

KINGDOM OF CAMBODIA  
NATION RELIGION KING

MINISTRY OF HEALTH

# TUBERCULOSIS REPORT 2018



Prepared by

National Center for Tuberculosis and Leprosy Control



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មជ្ឈមណ្ឌលជាតិកំចាត់ជំងឺបាត់ដោយសេស និងបាត់ដោយសេស

អង្គបទប្បញ្ញត្តិជាតិសម្រាប់ប្រជាជន  
ENGLISH VERSION

## **TABLE OF CONTENTS**

|   | <b>Page</b> |
|---|-------------|
| <b>1. Introduction</b>  | <b>3</b>    |
| <b>2. Tuberculosis Situation in the World</b>                   | <b>3</b>    |
| <b>3. Main Achievements</b>                                     | <b>4</b>    |
| <b>3.1. Service Coverage</b>                                    | <b>4</b>    |
| <b>3.2. Case Detection</b>                                      | <b>4</b>    |
| <b>3.3. Treatment</b>   | <b>4</b>    |
| <b>3.4. Mortality and Incidence of Tuberculosis</b>             | <b>4</b>    |
| <b>4. Main Interventions</b>                                    | <b>5</b>    |
| <b>4.1. Drug Resistance Tuberculosis</b>                        | <b>5</b>    |
| <b>4.1.1. MDR-TB Suspect Screening, Diagnosis and Treatment</b> | <b>6</b>    |
| <b>4.1.2. MDR-TB Treatment Outcome</b>                          | <b>7</b>    |
| <b>4.2. Collaborative TB/HIV Activity</b>                       | <b>8</b>    |
| <b>4.2.1. Meeting/Workshop</b>                                  | <b>8</b>    |
| <b>4.2.2. Training</b>  | <b>8</b>    |
| <b>4.2.3. Supervision</b>                                       | <b>8</b>    |
| <b>4.2.4. TB/HIV Data</b>                                       | <b>9</b>    |
| <b>4.3. Diagnosis by Bacteriological Examination</b>            | <b>12</b>   |
| <b>4.3.1. Diagnosis by Smear Microscopy</b>                     | <b>12</b>   |
| <b>4.3.2. Diagnosis by GeneXpert, Xpert MTB/RIF</b>             | <b>12</b>   |
| <b>4.3.3. TB Culture and Drug Susceptibility Testing</b>        | <b>13</b>   |
| <b>4.3.4. Training</b>  | <b>14</b>   |
| <b>4.4. Childhood TB</b>  | <b>14</b>   |
| <b>4.5. Financing</b>   | <b>15</b>   |
| <b>4.6. Drugs, Equipment, and Laboratory Supplies</b>           | <b>16</b>   |
| <b>4.7. TB Infection Control</b>                                | <b>18</b>   |

|  |           |
|--|-----------|
| <b>4.8. Community DOTS</b>                                   | <b>18</b> |
| <b>4.9 Public-Private Mix DOTS</b>                           | <b>19</b> |
| <b>4.10. TB in Congregational Settings</b>                   | <b>20</b> |
| <b>4.10.1. Prisons</b>                                       | <b>20</b> |
| <b>4.10.2. Factories and Enterprises</b>                     | <b>21</b> |
| <b>4.11. Hospital Linkages</b>                               | <b>22</b> |
| <b>4.12. Active and Semi-active Case Findings</b>            | <b>23</b> |
| <b>4.12.1. Active and Semi-active Case Findings by NTP</b>   | <b>23</b> |
| <b>4.12.2 Active Case Finding Project by CATA</b>            | <b>24</b> |
| <b>4.12.3 Active Case Finding Project by KHANA</b>           | <b>25</b> |
| <b>4.13. Collaborative DM-TB Services</b>                    | <b>26</b> |
| <b>4.14. Advocacy, Communication and Social Mobilization</b> | <b>29</b> |
| <b>4.15. Research</b>  | <b>29</b> |
| <b>4.16. Electronic TB Management Information System</b>     | <b>30</b> |
| <b>5. Targets for 2019</b>                                   | <b>31</b> |
| <b>6. Acknowledgement</b>                                    | <b>32</b> |

## **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 previous 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 and not high burden of MDR-TB.

According to the 2018 WHO Global TB Report, Cambodia had TB incidence of 326 per 100,000 populations, while the mortality rate was 19 per 100,000 populations in 2017.

The followings are the main achievements on TB control in 2018 and direction/targets for 2019 and the years beyond.

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

Worldwide, 10 million people are estimated to have fallen ill with TB in 2017; of which only 6.4 million new cases of TB were detected and reported to WHO. In the same year, there were an estimated 1.3 million TB deaths among HIV-negative people and additional 300,000 deaths among HIV-positive people. TB is the leading cause of death among infectious diseases, ranking above HIV/AIDS.

Globally, the treatment success rate was 82%.

### 3. Main Achievements

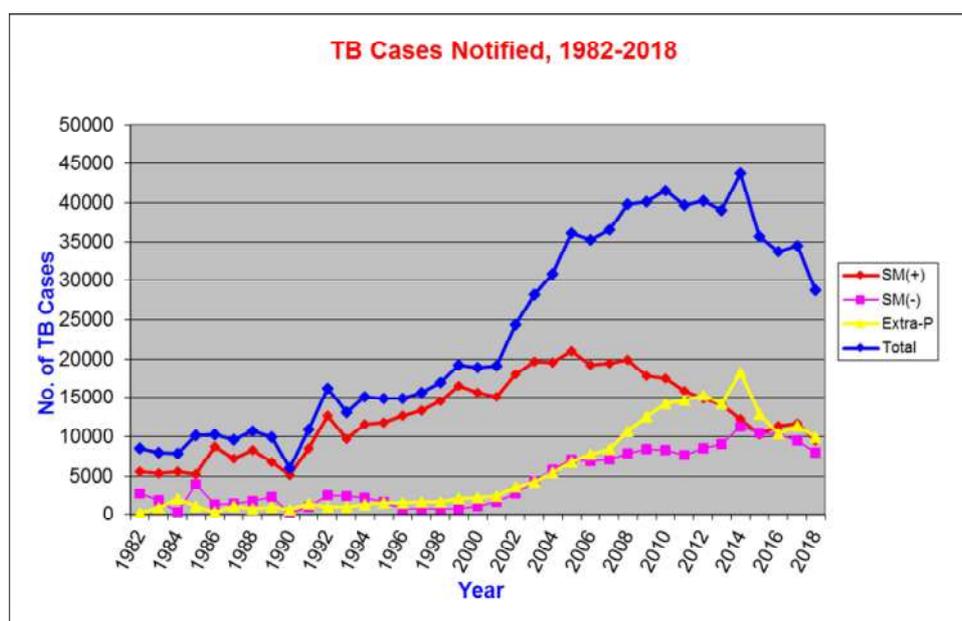
National TB Control Program has achieved the main results as below:

#### 3.1. Service Coverage

The coverage of TB service has been maintaining at 100% in all referral hospitals and health centers nationwide. Community DOTS (C-DOTS) has been expanded from 506 health centers in 2008 to 644 health centers in 2018. TB/HIV collaborative activity has been implementing in all ODs in 2018 (compared to only 57 ODs in 2008) while TB in children activity was implemented in 46 ODs. In addition, the TB activities have been implementing in 12 factories and 19 prisons in 2018. MDR-TB treatment sites have increased from 9 in 2010 to 11 in 2018. In summary, the TB services are available at 1,325 health facilities nationwide including 1,205 health centers.

#### 3.2. Case Detection

In 2018, NTP has detected a total of 28,757 TB cases, of which 9,489 were bacteriologically confirmed new TB cases.



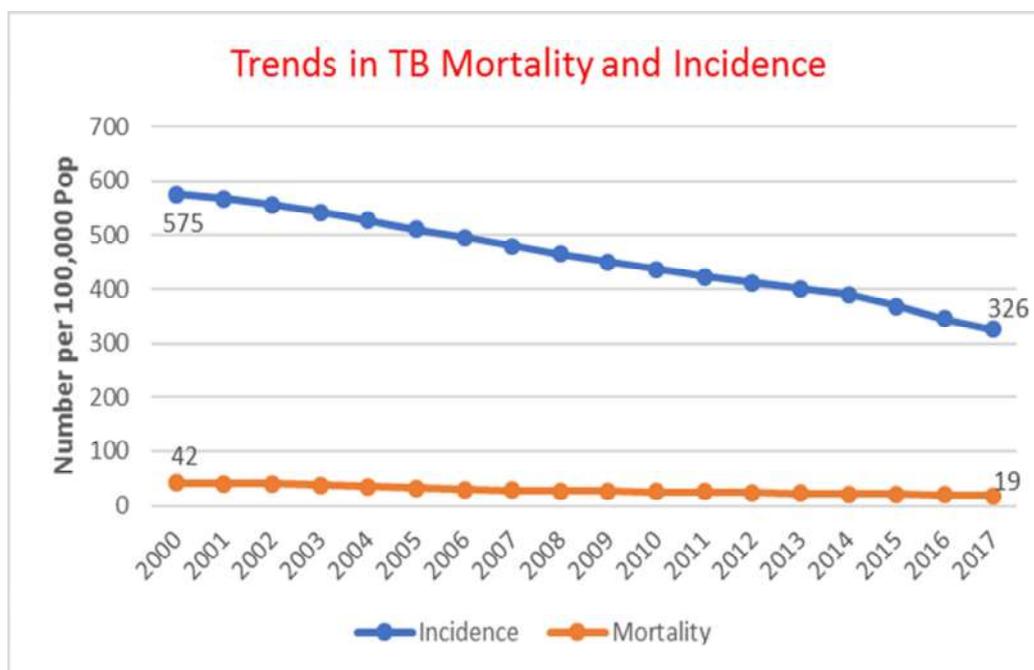
#### 3.3. Treatment

The Treatment Success Rate of TB has been maintained over 90% during the last 20 years. For instance, NTP has achieved 93% of the treatment success rate in 2018 which surpassed the target of 90%.

