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PREFACE

The SAARC TB & HIV/AIDS Centre (STAC) is an eminence regional Centre working in collaboration with the National TB Control Programmes and National HIV/AIDS Control Programmes in combating TB & HIV/AIDS epidemic. Along with other regular activities, STAC brings out compiled SAARC regional reports related to TB and HIV/AIDS and publications regularly in order to disseminate information in SAARC Member States.

In compliance to the decision of 27th Governing Board of STAC, 29-30 November 2017 under activity for the year 2018 this “Strengthening of Epidemiological Data Bank & Epidemiological networks in the Region on TB and HIV/AIDS” is prepared to provide the information on its progress and status of TB, HIV/AIDS & TB/HIV Co-infection, that subsequently enable us to show the remarkable progress in prevention and control of TB and HIV/AIDS during the period of 2000-2016.

I hope this document will help to formulate future plans for the planners, health care providers, medical students, and researchers. I assured that we have made maximum efforts to focus on the detail information on this document.

STAC is grateful to for receiving any suggestions/comments that might be helpful to improve this document in future course.

Dr. Rajendra Prasad Pant
Director
SAARC TB and HIV/AIDS Centre
Kathmandu, Nepal
1. OVERVIEW ON TUBERCULOSIS IN SAARC REGION

The estimated incidence of TB has reduced from 274 per 100 000 populations per year in 2000 to 215 per 100 000 populations per year in 2016 and the mortality due to TB has reduced from 54 per 100 000 populations per year in 2000 to 31 per 100 000 populations per year in 2016. However, the notification rate has increased from 90 per 100 000 populations per year in 2000 to 137 per 100 000 populations per year in 2016. (Figure 1)

Figure 1: Trends of Incidence, Mortality rates and Case notifications in SAARC Region 2000-2016

Source: http://www.who.int/tb/country/data/download/en/
The SAARC Region has treatment success rate among new and relapse cases was 90% in year 2011, however it had reduced to 78% in 2015. The case detection rate was 33 % in the year 2000 and increased to 64% in the year 2016. (Figure 2)

**Figure 2: Trend of CDR and TSR in SAARC Region, 2000-2016**

![Graph showing the trend of CDR and TSR in SAARC Region, 2000-2016](http://www.who.int/tb/country/data/download/en/)


Figure 3 shows the trend of total New & Relapse cases of TB notifications in the region from the year 2000-2016. It was seems in the increasing order.

**Figure 3: Trend of total New & Relapse cases of TB in SAARC Region, 2000-2016**

![Graph showing the trend of total New & Relapse cases of TB in SAARC Region, 2000-2016](http://www.who.int/tb/country/data/download/en/)
Figure 4 shows the estimated TB incidence were 3.8 million, notified TB cases were 2.4 million and missing TB cases were 1.4 million during the year 2016 in SAARC Region.

Figure 4: Estimated TB Incidence (All cases) Vs Notified TB cases in SAARC Region-2016

Source: SAARC Epidemiological Response on Tuberculosis-2017
2. COUNTRY PROFILES FOR TUBERCULOSIS

AFGHANISTAN

BANGLADESH

BHUTAN

INDIA

MALDIVES

NEPAL

PAKISTAN

SRI LANKA
AFGHANISTAN

In Afghanistan, an estimated annual incidence of TB, 189 cases, per 100,000 populations, this seems, almost same from the year 2000 to 2016. However, the mortality rate of TB has decreased by 50% in 2016 comparing to year 2000. The case notification rate has increased from 35 per 100,000 populations in year 2000 to 121 cases per 100,000 populations in year 2016. (Figure 5)

Figure 5: Trends of Incidence, Case notifications and Mortality rates, 2000-2016

Source: http://www.who.int/tb/country/data/download/en/

Initially, MoPH was relatively successful in treatment of tuberculosis through DOTS as this treatment's success rate was as high as 90% in 2005 when the application begun. However, the treatment success rate has remains 88% from the year 2011 to 2015. The case detection rate has increased from 19% in the year 2000 to 64% in year 2016. (Figure 6)
Figure 6: Trends of Case Detection rate and Treatment Success rates, 2000-2016

Source: http://www.who.int/tb/country/data/download/en/

Figure 7 shows the trends of total case notifications (all types of TB) from 2000-2016. The number of notifications has increased from 7107 in the year 2000 to 41954 in year 2016.

Figure 7: Trends of total TB notifications (all types), 2000-2016

Source: http://www.who.int/tb/country/data/download/en/

Laboratories performing Smear microscopy has gradually increased from 528 in 2007 to 720 in 2014 (Figure 8).
Figure 8: Number of laboratories providing TB diagnostic services using smear microscopy 2007-2014

Source: http://www.who.int/tb/country/data/download/en/

Figure 9 shows the estimated TB incidence were 65000, notified TB cases were 41954 and missing TB cases were 23046 during the year 2016 in Afghanistan

Figure 9: Estimated TB Incidence (All cases) Vs Notified TB cases -2016

Source: SAARC Epidemiological Response on Tuberculosis-2017
BANGLADESH

In Bangladesh, the mortality rate of TB has decreased by 56% in 2016 comparing to year 2000. The case notification rate has increased from 57 in the year 2000 to 136 cases per 100,000 populations in the year 2016. (Figure 10)

**Figure 10: Trends of Incidence, Case notifications and Mortality rates, 2000-2016**

<table>
<thead>
<tr>
<th>Year</th>
<th>Incidence</th>
<th>Case Notifications</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>221</td>
<td>57</td>
<td>72</td>
</tr>
<tr>
<td>2001</td>
<td>221</td>
<td>57</td>
<td>72</td>
</tr>
<tr>
<td>2002</td>
<td>221</td>
<td>61</td>
<td>71</td>
</tr>
<tr>
<td>2003</td>
<td>221</td>
<td>63</td>
<td>70</td>
</tr>
<tr>
<td>2004</td>
<td>221</td>
<td>70</td>
<td>67</td>
</tr>
<tr>
<td>2005</td>
<td>221</td>
<td>86</td>
<td>61</td>
</tr>
<tr>
<td>2006</td>
<td>221</td>
<td>100</td>
<td>55</td>
</tr>
<tr>
<td>2007</td>
<td>221</td>
<td>100</td>
<td>55</td>
</tr>
<tr>
<td>2008</td>
<td>221</td>
<td>100</td>
<td>54</td>
</tr>
<tr>
<td>2009</td>
<td>221</td>
<td>101</td>
<td>52</td>
</tr>
<tr>
<td>2010</td>
<td>221</td>
<td>107</td>
<td>55</td>
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<tr>
<td>2011</td>
<td>221</td>
<td>102</td>
<td>55</td>
</tr>
<tr>
<td>2012</td>
<td>221</td>
<td>107</td>
<td>52</td>
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<tr>
<td>2013</td>
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<td>101</td>
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<tr>
<td>2014</td>
<td>221</td>
<td>100</td>
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<tr>
<td>2015</td>
<td>221</td>
<td>108</td>
<td>44</td>
</tr>
<tr>
<td>2016</td>
<td>221</td>
<td>128</td>
<td>40</td>
</tr>
</tbody>
</table>


The treatment success rate among new and relapse cases has above 90% from 2004, and it reached 93% in the year 2015 cohort. However, the case detection rate has been increased from 26% in the year 2000 to 62% in the year 2016. (Figure 11)
The case notification rate has increased from 75557 in the year 2000 to 222248 in the year 2016. Number of TB cases notified in Bangladesh has gradually increased. (Figure 12).

**Figure 11: Trends of Case Detection rate and Treatment Success rates, 2000-2016**

**Figure 12: Trends of total TB notifications (all types), 2000-2016**

Source: http://www.who.int/tb/country/data/download/en/
Figure 13 shows number of laboratories providing TB diagnostic services using smear microscopy. It has increased from 703 in year 2007 to 1104 in year 2014.

**Figure 13: Number of laboratories providing TB diagnostic services using smear microscopy 2007-2014**

Source: http://www.who.int/tb/country/data/download/en/

Figure 14 shows the estimated TB incidence were 360000, notified TB cases were 222248 and missing TB cases were 137752 during the year 2016 in Bangladesh.

