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## **1. Introduction**

The Ministry of Health of Cambodia has given high priority to TB Control. With the support and encouragement from the Royal Government of Kingdom of Cambodia led by the Prime Minister, Samdech Akka Moha Sena Padei Techo Hun Sen, as the Honorable Chairman of the National Anti-Tuberculosis Committee, as well as the involvement from all partners, TB control in Cambodia has achieved the remarkable results in the last recent years. This achievement has been recognized by the World Health Organization (WHO) and other key partners.

In 2015, WHO reclassified the countries with high burden of tuberculosis in which there are 30 countries with high burden of TB in the new list compared to 22 high burden countries in the old one. By the end of 2015, Cambodia was one of the 9 countries among 22 TB high burden countries that have successfully achieved Millennium Development Goal (MDG). Despite this great achievement, based on the new classification, Cambodia is still one of the 30 countries with high burden of TB in the world. However, Cambodia is no longer country with high burden of TB/HIV.

According to the 2015 WHO Global TB Report, in 2014, Cambodia had TB incidence of 390 per 100,000 population, prevalence of 668 per 100,000 population, and mortality rates of 58 per 100,000 population.

The followings are the main achievements on TB control in 2015 and direction/targets for 2016 and the years beyond.

## **2. Tuberculosis Situation in the World**

Worldwide, 9.6 million people are estimated to have fallen ill with TB in in 2014; of which only 6 million new cases of TB were detected and reported to WHO. In the same year, TB killed 1.5 million people including 400,000 HIV-positive. TB now ranks alongside HIV as a leading cause of

death among infectious diseases. Death toll due to HIV in 2014 was estimated at 1.2 million.

There are three main Millennium Development Goals related to TB for the period between 1990 and 2015:

- 1-Reduction of TB prevalence by 50%;
- 2-Reduction of TB mortality by 50% and
- 3-Reverse TB incidence

Worldwide, by the end of 2015, TB mortality has fallen 47% (between 1990 and 2015) compared to MDG target of 50%; while prevalence of TB has declined since 2000. In particular, only three out of the six WHO regions achieved all three MDG targets: the America, South-east Asia, and Asia Pacific regions. The other three regions that did not achieve the MDG targets include the Eastern Mediterranean, European, and African.

### **3. Main Achievements**

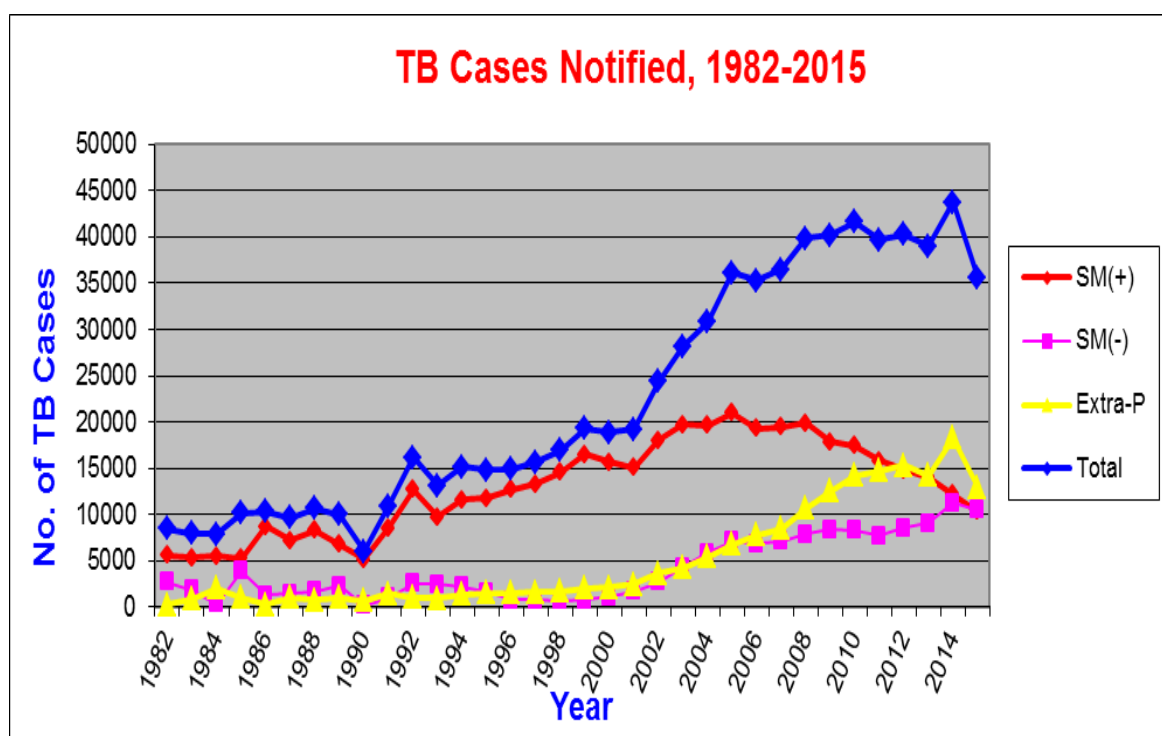
National TB Control Program has achieved the main results as below:

#### **3.1. Service Coverage**

The coverage of Directly Observed Treatment, Short Course (DOTS) Strategy has been maintaining at 100% in all health centers nationwide. Community DOTS (C-DOTS) has been expanded from 506 health centers in 2008 to 861 health centers in 2015. Public-Private Mix DOTS (PPM-DOTS) has been implemented in 27 ODs (operational districts) of 8 provinces in 2014 but this activity has been discontinued in 2015 due to lack of fund. TB/HIV collaborative activity has been implementing in all ODs in 2015 (compared to only 57 ODs in 2008) while TB in children activity was implemented in 25 ODs. In addition, the implementation of DOTS strategy has been implementing in 14 factories and 26 prisons in 2015. MDR-TB treatment sites have increased from 9 in 2010 to 11 in 2015. In total, there are 1,372 health facilities with DOTS services across the country.

### 3.2. Case Detection

In 2015, NTP has detected a total of 35,638 TB cases, of which 10,280 new bacteriologically confirmed TB cases.



