor and Kg Cham provincial Hospital. In 2012, total 6,929 children have been diagnosed and treated with active TB countrywide.

In 2013, NTP plan to expand the case finding and IPT in additional 10 Operational Districts.



7.5. Active Case finding using Machine Xpert MTB/RIF :

In 2012, National TB Control Program has carried out TB active case finding by using Machine Xpert MTB/RIF in 15 ODs (Kg Cham-Kg Siem OD, Chamkar Leu, Tbong Khmom, Kampot, Chhouk, Kg Trach, Siem Reap, Kralanh, Angkor Chum, Kg Thom, Baray-Santuk, Chhlong, Tbang Meanchey, Samrong and Kamchay Mear). In 2012, 35,021 patients have been screened and taken chest X-ray examination. Of which, 3,649 suspected has been tested by using Xpert MTB/RIF. As a results, 1,986 were diagnosed as active TB (all forms) which included 807 cases as smear-positive TB.

These results has been achieved by good and close collaboration between all staff at all levels and the community members especially, 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 most important activities of the program. In summary, in 2012, there is more than 1,200 health facilities including 1,051 health center 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 DOTS implementation:

The overall goal of the Community DOTS implementation is to improve case finding through referral of TB suspects to Health Center or Referral Hospital by community volunteers and to provide anti-TB drugs to patients who are unable to take anti-TB drugs everyday at public health facilities. Under Community DOTS (C-DOTS), DOT-Watchers will ensure that TB patients take fixed-dose combinations (FDC) of anti-TB drugs correctly and regularly and complete the 6-month treatment regimen.

9.2. Background of Community DOTS:

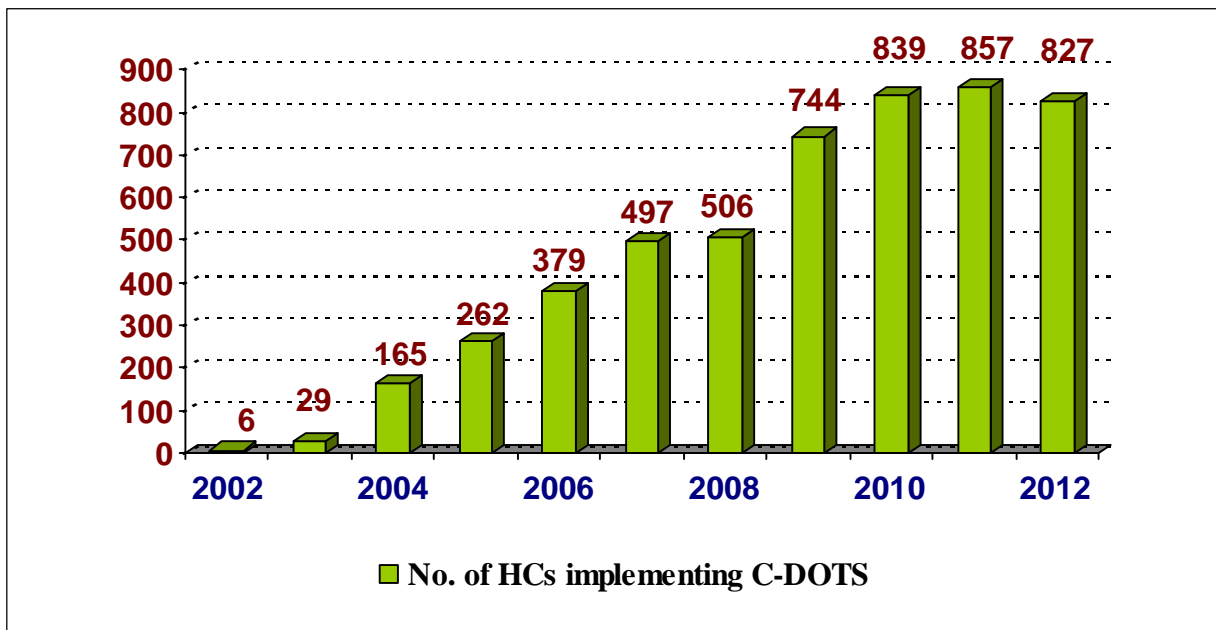
In 2002, the Community-DOTS implementation was piloted in three Operational Districts (ODs) namely – Bakan OD (Pursat Province), O’Chroeuv and Preah Net Preah ODs (Banteay Meanchey Province), which were supported by CARE under the technical leadership of CENAT. In 2003, further pilot projects were established in Angkor Chey OD (Kampot Province) under the support of RACHA, in Svay Rieng and Chipou ODs (Svay Rieng Province) under the support of CHC and Mongkul Borei OD (Banteay Meanchey Province) under the support of CARE.

In 2004, the C-DOTS implementation was scaled-up in collaboration with NGOs; with P-FHAD in Kratie OD (Kratie Province), SCA (now known as SCI) in Kampong Cham Province and with RHAC in Battambang Province. In 2012, the total number of public health facilities implementing Community DOTS was 827 HCs.

9.3. Development of Guidelines for C-DOTS:

- In 2004, Guidelines on Community DOTS Implementation was developed and used nationwide.
- In 2005, Guide for Tuberculosis Treatment Supporters was developed and used nationwide.

9.4. Expansion of C-DOTS at Health Centers (HCs):



The C-DOTS implementation was gradually expanded to health centers since 2002 as shown in the above chart:

- By 2002, 6 health centers implemented C-DOTS
- By 2003, 29 health centers implemented C-DOTS
- By 2004, 165 health centers implemented C-DOTS
- By 2005, 262 health centers implemented C-DOTS
- By 2006, 379 health centers implemented C-DOTS
- By 2007, 497 health centers implemented C-DOTS
- By 2008, 506 health centers implemented C-DOTS
- By 2009, 744 health centers implemented C-DOTS
- By 2010, 839 health centers implemented C-DOTS
- By 2011, 857 health centers implemented C-DOTS

- By 2012, 827 health centers implemented C-DOTS

In summary, 827 HCs have been implementing C-DOTS in 64 ODs in 22 provinces by the end of 2012. The number of HCs implementing Community DOTS in 2012 was less than the previous year due to the completion of Global Fund Round-5 and lack of funding thereafter to continue the activities.

9.5. Contribution of Community DOTS:

In addition to the availability of good quality of DOTS services at public health facilities (1,273), Community DOTS contributed to improving access to TB service and 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 increased case notification and excellent treatment outcomes (more than 85%) nationwide.