**Figure 14: Estimated TB Incidence (All cases) Vs Notified TB cases -2016**

Source: SAARC Epidemiological Response on Tuberculosis-2017
The estimated incidence rate and the mortality rate has decreased from 249 and 27 per 100,000 populations in the year 2000 to 178 and 20 cases per 100,000 population respectively in 2016. The case notification rate also decreased to 143 cases per 100,000 population compare to 199 cases per 100,000 populations in year 2000. (Figure 15)

**Figure 15: Trends of Incidence, Case notifications and Mortality rates, 2000-2016**

![Graph showing trends of Incidence, Case notifications and Mortality rates, 2000-2016](http://www.who.int/tb/country/data/download/en/)

In Bhutan, the treatment success rate has increased from 82% in the year 2005 to 92% in the year 2015. However, the case detection rate was remains same from the year 2000 to 2016. (Figure 16)
Trend of total TB notifications (all types), in Bhutan has shown in figure 14. The maximum number of notifications has noted in the year 2010 and the minimum number has noted in the year 2006. (Figure 17)

Source: http://www.who.int/tb/country/data/download/en/
Figure 18 shows number of laboratories providing TB diagnostic services using microscopy from the year 2007-2014. It has increased from 29 laboratories in the year 2007 to 35 numbers of laboratories in the year 2013.

**Figure 18: Number of laboratories providing TB diagnostic services using smear microscopy, 2007-2014**

![Graph showing number of laboratories providing TB diagnostic services using microscopy from 2007 to 2014.]

*Source: http://www.who.int/tb/country/data/download/en/*

Figure 19 shows the estimated TB incidence were 1400, notified TB cases were 1139 and missing TB cases were 261 during the year 2016 in Bhutan.

**Figure 19: Estimated TB Incidence (All cases) Vs Notified TB cases -2016**

![Graph showing estimated TB incidence, notified cases, and missing cases.]

*Source: SAARC Epidemiological Response on Tuberculosis-2017*
INDIA

The incidence of TB has reduced from 289 per 100 000 populations per year in 2000 to 211 per 100 000 populations per year in 2016 and the mortality due to TB has reduced from 56 per 100 000 populations per year in 2000 to 32 per 100 000 populations per year in 2016. However, the notification rate has increased from 106 per 100 000 populations per year in 2000 to 133 per 100 000 populations per year in 2016. (Figure 20)

**Figure 20: Trends of Incidence, Case notifications and Mortality rates, 2000-2016**

![Graph showing trends of Incidence, Case notifications and Mortality rates, 2000-2016](http://www.who.int/tb/country/data/download/en/)


The treatment success rate among new and relapse cases was 89% in year 2009, however it has reduced to 72% in the year 2015. The case detection rate was also increased from 37% in the year 2000 to 63% in the year 2016. (Figure 21)
**Figure 21:** Trends of Case Detection rate and Treatment Success rates, 2000-2016

![Graph showing trends of case detection rate and treatment success rates from 2000 to 2016.](http://www.who.int/tb/country/data/download/en/)

**Source:** http://www.who.int/tb/country/data/download/en/

Figure 22 shows the trend of total TB notifications from the year 2000-2016. The notification has increased from 1.06 million in the year 2002 to 1.76 million in the year 2016.

**Figure 22:** Trend of total TB notifications (all types), 2000-2016

![Graph showing trend of total TB notifications from 2000 to 2016.](http://www.who.int/tb/country/data/download/en/)

**Source:** http://www.who.int/tb/country/data/download/en/
In India, number of laboratories providing TB diagnostic services using smear microscopy has increased from 12000 in year 2007 to 13583 in year 2014. (Figure 23)

**Figure 23**: Number of laboratories providing TB diagnostic services using smear microscopy, 2007-2014

![Figure 23](image_url)

Source: http://www.who.int/tb/country/data/download/en/

Figure 24 shows the estimated TB incidence were 12790000, notified TB cases were 1763876 and missing TB cases were 1026124 during the year 2016 in India.

**Figure 24**: Estimated TB Incidence (All cases) Vs Notified TB cases -2016

![Figure 24](image_url)

Source: SAARC Epidemiological Response on Tuberculosis-2017
MALDIVES

The incidence of TB has reduced from 59 per 100 000 populations per year in 2000 to 49 per 100 000 populations per year in 2016 and the mortality due to TB has reduced from 6.7 per 100 000 populations per year in 2001 to 3.9 per 100 000 populations per year in 2016. However, the notification rate has also reduced from 47 per 100 000 populations per year in 2000 to 40 per 100 000 populations per year in 2016. (Figure 25)

**Figure 25: Trends of Incidence, Case notifications and Mortality rates, 2000-2016**

![Graph showing trends in incidence, case notifications, and mortality rates from 2000 to 2016.]

The treatment success rate among new and relapse cases was 97% in year 2009, however it has reduced to 83% in the year 2015. The case detection rate remains same since the year 2000. (Figure 26)

Figure 26: Trends of Case Detection rate and Treatment Success rates, 2000-2016

Source: http://www.who.int/tb/country/data/download/en/

Figure 27 shows the trend of total TB notifications from the year 2000-2016. Number of TB notification has increased from 132 in the year 2000 to 169 in the year 2016.

Figure 27: Trend of total TB notifications (all types), 2000-2016

Source: http://www.who.int/tb/country/data/download/en/
Number of laboratories providing TB diagnostic services using smear microscopy has remained the same since the year 2009. (Figure 28)

**Figure 28: Number of laboratories providing TB diagnostic services using smear microscopy, 2007-2014**

Source: http://www.who.int/tb/country/data/download/en/

Figure 29 shows the estimated TB incidence were 210, notified TB cases were 169 and missing TB cases were 41 during the year 2016 in Maldives.

**Figure 29: Estimated TB Incidence (All cases) Vs Notified TB cases -2016**

Source: SAARC Epidemiological Response on Tuberculosis-2017
NEPAL

The incidence of TB has reduced from 163 per 100 000 populations per year in 2000 to 154 per 100 000 populations per year in 2016 and the mortality due to TB has increased from 20 per 100 000 populations per year in 2000 to 22 per 100 000 populations per year in 2016. The notification rate has also reduced from 124 per 100 000 populations per year in 2000 to 108 per 100 000 populations per year in 2016. (Figure 30)

Figure 30: Trends of Incidence, Case notifications and Mortality rates, 2000-2016

The treatment success rate among new and relapse cases was increased from 84% in the year 2000 to 92% in the year 2015. The case detection rate reduced from 76% in the year 2000 to 70% in the year 2016. (Figure 31)
Figure 31: Trends of Case Detection rate and Treatment Success rates, 2000-2016

![Graph of Case Detection Rate and Treatment Success Rate (2000-2016)](image)


Figure 32 shows the trend of total TB notifications from the year 2000-2016. TB notification has increased from 29.5 thousand in the year 2000 to 31.3 thousand in the year 2016.

Figure 32: Trend of total TB notifications (all types), 2000-2016

![Graph of Total TB Notifications (2000-2016)](image)

Number of laboratories providing TB diagnostic services using smear microscopy has increased from 414 in the year 2007 to 528 in the year 2014. (Figure 33)

**Figure 33: Number of laboratories providing TB diagnostic services using smear microscopy, 2007-2014**

![Bar chart showing the number of laboratories providing TB diagnostic services using smear microscopy from 2007 to 2014.](http://www.who.int/tb/country/data/download/en/)


Figure 34 shows the estimated TB incidence were 45000, notified TB cases were 31371 and missing TB cases were 13629 during the year 2016 in Nepal.

**Figure 34: Estimated TB Incidence (All cases) Vs Notified TB cases -2016**

![Bar chart showing the estimated TB incidence, notified cases, and missing cases in 2016.](http://www.who.int/tb/country/data/download/en/)

Source: SAARC Epidemiological Response on Tuberculosis-2017
PAKISTAN

The incidence of TB has reduced from 275 per 100,000 populations per year in 2000 to 268 per 100,000 populations per year in 2016 and the mortality due to TB has decreased from 34 per 100,000 populations per year in 2000 to 23 per 100,000 populations per year in 2016. However, the notification rate has increased from 8 per 100,000 populations per year in 2000 to 184 per 100,000 populations per year in 2016. (Figure 35)

**Figure 35: Trends of Incidence, Case notifications and Mortality rates, 2000-2016**

The treatment success rate among new and relapse cases was increased from 74% in the year 2000 to 93% in the year 2015. The case detection rate also increased from 2.9% in the year 2000 to 69% in the year 2016. (Figure 36)

*Source: http://www.who.int/tb/country/data/download/en/*
Figure 36: Trends of Case Detection rate and Treatment Success rates, 2000-2016

Source: http://www.who.int/tb/country/data/download/en/

Figure 37 shows the trend of total TB notifications from the year 2000-2016. TB notification has increased from 11 000 in the year 2000 to 356 000 in the year 2016.

Figure 37: Trend of total TB notifications (all types), 2000-2016

Source: http://www.who.int/tb/country/data/download/en/
Number of laboratories providing TB diagnostic services using smear microscopy has increased from 1106 in the year 2007 to 1483 in the year 2014. (Figure 38)

**Figure 38: Number of laboratories providing TB diagnostic services using smear microscopy, 2007-2014**

![Graph showing the increase in the number of laboratories providing TB diagnostic services from 2007 to 2014.](source)

*Source: http://www.who.int/tb/country/data/download/en/*

Figure 39 shows the estimated TB incidence were 518000, notified TB cases were 356390 and missing TB cases were 161610 during the year 2016 in Pakistan.