#### 3.4. Mortality and Incidence of Tuberculosis

In the recent years, Cambodia has achieved remarkable results in TB control. The 2018 WHO Global TB Report has shown that TB mortality rate

dropped from 42 per 100,000 populations (pop) in 2000 to 19 per 100,000 pop in 2017, which equal to 55% reduction. While the incidence has also fallen from 575 per 100,000 pop in 2000 to 326 per 100,000 pop in 2017, which equal to 43% reduction.



Ministry of Health's NTP 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.

## 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

The Cambodia NTP 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-France (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 1.4% and 10.5% among new and previously treated TB cases respectively. The third National Drug Resistant Survey has been conducted in 2017 and its laboratory results and final reports are under process.

### 4.1.1. MDR-TB Suspect Screening, Diagnosis, and Treatment

In 2018, there were 1,370 DR-TB suspects tested by Xpert MT/RIF. Of those, 128 MDR-TB cases were detected and treated which was achieved of 98.4% compared to the target (128/130); while there were only 3 cases as poly/mono-drug resistant in 2018.

The figure below shows drug-resistant TB suspects that were tested by Xpert (figure 1) and drug-resistant TB cases treated during 2007-2018.

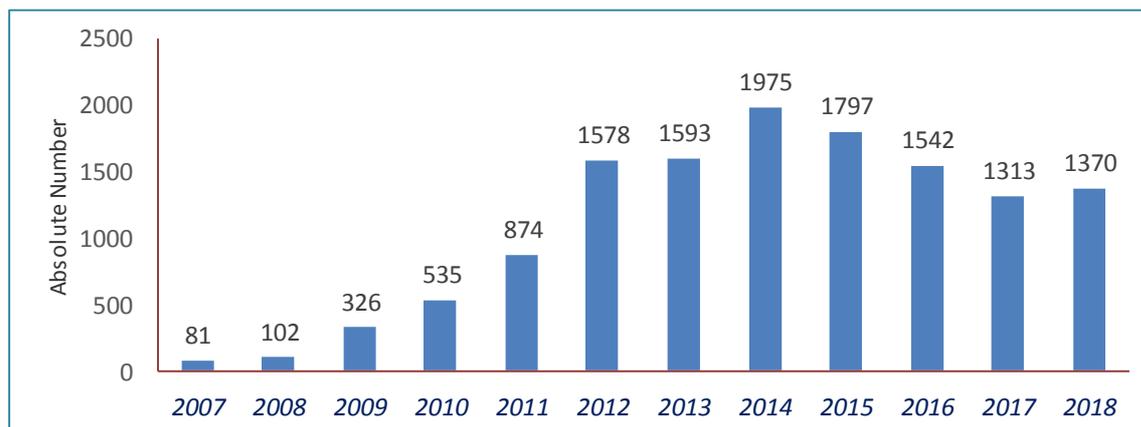


Figure 1: Number of drug-resistant TB suspects that were tested by Xpert

Cambodia has 11 MDR-TB treatment sites with 57 isolation rooms by the end of 2018.

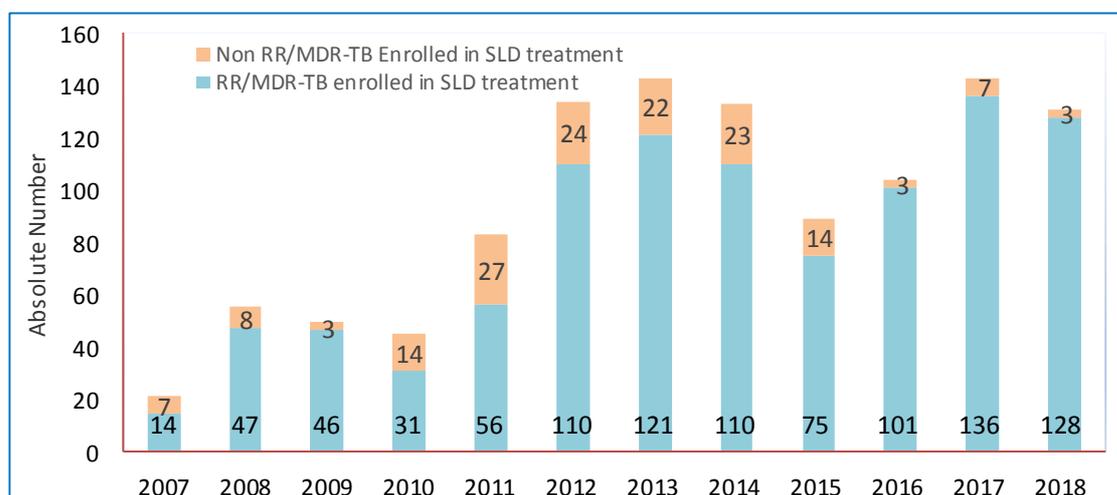


Figure 2: Number of drug-resistant TB cases treated with second-line drugs during 2007-2018

### 4.1.2. MDR-TB Treatment Outcome

The treatment success rate among RR/MDR-TB patients initiated on MDR-TB regimen (long regimen) in Cambodia was higher than an average of global level, which was only 54%. The treatment success rate varies from year to year; and it was 65% in 2016 cohort while the death rate also varies from one year to another (Figure 3).

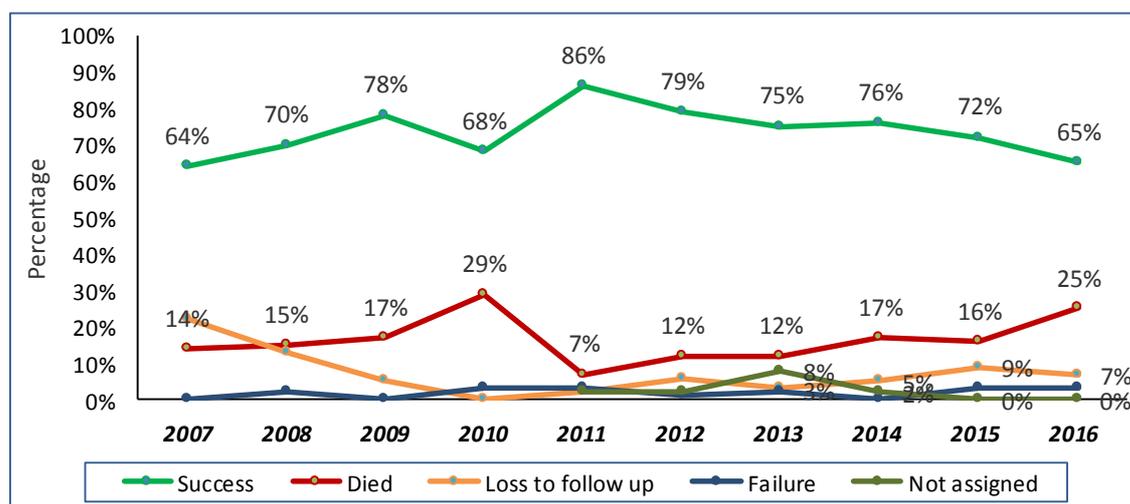


Figure 3: RR/MDR-TB treatment outcome cohort: 2007-2016

Moreover, we have updated guidelines on the programmatic management of MDR-TB (PMDT) in which we introduced the use of the shorter treatment regimen (9-11 months) based on the global tendency, especially the recommendation of WHO and we smoothly conducted training to all staffs working on this programme as well. As the result we have put MDR-TB patients for the shorter treatment regimen from early of December, 2017 for 10 cases during 1 month of 2017. During 2018, among 128 MDR-TB patients enrolled for treatment there 93 cases (73%) were started with shorter treatment regimen and 35 cases (27%) needed to receive longer individualized treatment regimen. Out of 35 cases, 17 cases were put on regimen with new drug Bedaquiline in which there are 13 cases were confirmed as Pre-XDR-TB as well. It is estimated that there are around 70% of MDR-TB patients eligible for the use of shorter treatment regimen, it means that there still have patients need longer individualized treatment regimen and some cases need regimen with new drugs such as bedaquiline or Delamanid or Linezolid. Yet we have challenges in strengthening and improving quality of care especially for MDR-TB patients in special situations or patients who presents with resistance to second line drugs such as XDR-TB or Pre-XDR-TB cases by special focusing the appropriate use of active drug safety monitoring and management (aDSM).

## **4.2. Collaborative TB/HIV Activities**

### **4.2.1. Meeting/Workshop**

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 cluster meeting workshop in US-CDC focused provinces.

The main objectives of the meeting are to monitor and evaluate the progress being made toward Three's Is Strategy and share experiences and good practices among OI/ART sites through the presentation and discussion from different sites of OI/ART services.

In 2018, 2 times of 3Is cluster meeting were conducted in 2 cluster sites where 1 time for Sihanouk cluster site at CENAT and this site consists of Sihanouk, Kampot, Kampong Speu, Koh Kong and Pursat provinces; and 1 time for Kampong Cham cluster site at CENAT and this site consists of Kampong Cham, Tbong Khmom, Kampong Thom, Prey Veng and Svay Rieng provinces.

### **4.2.2. Training**

With the financial support from GFATM, National Center for TB and Leprosy (CENAT) in collaboration with National Center for HIV/AIDS, Dermatology and STD (NCHADS) has an opportunity to conduct trainings on TB diagnostic workup for PLHIV to remain no training OI/ART sites. There are around 37 participants per training session and the trained participants are PHD TB supervisor, OD TB supervisor and physician and staff of OI/ART team (including TB physicians). In 2018, there are 2 TB/HIV diagnostic workup training course conducted at Kampong Cham province (17<sup>th</sup> to 18<sup>th</sup> May 2018 and 15<sup>th</sup> to 16<sup>th</sup> November 2018). The objective of the TB diagnostic workup training is to strengthen TB diagnostic capacities for staff working at OI/ART services and TB services and to provide TB prevention therapy with INH.