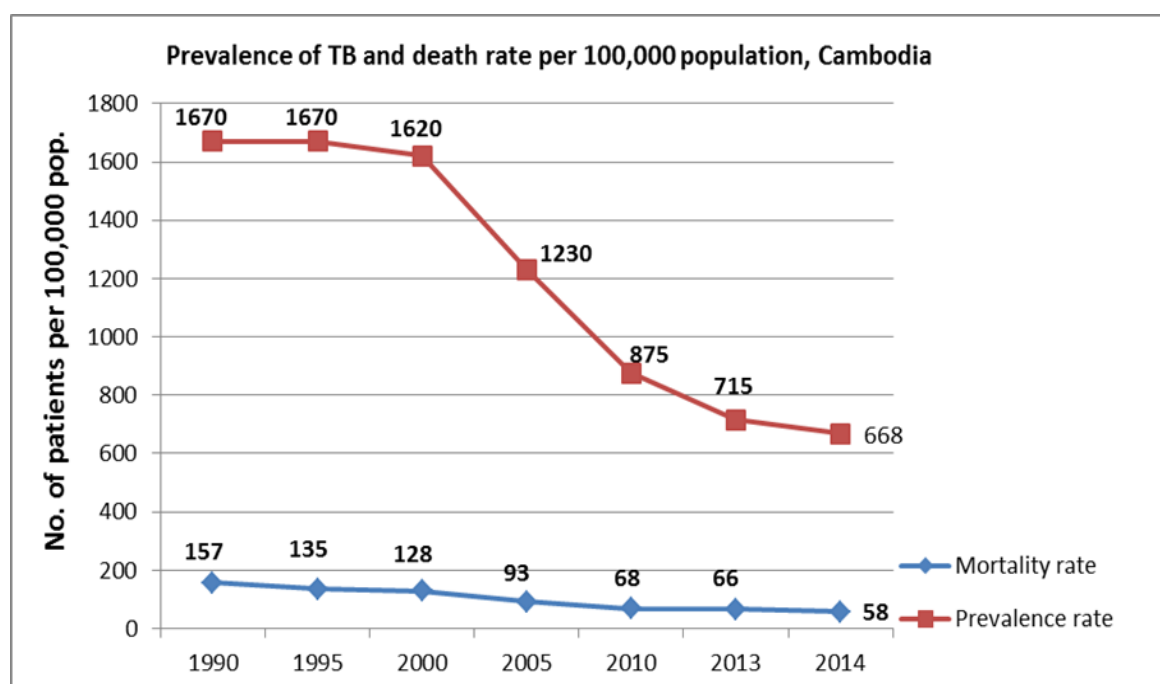
### 3.3. Treatment

Cure rate of TB has been maintained over 85% during the last 18 years. For instance, NTP has achieved 90% of cure rate in 2015 which surpassed the target of 85%.

### 3.4. Mortality, Incidence, and Prevalence

In the recent years, Cambodia has achieved remarkable results in TB control. The 2015 WHO Global TB Report has shown that TB mortality rate dropped from 157 per 100,000 population in 1990 to 58 per 100,000 population in 2014, which equal to 63% reduction against MDG target of 50% reduction by 2015. The prevalence of TB dropped from 1,670 per 100,000 population in 1990 to 668 per 100,000 population in 2014, which equal to 60% reduction against MDG target of 50% reduction by 2015; while

the incidence has fallen since 2001. Ministry of Health's National Tuberculosis Control Program has already achieved MDG targets in reversing incidence, reduction of prevalence and death rate due to TB by 50% since 2011, that's four years earlier than scheduled. By the end of 2015, Cambodia was one of the nine countries among 22 high burden countries that have successfully achieved tuberculosis MDG targets.



Moreover, the report of second national TB prevalence survey conducted in 2011 has shown that the prevalence of bacteriologically confirmed pulmonary TB cases has fallen by 38% between 2002 and 2011, which equal to 4.2% each year. This level of reduction is more than estimated by TB experts. The 2012 WHO Global TB Report has mentioned that Cambodia was a model example that remarkably reduced TB prevalence by 4.2% every year, which is a rare case that low-income country like Cambodia could achieve such tremendous result. These are the great achievements of Cambodia Ministry of Health's national TB program.

## **4. Main Interventions**

In addition to the main achievements mentioned above, the National TB Control Program has remarkably achieved the results, which related to the main interventions as following:

### **4.1 Drug Resistance Tuberculosis**

National Tuberculosis Control Program (NTP) of Cambodia started implementing programmatic management for drug resistant TB (PMDT) since 2006 in collaboration with partners, especially World Health Organization (WHO), Cambodian Health Committee Organization (CHC), Médecins Sans Frontières (MSF-F), and Médecins Sans Frontières-Belgium (MSF-B), US-CDC, and USAID. The second National Drug Resistant Survey (NDRS), conducted in 2006-2007, showed that the proportion of Multi-Drug Resistant TB (MDR-TB) were respectively 1.4% and 10.5% among new and previously treated TB cases.

#### **4.1.1. MDR-TB Suspect Screening**

There were 1,797 MDR-TB suspects tested for drug sensitivity testing (DST) in 2015, including 1,539 previously treated pulmonary TB cases. This figure reflects that MDR-TB suspect screening activities among previously treated pulmonary TB was roughly 89% of 1,727 previously treated pulmonary TB cases registered for treatment.

Number of MDR-TB suspects tested for DST in 2005 decreased up to 9% compared to 2014 (Figure 1). The decline might be due to some reasons such as the delay of budget approval from donors and limited budget for supervision of all levels and human resource constraints.