**Figure 39: Estimated TB Incidence (All cases) Vs Notified TB cases -2016**

![Bar chart showing estimated incidence, notified cases, and missing cases in 2016.](source)

*Source: SAARC Epidemiological Response on Tuberculosis-2017*
SRI LANKA

The incidence of TB has almost constant since the year 2000. However incidence has note 65 per 100 000 populations per year in 2016 and the mortality due to TB has decreased from 10 per 100 000 populations per year in 2000 to 6 per 100 000 populations per year in 2016. The notification rate has decreased from 45 per 100 000 populations per year in 2000 to 42 per 100 000 populations per year in 2016. (Figure 40)

Figure 40: Trends of Incidence, Case notifications and Mortality rates, 2000-2016

![Graph showing trends of incidence, case notifications, and mortality rates from 2000 to 2016.](http://www.who.int/tb/country/data/download/en/)


The treatment success rate among new and relapse cases was increased from 79% in the year 2000 to 85% in the year 2015. However, the case detection rate decreased from 76% in the year 2011 to 64% in the year 2016. (Figure 41)
Figure 41: Trends of Case Detection rate and Treatment Success rates, 2000-2016

![Graph showing CDR and TSR trends from 2000 to 2016](http://www.who.int/tb/country/data/download/en/)

Source: http://www.who.int/tb/country/data/download/en/

Figure 42 shows the trend of total TB notifications from the year 2000-2016. TB notification has increased from 7499 in the year 2001 to 10181 thousand in the year 2011.

Figure 42: Trend of total TB notifications (all types), 2000-2016

![Graph showing total TB notifications from 2000 to 2016](http://www.who.int/tb/country/data/download/en/)

Source: http://www.who.int/tb/country/data/download/en/
Number of laboratories providing TB diagnostic services using smear microscopy has increased from 152 in the year 2007 to 206 in the year 2014. (Figure 43)

**Figure 43: Number of laboratories providing TB diagnostic services using smear microscopy, 2007-2014**

![Bar chart showing the number of laboratories providing TB diagnostic services using smear microscopy from 2007 to 2014.](source: http://www.who.int/tb/country/data/download/en/)

Figure 44 shows the estimated TB incidence were 13000, notified TB cases were 8664 and missing TB cases were 4336 during the year 2016 in Sri Lanka.

**Figure 44: Estimated TB Incidence (All cases) Vs Notified TB cases -2016**

![Bar chart showing estimated incidence, notified cases, and missing cases from 2007 to 2014.](source: SAARC Epidemiological Response on Tuberculosis-2017)
3. MDR AND XDR TB SITUATION

**Global Situations**

- The global male: female (M: F) ratio for notifications of DR-TB was 1.7. But Results from national TB prevalence surveys of adult show higher M:F ratios, indicating that notification data understate the share of the TB burden accounted for by men in some countries.
- Many more men than women are diagnosed with, and die from, tuberculosis (TB) globally.
- Globally, children (aged <15 years) accounted for 6.9% of the new TB cases that were notified in 2016.
- Globally, in 2016, coverage of testing for rifampicin resistance was 33% for new TB patients and 60% for previously treated TB patients, and 39% overall (up from 31% in 2015).
- Globally in 2014, 123 000 patients with MDR -TB or rifampicin resistant tuberculosis (RR-TB) were notified, of whom about 75% lived in the European Region, India, South Africa or China. This was equivalent to 41% of the 300 000 notified TB patients who were estimated to have MDR-TB in 2014. The number of notified MDR/RR-TB cases in 2014 was almost the same as in 2013. People with MDR-TB or RR-TB are eligible for second-line treatment with MDR-TB regimens. A total of 111 000 people were started on MDR-TB treatment in 2014, an increase of 14% compared with 2013. Only 50% of patients on MDR-TB treatment were successfully treated, largely due to high rates of mortality and loss to follow-up.
- The combination of pyrazinamide plus a fourth-generation fluoroquinolone (moxifloxacin or gatifloxacin) is considered essential in novel rifampicin-sparing regimens for the treatment of TB and in shorter regimens for the treatment of MDR-TB. But testing for susceptibility to fluoroquinolones and pyrazinamide is not routinely performed as part of surveillance efforts. To address this issue a multi-country project was coordinated by WHO in five countries (including two SAARC Countries)–Azerbaijan, Bangladesh, Belarus, Pakistan and South Africa – enrolling more than 5000 patients.
Levels of resistance varied substantially among settings (3.1–42.1%). In all settings, pyrazinamide resistance was significantly associated with rifampicin resistance (0.5–4.2% among rifampicin-susceptible cases and 36.7–81.3% among rifampicin-resistant cases). Resistance ranged from 1.0% to 16.6% for ofloxacin, from 0.5% to 12.4% for levofloxacin and from 0.9% to 14.6% for moxifloxacin when tested at 0.5 μg/ml. High levels of ofloxacin resistance were found in Pakistan.

Globally in 2016, drug resistance surveys were ongoing in 11 countries, with the first nationwide surveys in seven countries including India.

**SAARC Situations**

Three of member states namely India, Pakistan and Bangladesh still in the list of WHO 30 High TB and MDR-TB Countries.

The MDR TB cases in the region range from less than 1-4% among new TB cases and it ranges from less than one to almost 35 percent among the retreatment TB cases. In 2014 Pakistan has 4.3% of new tuberculosis cases with MDR-TB, which is highest in the SAARC region. However, in India there were 24,000 new MDR-TB cases among notified pulmonary TB cases. In case of retreatment Bhutan has 35% of new tuberculosis cases with MDR-TB, which is highest in the SAARC region. However, in India there were 47,000 MDR-TB cases among retreatment TB cases.

Except in Bhutan and Pakistan estimated TB incidence in SAARC region are more in males.

Most of the global increase in notifications of new TB cases since 2013 is explained by a 37% increase in India 2013–2016.

**Afghanistan**

In Afghanistan the total number of estimated MDR-TB cases among notified cases in 2016 was 1600 (CI: 790-2400). Total of 1472 cases were tasted for rifampicin resistance in 2016. In the same year 86 MDR/RR-TB cases were tasted for resistance to second line drugs. In 2016 there were 86 laboratory confirmed MDR/RR-TB and 3 XDR cases were detected in Afghanistan.
Drug- resistant TB care, 2016

<table>
<thead>
<tr>
<th>Estimated MDR/RR-TB cases among notified pulmonary TB cases</th>
<th>New cases</th>
<th>Previously treated cases</th>
<th>Total Number***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated % of TB cases with MDR/RR-TB</td>
<td>4.1% (1.4-6.9)</td>
<td>16% (13-18)</td>
<td>1600 (790-2400)</td>
</tr>
<tr>
<td>% notified tested for rifampicin resistance</td>
<td>&lt;1%</td>
<td>58%</td>
<td>1472</td>
</tr>
<tr>
<td>MDR/RR-TB cases tested for resistance to second line drugs</td>
<td></td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>Laboratory confirmed cases</td>
<td>MDR/RR-TB: 86</td>
<td>XDR-TB:3</td>
<td></td>
</tr>
<tr>
<td>Patients started on treatment****</td>
<td>MDR/RR-TB: 149</td>
<td>XDR-TB:0</td>
<td></td>
</tr>
</tbody>
</table>

Bangladesh

Drug Resistant TB

Drug Resistant TB (DR-TB) poses a significant threat to control of TB worldwide. In 2018, globally an estimated 3.9% of new cases and 21% of previously treated cases have DRR/RR-TB equivalent to an estimated absolute number of 580,000 new MDR-TB cases. In the same year approximately 250,0000 patients died from MDR/RR-TB worldwide, ( Ref: WHO Global TB report 2016).