### **4.2.3. Supervision**

A main objective of supervision is to monitor and follow up the performance of collaborative TB/HIV activities and provide job coaching at sites visited if there is mistake or misunderstanding during the implementation. The activities were jointly conducted by both national programmes in collaboration with US-CDC to provinces where 3Is strategy is being implemented.

The challenges found to be addressed in the field are: 1/difficult to collect sputum from PLHIV who have symptom screening positive with dry cough; 2/Challenge of transportation of specimen of PLHIV to Xpert machine; 3/workload for the staff at the field; and 4/mal distribution of INH

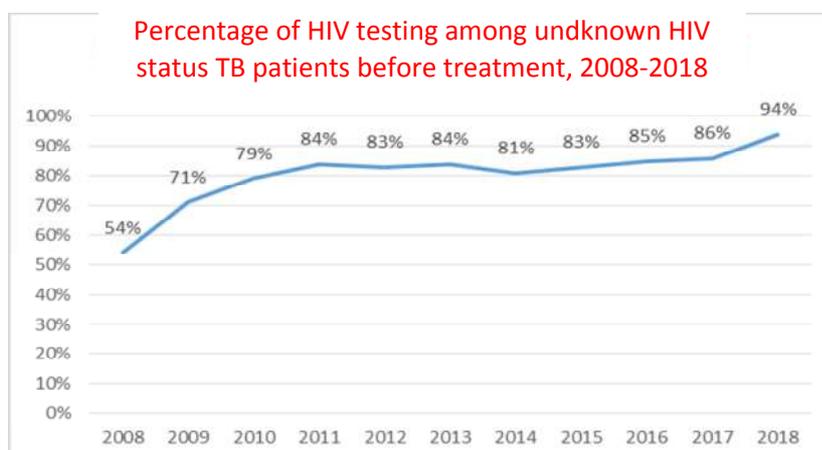
100mg and 300mg from Central Medical Store (CMS) to some OI/ART sites where INH 100mg should reserve for children rather than to provide for adult PLHIV.

#### 4.2.4. TB/HIV Data

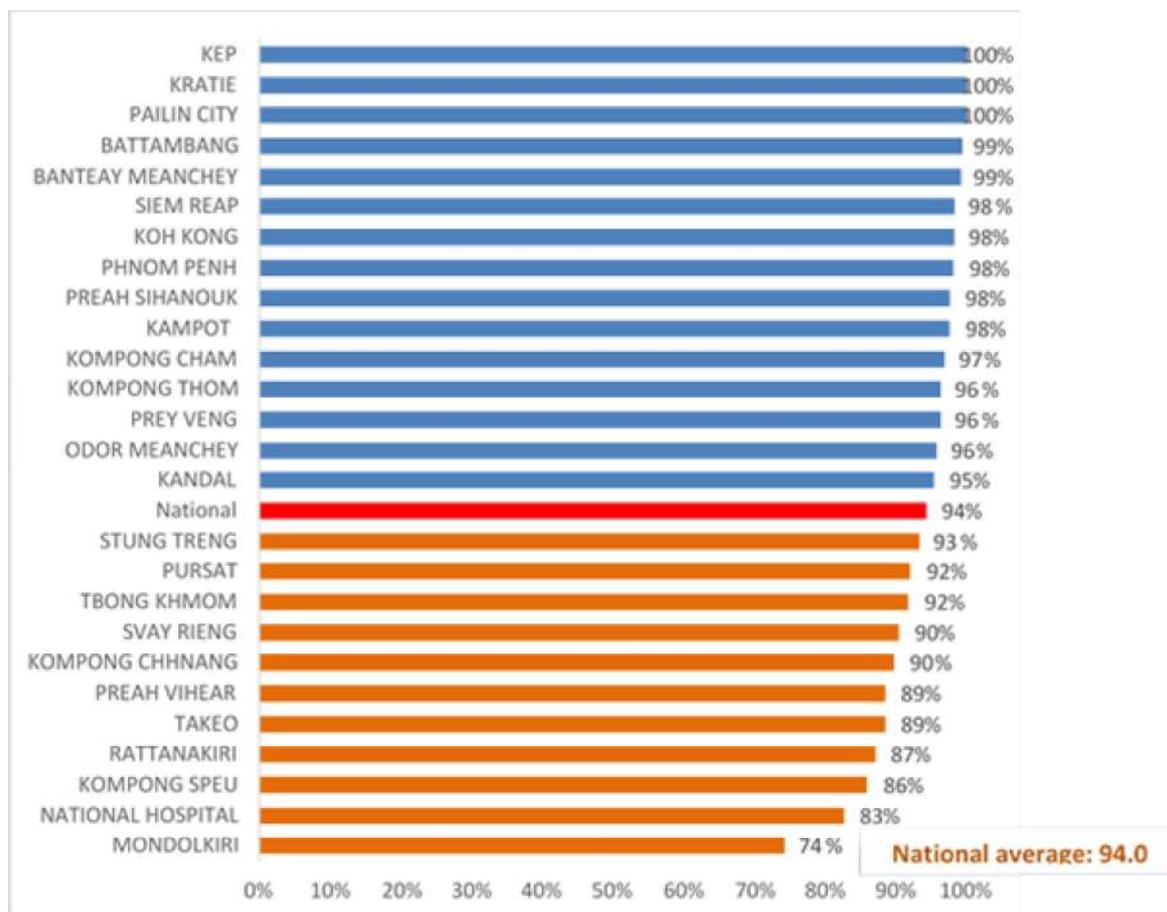
Percentage of registered unknown HIV status TB patients referred and tested for HIV (tested on sites mostly at health centers where the activity has been implemented in the middle of 2014) was increased gradually from 54% in 2008 to 70.59% in 2009, to 79.28% in 2010, to 81% in 2014, to 82.77% in 2015 and to 85% in 2016, 86.4% in 2017 and increased to 94% in 2018.

| HIV / AIDS Among TB Patients 2018 |  |  |  |  |  |           |               |            |            |
|-----------------------------------|--|--|--|--|--|-----------|---------------|------------|------------|
| 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                                 | 7,826  | 7,704  | 122                                      | 7,539  | 7,233                                    | 37        | 7,796         | 134        | 143        |
| 2                                 | 6,976  | 6,846  | 130                                      | 6,717  | 6,570                                    | 27        | 6,543         | 143        | 150        |
| 3                                 | 7,475  | 7,349  | 105                                      | 7,164  | 6,794                                    | 25        | 6,769         | 111        | 104        |
| 4                                 |  |  |  |  |  |           |               |            |            |
| total                             | <b>22,277</b>  | <b>21,899</b>  | <b>357</b>                               | <b>21,420</b>                                      | <b>20,597</b>                            | <b>89</b> | <b>21,108</b> | <b>388</b> | <b>397</b> |

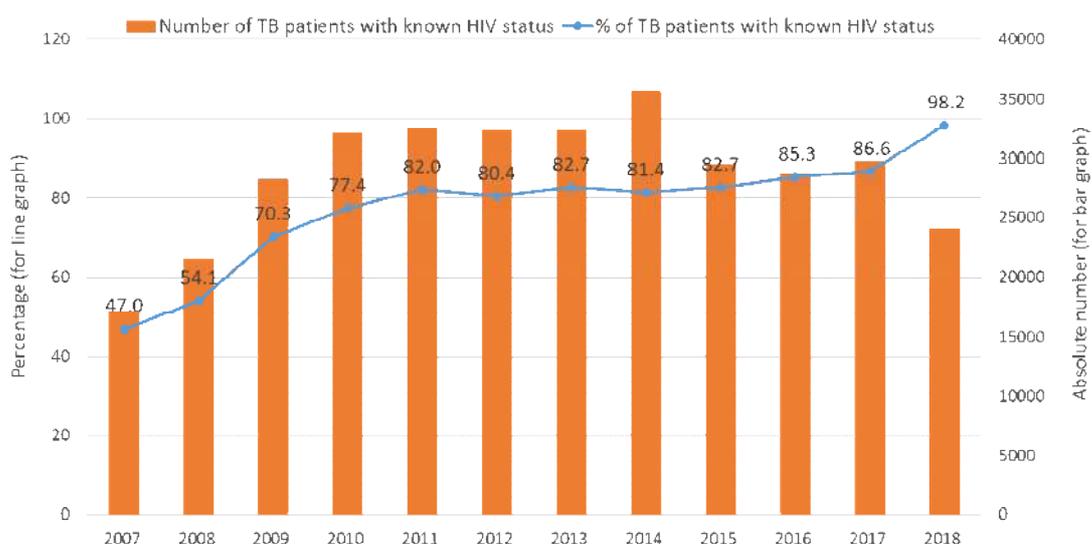
Percentage of registered unknown HIV status TB patients referred and tested for HIV (tested on sites mostly at health centers where the activity has been implemented in the middle of 2014) was increased gradually from 54% in 2008 to 70.59% in 2009, to 79.28% in 2010, to 81% in 2014, to 82.77% in 2015 and to 85% in 2016, 86.4% in 2017 and to 94% (20,597/21,899) in 2018.