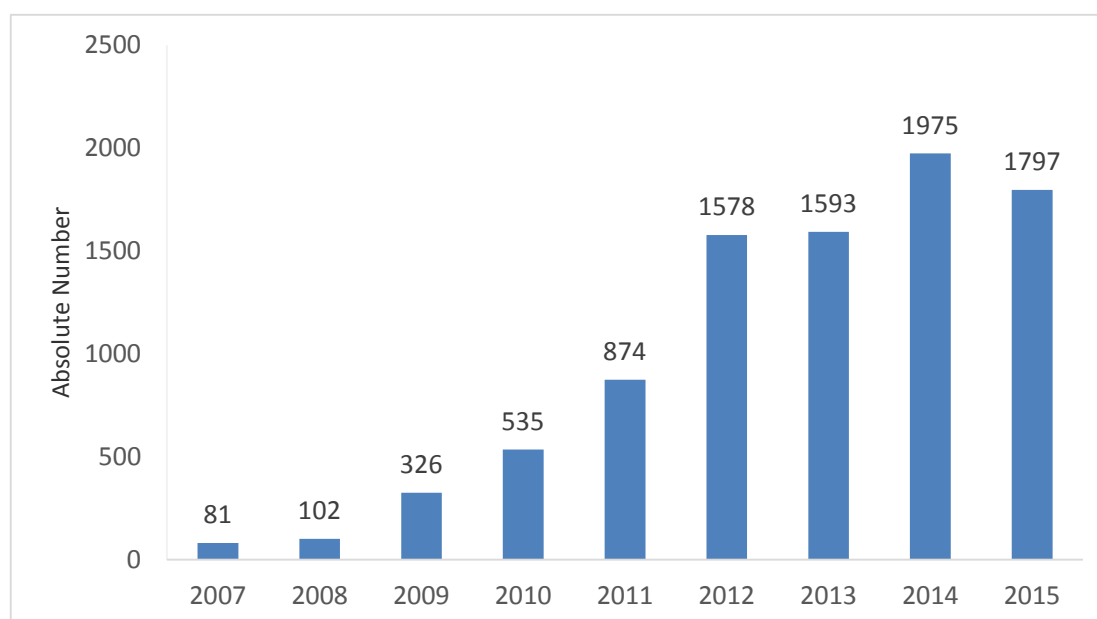


Figure 1: Number of MDR-TB suspects tested for drug sensitivity testing

#### 4.1.2. MDR-TB Diagnosis and Treatment

Patients enrolled for MDR-TB treatment had remarkably increased from 2012 to 2014 and declined in 2015 (Figure 2). In 2015, 75 MDR-TB patients and 14 Mono-drug resistant TB patients enrolled for their appropriate treatment. Cambodia has 11 MDR-TB treatment sites with 57 isolation rooms by the end of 2015. The highest number of MDR-TB cases enrolled for treatment was 35 cases at CENAT MDR-TB treatment site followed by Siem Reap and Takeo MDR-TB treatment sites. The highest number of non-MDR-TB cases (Mono and Poly Drug Resistant TB) enrolment was 7 cases at CENAT MDR-TB treatment site followed by 5 cases in Kampong Cham MDR-TB treatment site. Since MDR-TB project started up to the end of 2015, NTP has diagnosed and enrolled 610 MDR-TB cases for the appropriate treatment with second line anti-TB drugs.



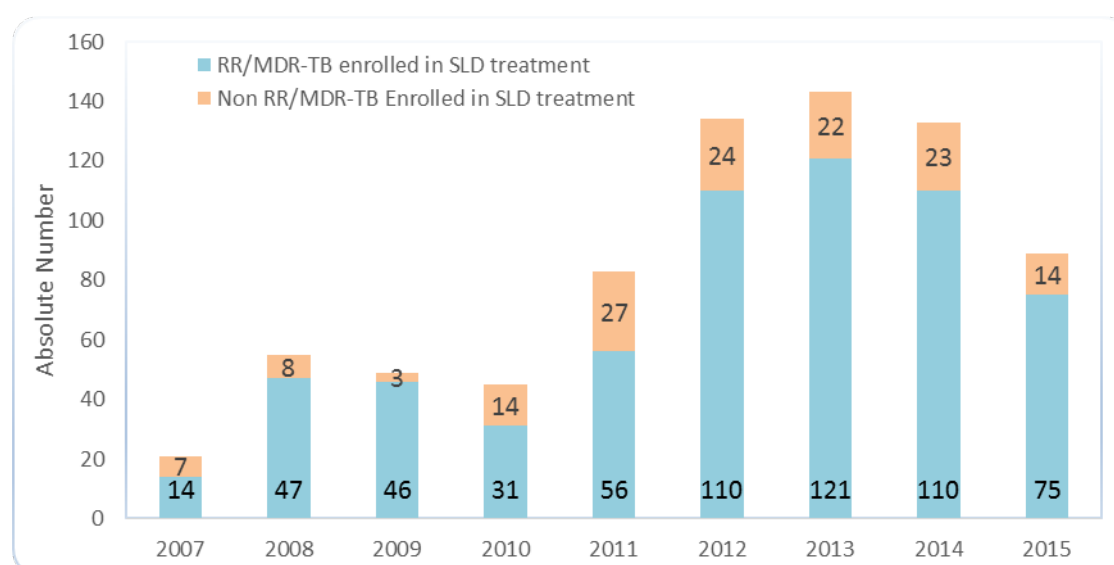


Figure 2: Patients enrolled on second line drugs

#### 4.1.3. MDR-TB Treatment Outcome

The following table shows the number of RR/MDR-TB patients converted culture by month 6 of treatment and the proportion of culture conversion among RR/MDR-TB patients enrolled on second line drug treatment during 2011-2014. The proportion of culture conversion has declined from 90% in 2011 to 80% in 2014 due to the increase of death toll.

Table: Culture conversion at month 6 of RR/MDR-TB patients enrolled on treatment

Year	Enrolled RR/MDR-TB patients	Culture negative	Culture positive	Died	Lost to follow-up	Culture conversion rate*	Culture not done or not MDR-TB
2011	56	45	5	0	0	90%	6
2012	110	78	5	10	7	78%	9
2013	121	83	1	12	4	83%	17
2014	110	80	6	12	3**	80%	9

(1 MTB, 5 NTM)

\* Denominator includes patients tested, died, and lost to follow up

\*\* Two are loss to follow up and one transfer out to Vietnam.

RR/MDR-TB treatment success rate had increased from 64% in 2007 to 86% in 2011 cohort (Figure 3). This treatment success rate has declined

from 86% in 2011 to 75% in 2013 cohort (compared to the target of 75%) while the death rate increased from 7% to 12% in the same period.