9.6. Health Centers that implemented C-DOTS in 2012:

In 2012, there were 13 NGO partners that implemented C-DOTS in 827 HCs as shown in the table below:

Name of C-DOTS implementers	Number of HCs
ASHA (Operation-ASHA)	49
CATA	21
CHC	132
CRS	52
FHI 360	38
HEAD	93
H & H (previously known as VOR.ORT)	8
HPA (previously known as HU)	16
P-FHAD	70
RACHA	127
RHAC	193

SCI (previously known as SCA)	23
SHCH	5
Total	827

9.7. Community DOTS Supervision:

Appropriate and regular supervision of C-DOTS watchers and patients by HC staff and/or C-DOTS coordinators of the NGOs recognized by NTP is the key for C-DOTS to be successful.

The main purpose of C-DOTS supervision is to make sure that TB patients have received TB care and treatment listed in the source documents (TB treatment card) and in accordance with the NTP' policies, standards and procedures. It is also an opportunity for C-DOTS supervisors to acknowledge and reinforce good performance of DOT watcher and compliance to TB treatment of the patient.



9.8. Constraints:

- Inadequate financial resources for C-DOTS implementation
- Limited capacity of frontline TB health workers
- Limited motivation for TB supervisors and HC staff
- Limited resources for motivation of VHSG/DOT-Watchers

9.9. Challenges:

- Sustainability of C-DOTS implementation due to uncertainty of funding after the completion of GFATM round 7.
- Turn-over of trained TB staff at health facilities
- Resources for training and retention of trained staff
- Seasonal migration of VHSG/DOT-Watchers for employment

X. Collaborative TB/HIV activities:

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 51 OI/ART sites by 2012 as listed below:

-Banteay Meanchey (4): Mongkul Borey, Serey Sophorn, Poipet and Thmor Pourk

-Battambang (5): Battambang Referral Hospital, Maung Russey, Sampov Loun, Thmorkol and Military Hospital (Region 5)

-Pailin (1): Pailin Referral Hospital

-Pursat (1): Sampov Meas Referral Hospital

-Kampong Chhnang (1): Kampong Chhnang Referral Hospital

-Kandal (3): Chey Chamneas Referral Hospital, Koh Thom and Kien Svay

-Kampong Cham (6): Kampong Cham Referral Hospital, Tbaung Khmom, Memot, Cheung Prey, Chamkaleu and Srey Santhor

-Prey Veng (3): Prey Veng Referral Hospital, Neakleung and Pearaing

-Kampong Speu (3): Kampong Speu Referral Hospital, Outdong and Kang Pisey

- Takeo (3): Daunkeo, Kirivong and Angroka
- Svay Rieng (2): Svay Rieng Referral Hospital and Romeas Hek
- Koh Kong (2): Smach Meanchey and Sre Ambil
- Kampot (2): Kampot Referral Hospital and Kampong Trach
- Sihanouk Ville (1): Sihanouk Referral Hospital
- Siem Reap (3): Siem Reap Referral Hospital, Sotnikum and Kralanh
- Phnom Penh (7): Hope Center, Social Health Clinic, Meanchey Referral Hospital, Chamk Daung HC, Pochengtong Referral Hospital, Samdach Ov and Clinic Chhouk Sar
- Kampong Thom (2): Kampong Thom Referral Hospital and Baray Santok
- Kratie (1): Kratie Referral Hospital
- Stung Treng (1): Stung Treng Referral Hospital

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

2. Supervision

Joint 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 work is quite new for them, workload for the staff at the field and shortage of staff who are working at OI/ART and TB as well.

3. TB/HIV Data :

HIV / AIDS Among TB Patients 2012									
Quarter	Number of TB cases registered for treatment (including HIV+)	Number of TB Cases Registered for treatment (excluding HIV+)	Number of Known HIV+ before TB treatment	Number of TB Cases Referred to VCT for HIV testing	Number of TB Cases tested for HIV at VCT	HIV+	HIV -	CPT	ARV
1	10,545	10,195	350	8,407	8,161	70	8,091	450	376
2	9,596	9,301	295	7,249	7,047	58	6,989	334	310
3	10,998	10,732	266	9,250	8,723	70	8,653	319	309
4	9,119	8,864	255	7,488	7,262	59	7,203	307	273
Total	40,258	39,092	1,166	32,394	31,193	257	30,936	1,410	1,268

Based on the above table, 83% (32,394/39,092) of unknown HIV TB patients were referred for HIV testing, then out of them around 96% (31,193/32,394) 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 0.82% (257/31,193).

Proportion of registered TB patients who were tested and recorded in the result in the TB register is 80% (32,359/40,258).

Since National TB control program get 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 is increasing from 54% in 2008 to 70.59% in 2009, to 79.28% in 2010, to 84% in 2011 and to 83% in 2012. In the last quarter of 2012, there is shortage of HIV test kit, then the TB patients tested seem to be a bit decrease. Cotrimoxazole preventive therapy for co-infected TB/HIV patients is increasing from 65% to 85.5% and to more than 95% in 2010, 2011 and 2012; respectively. Anti-retroviral treatment during TB treatment is also increasing from 45% to 78% and to 89% in 2010, 2011 and 2012; 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. Yet, in 2012 the uptake of IPT seems to be a bit lower than 2011 and it is proportionate with the newly HIV positive patients.

Since the number of newly HIV positive patients comes down from year to year, the programmes will consider IPT for PLHIV who are currently under ART in near future.

TB Among PLHIV 2012								
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	943	663	1,043	70	79	120	269	211
2	857	642	870	71	76	93	240	235
3	737	545	802	50	89	79	218	273
4	621	468	696	46	77	68	191	225
Total	3,158	2,318	3,411	237	321	360	918	944

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 2012, there are 11 MDR-TB treatment sites with 65 isolation rooms in whole country

N ^o	Treatment Site	Number of Isolation Rooms
1	CENAT	14
2	Mittapheap Khmer-Soviet Hospital	10
3	Battambang	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 :

National Center for Tuberculosis and Leprosy Control Program has revised MDR-TB suspect screening criteria base on their capacity and enrollment target. The revised criteria have been mentioned as the following:

1. Pulmonary TB re-treatment cases

- Failure: is defined as sputum smear positive at month 5 or later during treatment.
- Relapse: those diagnosed with bacteriologically positive TB by sputum smear microscopy or culture after treatment outcome was “cured” or “completed”.
- Return after default : who diagnosed with bacteriologically positive by sputum smear microscopy or culture, after treatment more than one month and following interruption of treatment for at least two consecutive months.
- Other Pulmonary TB (others): those diagnosed as pulmonary TB smear negative after treatment outcome was “cured” or “completed”.

2. Smear positive pulmonary TB cases, whose sputum smear examination remains positive at month 3 during treatment. Non converter at month 2 can be screened for diagnosed MDR-TB in ODs or provinces where screening of the MDR-TB suspect eligible is more than 80%.
3. New smear positive pulmonary TB cases who are close contact with MDR TB patients.
4. Symptomatic (cough for more than 2 weeks) close contact with known MDR TB patients
5. Smear positive pulmonary TB cases are co-infected with HIV.