### Proportion of HIV testing among registered TB patients by different provinces, 2018



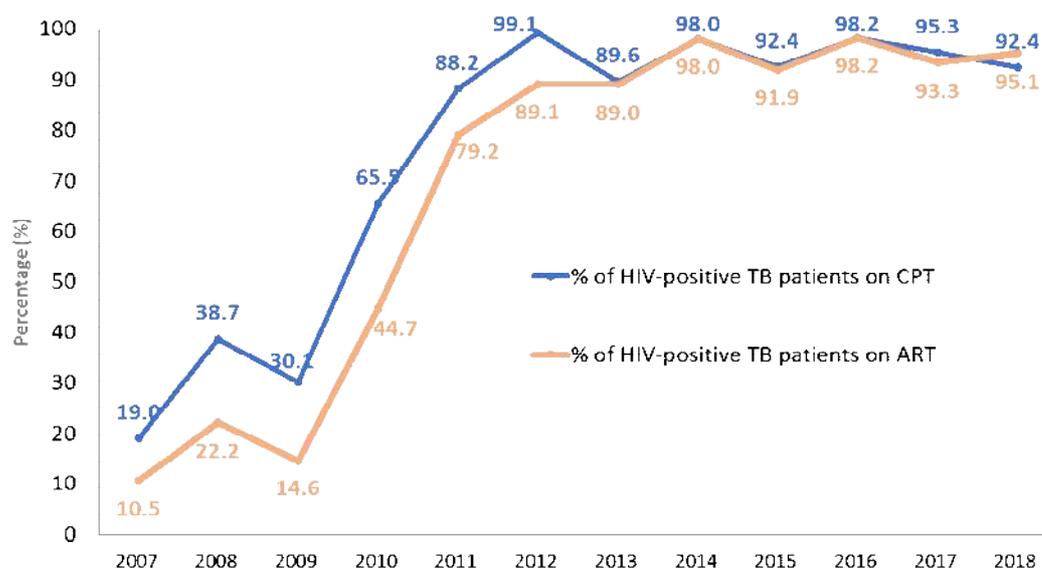
### Number and Proportion of registered TB patients with HIV test results from 2007 to 2018



Proportion of registered TB patients who were tested and recorded the result of HIV in the TB register is 98.2% (24,111/24,542) in 2018.

HIV positive TB patients who received Cotrimoxazole Preventive Therapy (CPT) increase from 65% in 2010 to 92% in 2015, to 98.2% in 2016, to 95.3% in 2017 and to 92.4% in 2018. Anti-Retroviral Treatment (ART) among TB/HIV patients also increase from 45% in 2010 to 92% in 2015, to 98.2% in 2016, to 93.3% in 2017 and to 95.1% in 2018.

Number and proportion of HIV+TB patient received CTP and ART from 2007 to 2018



INH Preventive Therapy for people living with HIV/AIDS who are not likely having TB disease is increasing from 172 in 2010 to 1,043 in 2011. Since the mid of 2014 we start introduce IPT for all PLHIV (new and ART clients) the number of PLHIV who are unlikely to have TB disease is increasing from 767 in 2014 to 954 in 2015, to 2,379 in 2016, to 2,567 in 2017 and to 2,778 in 2018. Referral of newly HIV positive clients for TB screening at OI/ART services is 88% in 2018.

| TB Among PLHIV 2018 |  |  |  |            |            |           |           |            |                             |
|---------------------|--|--|--|------------|------------|-----------|-----------|------------|-----------------------------|
| 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                   | 924  | 590  | 647  | 45         | 26         | 0         | 26        | 97         | 495                         |
| 2                   | 827  | 453  | 725  | 123        | 101        | 29        | 19        | 272        | 577                         |
| 3                   | 626  | 513  | 712  | 35         | 65         | 4         | 39        | 148        | 835                         |
| 4                   | 323  | 253  | 322  | 20         | 8          | 0         | 11        | 39         | 871                         |
| <b>Total</b>        | <b>2,745</b>                               | <b>1,809</b>   | <b>2,406</b>                                 | <b>258</b> | <b>180</b> | <b>31</b> | <b>75</b> | <b>544</b> | <b>2,778</b>                |

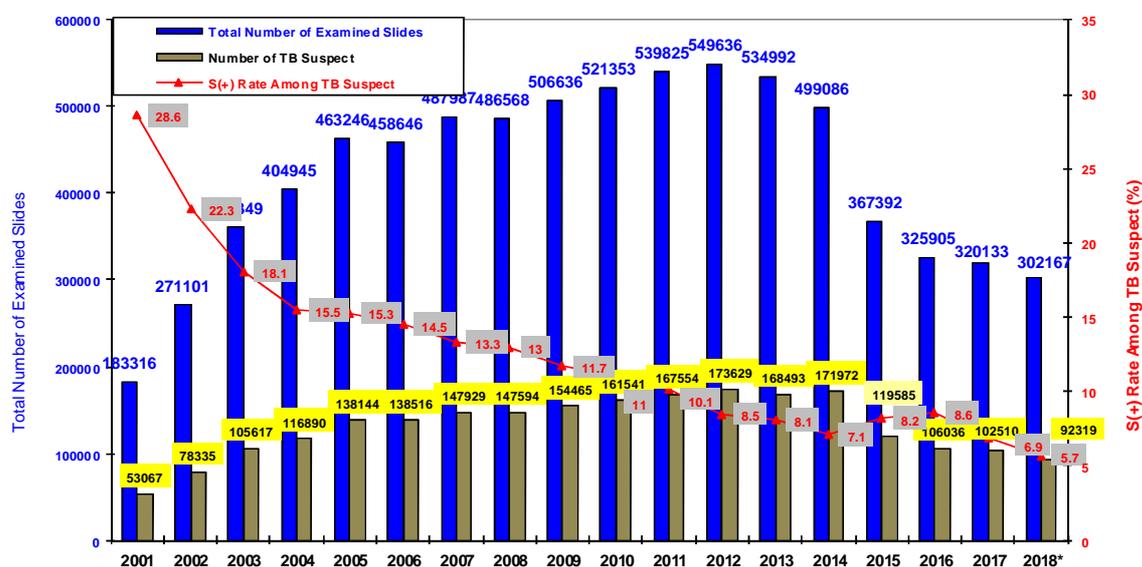
### 4.3. Diagnosis by Bacteriological Examination

#### 4.3.1. Diagnosis by Smear Microscopy

The total number of slides that National Tuberculosis Program used for TB smear examination in 2018 was 302,167 slides (detection and follow up), of which 279,028 slides were for detection. The positivity rate among smear examination for case detection was 5.7%.

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 1.2% and 1.0% respectively for the 3<sup>rd</sup> Quarter of year 2018.

*Below chart is yearly smear microscopy report from 2001 to 2018*



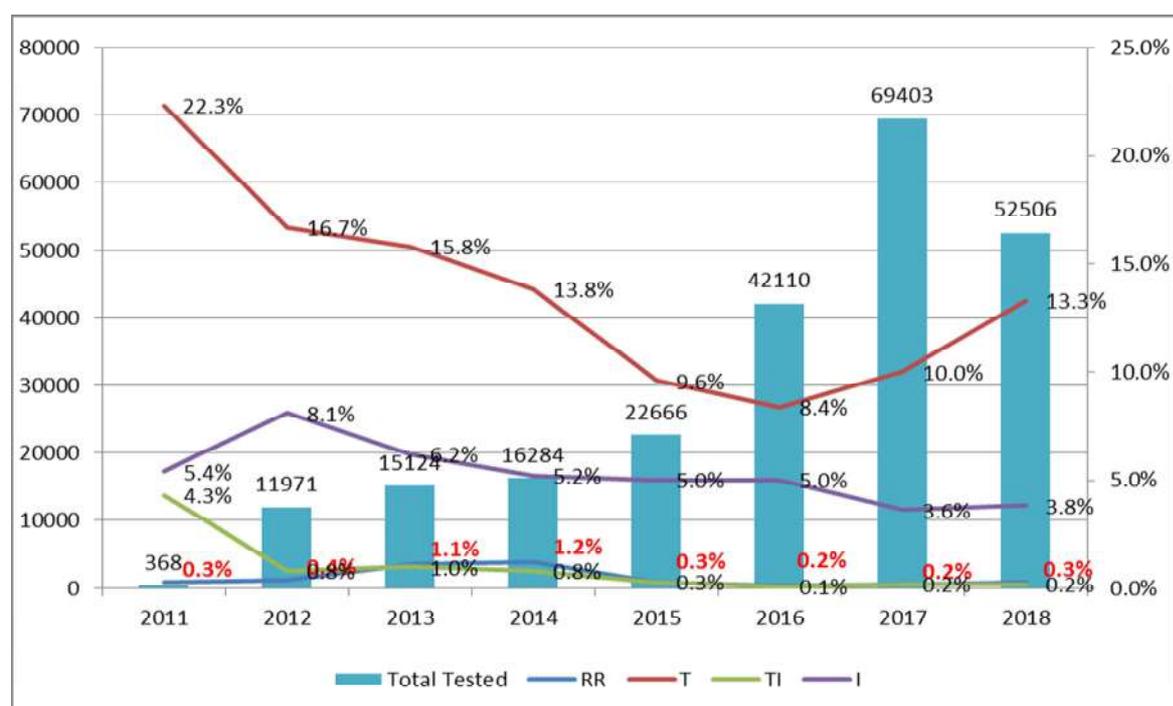
#### 4.3.2. Diagnosis by GeneXpert, Xpert MTB/RIF

New diagnostic tool is GeneXpert machine, which had the tests called Xpert® MTB/RIF has put into operation in the country in 2011 after an official authorization from the World Health Organization in late 2010 and currently the 75 sets have been using. Among these 75 sets, 69 sets (at 64 sites) are used for routine activities. This test is simple, highly effective and gets results faster for less than two hours.

This new test is not only detected susceptible TB but it also can detect Rifampicin resistant. Based on their specific characteristic, NTP decided to roll out these machines to use for case detection among the group of presumptive MDR-TB, the group of PLHIV, the group of new smear positive cases, the group of high risk population (elderly over 55 years old, close

contact with smear positive PTB, Diabetic, and PLHIV) and for Active Case Finding activities. The utilization of tests varied from year to year, i.e. in 2018, national program used 52,506 tests with the results as following: Rate of MTB detected and Rifampicin resistant detected (RR) 0.3%, MTB detected and Rifampicin not detected (T) 13.3%, MTB detected and Rifampicin resistant indeterminate (TI) 0.2% and test Error (I) 3.8%.