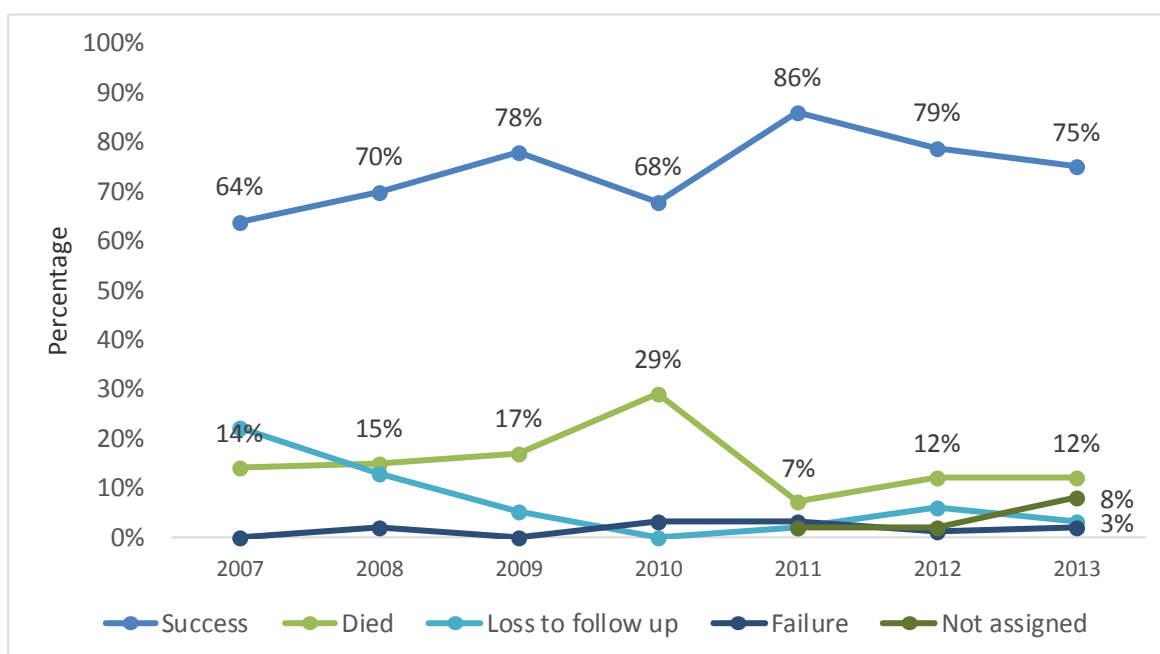


Figure 3: RR/MDR-TB treatment outcome cohort: 2007-2013

## 4.2. Collaborative TB/HIV Activity

### 4.2.1. Meeting/Training

With the support from US-CDC, National Center for TB and Leprosy Control (CENAT) and National Center for HIV/AIDS, Dermatology and STD (NCHADS), jointly conducted Three I's cluster meeting workshop in US-CDC focused provinces. In 2015, the cluster meeting has been expanded to more provinces and divided into 4 clusters, which includes Battambang cluster (Battambang, Pursat, Pailin, Banteay Meanchey and Siem Reap provinces), Sihanouk cluster (Sihanouk, Kampot, Kampong Speu and Koh Kong provinces) Kampong Cham cluster (Kampong Cham, Tbong Khmum, Kampong Thom, Prey Veng and Svay Rieng provinces) and Phnom Penh cluster (Phnom Penh, Takeo, Kandal, Kampong Chhnang and OI/ART sites in Phnom Penh). The main objectives of the meeting were to monitor and evaluate the progress of activities being made toward Three's Is Strategy and share experiences and good practices among OI/ART sites.

### 4.2.2. Supervision

This supervision is aimed to monitor the implementation of TB/HIV collaborative activities and to provide on the job training if weaknesses are identified. In some occasion, the supervision and coaching are jointly conducted by CENAT and NCHADS in collaboration with US-CDC in some provinces where 3Is strategy is implemented. The challenges found to be addressed in the field are 1) the collaboration is quite new for some sites, 2) workload for the staff at the field, and 3) shortage of staff who are working at OI/ART and TB as well.

### 4.2.3. TB/HIV Data

HIV / AIDS Among TB Patients 2015									
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	9,272	9,135	137	7,380	7,237	33	2,204	169	169
2	8,587	8,449	138	7,063	6,973	36	6,937	164	160
3	9,667	9,545	122	7,992	7,955	81	7,874	160	160
4	8,112	7,953	159	7,063	6,779	34	6,745	191	191
<b>Total</b>	<b>35,638</b>	<b>35,082</b>	<b>556</b>	<b>29,498</b>	<b>28,944</b>	<b>184</b>	<b>28,760</b>	<b>684</b>	<b>680</b>

Percentage of registered unknown HIV status TB patients referred and tested for HIV (tested on sites mostly at health centers where the activity has been implemented in the middle of 2014) increased gradually from 54% in 2008 to 70.59% in 2009, to 79.28% in 2010, to 81% in 2014 and to 82.77% in 2015. HIV positive TB patients who received Cotrimoxazole Preventive Therapy (CPT) increased from 65% in 2010 to 92% in 2015. Anti-Retroviral

Treatment (ART) among TB/HIV patients also increased from 45% in 2010 to 92% in 2015. Proportion of registered TB patients who were tested and recorded in the result in the TB register was 82.77% (29,500/35,638).

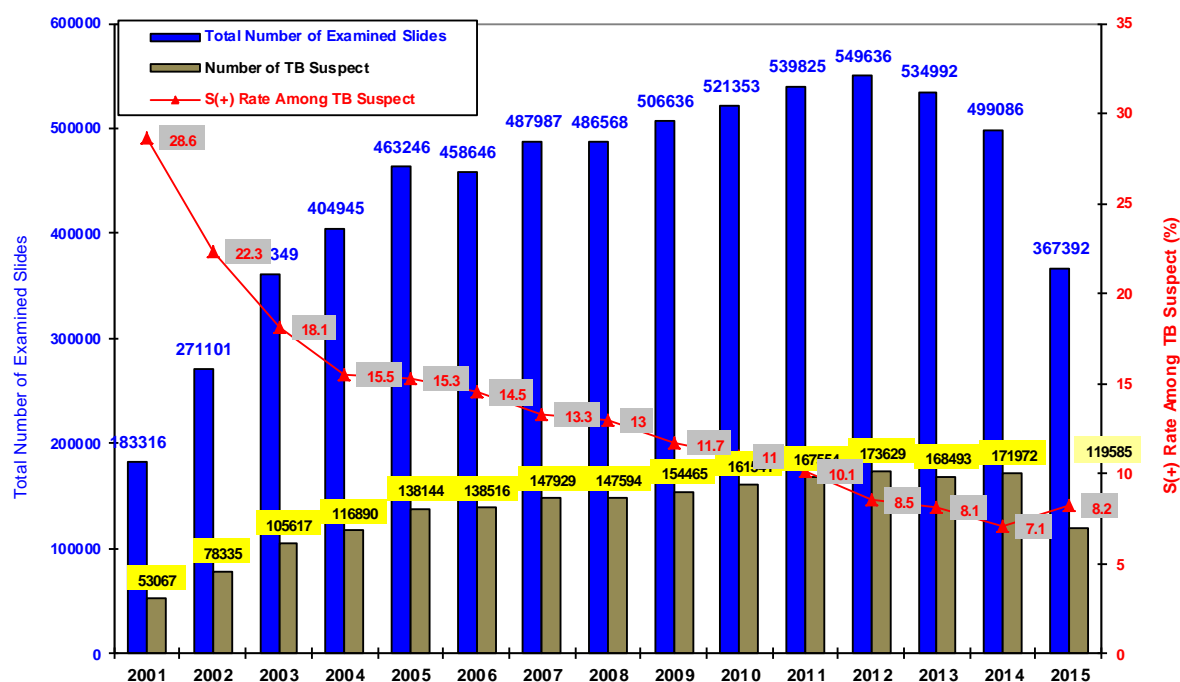
INH Preventive Therapy for people living with HIV/AIDS who are not likely having TB disease increased from 172 cases in 2010 to 1,043 cases in 2011 and then fell down to 767 cases in 2014. However, since the national program introduced IPT for all PLHIV (new and ART clients), the number of PLHIV who are unlikely to have TB disease received IPT slightly increased from 767 in 2014 to 954 in 2015.

TB Among PLHIV 2015									
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	PTB		EPTB		Total	Number of HIV+ received IPT
				BK+	BK-	BK+	BK-		
1	599	566	610	40	46	1	45	132	138
2	594	543	566	43	52	5	34	134	125
3	786	500	737	47	36	5	51	139	164
4	911	666	871	35	49	4	32	120	527
<b>Total</b>	<b>2,890</b>	<b>2,275</b>	<b>2,784</b>	<b>165</b>	<b>183</b>	<b>15</b>	<b>162</b>	<b>525</b>	<b>954</b>

### 4.3. Diagnosis by Bacteriological Examination

The total number of slides that National Tuberculosis Program used for TB smear examination in 2015 was 367,392 (detection and follow up), of which 344,345 slides were for detection. The positivity rate among smear examination for case detection was 8.2%.