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:

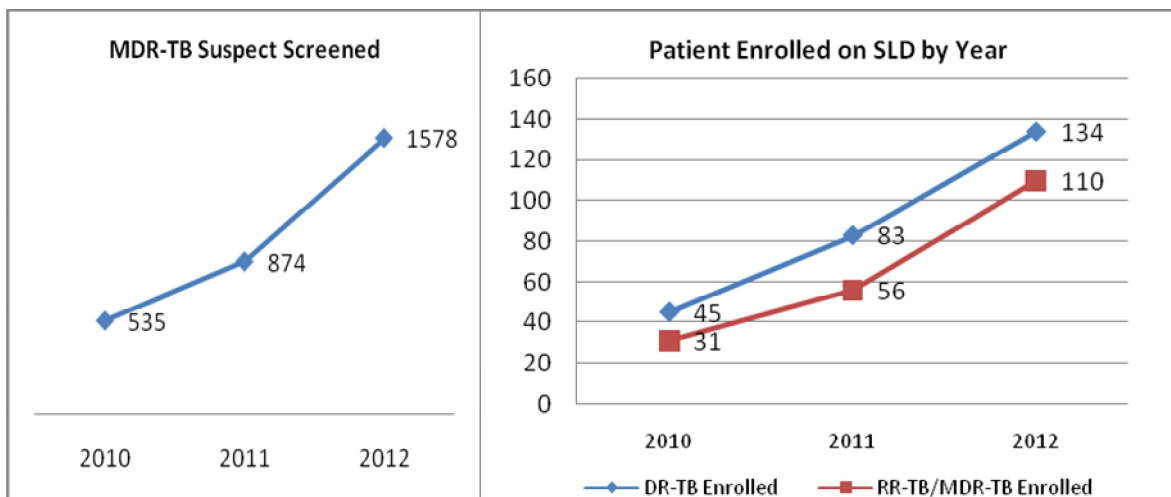
6 Km (or Cm), Lfx (or Mfx), Eto, Cs (or PAS), Z, E*/ 18 Lfx (or Mfx), Eto, Cs (orPAS), Z, E*
--

* If still susceptible by drug susceptibility testing.

11.5. Achievement :

To prevent the Drug Resistant TB, NTP has maintained the high cure rate of pulmonary new smear positive TB patient of more than 85%, expanded the MDR-TB suspect referral system and testing countrywide since early 2011, and also established 11 MDR-TB treatment sites in order to fight against the growing of MDR-TB in the country.

Due to the increased effort in combating drug resistant tuberculosis, NTP has achieved the good results in the last two years such as increasing of MDR-TB suspects referred and tested from 535 patients in 2010 to 1578 patients in 2012 and patients enrolled on second line drugs from 45 cases in 2010 to 134 cases in 2012.

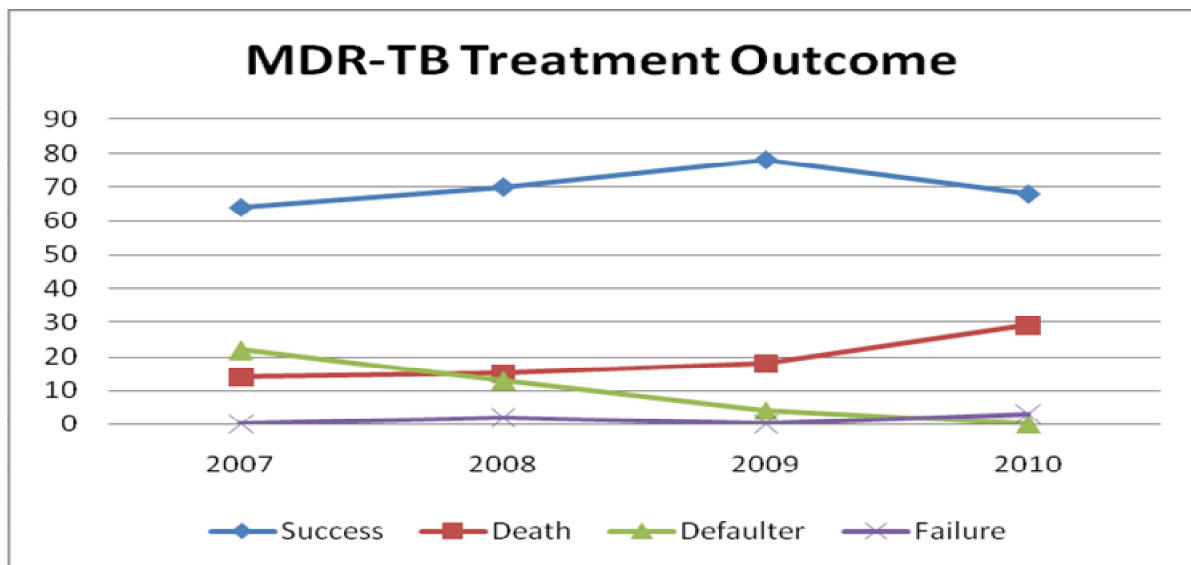


In 2012, NTP has achieved:

- screened 1,578 MDR-TB suspects, which is equal to 137% of the planned target (1153).
- 134 drug resistant TB cases have been enrolled for Category IV treatment as follows:
 - MDR-TB by DST : 17 cases
 - MDR-TB by Xpert MTB/RIF : 93 cases
 - Any resistant : 24

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

Cohort	2007	2008	2009	2010
Success	9 (64%)	33 (70%)	36 (78%)	21 (68%)
Died	2 (14%)	7 (15%)	8 (18%)	9 (29%)
Default	3 (22%)	6 (13%)	2 (4%)	0
Failure	0	1 (2%)	0	1 (3%)
Total	14	47	46	31



11.6 Challenges :

- Budget for MDR-TB Control Project is limited especially budget for training health center staff.
- 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 2012, 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
2012	10	35	1919	4589	3130	763

In summary, the PPM-DOTS activities contribute for increase in case detection by 763 TB cases (2%) among 40258 cases detected nationwide. This PPM-DOTS project also contributes to preventing MDR-TB from happening.

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 2012, 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
2012	19	368	8

Also in year 2012, with strong support from US-AID/TBCARE I/FHIV360 and CARITAS, National TB Program has conducted active case finding in 12 prisons (CC3, Kg Cham Prison, Kg Speu, Sihanouk, Kandal, Takeo and Koh Kong. Siem Reap, Kg. Thom, Cratie, Prah Vihear, Mondulkiri) where 6,832 inmates are screened and 207 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	2012
Number of workers	10,900	22,701	15,740	21,077	25,171	25,881
Referred TB suspect	44	149	102	99	107	127
TB cases	6	22	10	24	15	16

In this year NTP does not conduct active case finding. 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 2012, the activities and achievements related to IEC and Advocacy conducted by National Tuberculosis Program (NTP) are as follows:

15.1. Capacity building for TB staff :

- All training or refresher courses and also Workshop for Projects TB activities are included ACSM strategies, such as TB-HIV, C-DOTS, PPM DOTS, TB in prison and TB in Factory. MDR, Infection Prevention and

Control Health Care Facilities, TB in Children and Laboratory These above courses or Workshop were initiated by National Center for TB and Leprosy control in collaboration with GFATM, USAID, CDC, FHI and TB - CARE I, technically and financially.