*Below chart is yearly Xpert MTB/Rif report from 2011 to 2018*



### 4.3.3. TB Culture and Drug Susceptibility Testing

In late 1999, NTP with the technical assistance from JICA introduced TB culture with solid medium. Step by step later on, the capacity to culture on liquid medium (MGIT) and rapid method to make identification for MTB started up in 2011 at the National Center for TB and Leprosy Control, Battambang TB Laboratory and 2014 at Kampong Cham TB Laboratory.

The first line Drug Susceptibility Testing by using liquid medium (MGIT) was evaluated and introduced at National Center (CENAT) and later at Kampong Cham TB Laboratory (2014). The second line Drug Susceptibility Testing by using liquid medium (MGIT) was evaluated by the supranational TB reference laboratory from Research Institute of Tuberculosis of Japan (RIT) and was put into service since 2014.

In 2018, three culture center laboratories (CENAT, Battambang and Kampong Cham) received 2,725 specimens to do culture for TB with positive rate of 20%.

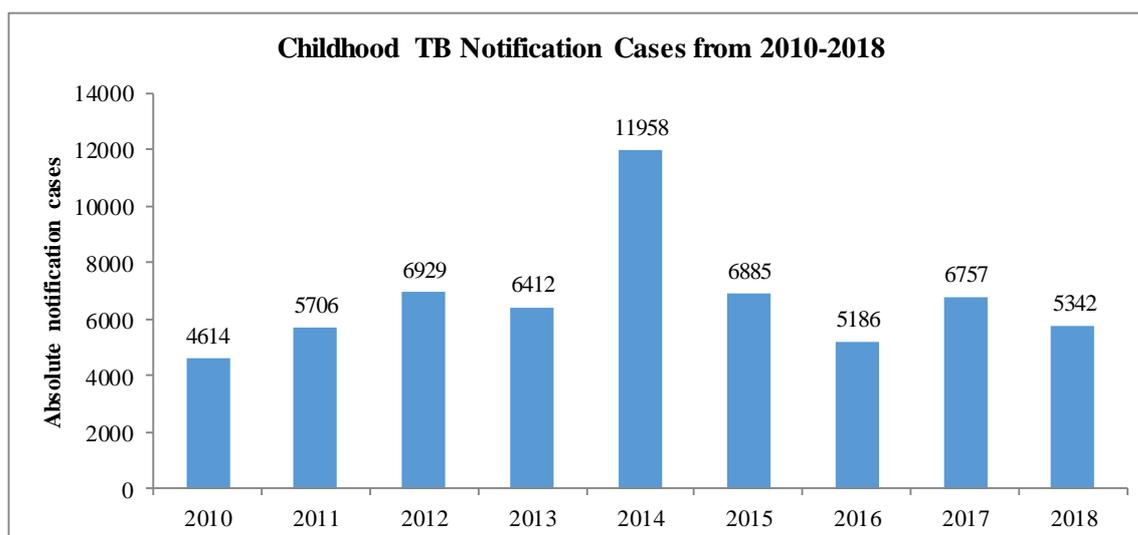
#### 4.3.4. Training

In 2018, National TB Laboratory conducted 2 refresher training courses on utilization of GeneXpert machine to 40 participants. These courses were supported by Global Fund. In addition, National TB Laboratory conducted others 2 refresher training courses on smear microscopy that were the 1<sup>st</sup> course with 20 participants was supported by CoAg CENAT/US-CDC and the 2<sup>nd</sup> course with 20 participants was supported by Global Fund.

#### 4.4. Childhood TB

Childhood TB remains one of the priorities of NTP. There were 5,342 childhood TB cases nationwide notified and treated in 2018 (see the figure below). Since August 2017, NTP has been using the new pediatric drug formulation for childhood cases, which is more effective and better than the old one.

**Figure 1: Childhood TB Notification cases in 2010-2018**

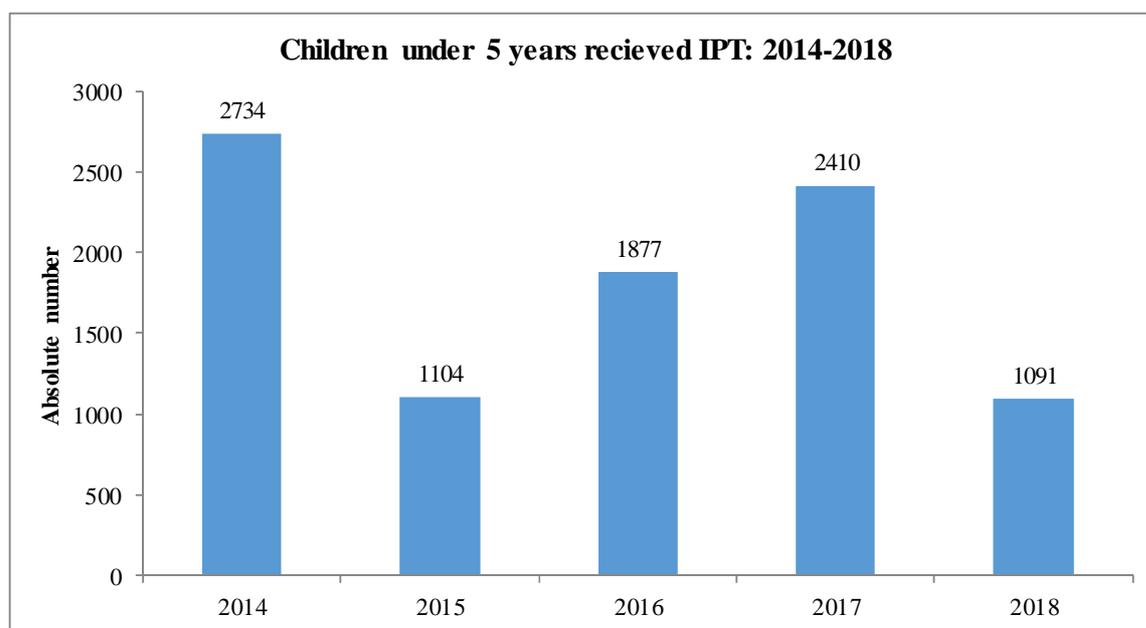


After JATA has ended by 2014 its TB/CARE I project funded by USAID and implemented in 27 ODs, NTP had maintained and strengthened childhood TB activities in 25 ODs supported by USAID, and most of them were former ODs implementing childhood TB under TB CARE I project.

By 2017, childhood TB activities supported by USAID were implemented by FHI-360 under Challenge TB project collaborated with ECH project of RACHA. The childhood TB activities in 25 ODs of the 10 provinces namely Battambang, Pursat, Kampong Chhnang, Kampong Thom, Kampong Speu, Prey Veng, Svay Rieng, Kampot, Kampong Cham, and Tbong Khmum were ended by March 2018. This project supported contact investigation activity to identify TB suspected children and refer them to

referral hospital for TB diagnosis. Nowadays, childhood TB is becoming a routine activity in community and health center/referral hospital implemented by NTP and five NGO partners that received fund from the Global Fund. The number of children under five years old received IPT drops at 1,091 cases (see figure below).

**Figure 2: Children under 5 years old received IPT in 2014-2018**



#### **4.5. Financing**

The National Tuberculosis Program has clearly identified a 7-year National Strategic Plan (2014-2020) by thoroughly consultation with all concern partners and financial gap was also clearly shown. In average, the need of NTP is about US\$20 million per year. Budget plan for 2018 was developed based on this National Strategic Plan. NTP is trying to negotiate with all potential 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 (11SRs). 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 US\$15.6 million and managed the financing of 5 Sub-Recipients (5SRs). In December 2017, The Grant Agreement between Ministry of Economy and Finance as the new Principal Recipient and the Global Fund has been signed for the three-year Global Fund project cover from January 2018 to December 2020. In this project, the Global Fund will provide fund support to TB program with the total amount of about US\$13.7 million and implemented by CENAT itself and as Sub-Implementer (SI) for TB program, CENAT also manages grant

implementation of all Provincial Health Departments and five Sub-Sub-Implementers (SSIs) namely: CHC, CRS, HPA, Op-ASHA and RHAC.

Also in 2018, there are three major donors supporting NTP namely, USAID/Challenge TB, US-CDC, ADB and TB REACH.

In addition to these grants from development partners, Royal Government of Cambodia is increasing fund allocation from National Budget to TB program including 50% contribution for purchasing adult TB Drugs in 2018.

In summary, NTP received funding support in 2018 from six main sources namely National Budget, The Global Fund, USAID, US-CDC, ADB and TB REACH.

However, the funding that NTP can mobilize may not be sufficient for more aggressive TB control to meet the new direction since some projects have reduced budget in 2017-2018 and will end by early 2019.

#### **4.6. Drugs, Equipment, and Laboratory Supplies**

Proving highly important in TB Control, TB Drug Management (TBDM) is deemed the core element of the DOTS 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; and this also 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 2018, NTP received First Line Drugs (FLD) for treating adult and childhood TB patients in 13 shipments (from national budget for 5 shipments, under the Global Fund to Fight AIDS, Tuberculosis and Malaria grant for 3 shipments, and United States Agency for International Development [USAID] Project for 7 shipments).