To strengthen the quality of sputum examination, NTP has conducted the crosschecking by re-examining the read slides. This is one of the laboratory quality assurance activities. Results showed that agreement rate was 99% with false positive and false negative rates of 3.7% and 0.7% respectively for the first quarter of 2015.



#### 4.4. Childhood TB

Childhood TB is one of the priority of NTP. There were 6,885 childhood TB cases nationwide notified and treated in 2015.

After JATA has ended by 2014 its TB CARE I project, funded by USAID and implemented in 27 ODs, NTP has maintained and strengthened childhood TB activities in 25 ODs supported by USAID, most of them are former ODs implementing childhood TB under TB CARE I project. Currently, childhood TB activities supported by USAID has been implementing by FHI-360 under Challenge TB project. This project has been implementing childhood TB activities in 25 ODs of the 12 provinces namely Battambang, Pursat, Kampong Chhnang, Kampong Thom, Oddor Meanchey, Kampong Speu, Prey Veng, Svay Rieng, Kampot, Takeo, Kampong Cham, and Tbong Khmum.

Challenge TB project, in collaboration with NTP, has strengthened the capacity of health center and referral hospital staff about childhood TB management including knowledge/skill on Tuberculin Skin Test (TST), X-ray reading, Isoniazid Preventive Therapy (IPT) through trainings and on the job trainings. Challenge TB project supported contact investigation activity to identify TB suspected children and refer them to referral hospital for TB diagnosis. Childhood TB is becoming a routine activity in community and health center/referral hospital. As a result, through contact investigation, Challenge TB project has notified 2,995 childhood TB cases, which equal to 43% of the country's total 6,885 childhood TB cases in 2015.

#### **4.5. Financing**

The National Tuberculosis Program has clearly identified a 7-year National Strategy Plan (2014-2020) by thoroughly consultation with all concern partners and financial gap was also clearly shown. Based on this National Strategic Plan, budget plan for 2015 was developed. NTP is trying to negotiate with all potential donors/partners for program financing.

From April 2009 to the end of 2014, National Center for Tuberculosis Control has become a Principal Recipient (PR) for the Global Fund to Fight with AIDS, Tuberculosis and Malaria (GFATM) for TB grant round 7 and managed the financing of 11 Sub-Recipients (SRs). From 2015 to 2017, CENAT still continue as a PR for The Global Fund under New Funding Model (NFM) with the total funding amount about 15.6 million US Dollar. However, the funding that NTP can mobilize may not be sufficient for more ambitious TB control to meet the new direction since some projects were ended.

USAID is supporting NTP for another 5-year project under the project name "Challenge TB" implemented by RHACHA. US-CDC is also continuing its funding support to NTP from 2015 to 2020.

#### **4.6. TB Drugs, Reagents, and Consumables**

Anti-TB drugs, reagents, and consumables are key elements of the National TB Program. An uninterrupted supply of anti-TB drugs, reagents, and consumables is necessary for the sustained provision of quality TB diagnostic and treatment services through DOTS in all service delivery facilities nationwide. It promotes better patient care, improves the public health services' credibility, and increases the patients' trust and participation in the program. Ensuring uninterrupted of TB drugs, reagents, and consumables leads to better treatment success and reduces TB deaths.

NTP closely collaborates with Ministry of Health (MoH)'s Department of Drug and Food (DDF) and Central Medical Store (CMS); and TB partners to thoroughly monitor stock situation, distribution and utilization of anti-TB drugs through quarterly report of NTP, monthly report of CMS and system management of drugs of DDF in order to ensure the uninterrupted supply and proper management of good quality of anti-TB drugs, reagents and consumables to TB networks.

In 2015, NTP received First Line Drugs (FLD) for treating adult TB patients from Global Drug Facility (GDF). Meanwhile, under the Global Fund New Funding Model (GF-NFM) grant, NTP received childhood anti-TB drugs, Second Line Drug (SLD) for drug resistance TB treatment, diagnostic tool such as X-pert machine, and chest X-ray films. In addition, NTP also received equipments laboratory and other equipments such as mass. In addition NTP received some SLDs for drug resistance TB treatment and childhood anti-TB drugs from national budget source.

NTP always sends its officers to attend regular drug management meetings organized by relevant departments of Ministry of Health to report

TB drug management activities of the national program and obtain information on the current national drug management update.

## **4.7. TB Infection Control**

### **4.7.1. Launching a Model Project**

In 2014, the National TB Control Program (NTP) launched a model project for improving TB infection control in five hospitals of Cambodia: CENAT's hospital and provincial hospitals of Pursat, Battambang, Banteay Meanchey and Pailin. Under this project, the NTP conducted a baseline assessment, provided training, developed supervisory checklists, conducted quarterly supervisory visits combined with progress review workshops, supplied personal protection equipment, displayed appropriate posters, and created general awareness at these hospitals. In addition, the NTP updated the chapter on infection control in the MDR-TB guidelines and assessed the physical infrastructure and supplies for infection control at almost all of the 11 MDR-TB hospitals in Cambodia.

### **4.7.2. Outcome of the Model Project**

In 2015, after a year of implementation, the NTP reassessed the status of infection control. The areas assessed were in-patient wards and outpatient departments, X-ray units, intensive care units, and TB laboratories. Compared to the baseline assessment results, the implementing hospitals showed many positive changes. Each hospital had established or reactivated dormant infection control committees and developed plan of actions. Moreover, the hospitals screened TB suspects and systematically separated TB patients at the inpatient wards and outpatient departments (OPDs), most of the TB care areas had doors and windows opened for natural ventilation. The hospitals have appropriately been maintaining UVGI fixtures and lamps. Access, donning and storage of N95 masks were adequate. Waiting areas, in-patient, and outpatient departments had well-displayed posters on infection control.