15.2. IEC material Production and Dissemination :

In 2012, NTP has performed very few activities regarding the production of IEC materials such as posters, leaflets, TV spots, etc. This was due to shortage of budget. NTP will plan to mobilize resources in order to better perform ACSM related to TB control.

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

1. The 2nd National TB Prevalence Survey 2011:

The 2nd National TB Prevalence Survey (NPS) was conducted in 2010-2011, after the 1st NPS conducted in 2002. The results of the 2nd National TB Prevalence Survey in 2011 have shown that the prevalence rate of smear positive TB was 272 per 100,000 (adult population), which corresponds to 38% reduction between 2002 and 2011 (equal to 4.2% reduction annually). This significant reduction is more than expected by intentional TB expert. WHO TB report 2012 has mentioned that Cambodia as an example country of reducing prevalence of tuberculosis at remarkable rate (4.2% annually), which is a rare case that a low income country as Cambodia can achieve such a great result.

2. Prevalence survey of Chronic Respiratory Diseases in Cambodia

Prevalence survey of chronic respiratory disease was conducted in Phnom Penh, Cambodia in 2011. Aim of this survey is to know the

prevalence of asthma and chronic obstructive pulmonary disease (COPD) and the level of risk factor for these chronic respiratory disease (CRD). 1365 subjects have been recruited for the survey. The preliminary results shows prevalence of current asthma was around 5.5%.

XVIII. Joint Program Review of the National TB Control Program

National TB control program has conducted the second joint program review (JPR) of the Cambodian NTP following form the first one in 2006 this second JPR has carried out from 6-15 august 2013.

The main purposes of this review are the following,

- Review the progress of this National TB program of Cambodia.
- Recommend measures to improve the program further.
- Recommend ways to address the serious funding gap.
- Disseminate the findings of the review during a dissemination workshop.
- Publish a comprehensive report

Site of the visit : 8 operational districts (8 OD) have been selected for the visites:

1. Kampong Thom OD, Kg. Thom province.
2. Kampong Chhnang OD, Kg. Chhnang province.
3. Kirirong OD, Takeo province.
4. Kien Svan OD, Kandal province
5. Sampov Meas OD, Pursat province.
6. North OD, Phnom Penh.
7. Chamcar Leu OD, Kg. Cham province.
8. Angkor Chum OD, Siem Reap province.

The composition of the review teams consist of the following:

- CENAT team
- External / International TB experts such as WHO, US-CDC, USA, RIT/JATA, FHI 360, MSF-UK, KNCV etc.
- Funding agencies such as the Global fund, USAID, US-CDC.
- Local NGOs such as RHAC, RACHA, FHI 360, SHCH.

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 advise 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 States Agency for International Development (USAID)
3. United States Centers for Disease Control and Prevention (US CDC)
4. Japan International Cooperation Agency (JICA)
5. Research Institute of Tuberculosis, Japan (RIT)
6. TBCAP
7. Medecin Sans Frontier (MSF)
8. Pasteur Institute
9. Cambodia Anti-tuberculosis Association (CATA)
10. Cambodia Health Committee (CHC)
11. Catholic Relief Service (CRS)
12. Family Health International (FHI)
13. Health Alliance Development (HEAD)
14. Health Poverty Action (HPA)
15. Partner for Health and Development (P-FHAD)

16. Reproductive Health Association of Cambodia (RHAC)
17. Reproductive and Child Health Alliance (RACHA)
18. Save the Children International (SCI)
19. Sihanouk Hospital Center of HOPE (SHCH)
20. Human and Right (H and H)
21. Operation Asha

XIX. Annexes**Cure rate by Provinces , year 2012****Table 1**

N°	Province	Cure Rate
1	<i>Kandal</i>	89%
2	<i>Svay Rieng</i>	96%
3	<i>Phom Penh</i>	89%
4	<i>Pursat</i>	94%
5	<i>Battambang</i>	90%
6	<i>Pailin</i>	86%
7	<i>BMC</i>	90%
8	<i>Siem Reap</i>	88%
9	<i>Oddar MC</i>	88%
10	<i>Kg Thom</i>	90%
11	<i>Takeo</i>	88%
12	<i>Kg Speu</i>	95%
13	<i>Kampot</i>	96%
14	<i>Kep</i>	100%
15	<i>Kg Som</i>	83%
16	<i>Koh Kong</i>	74%
17	<i>Prey Veng</i>	96%
18	<i>Kg Chhnang</i>	94%
19	<i>Kratie</i>	83%
20	<i>Kg Cham</i>	82%
21	<i>Stung Treng</i>	93%
22	<i>Preah Vihear</i>	92%
23	<i>Modulkiri</i>	61%
24	<i>Rattanakiri</i>	57%
	Total	90%