NTP Bangladesh has conducted countries first nationwide drug resistance survey in 2010-2011. According to this survey report the proportion of new TB cases with RR/MDR –TB is 1.6 % and that of retreatment cases with RR/MDR-TB is 29%. On this assumption the estimated total numbers of MDR-TB cases in 2011 to 2015 in the country are shown in below table. In 2015 the notified new pulmonary cases were 157026 and retreatment pulmonary TB cases were 8645.
### Table: Annual estimated number of MDR-TB cases in Bangladesh (2011-20158)

<table>
<thead>
<tr>
<th>Year</th>
<th>Among new PTB cases</th>
<th>Among retreated pulmonary TB cases including relapse</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1700</td>
<td>2100</td>
<td>3800</td>
</tr>
<tr>
<td>2012</td>
<td>1850</td>
<td>2300</td>
<td>4150</td>
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<tr>
<td>2013</td>
<td>2071</td>
<td>2425</td>
<td>4496</td>
</tr>
<tr>
<td>2014</td>
<td>2094</td>
<td>2703</td>
<td>4797</td>
</tr>
<tr>
<td>2015</td>
<td>2512</td>
<td>2507</td>
<td>5019</td>
</tr>
</tbody>
</table>

For diagnosis and management of multidrug resistant TB (MDR-TB), a National TB Reference Laboratory (NTRL) has been established in National Institute of Diseases of the Chest and Hospital (NIDCH). The NTRL have been functioning since 27th June 2007 for culture and Drug Sensitivity Test (DST). It is linked with supranational reference laboratory (SRL) in Antwerp, Belgium. In August 2008 NIDCH started enrolment of MDERTB patients with GLC approved 24 months regimen and supported by the Global Fund. By end of December 2016 a total of 2639 confirmed MDR-TB patients including 461 in 2016 have been enrolled in NIDCH. As a part of programmatic Management of Drug resistant TB (PMDP) plan NTP established one Regional TB Reference Laboratory (RTRL) at chest disease hospital (CDH), Chittagong in 2011 and also managing MDR TB patients and by end of December 2016 a total of established in the CDH, Rajshahi in May 2008.

Details of MDR-TB patients, enrollment by the CDHs is shown in below table

**Criteria for presumptive DR-TB cases:**

- Failures of Category I and II
- Non-converters of Category I and II
- All relapses
- All return after loss to follow up
- Close contacts of MDR-TB patient with symptoms
- All HIV infected patients

The MDR patients diagnosed and enrolled for management are shown in the Table below.

**Table: Summary, MDR TB Enrolment for Treatment**

<table>
<thead>
<tr>
<th>Year</th>
<th>GLC approved 20-24 months regimen</th>
<th>Non-GLC (DF) including CDH, Rajshahi</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NIDCH CDH, CTG CDH, Pabna CDH, Khulna CDH, Sylhet</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>2005 May-2007</td>
<td></td>
<td>(67+69+106)=242</td>
<td>242</td>
</tr>
<tr>
<td>2008</td>
<td>107</td>
<td>107 129</td>
<td>236</td>
</tr>
<tr>
<td>2009</td>
<td>179</td>
<td>179 181</td>
<td>360</td>
</tr>
<tr>
<td>2010</td>
<td>183</td>
<td>183 154</td>
<td>337</td>
</tr>
<tr>
<td>2011</td>
<td>212 41</td>
<td>253 137</td>
<td>390</td>
</tr>
<tr>
<td>2012</td>
<td>290 86</td>
<td>376 129</td>
<td>505</td>
</tr>
<tr>
<td>2013</td>
<td>330 120 31 14</td>
<td>495 191</td>
<td>686</td>
</tr>
<tr>
<td>2014</td>
<td>447 123 31 61 54</td>
<td>716 230</td>
<td>946</td>
</tr>
<tr>
<td>2015</td>
<td>430 121 26 43 60</td>
<td>680 200</td>
<td>880</td>
</tr>
<tr>
<td>2016</td>
<td>461 113 21 60 95</td>
<td>750 168</td>
<td>918</td>
</tr>
<tr>
<td>Total</td>
<td>2639 604 109 178 209</td>
<td>3739 1761</td>
<td>5500</td>
</tr>
</tbody>
</table>

**Treatment outcome of MDR-TB patients under GLC approved 24 months regimen:**

Diagnosed MDR-TB patients are enrolled for treatment. The treatment lasts for 20-24 months. Initially hospital duration was 6-8 months and rest period patients were treated in the community. From 2012 management modality has been modified with initial hospitalization for 1-2 months followed by community management for the rest period. At the end of the treatment, the patients are evaluated with regard to treatment outcomes.
The overall trend of treatment success rates of MDR-TB patients is increasing. Below table shows the treatment outcomes of the patients enrolled during 2008-2014 under 24 months regimen.

### Table: Treatment Outcomes MDR TB, 2008-2014 cohorts

<table>
<thead>
<tr>
<th>Year</th>
<th>Registered</th>
<th>Confirmed MDR</th>
<th>Cured</th>
<th>Treatment Completed</th>
<th>Failed</th>
<th>Defaulted</th>
<th>Died</th>
<th>Still on treatment Cured</th>
<th>Treatment completed</th>
<th>Failed</th>
<th>Defaulted</th>
<th>Died</th>
<th>Still on Treatment</th>
<th>Treatment Success Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>107</td>
<td>104</td>
<td>61</td>
<td>6</td>
<td>28</td>
<td>8</td>
<td>0</td>
<td>58.7</td>
<td>5.8</td>
<td>1.0</td>
<td>26.9</td>
<td>7.7</td>
<td>0</td>
<td>64.42 After 36 months</td>
</tr>
<tr>
<td>2009</td>
<td>179</td>
<td>167</td>
<td>104</td>
<td>9</td>
<td>3</td>
<td>30</td>
<td>21</td>
<td>0</td>
<td>62.3</td>
<td>5.4</td>
<td>1.8</td>
<td>18</td>
<td>12.6</td>
<td>67.66 After 36 months</td>
</tr>
<tr>
<td>2010</td>
<td>183</td>
<td>175</td>
<td>99</td>
<td>24</td>
<td>25</td>
<td>27</td>
<td>0</td>
<td>56.6</td>
<td>13.7</td>
<td>0.0</td>
<td>14.3</td>
<td>15.4</td>
<td>0</td>
<td>70.29 After 36 months</td>
</tr>
<tr>
<td>2011</td>
<td>253</td>
<td>240</td>
<td>153</td>
<td>15</td>
<td>4</td>
<td>34</td>
<td>34</td>
<td>0</td>
<td>63.7</td>
<td>6.25</td>
<td>1.7</td>
<td>14.2</td>
<td>14.2</td>
<td>70 After 36 months</td>
</tr>
<tr>
<td>2012</td>
<td>376</td>
<td>372</td>
<td>236</td>
<td>35</td>
<td>3</td>
<td>50</td>
<td>42</td>
<td>5</td>
<td>63.4</td>
<td>9.4</td>
<td>0.8</td>
<td>13.4</td>
<td>11.3</td>
<td>1.3 72.85 After 30 months</td>
</tr>
<tr>
<td>2013</td>
<td>495</td>
<td>495</td>
<td>333</td>
<td>27</td>
<td>1</td>
<td>51</td>
<td>59</td>
<td>22</td>
<td>67.3</td>
<td>5.5</td>
<td>0.2</td>
<td>10.3</td>
<td>11.9</td>
<td>4.4 72.73 After 30 months</td>
</tr>
<tr>
<td>2014</td>
<td>716</td>
<td>716</td>
<td>233</td>
<td>271</td>
<td>0</td>
<td>73</td>
<td>109</td>
<td>23</td>
<td>32.5</td>
<td>37.8</td>
<td>0</td>
<td>10.2</td>
<td>15.2</td>
<td>3.2 70.39 After 24 months</td>
</tr>
</tbody>
</table>

Under an operational research NTP in collaboration with DF Bangladesh has been managing MDR-TB patients with 9 months regimen since 2008 and showing a good success with treatment success rates of 83.5% for the cohort register in 2015.
### Table: Treatment outcome of MDR-TB patients under 9 month’s regimen