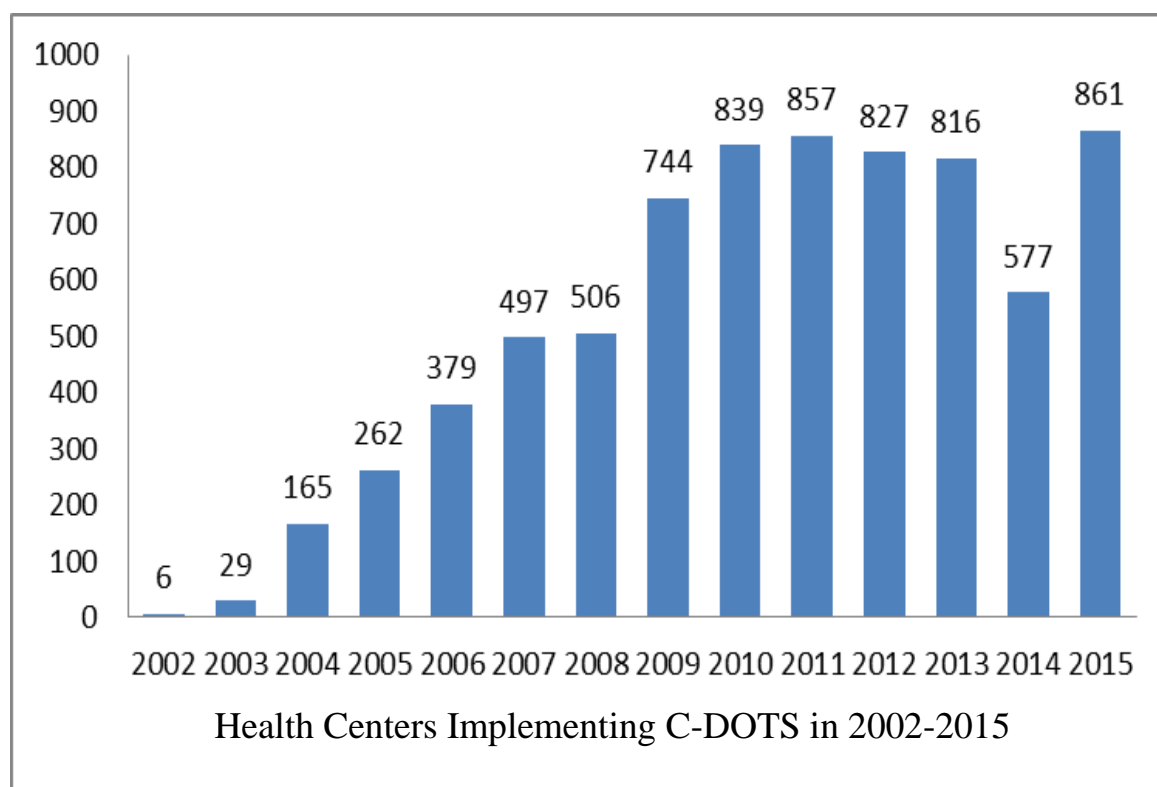
## **4.8. Community DOTS**

Strengthening and scaling up the Community DOTS is one of the NTP priorities in order to bring DOTS service closer to the community to achieve case detection and treatment outcome. The purpose 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 every day at public health facilities.

As shown in the table below, the number of health facilities implementing Community DOTS varied from year to year according to the support from NGO TB partners and donors.

In 2015 there are 861 HCs implementing Community DOTS in 61 Operational Districts under financial support from Global Fund (5 SRs namely CHC, CRS, HPA, Op-ASHA, and RHAC) and USAID (Challenge TB project and RACHA).

There are some constraints and challenges in the implementation of Community-DOTS. Insufficient funding limits the implementation of C-DOTS at all levels. There is limited motivation for VHSGs/DOT Watchers as well as for TB supervisors and HC staff. The insufficient resources cause limited capacity of frontline TB health workers. This challenge will need us to do more efforts. The different strategies in C-DOTS implementation of partners is another challenge. Moreover, there are other challenges such as turn-over of trained TB staff at health center, limited capacity of TB health workers, and seasonal migration of VHSG/DOT Watchers for employment. These challenges need to be solved on time in order to make community DOTS sustainable.



#### 4.9. Public-Private Mix DOTS

Public-Private Mix DOTS (PPM-DOTS) is collaboration between NTP and public and private healthcare providers to promote DOTS service. This approach aims to strengthen the referral of TB suspects from the private sector (including pharmacy, consultation room, private clinics etc.) to public health facilities for appropriate TB diagnosis and treatment. In collaboration with many NGOs and International partners, NTP has intensified the implementation of PPM-DOTS since its start in 2005 up to 2014. TB CARE I project that supported this activity has ended at the end of 2014 and this activity had not been continued in 2015 due to lack of funding support from donor.

Challenge TB considers assisting NTP by resuming PPM-DOTS activity in the near future.

Table: Summary Table of PPM-DOTS: 2005-2015

Year	Number of province	Number of OD	PPM-DOT implementer	TB Suspects referred from private	TB Suspects received by public	TB patients diagnosed among suspects referred from private	Referral success rate	Yield per referral (all forms)
				(a)	(b)	(c)	(b)/(a)	(c)/(a)
2005	2	3	287	314	242	46	77%	15%
2006	8	15	755	1989	1154	244	58%	12%
2007	11	38	980	5562	2763	533	50%	10%
2008	11	38	1690	4212	1882	301	45%	7%
2009	10	38	1735	9781	5540	769	57%	8%
2010	10	37	1735	7612	4280	851	56%	11%
2011	10	37	1547	5024	2920	691	58%	14%
2012	10	35	1919	4589	3130	763	68%	17%
2013	10	35	1696	6392	3919	660	61%	10%
2014	8	30	1187	3049	2148	465	70%	15%
2015	0	0	0	0	0	0	0	0

In response, NTP is making an effort to mobilize resources in order to resume PPM-DOTS activity.

#### 4.10. TB in Congregational Settings

In recent years, the NTP has focused on case finding in congregational settings such as prisons and factories where TB transmission is believed to be high.

##### 4.10.1. Prisons

With strong support from the MoH and the Ministry of the Interior, and in close collaboration with the Prison Department and other partners, great progress has been made in prison TB control. The activities include TB health education for prisoners and referral of TB suspects to public health

facilities for diagnosis and for subsequent treatment at prison health post with DOTS approach. Table 16 depicts the increasing TB control activities in prison in recent years. The number of prisons implementing TB control activities increased from 8 in 2009 to 26 in 2015. In 2015, 191 TB cases including 4 TB/HIV cases and 4 MDR-TB cases were detected through passive and active TB case findings. The Standard Operating Procedure for TB control in prisons has already been revised and will be published in Khmer and English in 2016.

Table: TB Control Activities in Prisons: 2009-2015

<b>Year of Implementation</b>	<b>Number of Prisons</b>	<b>TB Cases Detected</b>	<b>TB/HIV Cases Detected</b>
2009	8	203	26
2010	11	315	26
2011	19	342	19
2012	19	368	8
2013	22	299	7
2014	26	229	12
2015	26	191	4

#### 4.10.2. Factories and Enterprises

Factory and enterprises are ideal for TB transmission as employees work together in close area and have high interaction with others. NTP in collaboration with Occupational Health Department of Ministry of Labor and Vocational Training, and with the support from partners especially from CATA, has been implementing DOTS pilot project in 6 factories and enterprises in 2007.

The main activities are to strengthen capacity of health staff who are working at infirmary of factories and enterprises that refer TB suspects to

health centers for diagnosis, to conduct supportive supervision, and quarterly meeting that aims to motivate staff and to prepare plan for the coming quarters. Currently, 14 factories and enterprises have been providing TB-DOTS services at their workplaces. Compared to 2013, five factories and enterprises discontinued TB-DOTS services due to the external support from ARC ended.

A summary of TB control activities in factories and enterprises (2007-2015) are shown in table below. The table shows that the number of workers covered by the activities has some fluctuations by from year to year. In recent years, the number of TB suspects referred was in the range of 100-150 cases and TB cases detected was around 15-24 cases.