ANTI-TUBERCULOSIS ACTIVITIES BY PROVINCES, 2012 (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)	1,158	25	2	2	29	712	1,100	43	3,042	38%	1%	23%	36%	92	93	56	87	240	
SVAY RIENG, 3 (OD)	574	25	0	0	25	697	658	262	2,216	26%	1%	31%	30%	119	124	144	136	459	
PHNOM PENH 4 OD and National Hospital	1,521	128	15	6	149	827	1,142	111	3,750	41%	4%	22%	30%	115	124	62	86	282	
PURSAT, 2 (OD)	494	35	0	0	35	145	490	14	1,178	42%	3%	12%	42%	124	133	37	123	297	
BATTAMBANG, 5 (OD)	823	39	6	1	46	440	1,351	40	2,700	30%	2%	16%	50%	80	84	43	132	263	
PAILIN, 1 (OD)	42	2	0	0	2	40	86	6	176	24%	1%	23%	49%	60	62	57	122	250	
BANTEAY MEANC. 4 (OD)	695	27	1	1	29	362	1,719	99	2,904	24%	1%	12%	59%	103	107	53	254	428	
SIEM REAP, 4 (OD)	1,381	20	2	0	22	1,074	854	64	3,395	41%	1%	32%	25%	154	156	120	95	379	
ODORMEANHEY, 1 (OD)	303	8	2	0	10	53	84	11	461	66%	2%	11%	18%	163	167	29	45	248	
KOMPONG THOM, 3 (OD)	848	3	0	0	3	362	255	12	1,480	57%	0%	24%	17%	134	135	57	40	234	
TAKEO, 5 (OD)	1,250	15	1	0	16	707	743	161	2,877	43%	1%	25%	26%	148	150	84	88	341	
KOMPONG SPEU, 3 (OD)	873	14	0	0	14	340	1,141	51	2,419	36%	1%	14%	47%	122	124	47	159	337	
KAMPOT, 4 (OD)	639	13	1	0	14	370	320	73	1,416	45%	1%	26%	23%	109	111	63	55	242	
KEP, 1 (OD)	27	0	0	0	0	25	16	0	68	40%	0%	37%	24%	76	76	70	45	190	
KOMPONG SOM, 1 (OD)	179	6	0	0	6	52	180	7	424	42%	1%	12%	42%	81	84	23	81	192	
KOH KONG, 2 (OD)	82	0	0	0	0	42	47	2	173	47%	0%	24%	27%	70	70	36	40	147	
PREY VENG, 7 (OD)	1,117	20	1	0	21	740	2,316	46	4,240	26%	0%	17%	55%	118	120	78	244	448	
KOMPONG CHHNANG, 3 (OD)	585	10	0	0	10	154	263	10	1,022	57%	1%	15%	26%	124	126	33	56	216	
KRATIE, 2 (OD)	179	0	0	0	0	107	170	0	456	39%	0%	23%	37%	56	56	34	53	143	
KOMPONG CHAM, 10 (OD)	1,614	48	18	8	74	1,103	2,129	80	5,000	32%	1%	22%	43%	96	99	66	127	298	
STUNG TRENG, 1 (OD)	142	2	0	0	2	15	99	0	258	55%	1%	6%	38%	127	129	13	89	231	
PREAH VIHEAR, 1 (OD)	217	5	0	1	6	106	75	5	409	53%	1%	26%	18%	127	130	62	44	239	
MODULKIRI, 1 (OD)	21	0	0	3	3	7	6	0	37	57%	8%	19%	16%	34	34	11	10	61	
RATANAKIRI, 1 (OD)	74	1	2	0	3	29	46	5	157	47%	2%	18%	29%	49	50	19	31	104	
24 PROVINCES	14,838	446	51	22	519	8,509	15,290	1,102	40,258	37%	1%	21%	38%	111	114	64	114	301	

ANTI-TUBERCULOSIS ACTIVITIES BY PROVINCES, 2012 (NTP)

Table 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		TOTAL
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
KANDAL, 8 (OD)	0	0	4	0	35	44	95	89	80	78	120	95	136	121	136	125	606	552	1,158
SVAY RIENG, 3 (OD)	0	0	0	0	19	20	37	39	58	35	74	66	61	75	45	45	294	280	574
NATIONAL HOSPITAL	0	0	0	1	27	28	52	32	43	18	50	34	38	17	42	39	252	169	421
PHNOM PENH, 4 (OD)	1	1	5	4	88	52	139	112	110	58	153	67	87	67	87	69	670	430	1,100
PURSAT, 2 (OD)	0	0	0	1	14	14	36	36	33	26	64	45	63	60	48	54	258	236	494
BATTAMBANG, 5 (OD)	0	0	1	2	37	40	68	48	70	50	121	73	101	63	90	59	488	335	823
PAILIN, 1(OD)	0	0	3	1	1	1	4	5	6	3	5	7	2	2	1	1	22	20	42
BANTEAY MEANCHEY. 4 (OD)	0	0	1	1	33	30	69	38	81	41	124	62	69	46	57	43	434	261	695
SIEM REAP, 4 (OD)	0	0	0	0	67	47	125	98	177	106	188	160	135	120	97	61	789	592	1,381
ODORMEANCHEY 1 (OD)	0	0	0	0	16	8	29	18	34	16	56	45	25	27	14	15	174	129	303
KOMPONG THOM, 3 (OD)	0	0	0	2	36	38	78	71	87	66	98	100	68	69	74	61	441	407	848
TAKEO, 5 (OD)	0	0	3	1	46	34	79	77	103	64	140	123	101	123	175	181	645	603	1,250
KOMPONG SPEU, 3 (OD)	0	0	1	0	38	48	81	76	86	67	99	79	69	72	88	69	462	411	873
KAMPOT, 4 (OD)	0	0	2	0	29	24	51	29	50	32	97	52	58	64	91	60	378	261	639
KEP, 1 (OD)	0	0	0	0	3	0	3	2	6	3	3	0	1	1	3	2	19	8	27
KOMPONG SOM, 1 (OD)	0	0	0	0	11	10	20	13	21	7	25	10	16	13	20	13	113	66	179
KOH KONG, 2 (OD)	0	0	0	0	8	3	10	3	13	4	9	3	10	5	11	3	61	21	82
PREY VENG, 7 (OD)	0	0	3	4	38	42	64	91	83	98	110	136	113	146	107	82	517	599	1,117
KOMPONG CHHNANG, 3 (OD)	1	0	1	0	19	17	37	46	45	37	79	68	58	51	76	50	316	269	585
KRATIE, 2 (OD)	0	0	0	1	7	9	13	10	28	7	27	12	22	17	19	7	116	63	179
KOMPONG CHAM, 10 (OD)	2	0	3	2	79	81	136	125	149	102	205	148	145	113	195	129	914	700	1,614
STUNG TRENG, 1 (OD)	0	0	0	0	9	9	12	11	18	12	16	12	16	8	12	7	83	59	142
PREAH VIHEAR, 1 (OD)	0	0	0	1	7	11	9	9	22	15	33	19	26	20	28	17	125	92	217
MODULKIRI,1(OD)	0	0	0	0	2	1	2	1	1	3	5	2	3	0	1	0	14	7	21
RATANAKIRI, 1 (OD)	0	0	0	0	4	1	7	9	10	9	3	6	11	2	9	3	44	30	74
24 PROVINCES	4	1	27	21	673	612	1,256	1,088	1,414	957	1,904	1,424	1,434	1,302	1,526	1,195	8,235	6,603	14,838