<table>
<thead>
<tr>
<th>Year</th>
<th>Registered</th>
<th>Confirmed MDR</th>
<th>Cured</th>
<th>Treatment Completed</th>
<th>Failed</th>
<th>Defaulted</th>
<th>Died</th>
<th>No result</th>
<th>Cured</th>
<th>Treatment Completed</th>
<th>Failed</th>
<th>Defaulted</th>
<th>Died</th>
<th>Still on treatment</th>
<th>Treatment Success</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>129</td>
<td>129</td>
<td>103</td>
<td>0</td>
<td>3</td>
<td>12</td>
<td>6</td>
<td>5</td>
<td>79.84</td>
<td>2.3</td>
<td>9.3</td>
<td>4.65</td>
<td>3.876</td>
<td>79.84</td>
<td>After 1 year</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>181</td>
<td>181</td>
<td>138</td>
<td>5</td>
<td>2</td>
<td>16</td>
<td>11</td>
<td>9</td>
<td>76.24</td>
<td>2.76</td>
<td>1.1</td>
<td>8.84</td>
<td>6.08</td>
<td>4.972</td>
<td>79.01</td>
<td>After 1 year</td>
</tr>
<tr>
<td>2010</td>
<td>154</td>
<td>154</td>
<td>25</td>
<td>2</td>
<td>2</td>
<td>17</td>
<td>8</td>
<td>0</td>
<td>81.17</td>
<td>1.3</td>
<td>1.3</td>
<td>11</td>
<td>5.19</td>
<td>0</td>
<td>82.47</td>
<td>After 1 year</td>
</tr>
<tr>
<td>2011</td>
<td>137</td>
<td>137</td>
<td>102</td>
<td>0</td>
<td>9</td>
<td>22</td>
<td>4</td>
<td>0</td>
<td>74.45</td>
<td>0</td>
<td>6.6</td>
<td>16.1</td>
<td>2.92</td>
<td>0</td>
<td>74.45</td>
<td>After 1 year</td>
</tr>
<tr>
<td>2012</td>
<td>129</td>
<td>129</td>
<td>91</td>
<td>2</td>
<td>2</td>
<td>18</td>
<td>16</td>
<td>0</td>
<td>70.54</td>
<td>1.55</td>
<td>1.55</td>
<td>13.95</td>
<td>12.4</td>
<td>0</td>
<td>72.09</td>
<td>After 1 year</td>
</tr>
<tr>
<td>2013</td>
<td>191</td>
<td>191</td>
<td>152</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>23</td>
<td>3</td>
<td>79.59</td>
<td>0.52</td>
<td>2.09</td>
<td>4.19</td>
<td>12.0</td>
<td>1.57</td>
<td>80.1</td>
<td>After 1 year</td>
</tr>
<tr>
<td>2014</td>
<td>230</td>
<td>230</td>
<td>195</td>
<td>2</td>
<td>7</td>
<td>16</td>
<td>10</td>
<td>0</td>
<td>84.78</td>
<td>0.87</td>
<td>3.04</td>
<td>6.96</td>
<td>4.35</td>
<td>0</td>
<td>85.65</td>
<td>After 1 year</td>
</tr>
<tr>
<td>2015</td>
<td>200</td>
<td>200</td>
<td>165</td>
<td>2</td>
<td>6</td>
<td>13</td>
<td>12</td>
<td>2</td>
<td>82.5</td>
<td>1.0</td>
<td>3.0</td>
<td>6.5</td>
<td>6.0</td>
<td>1.0</td>
<td>83.5</td>
<td>After 1 year</td>
</tr>
</tbody>
</table>

**Bhutan**

In Bhutan, the estimated proportion of new cases with multidrug-resistant TB (MDR-TB) was 2.6% among new cases and 38% among retreatment cases based on DRS survey in Nepal. Figure shows the MDR-TB case notification in Bhutan from 2005-2016. In Bhutan, treatment success rate of MDR-TB has been above 75%.
The following table shows programme performance in terms of detection and notification of rifampicin resistant (RR) and MDR-TB cases. There has been a substantial increase in number of RR/MDR-TB cases diagnosed in recent years.

<table>
<thead>
<tr>
<th></th>
<th>New</th>
<th>Retreatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases tested for RR/MDR-TB</td>
<td>53%</td>
<td>30%</td>
<td>504</td>
</tr>
<tr>
<td>Laboratory confirmed RR/MDR-TB cases</td>
<td></td>
<td></td>
<td>49 (9.7%)</td>
</tr>
<tr>
<td>Patients started on MDR-TB treatment*</td>
<td></td>
<td></td>
<td>49 (100%)</td>
</tr>
</tbody>
</table>

*May include patients who were not laboratory confirmed and those diagnosed before 2015

**Treatment outcomes**

Figure 46 shows the treatment success rate among new and relapse cases is sustained at >88% while for other previously treated cases, the success rate is >75%. Treatment success rate of RR/MDR-TB achieved at 92% (for cohort of 2013).
**Table: Treatment success rate for various categories of Tuberculosis**

<table>
<thead>
<tr>
<th>Treatment success rate and cohort size</th>
<th>(%)</th>
<th>Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>New and relapse cases registered in 2014</td>
<td>90%</td>
<td>1066</td>
</tr>
<tr>
<td>Previously treated cases, excluding relapse, registered in 2014</td>
<td>79%</td>
<td>71</td>
</tr>
<tr>
<td>HIV-positive TB cases, all types, registered in 2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RR-/MDR-TB cases started on second-line treatment in 2015</td>
<td>92%</td>
<td>37</td>
</tr>
<tr>
<td>XDR-TB cases started on second-line treatment in 2012</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Figure 46: Treatment outcomes by type of cases, 2014 cohort (2013 cohort for RR/MDR-TB cases)**
India
Currently, in India there are 74 TB Culture & DST laboratories which are certified by RNTCP for one or more diagnostic technologies. Out of the 74 TB C&DST laboratories, 45 laboratories are certified for all the three diagnostic technologies. Cumulatively, 48 laboratories are certified for solid culture DST; 45 laboratories for first-line liquid culture DST and 38 laboratories for second-line liquid culture DST; 56 laboratories for first-line LPA technology and 50 laboratories for second-line LPA technology. For decentralized diagnosis of TB and Rifampicin resistance CBNAAT machines have been provided at district levels. In the year 2017, more than one million CBNAAT tests have been conducted. Genome sequencing facilities are being established at six Reference Laboratories, for surveillance of drug resistance, for providing information on transmission dynamics and molecular epidemiology. First National Drug Resistance Survey in India results showed the rates of MDR among new TB patients to be 2.84% and that in previously treated to be 11.60%.

Laboratory testing performance for the year 2017

<table>
<thead>
<tr>
<th>No. of machines</th>
<th>No. of tests performed</th>
<th>No. of Rifampicin-Resistant TB Detected</th>
<th>Tests for private sector patients</th>
<th>EP-TB samples tested out of total test done</th>
<th>HIV +ve out of total tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>628</td>
<td>10,77,377 (1million)</td>
<td>37,488</td>
<td>93,618</td>
<td>1,31,428</td>
<td>1,90,218</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of test</th>
<th>No of sensitive to H&amp;R</th>
<th>No of resistant to INH</th>
<th>No of resistant to Rifampicin</th>
<th>No of MDR TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>93,989</td>
<td>68,070</td>
<td>7,736</td>
<td>2,243</td>
<td>11,518</td>
</tr>
</tbody>
</table>

- LPA Testing
SLDST performed (2017)

<table>
<thead>
<tr>
<th>Number of SL DSTs conducted</th>
<th>Number of MDR + FQ resistance detected</th>
<th>Number of MDR + SLI resistance detected</th>
<th>Number of XDR detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>26,832</td>
<td>8,594</td>
<td>826</td>
<td>2,650</td>
</tr>
</tbody>
</table>

Hence in India 9420 Pre XDR patients and 2650 XDR patients were reported in 2017.

First National Drug Resistance Survey, India: Understanding the epidemiology of drug resistant TB and knowledge on the rates of drug resistant TB is essential for combating the challenge of DR TB. In order to plan, strategize and refine the quality of services for DR TB, it was crucial to have data on the rates of drug resistance at a National level. Towards this goal, India has conducted the survey. 5280 sputum smear positive patients attending diagnostic centres belonging to 120 TUs (selected as clusters for sampling) were recruited for the Survey. This has been the largest survey conducted globally and for the very first time Liquid Culture was used and DST performed for 13 anti TB drugs. The results of the survey showed the rates of MDR among new TB patients to be 2.84% and that in previously treated to be 11.60 %.

Maldives

In Maldives very few MDR-TB cases have been identified. Fortunately no XDR –TB cases reported as of now. However there is a risk that this trend may change as the country employs a large expatriate workforce from neighboring countries with higher MDR prevalence.

Nepal

Nationwide, the proportion of new cases with multidrug-resistant TB (MDR-TB) was 2.2% among new cases and 15.4% among retreatment cases based on DRS survey in Nepal carried out in 2011/12, and another DRS survey is planned to be carried out in 2018. The routine surveillance
showed much higher proportion of drug resistant pattern among second line drugs used for the treatment of MDR patients in Nepal. The resistance to fluoroquinolones (FQ), SLI and both FQ and SLI were 39.3%, 3% and 4% respectively, altogether there was 46.3% resistant to SLD among MDR patients. In other words, among all initially diagnosed as RR-MTB/MDR TB 42.3% of MDR patients may require Pre-XDR treatment similarly 4% may require XDR treatment. (Figure 47)

Around 69.0% of estimated RR/MDR-TB cases, 72.0% of Pre XDR-TB and only 43.0% of XDR-TB cases were enrolled for treatment in Nepal. Drug Resistance patient getting ambulatory treatment management from 17 DR-TB Treatment Centre and 83 DR-TB Treatment Sub-centre from 46 districts. For those patient who need residential care and management due to various reason benefitted through 6 DR-TB Hostel, 1 DR-TB Home, 1 DR-TB Referral Centre and 1 TB Hospital established in Nepal.