Table: First Line Drugs procured in 2018

| Product and formulation  | Source     |           |           | Total Quantity<br>(Tablet or Vial) |
|--|------------|-----------|-----------|------------------------------------|
|  | NB         | GF        | USAID     |                                    |
| <i>Adult formulation</i>   |            |           |           |                                    |
| <b>RHZE</b> Rifampicin/Isoniazid/Pyrazinamide/Ethambutol 150/75/400/275 mg | 6,422,304  |           | 4,523,904 | 10,946,208                         |
| <b>RH</b> Rifampicin/Isoniazid 150/75mg                                    | 10,543,008 |           | 8,933,568 | 19,476,576                         |
| <b>S</b> Streptomycin 1g   | 98,000     |           | 75,600    | 173,600                            |
| <b>E</b> Ethambutol 400mg  | 309,792    |           |           | 309,792                            |
| <b>Z</b> Pyrazinamide 400mg  | 29,568     |           |           | 29,568                             |
| <b>H</b> Isoniazid 300mg   |            | 1,278,144 |           | 1,278,144                          |
| <i>Paediatric formulation</i>  |            |           |           |                                    |
| <b>RHZ</b> Rifampicin/Isoniazid/Pyrazinamid 75/50/150 mg                   | 733,236    | 825,720   |           | 1,558,956                          |
| <b>RH</b> Rifampicin/Isoniazid 75/50 mg                                    | 1,466,388  | 1,265,376 |           | 2,731,764                          |
| <b>E</b> Ethambutol 100 mg   | 73,400     | 62,700    |           | 136,100                            |
| <b>H</b> Isoniazid 100mg   |            | 294,000   |           | 294,000                            |

In addition, in 2018, NTP received Second Line Drugs (SLD) for drug resistance TB treatment in 4 shipments including 2 shipments from GDF Grant and 2 shipments from the Global Fund Grant (GFATM).

Table: Second Line Drugs procured in 2018

| Product and formulation       | Source |           | Total Quantity<br>(Tablet, Capsule, Vial, Cont.) |
|-------------------------------|--------|-----------|--|
|                               | GF     | GDF Grant |  |
| <b>Cm</b> Capreomycin 1g      | 243    |           | 243  |
| <b>Mxf</b> Moxifloxacin 400mg | 16,100 |           | 16,100   |
| <b>Bdq</b> Bedaquiline 100mg  |        | 6,580     | 6,580  |
| <b>Dlm</b> Delamanid 50mg     | 672    |           | 672  |
| <b>Lnz</b> Linezolid 600mg    | 5,120  |           | 5,120  |

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 at all levels.

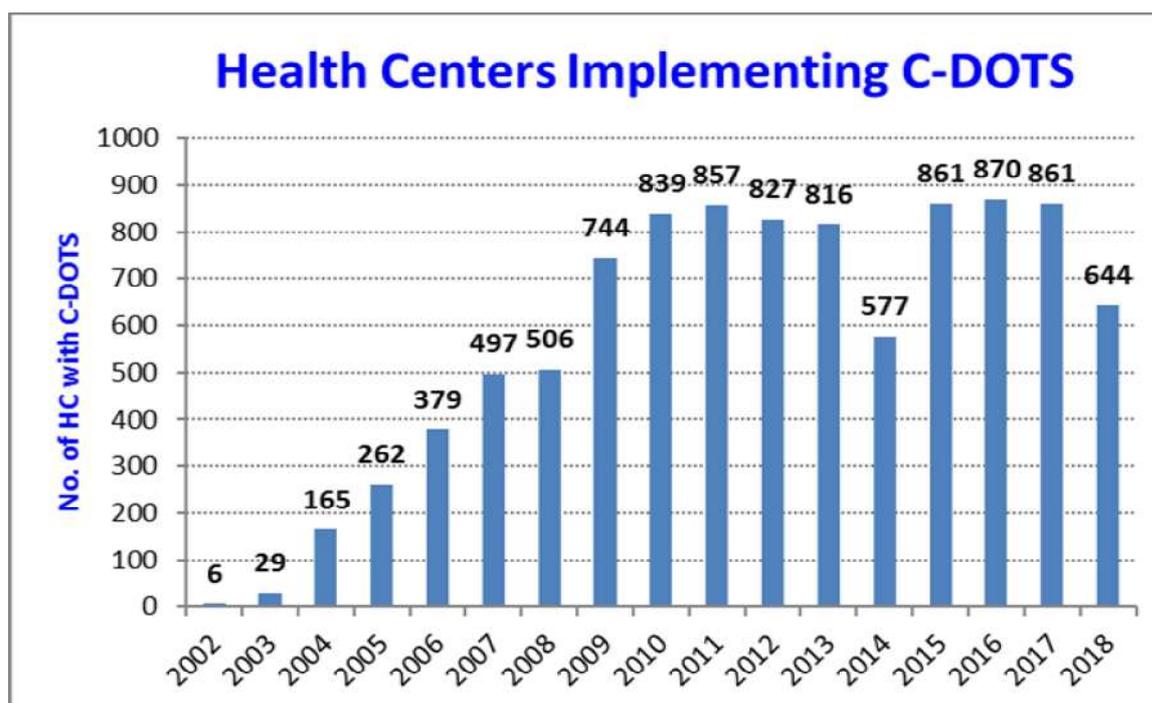
#### **4.7. TB Infection Control**

In 2018, very limited activity of infection control was done due to financial resource constraints. However a notable success was that the NTP, in collaboration with partners including GFATM, USAID, FHI360, HSD, Op-ASHA, KHANA, and CATA, NTP reassessed the status of infection control. 15 hospitals had established and reactivated dormant infection control committees. The hospitals were screening TB suspects and patients and separating them systematically at the inpatient wards and outpatient departments (OPDs), most of the TB care areas had doors and windows opened for natural ventilation. The hospitals were maintaining UVGI fixtures and lamps appropriately. Accessing and using of N95 masks were adequate. Waiting areas and in-patient and outpatient departments had well-displayed posters on infection control. The hospitals have built sputum collection booths with their local budget.

#### **4.8. Community DOTS**

The main purpose of 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. Strengthening and scaling up the Community DOTS is one of the NTP's priorities in order to bring DOTS service closer to the community to achieve case detection and treatment outcome; and to contribute to speeding up the progress towards the goal of ending the TB epidemic by 2030.

As shown in the table below, the number of health facilities implementing Community DOTS varies from year to year according to the support from NGO TB partners and donors. By the end of the first quarter of 2018, there were 682 health centers implementing Community DOTS in 50 Operational Districts under financial support from the Global Fund (5 SSIs namely CHC, CRS, HPA, Op-ASHA, and RHAC) and USAID (FHI-360's Challenge TB). The Challenge TB under the USAID support has phased out from the second quarter of 2018. Since then, the Community DOTS remain only in areas supported by the Global Fund in 644 health centers in 46 ODs. As a result, we conducted 2,066 semi-active Community TB screenings, screened 54,685 people, tested 1,415 TB suspects, and detected 820 TB cases including 351 bacteriologically confirmed TB cases.



Some constraints and obstacles remain our challenges in the implementation of Community DOTS. Insufficient funding support limits the community DOTS implementation at all levels. There is limited motivation for VHSGs/DOT Watchers as well as for TB supervisors and health center staff. The insufficient resources cause limited capacity of frontline TB health workers. This challenge will need us to do more efforts than usual with scarce resources. The different strategies in C-DOTS implementation of partners is another challenge. In addition to what mentioned above, 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 VHSGs and/or DOT Watchers for employment seeking. In order to make community DOTS sustainable, these challenges need to be solved timely.

#### **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 from 2015 till 2018 due to lack of funding support from donors.

## 4.10. TB in Congregational Settings

In last recent years, the NTP has been focusing on case finding in congregational settings such as prisons and factories where TB transmission is high.

### 4.10.1. Prisons

With strong support from the Ministry of Health and the Ministry of the Interior, and in close collaboration with the Prison Department and other partners, great progress has been made in TB control activities in prison. The activities include TB health education for prisoners and referral of TB suspects to public health facilities for tuberculosis diagnosis and subsequent treatment at prison health post with DOTS approach. Table 16 depicts the increasing TB control activities in prison in the recent years. The number of prisons implementing TB control activities increased from 8 in 2009 to 26 in 2015 and remains 17 in 2016. By the end of 2018, there were two partners doing TB control activities in prison; which include the Global Fund supported 10 prisons and CARITAS supported 9 prisons. Through passive and active case finding, 120 TB cases (38 cases through routine case finding and 82 cases through active case finding) were detected including 10 TB/HIV co-infection cases.

Table: TB Control Activities in Prisons: 2009-2018

| Year of Implementation | Number of Prisons | TB Cases Detected | TB/HIV Cases Detected |
|------------------------|-------------------|-------------------|-----------------------|
| 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                     |
| 2016                   | 17                | 139               | 2                     |
| 2017                   | 17                | 117               | 1                     |
| 2018                   | 19                | 120               | 10                    |

### 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, 12 factories and enterprises have been providing TB-DOTS services at their workplaces in 2018.

A summary of TB control activities in factories and enterprises (2007-2018) 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 a bit increase in the range of 100-150 cases and TB cases detected was around 05-17 cases.

Table: TB Control Activities in Factories and Enterprises: 2007-2018

| Year of implementation | Number of workers | of TB suspects referred | of TB cases detected | Yield per population (per 1000) | 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 %                   |
| 2016                   | 18443             | 68                      | 10                   | 54                              | 15%                    |
| 2017                   | 18443             | 293                     | 13                   | 70.48                           | 4.4%                   |
| 2018                   | 16843             | 321                     | 5                    | 30                              | 2%                     |

### 4.11. Hospital Linkages

In 2018, National Tuberculosis Control Program was implementing Hospital Linkage project with the support from Global Fund by five NGO partners in 10 hospitals (Svay Rieng provincial referral hospital, Prey Veng provincial referral hospital, Battambang provincial referral hospital, Maung Russey OD referral hospital, 16 Makara referral hospital of Preah Vihear, Soth Nikum OD referral hospital, Kampong Speu provincial referral hospital, Korng Pisey OD referral hospital, Pursat provincial referral hospital, and Batheay OD referral hospital) and FHI-360's Challenge TB (CTB) project in 11 hospitals (Bati, Prey Kabas, Kirivong, Angkor Chey, Kampong Trach, Romeas Haek, Kampong Trabek, Pearaing, Kralanh, Angkor Chum and Puok). Orientation workshops and monthly meeting were conducted at the above mentioned referral hospitals in order to make implementers understand well the approach and to monitor the progress of the implementation of hospital linkage project.