Table 4

TB Cases Notified by Operational District in 2012

Operational District (OD) of Province	AFB pos					AFB neg	EP	OTHER	TOTAL
	New	Re	Fail.	RAD	ReTt				
KANDAL :									
TAKMOV (OD)	156	8	2	0	10	352	243	17	778
SAANG(OD)	245	6	0	0	6	31	69	11	362
KOH THOM(OD)	177	2	0	1	3	135	13	6	334
KIEN SVAY(OD)	141	2	0	0	2	106	458	4	711
KHSACH KANDAL(OD)	94	0	0	1	1	30	194	2	321
MOUK KAMPOL(OD)	76	2	0	0	2	20	52	0	150
PONHEA LEU(OD)	92	3	0	0	3	26	24	0	145
ANG SNOUL(OD)	177	2	0	0	2	12	47	3	241
subtotal	1,158	25	2	2	29	712	1,100	43	3,042
SVAY RIENG									
SVAY RIENG (OD)	376	18	0	0	18	365	422	146	1,327
ROMEAS HEK(OD)	92	1	0	0	1	90	99	31	313
CHIPOU (OD)	106	6	0	0	6	242	137	85	576
subtotal	574	25	0	0	25	697	658	262	2,216
NATIONAL HOSPITAL									
CENAT	250	74	13	1	88	245	301	61	945
IOM	1	0	0	0	0	18	0	0	19
PREAS KOSMAK HOSPITAL	27	0	0	0	0	23	63	0	113
HOPE HOSPITAL	115	20	1	3	24	34	86	23	282
NORODOM SIAHNOUK	24	2	0	0	2	52	83	2	163
PREAH KET MELEAH	4	0	0	0	0	28	67	0	99
NATIONAL PEDIATRIQUE	0	0	0	0	0	23	46	0	69
subtotal	421	96	14	4	114	423	646	86	1,690
PHNOM PENH									
CENTER (OD)	63	0	0	0	0	41	62	0	166
NORTH(OD)	222	17	0	1	18	83	122	9	454
SOUTH(OD)	321	11	0	1	12	182	174	14	703
WEST(OD)	494	4	1	0	5	98	138	2	737
subtotal	1,100	32	1	2	35	404	496	25	2,060
PURSAT									
SAMPOVMEAS (OD)	302	24	0	0	24	87	288	12	713
BAKAN (OD)	192	11	0	0	11	58	202	2	465
subtotal	494	35	0	0	35	145	490	14	1,178
BATTAMBANG									
BATTAMBANG (OD)	328	25	4	0	29	113	691	12	1,173
THMAR KOUL (OD)	159	2	0	0	2	55	40	0	256
MAUNG RUSSEY (OD)	138	7	2	1	10	185	484	28	845
SAMPOEV LONE (OD)	87	2	0	0	2	48	30	0	167
SANG KE (OD)	111	3	0	0	3	39	106	0	259
subtotal	823	39	6	1	46	440	1,351	40	2,700
PAILIN CITY									
PAILIN (OD)	42	2	0	0	2	40	86	6	176

Table 4 (continued)

TB Cases Notified by Operational District in 2012

Operational District (OD) of Province	AFB pos					AFB neg	EP	OTHER	TOTAL
	New	Re	Fail.	RAD	ReTt				
BANTEAY MEANCHEY:									
MONGKOL BOREI (OD)	205	10	0	1	11	125	646	36	1,023
PREANEATPREAS (OD)	109	2	1	0	3	60	587	52	811
OCHROV (OD)	251	12	0	0	12	101	457	11	832
TMORPOUK(OD)	130	3	0	0	3	76	29	0	238
subtotal	695	27	1	1	29	362	1,719	99	2,904
SIEM REAP									
SIEM REAP (OD)	519	9	1	0	10	388	270	28	1,215
SOTNIKUM(OD)	345	2	1	0	3	408	188	7	951
ANGKOR CHUM	327	7	0	0	7	70	106	15	525
ANGKOR CHILD HOSPITAL (OD)	0	0	0	0	0	1	4	0	5
KRALANH (OD)	190	2	0	0	2	207	286	14	699
subtotal	1,381	20	2	0	22	1,074	854	64	3,395
ODOR MEANCHEY									
SAMRONG (OD)	303	8	2	0	10	53	84	11	461
KOMPONG THOM									
KG THOM (OD)	382	3	0	0	3	219	110	9	723
BARAY (OD)	304	0	0	0	0	134	104	2	544
STUNG(OD)	162	0	0	0	0	9	41	1	213
subtotal	848	3	0	0	3	362	255	12	1,480
TAKEO									
DAUNKEOV (OD)	376	1	0	0	1	73	139	0	589
BATI (OD)	370	7	0	0	7	114	177	42	710
PREY KABAS (OD)	225	0	0	0	0	375	292	115	1,007
ANGROKA (OD)	100	1	0	0	1	80	82	2	265
KIRIVONG (OD)	179	6	1	0	7	65	53	2	306
subtotal	1,250	15	1	0	16	707	743	161	2,877
KOMPONG SPEU									
KOMPONG SPEU (OD)	480	10	0	0	10	152	493	23	1,158
KARNG PISEY(OD)	238	4	0	0	4	109	591	25	967
LOUDONG(OD)	155	0	0	0	0	79	57	3	294
subtotal	873	14	0	0	14	340	1,141	51	2,419
KAMPOT									
KAMPOT (OD)	148	2	1	0	3	100	103	3	357
ANGKOR CHEY(OD)	115	5	0	0	5	31	40	15	206
KOMPONG TRACH(OD)	178	2	0	0	2	127	78	18	403
CHHOUK(OD)	198	4	0	0	4	112	99	37	450
subtotal	639	13	1	0	14	370	320	73	1,416
KEP									
KRONG KEP (OD)	27	0	0	0	0	25	16	0	68
KOMPONG SOM									
PREASIHANOUK(OD)	179	6	0	0	6	52	180	7	424

Table 4 (continued)

TB Cases Notified by Operational District in 2012

Operational District (OD) of Province	AFB pos				ReTt	AFB neg	EP	OTHER	TOTAL
	New	Re	Fail.	RAD					
KOH KONG									
SMUCH MEANCHEY(OD)	38	0	0	0	0	36	31	1	106
SRE AMBIL(OD)	44	0	0	0	0	6	16	1	67
subtotal	82	0	0	0	0	42	47	2	173
PREY VENG									
PREY VENG (OD)	146	2	0	0	2	145	536	10	839
KAMCHEY MEAR(OD)	117	1	0	0	1	89	192	0	399
PEARING(OD)	225	1	0	0	1	164	317	9	716
KG TRABECK(OD)	88	0	0	0	0	66	223	8	385
MESANG(OD)	170	7	0	0	7	97	445	3	722
PREAH SDACH(OD)	249	4	0	0	4	9	238	0	500
NEAK LOEUNG (OD)	122	5	1	0	6	170	365	16	679
subtotal	1,117	20	1	0	21	740	2,316	46	4,240
KOMPONG CHHNANG									
KG. CHHNANG (OD)	255	8	0	0	8	80	63	7	413
KG TRALACH (OD)	139	0	0	0	0	41	93	0	273
Bar Bo (OD)	191	2	0	0	2	33	107	3	336
subtotal	585	10	0	0	10	154	263	10	1,022
KRATIE									
KRATIE (OD)	100	0	0	0	0	44	136	0	280
CHHLAUNG(OD)	79	0	0	0	0	63	34	0	176
subtotal	179	0	0	0	0	107	170	0	456
KOMPONG CHAM									
KG CHAM (OD)	410	29	16	6	51	356	335	33	1,185
KRAUCH CHMAR (OD)	35	1	0	0	1	56	34	4	130
TBONG KHMUM(OD)	95	4	2	0	6	133	80	6	320
CHOEUNG PREY(OD)	328	6	0	1	7	160	536	7	1,038
SREY SANTHOR(OD)	79	1	0	0	1	127	88	18	313
CHAMCAR LEU(OD)	282	0	0	0	0	128	684	3	1,097
PREY CHHOR (OD)	134	2	0	0	2	34	194	0	364
PONHEA KREK(OD)	141	3	0	0	3	71	66	0	281
ORAING OV(OD)	52	0	0	0	0	24	76	6	158
MEMOT(OD)	58	2	0	1	3	14	36	3	114
subtotal	1,614	48	18	8	74	1,103	2,129	80	5,000
STUNG TRENG									
STUNG TRENG (OD)	142	2	0	0	2	15	99	0	258
PREAH VIHEAR									
TBENG MEAN CHEY(OD)	217	5	0	1	6	106	75	5	409
MONDOLKIRI									
SEN MONORUM(OD)	21	0	0	3	3	7	6	0	37
RATTANAKIRI									
BANLUNG (OD)	74	1	2	0	3	29	46	5	157
TOTAL	14,838	446	51	22	519	8,509	15,290	1,102	40,258