Table: TB Control Activities in Factories and Enterprises: 2007-2015

Year of implementation	Number of workers	TB suspects referred	TB cases detected	Yield per population (per 100 000)	Yield per referral (%)
	(a)	(b)	(c)	( c )/(a)	( c )/(b)
2007	10900	44	6	55	14%
2008	22701	149	22	97	15%
2009	15740	102	10	64	10%
2010	21077	99	24	114	24%
2011	25171	107	15	60	14%
2012	25881	127	16	62	13%
2013	22575	145	17	75	12%
2014	19402	139	11	57	8%
2015	20402	144	14	69	10 %

#### 4.11. Hospital Linkages

National Center for Tuberculosis and Leprosy Control, with support from Challenge TB (CTB) project, has supported five hospitals to implement the hospital linkage approach, namely Battambang, Maung Russey, Sampov

Meas, Kampong Speu, and Korng Pisey. TB symptom screening was introduced in all departments within the hospitals including out-patient (OPD) and in-patients departments (IPD), pediatric and diabetes (DM) clinics. Cough triage has been deployed in all out-patient departments of the five referral hospitals. Cough triage and FAST (Find Actively, Separate Safely and Treat) strategy have been implemented in those five referral hospitals. Patients who are coughing are separated and provided with masks. All presumptive TB patients are referred to TB ward for further investigation. Under CENAT leadership, Challenge TB collaborates with partners to include four main TB symptoms in the IPD and OPD medical forms and cough in the triage form and now these documents are being used in the implementing hospitals.

From January to December 2015, 171,897 clients presented at an OPD and IPD. Of those who have TB sign and/or symptom were then referred for TB diagnosis at TB units within the hospitals. Among the screened patients, 2,160 were diagnosed as TB and put on treatment.

Coverage areas (five referral hospitals): Battambang, Maung Russey, Sampov Meas, Korng Pisey and Kampong Speu.

TB case detection in five hospitals:

Name Hospital	OPD and IPD	TB all forms	Bacteriologically Confirmed TB	Clinically Diagnosed Pulmonary TB	Extra Pulmonary TB
Battambang	84,939	812	252	201	359
Maung Russey	20,899	355	14	300	41
Sampov Meas	22,839	104	19	45	40
Kampong Speu	30,875	438	234	96	108
Korng Pisey	12,345	451	60	197	194
<b>Total</b>	<b>171,897</b>	<b>2,160</b>	<b>579</b>	<b>839</b>	<b>742</b>

National program are evaluating the pilot project. The findings will be used to improve the strategies and approaches as well as to apply this model at other hospitals from 2017 onwards.

## **4.12. Summary of Active Case Finding Project**

### **4-12-1 Active Case Finding of Sihanouk Hospital, Center of Hope (SHCH)**

Under Stop TB Partnership, TB REACH Wave 4 project started from 25 August 2014 to 31st March, 2016. The project conducted door-to-door household survey and screened for TB by TB health workers and village health support group (VHSGs) in Phnom Penh urban poor areas and six rural districts in Kandal province. The project deployed mobile chest X-ray machine, sputum smear LED microscopy, and Xpert machine for ACF. Initially, three diagnostic algorithms were used for different target groups: Xpert was the first test for high risk group (HIV, previously treated TB cases, and TB contact) and then Chest X-ray; sputum smear microscopic examination was the first test for children and elderly groups followed by Chest X-ray or Xpert test. Modified diagnostic algorithm was simplified to a standard flow which allow all target groups receive Chest X-ray and sputum collection at the same time. For those with Chest X-ray abnormal, if the first sputum smear examination is negative, Xpert test will be requested at the second sputum sample.

With the additional grant, from late August 2015, the project was expanded from one to three mobile X-ray teams, and two ACF teams in hospital waiting areas. All elderly, regardless the presence of TB symptom, were offered Chest X-ray in Saang and other two referral hospitals.

From August 2014 to the end of December 2015, this project diagnosed 536 bacteriologically confirmed TB cases and treated 509 cases (95%); and 2,145 all-form TB cases and treated 2,064 (96%).

From the start up to end of December 2015, the project reached 395,346 people through household survey and screened for TB symptoms. As a result, 40,882 people (10%) had TB symptoms and 17,185 suspects (42%) were tested with smear microscopic examination and 209 cases (1.2%) had

positive result. Among 7,733 TB suspects (45% of all suspects) tested with Xpert, 327 (4.2%) were positive. Of the 29,311 (most of them were asymptomatic elderly) received Chest X-ray, 1,220 (4.2%) cases had abnormal shadow suggestive of active TB. Overall, 509 bacteriologically confirmed TB cases and 2,064 all-form TB cases were registered for TB treatment.

#### **4-12-2 Active Case Finding of Cambodia Anti-TB Association (CATA)**

CATA had implemented Active Case Finding from 05 August 2014 to 28 February 2015, under the grant funded by TB REACH Wave3 Year2. The CATA's Project covered 7 ODs in 4 provinces (OD Preah Sihanouk, Preah Sihanouk province, OD Svay Rieng and Chi Phou, Svay Rieng province, OD Poipet [O Chrove], Thmor Puok and Mongkol Borey, Banteay Meanchey province, and OD Maung Russey, Battambang province). The project's target population was elderly aged from 55 years old and other vulnerable population. The CATA's mobile team equipped with semi-digital X-ray machine and X-pert MTB/RIF assay visited each health center (HC) in the target areas as planned schedule.

The trained Village Health Support Groups (VHSG) visited door-to-door the population in their villages and listed up those with TB symptoms. Not all the symptomatic people were listed but it was limited depending on the corresponding number of the population in each village. A few days before the event, the VHSGs have to report the number of TB suspects in their village to HC staff so that they know in advance and could arrange it to not exceed 200 cases per day. On the appointed date, the TB suspects were referred to the HC where the CATA's team was ready for screening. They were re-interviewed before Chest X-ray screening and those with Chest X-ray positive (active or suspect) have had their sputum collected to test by X-pert MTB/RIF assay.

The total number of people screened by Chest X-ray was 12,147 cases in which the elderly aged from 55 years old was 7,975 (66%); and 2,084 (17% among the Chest X-ray screened) Chest X-ray positive had their



sputum collected for X-pert testing. The number of X-pert test positive was 334 (16%) including 5 Rifampicin resistant, while the total case notification of all forms of TB was 1,094 (including 839 elderly) cases.

#### **4-13. TB and DM collaborative activities**

Diabetes mellitus (DM) is a known risk factor for tuberculosis (TB), but no studies have been reported from South-East Asia, which shows a high burden of TB and a rapidly growing prevalence of diabetes. In 2013, CENAT, Department of Medicine Prevention (DMP) of MoH, and URC in Cambodia conducted a rapid assessment on burden of DM and TB comorbidity in Siem Reap and Prey Veng provinces. The result showed that the prevalence of DM among TB patients was 7% and 5% in Siem Reap and Prey Veng provinces respectively. This prevalence rate is higher than the prevalence of DM among general population, which accounts for only 2.9%. The prevalence of TB among DM was also very high, about 6 folds higher than TB prevalence in general population.