**Figure 47: Result of Second Line DST in Routine Surveillance in 2073/74 in Nepal**

![Bar chart showing the percentage distribution of patients with different drug resistance patterns.](image)

In Nepal, Treatment success rate of XDR-TB is extremely low ranging from 13% to 33%. Most of the XDR-TB patient died within the treatment period due to disease severity, complication and toxicity.
Currently, there are 27 Xpert MTB/RIF centers in Nepal, with 31 Xpert MTB/RIF machines having 87 modules, and are functioning in different parts of the country. 22 more machines are being planned to be installed at various sites of the country.

**Pakistan**

Pakistan is 5 among high burden countries for RR-TB with estimated annual cases of around 14000 among notified pulmonary TB cases. In the notified new pulmonary TB cases there are 10,605 RR TB cases (at the rate of 4.2% in new cases) having 2773 among notified retreatment cases (at the rate of 16% in retreatment cases). DRTB Enrollment: 2881 DR-TB patients were enrolled, By the end of 2016, enrollment of DRTB patient reached 11368 and 29 PMDT sites were made functional nationwide. Among patient enrolled 1418 (49%) were male and 1463 (51%) female drug resistance TB patients. 71% of the DR-TB belong to the most productive age group (14 to 44).

**Figure 48: Scale up of DRTB enrolment over the years in Pakistan**
DR-TB Treatment success rate in Pakistan: Compared to previous years a decline in treatment success rate from 72% for cohort of patient enrolled in 2013 to 63% for patient enrolled in 2014 is reported. Low treatment outcome were due to high mortality (18%) and lost to follow-up (9%). In 2016, 130 XDR-TB cases were reported from Pakistan.

Figure 50: Treatment outcome (%) of patient enrolled on second line treatment
## National Trend of FQ Resistance in RR/MDR TB cases in Pakistan

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDR with DST available of FQ</td>
<td>2213</td>
<td>2359</td>
<td>2292</td>
<td>2366</td>
</tr>
<tr>
<td>FQ resistance(no)</td>
<td>1121</td>
<td>1114</td>
<td>996</td>
<td>1127</td>
</tr>
<tr>
<td>FQ resistance(%)</td>
<td>50.7%</td>
<td>47.2%</td>
<td>43.5%</td>
<td>47.6%</td>
</tr>
<tr>
<td>SLI Resistance(No)</td>
<td>140</td>
<td>193</td>
<td>145</td>
<td>163</td>
</tr>
<tr>
<td>SLI Resistance(%)</td>
<td>6.3%</td>
<td>8.2%</td>
<td>6.3%</td>
<td>6.9%</td>
</tr>
<tr>
<td>XDR</td>
<td>99</td>
<td>128</td>
<td>99</td>
<td>130</td>
</tr>
<tr>
<td>XDR(%)</td>
<td>4.5</td>
<td>5.4</td>
<td>4.3</td>
<td>5.5</td>
</tr>
</tbody>
</table>

### Sri Lanka

The incidence of MDR-TB is low in Sri Lanka when compared to other countries in the SAARC region. Seventeen cases of MDR-TB were reported in year 2016 and all of them were enrolled in treatment. Sri Lanka uses standardized treatment regimen and the period of treatment for MDR TB is at least 20 months.

## Trend of MDR-TB cases in Sri Lanka 2010-2016

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of laboratory confirmed MDRTB patients</td>
<td>8</td>
<td>12</td>
<td>5</td>
<td>4</td>
<td>13</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Number enrolled in treatment in the same year</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>11</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Number</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>enrolled in treatment in the next year</td>
<td>Total number enrolled in treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 (63%)</td>
<td>9 (75%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 (100%)</td>
<td>4 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 (85%)</td>
<td>13 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 (100%)</td>
<td></td>
<td></td>
<td></td>
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</table>
4. LABORATORY SERVICES

Globally

- Globally, one third of all tuberculosis (TB) cases are not notified, and many patients’ samples do not undergo drug-susceptibility testing (DST). To achieve the targets for TB prevention, care and control that have been agreed for after 2015, new health-system strategies and diagnostic tools are critically important.

- Early identification of presumptive TB cases, at the first point of care be it private or public sectors, and prompt diagnosis using high sensitivity diagnostic tests to provide universal access to quality TB diagnosis including drug resistant TB is the top priority of NTP.

What does it entail?

1. To use high efficiency diagnostic tools for early and accurate diagnosis linked treatment
2. To strengthen laboratory surveillance systems
3. To promote and foster research for new diagnostic tools
4. To build capacity for diagnosis of LTBI
5. Scale up effective mechanisms of affordable diagnostics for TB in private sector

SAARC Region

Bangladesh

- In Bangladesh during 2016, sputum microscopy under NTP was performed in 1116 (in 2015 it was 1106) laboratories across the country and sputum samples from a total of 18 74 473 presumptive TB cases were tested for AFB, out of which 1 25 776 were sputum smear positive (positivity rate 6.71 %). As follow up of treatment a total number of 406 240 sputum slides were tested; out which 3.92% were found positive.

- In 2016 number of EQA lab remains same as of 2015 i.e., 40. All 1 116 laboratories were brought under the quality assurance network of the EQA centers. Lot quality assurance sampling method is used for quantifying the number of slides to be rechecked. Each month five slides are selected from each laboratory. Slides are blindly rechecked by
a first controller. In 2016, a total of 62744 slides were rechecked. This sample contained approximately the same distribution as the pool from where they were selected i.e. 4580 (7.3%) positive, 1474 (2.35%) scanty and 56690 (90.35%) negative.

- New diagnostic techniques such as GeneXpert and LPA (line probe assay) were introduced in 2012 in Bangladesh. On 10th May 2008 Regional Tuberculosis Reference Laboratory was formally inaugurated in Rajshahi Chest Disease Hospital. Damien Foundation is providing technical support for this laboratory. Culture and drug susceptibility Test (DST) for Tuberculosis are done within shortest duration by this laboratory. The RTRL in Chittagong has started its function since October 2010. After completion and renovation and installation of instrument (in 2014), Khulna RTRL has been formally inaugurated on 30 June 2015.

**Bhutan**

- In Bhutan, the services for diagnosis, treatment and care are made available and provided free of cost to migrants and other vulnerable groups as well. The National TB Reference Laboratory (NTRL) under Royal Centre for Disease Control (RCDC) based in Serbithang, Thimphu is responsible for monitoring and maintaining quality diagnostic services. It is supervised and assessed by the Regional Supra National Reference Laboratory (SNRL) in Bangkok, Thailand, and provides facility for culture and Drug sensitivity testing services for diagnosis of Multi-Drug Resistant TB (MDR-TB) cases. There are total of 32 reporting centers, 35 microscopy centers and four GeneXpert sites in Bhutan. MDR-TB patients are being managed in three referral hospitals.

**India**

- In India, TB diagnosis is offered through more than 14,000 designated microscopy centres spread across the country. CBNAAT facilities have been established at District levels for decentralized molecular testing for TB and simultaneous detection of Rifampicin resistance. Reference laboratories have been established at State and National levels which provide Culture and DST services as well as molecular diagnosis. The laboratory network under RNTCP is composed of three tiers for quality assurance of all diagnostic modalities. Diagnostic algorithm has also undergone revision to accommodate
available technologies and optimal use at various levels. MDR-TB diagnosis is offered to all patients initiated on re-treatment as well as patients who remain smear positive on any follow up including failures of first line treatment and those at high risk such contacts of MDR-TB cases. CBNAAT is also offered for TB diagnosis in key populations such as PLHIV, Children and EP-TB cases, referrals from the private sector for early diagnosis and initiating appropriate treatment. More recently, the diagnostic algorithm has been modified wherein CBNAAT is offered to cases who are Smear negative but have an X ray suggestive of TB, as well as for new TB cases.

The RNTCP laboratory network is composed of a three tier system with National level Reference Laboratories (NRLs), State level Intermediate Reference Laboratories (IRLs), and peripheral level laboratories as Designated Microscopy Centres (DMCs). C&DST laboratories under RNTCP Lab Network are equipped with different diagnostic technologies for DR TB diagnosis, which include conventional Solid culture and/ or newer rapid TB diagnostic technologies i.e. Line Probe assay- LPA and Liquid Culture. 48 laboratories have been certified by RNTCP for performing solid C & DST, 45 laboratories for performing DST to First line drugs usin liquid culture system. Of these, 38 laboratories have additionally been certified for performing DST to second line anti TB drugs. 56 certified laboratories provide First Line-LPA services. The programme has a very well established quality assurance (QA) mechanism which follows the WHO system of hierarchal control from the highest level of National Reference laboratories to State Intermediate Reference labs (both IRL and CDST), to CBNAAT at the district/ sub district level and then designated microscopy centres at the most peripheral level. QA for the National level laboratories is provided through the WHO supranational reference laboratory (SNRL) network. One of the SNRL for the South East Asia region is NIRT, Chennai which also serves as a NRL. Quality assurance panel for both first and second line drugs to the SNRL and three other NRLs (NTI Bangalore, NITRD Delhi and NJIL&OMD, Agra) is provided by the WHO coordinating lab (Antwerp) of SRL network.
Nepal

- Currently, there are 604 microscopy centers registered as microscopy centers in Nepal, 564 (93%) of them are functioning and delivering sputum microscopy examination throughout the country. 484 (86%) of functioning Microscopic centers regularly participated in external quality assurance (EQA) in 2015/16.