Table 5

Treatment Outcomes of New Smear Positive TB Cases by Operational District in 2012

<i>Operational District (OD) of Province</i>	patients	Cure	%	Complete	%	Death	%	Failure	%	default	%	Trans	%
KANDAL :													
TAKMOV (OD)	172	119	69%	41	24%	4	2%	1	1%	3	2%	4	2%
SAANG(OD)	254	251	99%	0	0%	1	0%	0	0%	1	0%	1	0%
KOH THOM(OD)	133	121	91%	3	2%	6	5%	0	0%	2	2%	1	1%
KIEN SVAY(OD)	198	180	91%	6	3%	8	4%	0	0%	3	2%	1	1%
KHSACH KANDAL(OD)	114	94	82%	6	5%	13	11%	0	0%	0	0%	1	1%
MOUK KAMPOL(OD)	66	56	85%	7	11%	2	3%	0	0%	0	0%	1	2%
PONHEA LEU(OD)	105	100	95%	2	2%	2	2%	0	0%	1	1%	0	0%
ANG SNOUL(OD)	147	143	97%	0	0%	1	1%	0	0%	1	1%	2	1%
subtotal	1,189	1,064	89%	65	5%	37	3%	1	0%	11	1%	11	1%
SVAY RIENG													
SVAY RIENG (OD)	469	447	95%	1	0%	13	3%	0	0%	0	0%	8	2%
ROMEAS HEK(OD)	153	150	98%	0	0%	1	1%	0	0%	2	1%	0	0%
CHIPOU (OD)	140	137	98%	1	1%	2	1%	0	0%	0	0%	0	0%
subtotal	762	734	96%	2	0%	16	2%	0	0%	2	0%	8	1%
NATIONAL HOSPITAL													
CENAT	320	293	92%	5	2%	4	1%	10	3%	1	0%	7	2%
HOPE HOSPITAL	60	29	48%	1	2%	6	10%	5	8%	5	8%	14	23%
NORODOM SIAHNOUK	32	18	56%	2	6%	1	3%	0	0%	2	6%	9	28%
PREAH KET MELEAH	24	5	21%	10	42%	1	4%	0	0%	4	17%	4	17%
NATIONA PEDIATRIQUE	11	11	100%	0	0%	0	0%	0	0%	0	0%	0	0%
subtotal	1	0	0%	1	100%	0	0%	0	0%	0	0%	0	0%
PHNOM PENH													
CENTER (OD)	70	54	77%	0	0%	4	6%	0	0%	8	11%	4	6%
NORTH(OD)	217	205	94%	5	2%	3	1%	0	0%	2	1%	2	1%
SOUTH(OD)	266	231	87%	22	8%	3	1%	3	1%	1	0%	6	2%
WEST(OD)	205	185	90%	7	3%	2	1%	0	0%	1	0%	10	5%
subtotal	758	675	89%	34	4%	12	2%	3	0%	12	2%	22	3%
PURSAT													
SAMPOVMEAS (OD)	350	326	93%	4	1%	11	3%	1	0%	5	1%	3	1%
BAKAN (OD)	171	164	96%	0	0%	4	2%	0	0%	2	1%	1	1%
subtotal	521	490	94%	4	1%	15	3%	1	0%	7	1%	4	1%
BATTAMBANG													
BATTAMBANG (OD)	321	274	85%	5	2%	8	2%	2	1%	6	2%	26	8%
THMAR KOUL (OD)	173	158	91%	2	1%	9	5%	0	0%	1	1%	3	2%
MAUNG RUSSEY (OD)	147	137	93%	0	0%	1	1%	5	3%	1	1%	3	2%
SANG KE (OD)	130	123	95%	1	1%	3	2%	0	0%	1	1%	2	2%
SAMPOVLOUN (OD)	140	132	94%	2	1%	4	3%	0	0%	0	0%	2	1%
subtotal	911	824	90%	10	1%	25	3%	7	1%	9	1%	36	4%
PAILIN CITY													
PAILIN (OD)	93	80	86%	4	4%	3	3%	0	0%	2	2%	4	4%

Table 5 (continued)

Treatment Outcomes of New Smear Positive TB Cases by Operational District in 2012