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 selected hospitals. Cough triage and FAST (Find Actively, Separate Safely and Treat) strategy are implemented in those referral hospitals. Patients who are coughing are separated and provided with masks. All presumptive TB patients are referred to relevant units within the hospital for further investigation.

There were 250,086 clients presented at an OPD and IPD of the selected hospitals in 2018. Of those who have TB sign and/or symptom were referred for TB diagnosis at the relevant units within the hospitals. Among the screened patients, 2,785 cases were diagnosed as TB and put on treatment.

#### TB case detection in 21 hospitals:

| Name of Hospital | OPD & IPD | Presumptive TB Patients | TB All Forms | BK+ TB | Clinically Diagnosed TB |
|------------------|-----------|-------------------------|--------------|--------|-------------------------|
| Bati             | 7,797     | 569                     | 132          | 77     | 55                      |
| Prey Kabas       | 16,579    | 846                     | 188          | 82     | 106                     |
| Kirivong         | 23,304    | 916                     | 229          | 52     | 177                     |
| Pearaing         | 10,900    | 1,316                   | 111          | 12     | 99                      |
| Kampong Trabek   | 6,372     | 957                     | 177          | 23     | 154                     |
| Romeas Haek      | 9,940     | 439                     | 69           | 28     | 41                      |

|               |                |               |              |            |              |
|---------------|----------------|---------------|--------------|------------|--------------|
| Kampong Trach | 8,268          | 502           | 89           | 45         | 44           |
| Angkor Chey   | 6,200          | 361           | 62           | 17         | 45           |
| Puok          | 12,919         | 706           | 182          | 16         | 166          |
| Angkor Chum   | 4,890          | 251           | 88           | 22         | 66           |
| Kralanh       | 5,581          | 320           | 64           | 21         | 43           |
| Svay Rieng    | 14,879         | 103           | 40           | 28         | 12           |
| Prey Veng     | 15,619         | 380           | 68           | 46         | 22           |
| Battambang    | 2,620          | 987           | 188          | 68         | 120          |
| Maung Russey  | 7,490          | 105           | 27           | 13         | 14           |
| 16 Makara     | 11,783         | 594           | 28           | 13         | 15           |
| Soth Nikum    | 17,354         | 60            | 51           | 25         | 26           |
| Kampong Speu  | 28,912         | 2,053         | 433          | 78         | 355          |
| Korng Pisey   | 7,148          | 1,450         | 515          | 57         | 458          |
| Pursat        | 19,313         | 7,723         | 31           | 00         | 31           |
| Batheay       | 12,938         | 4,318         | 13           | 13         | 00           |
| <b>Total</b>  | <b>250,806</b> | <b>24,956</b> | <b>2,785</b> | <b>736</b> | <b>2,049</b> |

## 4.12. Active and Semi-active Case Findings

### 4.12.1. Active and Semi-active Case Findings by NTP

#### - Active Case Finding

In 2018, CENAT team conducted active TB case finding in:

- 6 operational districts namely Kampong Tralach, Chhlong, Tbeng Meanchey, Baray, Kralanh, and Kang Meas. As a result, 276 TB cases were detected including 139 bacteriologically confirmed TB cases and 3 drug-resistant TB cases.
- 6 prisons namely Kampong Cham CC3, Pursat, Prey Veng, Uddor Meanchey, and Mondulkiri. As a result, 82 TB cases were detected including 38 bacteriologically confirmed TB cases and 1 drug-resistant TB case.

## **-Semi-active Case Finding**

In the same year 2018, national TB control program conducted semi-active case finding activities, with the funding support from Great Mekong Sub-region's project for communicable disease control and prevention, among high risk population for TB in 13 operational districts (13 ODs) in 13 provinces which include Poi Pet OD of Banteay Meanchey, Sampov Loun OD of Battambang, Angkor Chey OD of Kampot, Koh Thom OD of Kandal, Preah Sdach OD of Prey Veng, Chiphou OD of Svay Rieng, Memut OD of Tbong Khmum, Kratie OD of Kratie, Senmonorum OD of Monduliri, Borkeo OD of Rattanakiri, Stung Treng OD of Stung Treng, Tbeng Meanchey OD of Preah Vihear, and Pailin OD of Pailin. As a result, the semi-active case finding screened a total of 5, 559 presumptive TB cases. Of which, 3,753 cases were tested and found 153 TB cases including 84 bacteriologically confirmed TB cases.

### **4.12.2 Active Case Finding Project by CATA**

CATA had implemented Active Case Finding from 8 January 2018 to 16 May 2018, under the grant funded by UNOPS/TB REACH Wave 5 and from 26 November 2018 to 21 December 2018 for Wave 5 scale up. This project was implemented among Elderly aged 55 and over and high-risk population in community. This ACF intervention was implemented in 4 operational districts (OD) in 3 provinces: OD Battambang, OD Thmarpouk, OD Poipet and OD Samrong. The CATA's mobile team equipped with digital X-ray machine and X-pert MTB/RIF Ultra visited each health center (HC) in the target areas as planed schedule.

An initial team of at least 2 VHSGs and village chiefs per village have been sensitized the communities living in the catchment area of participating health facilities about TB for one to two weeks prior to each of the ACF days. All people aged 55 and over in selected ODs, regardless of TB symptoms were invited to visit the health facility for screening. Small transport enablers also provided to those in need to improve participation. VHSG outreach efforts focused on people aged 55 years and over, but people less than 55 with at least one among four TB symptoms greater than two weeks have been encouraged to avail screening and testing services. All people visiting the ACF day were screened by both a multi-TB symptoms questionnaire and chest X-ray. Any person with either TB symptoms and/or an abnormal chest X-ray were asked to submit a spot sputum specimen for testing with the Xpert MTB/RIF Ultra. During project activities implementing at field, HC, OD and PHD staff will invite to participate in ACF team. Test results have been returned within a day and TB patients started on treatment at the HC under the supervision of National TB Program (CENAT).

A total of 118,281 people were screened by VHSGs and 33,238 (52% elderly) referred, which resulted in the symptomatic screening of 31,767 cases (53% elderly) visited health center. 28,865 people (58% elderly) have been screened by CXR which resulting 1,049 CXR active for TB, 1,503 CXR suspected for TB, and 3,072 CXR healed lesion of TB. Only 144 CXR cases were other lung diseases and 90 CXR heart diseases.

A total of 4,950 (17% of total CXR) people provided sputum specimens for testing, which resulted in the detection of 424 (8.6%) Xpert tested positive. Only 8 of the bacteriologically positive results (1.9%) were resistant to rifampicin. More than 83% of the people tested with the Xpert MTB/RIF assay were aged 55 or over. The total number of all forms TB was 1,224 cases including 424 Xpert positive (8 Rifampicin resistant) and 84 EP TB patients starting treatment for TB and being report to NTP.

### **4.12.3 Active Case Finding Project by KHANA**

This activity was implemented by KHANA during one year period from Aug 2017 to Aug 2018.

To complement national efforts to end TB and with financial support from Stop TB Partnership/UNOPS under TB Reach Wave 5 grant, KHANA implemented a project “Community-based Innovations for Revitalized Active Case Finding (ACF) for Improved Detection and Linkage to Treatment in Cambodia”.

The project aims to trial community-based innovations for improved early detection and linkage to treatment in Cambodia through 1). Snowball Active Case Finding; 2). Integrated Active Case Management; and 3). Community Mobilization for Sustainability. We mobilized community-based lay counselors to help those who are suspected of having TB, worked with local government commune councils, and promoted early case detection and more effective linkage to treatment.

The TB key affected populations (KAPs) included in this project were close household contact, people living with HIV, people older than 55 and diabetics. Community-based lay counselors were a main player to identify potential seeds among the key affected populations and former TB patients to find other people who might have TB in the community.

This intervention employed a targeted screening approach as KAPs faced disproportionate geographical, economic, social and biomedical barriers to detection and linkage to treatment such as health facilities are far away; transport costs are high; they may not be able to provide good sputum samples, or these might be non-reactive.

The project was implemented in four operational health districts: Siem Reap, Banteay Meanchey, Daun Keo and Kampong Chhnang, with a total of 82 health centers. As the result, in total, the number of people referred for screening was 6,369 and all of them were identified with symptoms of TB

and were tested. There were 527 of SS+/B+ cases (11.8%) and 1,620 of all forms of TB (25.4%). 1,614 cases of all forms were enrolled in treatment (99.6%).



Figure 1: Coupon distributing to TB suspected person

### **4.13. Collaborative DM-TB Services**

#### **Introduction:**

Diabetes mellitus is a known risk factor for tuberculosis (TB), but no studies have been reported from South-East Asia, which has a high burden of TB and a rapidly growing prevalence of diabetes. In 2013, CENAT, Department of Preventive Medicine 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 in Siem Reap and Prey Veng was 7% & 5% respectively. This prevalence is higher than the prevalence of DM among general population. The prevalence of TB among DM patients was also high, about 6 folds higher than TB prevalence in general population.

With financial support from Global Fund and good collaboration with Department of Preventive Medicine and other development partners, CENAT is conducted National Workshop on TB and DM collaborative activities. It is the 2<sup>nd</sup> National Workshop that followed by the 1<sup>st</sup> National Workshop which conducted last year in Siem Reap province on 29th September 2017. There were around 150 participants who work at TB services and Diabetes clinics from 25 municipal and provincial health departments.