- An EQA report of sputum microscopy is used for planning, supervision, training, blindly slide rechecking, report feedback and maintaining the quality of sputum microscopy. There are well-established networks between the microscopy centers at DHO/DPHO laboratories, hospitals (Covering from tertiary to Local level), PHC, some Health-posts, and hospitals and clinics at private health facilities with 5 RTQCCs in regional level and national quality control center at NTC Nepal. Microscopy centers send the examined slides to their respective regional TB quality control centers via district health office following lot quality assurance sampling (LQAS) method. Five Regional TB quality control centers (RTQCCs) are functioning smoothly with skilled and trained quality control assessors. EQA for sputum microscopy is carried out by RHD, Biratnagar for the eastern region, RHD Hetuda for the central region, RTC Pokhara for the western region, RHD Surkhet for the mid-western region and RHD Dhangadhi for the Far-western region. NTC perform as a national quality control assessor; recheck all the discordant slides (false negative/false positive) sent from 5 regional RQCCs. The overall agreement rate is an indicator to monitor the quality of smear examination. Agreement rate is 98.84% for the FY 2073/74. There are some issues and challenges in the microscopic centers. About 7% are not functioning; there are several reasons behind it and majority of them are not functioning due to unavailability laboratory staff. Among the functioning MCs, 14% did not regularly participate in the EQA system.

- The use of Xpert MTB/RIF introduced in Nepal from 2011/2012. Currently, there are 27 Xpert MTB/RIF centers, with 31 Xpert MTB/RIF machines having 87 modules, and are functioning in different parts of the country.

- The National TB Reference Laboratories (NRL) Nepal, NTC and GENETUP, provide culture and DST services. They are quality assured and accredited by Supranational TB Reference Laboratory (SRL) Gauting, Germany. SRL Gauting, Germany is supervising
and maintaining regular EQA of these laboratories. NRL at NTC is in the process to establish Liquid Culture (MGIT).

- This year (2018) NTP Nepal has established three regional culture laboratories in different part of the country— BPKIHS in Eastern region, RTC, Pokhara in Western region and Surkhet Regional Hospital in Mid-West region.

**Pakistan**

- In Pakistan, Microscopic network was expanded in 2015 with engagement of more Private sector under new PPM initiative supported by Global Fund. Number of functioning laboratories increased to 1705 including 473 private labs in 2016 compared to 300 in 2015.

- Laboratory Performance indicators in Pakistan:
  
i. Positivity rate among Presumptive TB Cases is showing gradual decline from 17% in 2010 to 13.7% in 2015 as total number of notified cases is improving this decline is assumed as an indicative of improved suspect referral to laboratories.
  
ii. Positivity rate among follow-up examination which is considered more sensitive indicator of quality of smear microscopy is showing gradual increase (3.4%in 2011 to 4.6%in 2016) but still lower than expected

- Quality Assurance Programme of microscopy services in Pakistan: EQA by Blinded rechecking remained corner stone for quality assured microscopy services. 1375 DCs (including 271 DCs of PPM-GF) in 146 districts were covered by EQA by December 2015.

- Efficiency of microscopy services in Pakistan is gradually improving with decline of proportion of false positive and false negative reporting. Decline in false positive error was seen between 2006-2011 but slight increase is seen again in 2012-13. Similarly decline in false negative error was seen 2006 to 2012 but an increase is observed in 2013 from 0.7% in 2012 to 0.9% in 2013, there was decline in both false positive and false negative in 2015 and 2016.

- Gene X-pert scale up continued in 2016 and by the end of 2016, 73 machines were installed across Pakistan. In year 2016, a total of 127,790 X-pert cartridges were used. Among all tested 36,984 were detected positive for MTB and 3331 rifampicin resistant cases were detected.
- NTP Pakistan plans to start LPA in seven DST laboratories. In year 2016 three DST laboratories started LPA first line. In May 2016 LPA-SL and short course treatment regimen was approved by WHO.

**Sri Lanka**

- In Sri Lanka, TB culture and DST facilities are available only at the National Reference Laboratory at Welisara. Regional Laboratory, Kandy and Ratnapura provide culture facilities only. Sputum cultures are being done for smear-negative PTB cases, all re-treatment cases before initiation of anti TB treatment and on presumptive MDR TB cases.

- WHO recommended diagnostic facilities (Gene X pert) are available in Sri Lanka since 2014 in a limited scale and these facilities were expanded to Ratnapura and Kandy Culture laboratories in last quarter of 2016. In 2016, NTRL has conducted 2765 GENE XPERTS tests were carried out.

- Quality assurance of sputum smear microscopy is an important component of the National TB Programme. In Sri Lanka, slides are being sent from all laboratories of District Chest Clinics & NHRD Welisara to the NTRL for EQA. Sputum smears done in microscopy centers of general health institutions are being sent to laboratories at District Chest Clinics for EQA. In addition, samples from 4 private hospitals are received for EQA. In 2016, 22590 slides were checked for EQA and 24(1.73%) false positives and 26(0.12%) false negatives were identified
5. TB/HIV CO-INFECTION IN SAARC REGION

In 2016, the region has 40255 TB Patients with known HIV status, among them 39506 were on Antiretroviral Therapy. India accounts 39815 TB patients with known HIV status, 98% patients were on ART. World Health Organization has recommended following indicators to monitor and evaluate TB –HIV Co infection activities in the member states,

1. **Number of new and relapse TB patients who had an HIV test result recorded in the TB register expressed as a percentage of the number registered during the reporting period.**

Rationale:

HIV infection rates are higher among TB patients than in the general population. Knowledge of HIV status helps promote safe behaviour, reduce HIV transmission, and improve access to appropriate HIV care and support for TB patients, including early ART. All TB patients with undocumented HIV status should be offered an HIV test, preferably at the time of TB diagnosis and within the same settings where they receive TB care. Alternatively, a well functioning referral system should be in place to ensure counselling, testing and feedback of HIV testing data to the referring TB unit.

A high proportion of TB patients with documented HIV status provide a robust estimate of HIV prevalence among TB patients, which can be used for surveillance purposes. Although programmatically it is important that the HIV status of all TB patients including retreatment and re-registered cases is ascertained, this indicator considers only the new and relapse TB patients to avoid double counting. A high indicator value also suggests a high uptake of HIV testing at TB treatment sites or good referral from HIV care sites – both signs that the collaborative TB/HIV activities are working well. But it gives no information on whether patients are aware of their HIV status or have received appropriate pre- or post-test counselling, which are crucial if behavior change is to be achieved and to reduce HIV transmission. Programmes should therefore ensure a quality-assured approach of provider-initiated counselling and testing as defined by UNAIDS and WHO. A low indicator value suggests low uptake of HIV testing and hence late detection of HIV but it provides no indication of where the problem lies.
2. Proportion of registered new and relapse TB patients with documented HIV-positive status

Number of registered new and relapse TB patients who are found to be HIV-positive expressed as a percentage of the number registered with documented HIV status during the reporting period.

**Rationale:**
Measurement of the proportion of HIV-positive TB patients defines a population group eligible for specific interventions aimed at reducing the burden of HIV among TB patients, such as cotrimoxazole preventive therapy and ART, and also provides a denominator for measurement of uptake of these interventions. It also helps in targeting of resources, strategic planning and monitoring the effectiveness of HIV prevention interventions over time. Documented HIV status also influences patient care, for example partner testing, referral to support group, and provision of cotrimoxazole preventive therapy and ART.

This indicator measures the proportion HIV-positive among TB patients with documented HIV test results. The indicator may provide a robust estimate of HIV prevalence among TB patients if high proportions of TB patients undergo testing (80% or more). The information is also useful for targeting resources and planning activities. A high indicator value at sub-national level relative to the national average suggests higher HIV prevalence among TB patients in that area but this interpretation requires careful consideration of testing coverage. This indicator does not capture the small proportion of retreatment TB patients who test HIV positive between their first treatment and re-registration as relapse or re-treatment cases.

3. Proportion of people living with HIV newly enrolled in HIV care with active TB disease

**Definition** Total number of people living with HIV having active TB expressed as a percentage of those who are newly enrolled in HIV care (pre-ART or ART) during the reporting period.