<i>Operational District (OD)</i> of Province	patients	Cure	%	Complete	%	Death	%	Failure	%	default	%	Trans	%
BANTEAY MEANCHEY													
MONGKOL BOREI (OD)	189	166	88%	0	0%	9	5%	1	1%	3	2%	10	5%
PREANEATPREAS (OD)	126	117	93%	5	4%	3	2%	1	1%	0	0%	0	0%
OCHROV (OD)	221	196	89%	4	2%	5	2%	3	1%	8	4%	5	2%
TMORPOUK(OD)	120	114	95%	1	1%	3	3%	1	1%	1	1%	0	0%
subtotal	656	593	90%	10	2%	20	3%	6	1%	12	2%	15	2%
SIEM REAP													
SIEM REAP (OD)	511	441	86%	0	0%	13	3%	4	1%	9	2%	44	9%
ANGKOR CHUM (OD)	268	235	88%	19	7%	4	1%	0	0%	6	2%	4	1%
SOTNIKUM(OD)	381	326	86%	49	13%	4	1%	0	0%	2	1%	0	0%
KRALANH (OD)	213	204	96%	0	0%	7	3%	0	0%	2	1%	0	0%
subtotal	1,373	1,206	88%	68	5%	28	2%	4	0%	19	1%	48	3%
ODOR MEANCHEY													
SAMRONG (OD)	328	290	88%	15	5%	3	1%	2	1%	10	3%	8	2%
KOMPONG THOM													
KG THOM (OD)	454	433	95%	5	1%	5	1%	1	0%	2	0%	8	2%
BARAY (OD)	356	327	92%	20	6%	3	1%	0	0%	4	1%	2	1%
STUNG(OD)	181	131	72%	43	24%	5	3%	0	0%	2	1%	0	0%
subtotal	991	891	90%	68	7%	13	1%	1	0%	8	1%	10	1%
TAKEO													
DAUNKEOV (OD)	268	242	90%	5	2%	8	3%	1	0%	2	1%	10	4%
BATI (OD)	188	143	76%	39	21%	0	0%	0	0%	3	2%	3	2%
PREY KABAS (OD)	306	286	93%	11	4%	5	2%	0	0%	3	1%	1	0%
ANGROKA (OD)	121	109	90%	4	3%	2	2%	0	0%	4	3%	2	2%
KIRIVONG (OD)	183	162	89%	5	3%	4	2%	1	1%	7	4%	4	2%
subtotal	1,066	942	88%	64	6%	19	2%	2	0%	19	2%	20	2%
KOMPONG SPEU													
KOMPONG SPEU (OD)	620	600	97%	4	1%	7	1%	0	0%	6	1%	3	0%
KARNG PISEY(OD)	302	281	93%	12	4%	4	1%	0	0%	3	1%	2	1%
OULDONG(OD)	184	172	93%	6	3%	3	2%	1	1%	2	1%	0	0%
subtotal	1,106	1,053	95%	22	2%	14	1%	1	0%	11	1%	5	0%
KAMPOT													
KAMPOT (OD)	187	176	1	0	0	5	0	0	0	3	0	3	0
ANGKOR CHEY(OD)	122	118	97%	1	1%	2	2%	0	0%	1	1%	0	0%
KOMPONG TRACH(OD)	158	158	100%	0	0%	0	0%	0	0%	0	0%	0	0%
CHHOUK(OD)	164	155	95%	0	0%	3	2%	0	0%	3	2%	3	2%
subtotal	631	607	96%	1	0%	10	2%	0	0%	7	1%	6	1%
KEP													
KRONG KEP (OD)	41	41	100%	0	0%	0	0%	0	0%	0	0%	0	0%
KOMPONG SOM													
PREASHANOUK(OD)	193	161	83%	15	8%	5	3%	0	0%	8	4%	4	2%

Table 5 (continued)

Treatment Outcomes of New Smear Positive TB Cases by Operational District in 2012

Operational District (OD) of Province	patients	Cure	%	Complete	%	Death	%	Failure	%	default	%	Trans	%
KOH KONG													
SMUCH MEANCHEY(OD)	55	38	69%	0	0%	2	4%	0	0%	5	9%	10	18%
SRE AMBIL(OD)	39	32	82%	2	5%	2	5%	0	0%	1	3%	2	5%
subtotal	94	70	74%	2	2%	4	4%	0	0%	6	6%	12	13%
PREY VENG													
PREY VENG (OD)	224	206	92%	2	1%	10	4%	1	0%	4	2%	1	0%
KAMCHEY MEAR(OD)	154	145	94%	4	3%	3	2%	0	0%	0	0%	2	1%
PEARING(OD)	329	317	96%	2	1%	5	2%	0	0%	1	0%	4	1%
KG TRABECK(OD)	130	122	94%	0	0%	5	4%	0	0%	3	2%	0	0%
MESANG(OD)	207	206	100%	0	0%	1	0%	0	0%	0	0%	0	0%
PREAH SDACH(OD)	232	230	99%	2	1%	0	0%	0	0%	0	0%	0	0%
NEAK LOEUNG (OD)	174	161	93%	8	5%	3	2%	0	0%	0	0%	2	1%
subtotal	1,450	1,387	96%	18	1%	27	2%	1	0%	8	1%	9	1%
KOMPONG CHHNANG													
KG. CHHNANG (OD)	290	262	90%	13	4%	14	5%	0	0%	0	0%	1	0%
BARBO (OD)	188	187	99%	0	0%	0	0%	1	1%	0	0%	0	0%
KG TRALACH (OD)	187	179	96%	1	1%	4	2%	0	0%	0	0%	3	2%
subtotal	665	628	94%	14	0	18	0	1	0	0	0	4	0
KRATIE													
KRATIE (OD)	114	106	93%	7	6%	0	0%	0	0%	1	1%	0	0%
CHHLAUNG(OD)	72	48	67%	17	24%	0	0%	1	1%	4	6%	2	3%
subtotal	186	154	83%	24	13%	0	0%	1	1%	5	3%	2	1%
KOMPONG CHAM													
KG CHAM (OD)	373	236	63%	34	9%	14	4%	7	2%	22	6%	60	16%
KRAUCH CHMAR (OD)	104	103	99%	0	0%	1	1%	0	0%	0	0%	0	0%
TBONG KHMUM(OD)	152	114	75%	19	13%	0	0%	1	1%	4	3%	14	9%
CHOEUNG PREY(OD)	332	316	95%	2	1%	6	2%	0	0%	5	2%	3	1%
SREY SANTHOR(OD)	98	87	89%	1	1%	4	4%	1	1%	3	3%	2	2%
CHAMCAR LEU(OD)	290	280	97%	6	2%	2	1%	0	0%	2	1%	0	0%
PREY CHHOR (OD)	232	218	94%	0	0%	6	3%	0	0%	0	0%	8	3%
PONHEA KREK(OD)	208	135	65%	31	15%	5	2%	0	0%	7	3%	30	14%
ORAING OV(OD)	80	55	69%	19	24%	0	0%	0	0%	5	6%	1	1%
MEMOT(OD)	112	84	84%	8	0%	3	5%	0	1%	7	4%	10	6%
subtotal	1,981	1,628	82%	120	6%	41	2%	9	0%	55	3%	128	6%
STUNG TRENG													
STUNG TRENG (OD)	127	118	93%	7	6%	0	0%	0	0%	1	1%	1	1%
PREAH VIHEAR													
TBENG MEAN CHEY(OD)	190	174	92%	8	4%	3	2%	0	0%	0	0%	5	3%
MONDOLKIRI													
SEN MONORUM(OD)	38	23	61%	6	16%	2	5%	0	0%	7	18%	0	0%
RATTANAKIRI													
BANLUNG (OD)	86	49	57%	13	15%	8	9%	3	3%	5	6%	8	9%
TOTAL	15,884	14,238	90%	613	4%	335	2%	58	0%	236	1%	404	3%

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 40,258 in 2012, 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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