National Workshop on TB and DM Collaborative activities, Tonle Bassac 2 Restaurant, Phnom Penh, 17<sup>th</sup> December 2018

The Objectives of the workshop are to strengthen the collaboration of TB and DM services; to share experiences between TB and DM in term of TB screening among DM patients and screening DM among TB patients; and to refer the co-morbidity patient to appropriate services in timely manner.

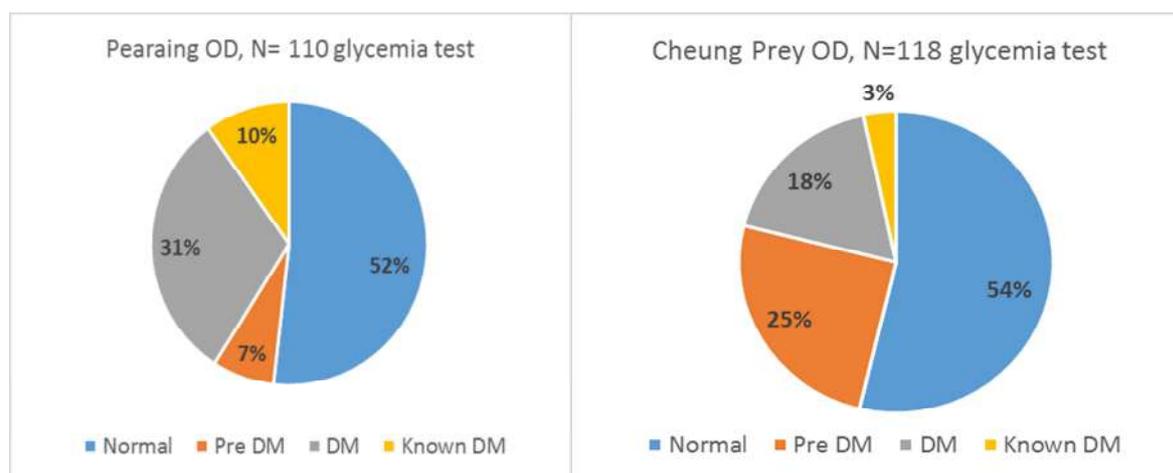
In collaboration with Health and Social Development (HSD), National Center for TB Control (CENAT) has been implemented collaborative TB/DM services for HSD phase I project in Prey Veng province (Pearaing OD) and Siem Reap province (Siem Reap and Sotnikum ODs) in 2014 under funding support from World Diabetes Foundation (WDF).

In 2017, HSD has received funding support from WDF for its phase-2 project to expand more coverage to 4 ODs including Memot, Chheung Prey, Daunkeo and Kirivong. In total, we have expanded this work in 5 provinces, in 7 ODs, 7 hospitals and 113 HCs that cover 1,611,901 populations.

### **Achievement of TB/DM Collaborative Activities with HSD Project in 2018:**

- 7 ODs in 5 provinces are implementing TB/DM collaborative activities: Siem Reap (OD Siem Reap and Sotnikum), Prey Veng (OD Pearaing), Kampong Cham (OD Cheung Prey), Tbong Khmum (OD Memot), Takeo (OD Daunkeo and Kirivong)
- HbA1c analyzers have been provided to all 7 laboratories at referral hospitals. The algorithm for HbA1c tests were shared to both DM clinics and laboratories as for physicians. The HbA1c strip tests will be supplied quarterly to laboratories depend on the number of DM-TB clients referral from DM clinics. The project is also supplied Glucose strips tests to 113 HCs with amount of 133 boxes of 25 tests.

- There were two trainings sessions on the use of Package of Essential Non Communicable (PEN) Disease to pilot decentralized diabetes services delivery to health centers. There are totally 20 HCs have sent there staff (two per each) to participate in the training session, but unfortunately two health centers were selected from other partner support. So, only eighteen health centers have been under ongoing monitoring and support by HSD.
- The project conducted World Diabetes Day event at 2 ODs (Pearaing and Cheung Prey OD) on 14 November 2018 with presence of local authority, public health facility staff, community including risk group (aged 35 years and over) and implementing partners. The total participants were 248. We also provided glycaemia screening of 228 participants during WDD. The project works with HC staff and peer educators to strengthen this activity.



- HSD, DPM and CENAT co-organized and facilitated the Project Dissemination Workshop which was held on 25 December 2018 to disseminate the project progress and result, share lessons learned and challenges, and find ways forward. There were 58 participants from PHD, OD and RH of the project target area.
- Quarterly supervisory meeting organized at OD with the presence of chief of TB/Diabetes and HC staff (122 staff). The objective of the meeting is to monitor the progress of the project, to resolution of any problem, to review report and to supply materials.
- Quarterly patient review meeting organized at RH with the presence of 36 RH staff. This work is very important to monitor and on the job-training as well as problem solving.

- Total of 1,750 patients with TB were screened for diabetes in 7 target ODs from July to December 2018.
- Total of 915 patients with diabetes were screened for TB in 7 target ODs from July to December 2018.
- There were a total of 1,467 persons screened for diabetes

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

Advocacy, Communication and Social Mobilization (ACSM) is an integral part of the TB control program.

In 2017, NTP always ensures that various ACSM approaches are included in the contents of refresher trainings, workshops and Health education to general population at Health Centre, Communities: Buddhist, School, Patient home etc.

Due to financial resource constraints, a very limited number of IEC materials were produced in 2018. However a notable success was that the NTP, in collaboration with partners including GFATM, USAID, FHI-360, HSD, Op-ASHA, KHANA, CATA produced IEC materials such as poster, educational leaflet on general TB adult and children awareness, MDR-TB, Prevention Infection Control, and TB-Diabetic.

For advocacy purpose, the NTP has raised awareness of TB on the World TB Day at all levels throughout the country.

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

#### **4.15. Research**

Research activity is one of the national TB control program (NTP)'s priorities. The third national drug resistance survey was started from May to December 2017 and we are waiting for finalization of TB Lab results that will be finished in end of March 2019. This survey is supported by Global Fund, FHI-360/Challenge TB project, and US-CDC.

Also in 2018, NTP and Institute Pasteur of Cambodia under TB-Speed project had started a research project to strengthen pediatric tuberculosis services for enhanced early case detection, which was supported by the UNITAID and INITIATIVE 5%. This research will be finished in 2021. Besides, NTP has been discussing and preparing a study on TB preventive therapy using 3HP involving multi-countries project in collaboration with partner (CHAI).

The national TB control program is discussing with National University of Singapore and other partners to explore/select the study topics for the period 2019-2020.

#### **4.16. Electronic TB Management Information System**

The Electronic TB Management Information System (TBMIS) is a web-based tool that enables decision-makers to monitor the status of TB treatment by integrating data across key aspects of TB control. This includes information on suspected cases, patients, lab testing, diagnosis, treatment, and treatment outcomes. The TBMIS provides timely access to quality data to monitor epidemiological trends and progress in treatment outcomes in addition to information used in planning and allocation of resources.

In November 2016, began piloting the Cambodia TBMIS in 17 operational districts of three provinces: Kampong Cham, Kampong Speu and Svay Rieng (including regional military hospital in Kampong Cham). The development and enhancement of the electronic TB management information system has been supported by the Health Information Policy and Advocacy (HIPA) project, funded by USAID and implemented by Palladium. The current TBMIS system was customized by a Palladium software developer, based on existing core application, eTB Manager, developed by Management Sciences for Health and first implemented in Cambodia by the USAID funded TBCARE I project. Enhancement of existing system was required to match the current NTP recording format, and further feedback was solicited during meetings and workshops to refine the user requirements. Features incorporated into the enhanced Cambodia TBMIS include (1) allowing the management of both presumptive and TB patients; (2) allowing lab technicians to input the TB lab result; (3) generating the standard report used by NTP and others and; (4) managing user accounts in the system to track most of transactions of the system.

As part of the preparation for national roll-out of the system, a three-day workshop to review the training materials and a training-of-trainer course for TB supervisors of the pilot provinces and NTP staff at the national level, the participant selection was conducted in order to facilitate the 16 training sessions during the first quarter of 2018. National introduction of the system was scheduled to start from January 2018.

In addition, HIPA has supported the implementation of the drug-resistance module in the TBMIS, which was handed over to CENAT/NTP by the TBCARE I project in November 2015. Case registration is performed by the TB nurses in all ten functioning DR-TB treatment sites throughout the eight provinces/cities (Battambang, Banteay Meanchey, Kampong Cham, Kampong Chhnang, Kandal, Phnom Penh, Svay Rieng and Takeo).

This is another new achievement of NTP and it is the first year that most of the operational districts reported to CENAT by using the quarterly report format extracted from the TBMIS. In 2019, we have plan to review and revise some necessary main points which will be supported by the Palladium's Health Policy Plus (HP Plus) project.

## 5. Targets for 2019

National TB Control Programme (NTP) has recently set the targets in line with the End TB Strategy as well as Sustainable Development Goals (SDG) targets by 2030, in which we aim to reduce about two-third of TB incidence and mortality rate during 2016-2030, which means that reduction of incidence rate of at least 65% and reduction of mortality rate of at least 67% compared to 2015 figures.

For 2019, Cambodia NTP has the main targets as below:

- Maintain the treatment cure rate of over 85% and success rate of at least 90 %.
- Detect all forms of TB: 36,000 cases (221 per 100,000 populations)
- Detect bacteriologically confirmed TB: 12,000 cases (75 per 100,000 populations)
- Detect Childhood TB: 7,800 cases
- Detect MDR-TB cases: 150 cases
- Promote intensified case detection through active and semi-active case finding activities.

## **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.

NTP would like to express our sincere thanks to:

- 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, ADB, Stop TB Partnership/GDF, TB-REACH, JATA/RIT, IOs 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.

**Director of CENAT**

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## 23<sup>rd</sup> Annual TB conference



## Annual Planning Workshop on TB Control



## Orientation Workshop on TB Project Implementation under GFATM for 2018-2020





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