Since 2014, under the support from World Diabetes Foundation, Health and Social Development (HSD) has implemented a project to improve DM-TB bi-directional screening, diagnosis and treatment of people with DM-TB comorbidity in three ODs namely Pearaing, Siem Reap, and Soth Nikum.

#### **Project Goal and Objectives:**

**Goal:** to reduce morbidity and mortality for patients with co-morbidity of DM and TB through prevention, early detection and improving quality of care.

#### **Specific Objectives:**

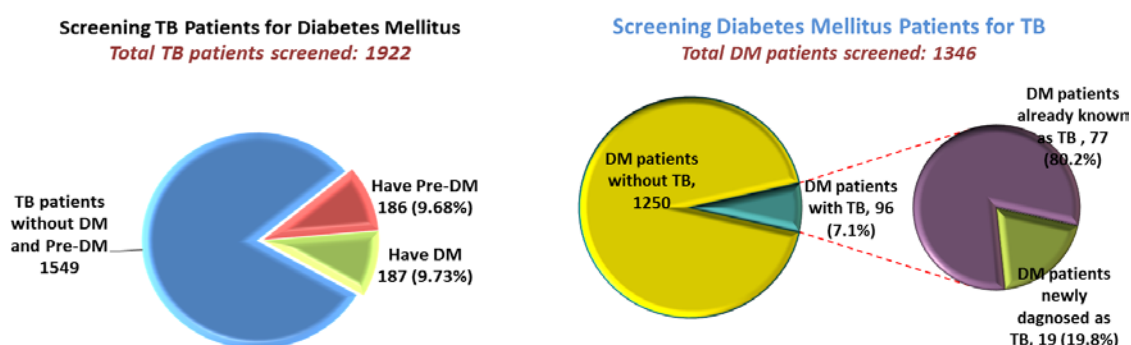
- To strengthen public health system capacity in diabetes diagnosis and case management
- To integrate diabetes screening with TB services and TB screening in diabetes service delivery provided by public health facilities
- To increase patients' awareness about diabetes/TB co-morbidity

## Project Key Partners:

Health and Social Development works closely with both National NTP and NCD programs particularly with provincial and district team to implement the project activities.

## Main Results: (From July 2014 to March 2016)

- **Capacity Building:** DM-TB technical working group has been established and meet on a regular basis. HSD supports capacity building on DM-TB comorbidity case management to counterpart staff. In addition, the project strengthens capacity of DM data collection and data entry to the existing OD data system.
- **Bi-directional Integrated DM and TB Screening:** all identified comorbidity DM and TB cases were referred for proper case management.



- **Increase Patients' Awareness about Diabetes/TB co-morbidity:** TB education for diabetes patients, world diabetes day, community awareness and project dissemination workshop.

In collaboration with Department of Medicine Prevention and HSD, National TB program will conduct annual dissemination workshop on the result of TB/DM collaboration in the late of 2016 in order to raise concerns for discussion and mobilization for expansion this collaboration to other sites of the country.

#### **4.14. Advocacy, Communication and Social Mobilization**

Advocacy, Communication and Social Mobilization (ACSM) is an integral part of the TB control program. The NTP always ensures that various ACSM approaches are included in the contents of refresher training courses and workshops. Besides, the NTP has raised awareness of TB by organizing the World TB Day at all levels throughout the country.

Due to financial resource constraints, a very limited number of IEC materials were produced in 2015. However a notable success was that the NTP, in collaboration with partners including USAID, FHI360, JICA, HSD and US-CDC, produced IEC materials such as poster, educational leaflet on general TB adult and children awareness, MDR-TB, Prevention Infection Control, TB-Diabetic and organized the World TB Day.

To overcome the limitations in the available funds and to further strengthen the ACSM activities in the country, the NTP will intensify its plans for future resource mobilization.

#### **4.15. Research**

Research activity is one of the national TB control program's priorities. We have started to develop plan and do a critical review on third national drug resistance survey which will be implemented in the beginning of September 2015. This research plan has been supported by Global Fund, Challenge TB, and US-CDC.

In 2015, NTP in collaboration with National University of Singapore and University of Health Science, Phnom Penh, initiated to conduct two operational researches on topics as following:

- 1- The study to evaluate the effectiveness of NTP strategy in Cambodia based on analysis on National TB prevalence survey which has been conducted in 2002 and 2011 and analyze TB active case finding activities and compare the different strategy to conduct TB active case finding.
- 2- The study on perception of community, TB patients, and health staff on TB service delivery through:

1. Interview with community people, village health support group
2. Focus group discussion with TB patients
3. In-depth interview with health staff

This study has been conducted in 6 operational districts in Kampot, Mondul Kiri, and Phnom Penh. The result is not yet available as these two studies have not yet been finished.

## 5. Targets for 2016-2020

Targets for 2016 are the following:

- Maintain the treatment cure rate of over 85%
- Detect all forms of TB: 40,300 cases (258 per 100,000 population)
- Detect bacteriologically confirmed TB: 13,413 cases (86 per 100,000 population)
- Conduct the third round of national drug-resistant survey
- Promote intensified case detection through active and semi-active case findings

### Main Indicators and Targets for 2016-2020

Indicators	Target				
	2016	2017	2018	2019	2020
Number of all TB cases notified to NTP	40,300	40,400	40,500	40,600	40,700
Number of bacteriologically confirmed patients detected each year	13,413	13,077	12,750	12,432	12,121
Number of childhood TB cases notified by NTP	7245	7456	7638	7820	8000
Number of RR-TB /MDR-TB cases notified by NTP	145	155	160	165	170

## **6. Acknowledgement**

With the support from the Royal Government of Cambodia and Ministry of Health, NTP has achieved tremendous results. The Royal Government of Cambodia and Ministry of Health of Cambodia has given high priority to TB Control. The above achievements are also contributed by active participation from all healthcare workers across the country with the supports and collaboration from various partners. These partners include local authority, community, volunteer, technical and financial supports from non-governmental and international organizations.

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- The Royal Government of Cambodia and Ministry of Health for their supports.
- All healthcare workers especially TB staff across the country for their active participation.
- NGO/IO partners especially WHO, Global Fund (GFATM), USAID, UD-CDC, Stop TB Partnership/GDF, TB-REACH, JICA, OIs and NGOs for their both technical and financial supports to NTP.
- Local authority, community, and volunteer as well as other partners for their supports and collaboration.

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**Photos** by National TB Control Program



## 20<sup>th</sup> Annual Joint TB Program Review Workshop



## National and Provincial Annual Planning Workshop for TB Control





## World TB Day, 24 March 2015





## Activity of TB Active Case Finding





## Activity of TB Active Case Finding