**Rationale:**
The primary aim of intensified TB case finding in HIV care settings and provider-initiated HIV testing and counselling in TB patients is early detection of HIV-associated TB and prompt
provision of ART and TB treatment. Although intensified TB case finding should be implemented among all people living with HIV at each visit to HIV care and treatment facilities, it is particularly important at the time of enrolment in HIV care and treatment, as the risk of undetected TB is higher among newly enrolled patients than among those already on ART. Also, newly enrolled people living with HIV may be less aware about TB symptoms and the importance of early detection and treatment, and hence may not seek care for general or specific TB symptoms. Intensified TB case finding thus offers an opportunity to educate people living with HIV and detect TB early. All people living with HIV thus detected with TB disease should be started on anti-TB treatment immediately and on ART within 8 weeks if they are not yet on ART.

**Strengths and limitations**

Review of the trend of TB among people living with HIV newly enrolled in care over a period of time may provide useful information on TB burden among them and thus the effectiveness of efforts to detect and treat HIV-associated TB early. This indicator may underestimate the actual burden of HIV associated TB as it may exclude patients detected through provider initiated HIV testing and counselling but not enrolled in HIV care or those who have disseminated forms of TB, remain asymptomatic and therefore missed during routine TB screening. Further a high indicator value may mean high TB rates or effective TB screening and HIV testing programmes whereas a low value may be because of poor implementation of TB screening and HIV testing activities or successful TB control efforts. Therefore indicator value needs carefully interpretation.

### 4. Proportion of HIV-positive new and relapse TB patients on ART during TB treatment

**Definition** Number of HIV-positive new and relapse TB patients who receive ART during TB treatment expressed as a percentage of those registered during the reporting period

**Rationale:** HIV-positive TB patients are detected either through intensified TB case finding at HIV care and treatment centres or provider-initiated HIV testing and counselling among TB patients. Prompt TB treatment and early ART are critical for reducing the mortality due to HIV-associated TB and must be the highest-priority activity for both the NACP and NTP. While TB
treatment should be started immediately, ART should be started within 8 weeks of TB diagnosis, given that all are eligible for ART irrespective of their CD4 cell count.

**Strengths and limitations**
This indicator measures the extent to which HIV-positive TB patients are provided with ART during TB treatment. TB and HIV programmes should aim to achieve TB treatment and ART in more than 90% of HIV positive TB patients. However, this indicator may miss patients diagnosed towards the end of reporting period whose ART treatment status may not be updated in the TB registers. Also, this indicator does not capture timeliness of ART initiation.

5. **Proportion of people living with HIV newly enrolled in HIV care started on TB preventive therapy**

**Definition**
Number of patients who are started on treatment for latent TB infection expressed as a percentage of the total number newly enrolled in HIV care during the reporting period

**Rationale:**
All persons in HIV care should be screened for TB at every visit using a clinical algorithm recommended by WHO. Adults and adolescents living with HIV who do not report any one of the symptoms of current cough, fever, weight loss or night sweats are unlikely to have active TB and should be offered TB preventive therapy, that is, treatment for latent TB infection. Similarly, children who do not have poor weight gain, fever or current cough should be offered this therapy to reduce the risk of developing active TB, both in persons on ART and without ART.

**Strengths and limitations**
This indicator measures the coverage of TB preventive therapy among persons newly enrolled in HIV care. However, it lacks the benchmark for acceptable performance. Scale-up of this intervention will assist development of such a benchmark at national level. Also, unless further data are collected this indicator provides no information on the number of individuals who adhere to or complete the course of treatment.

6. **Mortality among HIV-positive new and relapse TB patients**

**Definition** Number of deaths among documented HIV-positive new and relapse TB patients expressed as a percentage of those registered during the reporting period
Rationale Mortality among HIV-positive TB patients is significantly higher than among HIV-negative TB patients. The risk of death is higher if HIV-associated TB is detected late or treatment is delayed. To minimize this risk, close collaboration between the NTP and NACP is necessary for provision of optimal clinical care in the form of early diagnosis and prompt treatment of both HIV and TB.

Strengths and limitations
This indicator measures the extent of HIV-associated deaths among notified TB patients; however, it will be an underestimate of actual mortality as it covers only the patients registered for TB treatment and tested for HIV. It will not measure deaths among TB patients enrolled in HIV care but not registered in the TB register or those not enrolled in any care. Further the deaths occurring among patients re-registered after relapse or treatment default may also be missed.

7. Risk of TB among health care workers relative to the general population, adjusted for age and sex
Definition The relative risk of developing TB disease among health care workers employed in facilities providing care for TB or HIV expressed as a ratio of the TB case notification rate among health care workers to the TB notification rate in the general population during the same period, adjusted for age and sex if appropriate

Rationale Health care workers share the background risk of TB in the population. Additionally, due to involvement in patient care, their exposure to infectious TB is higher than for the general population. If TB infection control measures are effectively implemented in health care facilities, exposure can be minimized and the risk of acquiring TB reduced, and the relative risk of TB disease would be close to 1.

Strengths and limitations
This indicator attempts to measure the adequacy of infection control measures in health care facilities but it should be interpreted carefully, as occupational health records or registration in
NTP records by occupation may be lacking. The data may further be lacking if health care workers prefer TB treatment from non-NTP providers. This may underestimate the overall risk of TB among health care workers. On the other hand, the risk may be overestimated if the probability of health care workers accessing TB screening and diagnostic services from the NTP in a country is high.

**Bangladesh**

TB and HIV/AIDS Co-infection status in Bangladesh are stated below.

<table>
<thead>
<tr>
<th>Table: HIV among Diagnosed TB Patients in 2013-2016 Bangladesh</th>
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<tbody>
<tr>
<td>Category of TB patients</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>New Pulmonary Bacteriologically confirmed</td>
</tr>
<tr>
<td>New Pulmonary clinically diagnosed</td>
</tr>
<tr>
<td>New Extra-Pulmonary</td>
</tr>
<tr>
<td>All re-treatment</td>
</tr>
<tr>
<td>MDR</td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table: TB among PLWHA in 2015-2016 Bangladesh</th>
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</thead>
<tbody>
<tr>
<td># of PLWHA tested TB</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>New Pulmonary bacteriologically confirmed</td>
</tr>
<tr>
<td>New pulmonary clinically diagnosed</td>
</tr>
<tr>
<td>New Extra Pulmonary</td>
</tr>
<tr>
<td>All re-treatment</td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>
**Bhutan**

Although HIV prevalence in Bhutan is relatively low, the programme gives due priority to screening of HIV among TB cases and vice versa.

<table>
<thead>
<tr>
<th>TB/HIV collaboration 2015 in Bhutan</th>
<th>Number</th>
<th>(%)</th>
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<tbody>
<tr>
<td>Patients with known HIV-status who are HIV-positive</td>
<td>6</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>- on antiretroviral therapy</td>
<td>6</td>
<td>100%</td>
</tr>
</tbody>
</table>

**India**

India has the world’s highest burden of tuberculosis (TB) and third largest number of people living with HIV in the world; it also ranks third in the world for HIV-associated TB. While TB is endemic across India, the HIV epidemic is concentrated in six out of 35 states and union territories in the country: Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Manipur and Nagaland. These states have an HIV prevalence of around 1% among pregnant women attending the antenatal clinics.

India’s national AIDS control programme (NACP) and the revised national TB control programme (RNTCP), were established in 1992 and 1993, respectively. Both programmes have been instrumental in impacting the burdens of HIV and TB in India. To address the burden of HIV-associated TB, collaborative TB/HIV activities have been implemented by NACP and RNTCP since 2001. These activities were launched initially in the six high HIV burden states and gradually expanded across the country.

India has a high burden of both tuberculosis (TB) and HIV, and faces a high burden of HIV-associated TB. While TB is endemic, the HIV epidemic is concentrated in a few states. A national response to TB epidemic was initially integrated in the general health system through the revised national TB control programme. India’s revised national TB control programme and national AIDS control programme address the dual burden of TB and HIV through systematic
implementation of collaborative TB/HIV activities across the country. This involved the establishment of a mechanism for regular dialogue between the two national programmes at all administrative levels, adoption of policies and strategies aimed at optimizing use of existing resources and the integration of service delivery into the general health system to improve coverage as well as quality of services.

Table: Contribution of six high HIV prevalence states in detection of HIV associated TB in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Total No. of HIV positive TB patients detected in India</th>
<th>Total No. of HIV positive TB patients detected in six high HIV prevalence states</th>
<th>Proportion of HIV positive TB cases detected in six high prevalence states</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>32637</td>
<td>29884</td>
<td>92%</td>
</tr>
<tr>
<td>2010</td>
<td>42505</td>
<td>36517</td>
<td>86%</td>
</tr>
<tr>
<td>2011</td>
<td>44686</td>
<td>36422</td>
<td>82%</td>
</tr>
<tr>
<td>2012</td>
<td>43990</td>
<td>33566</td>
<td>76%</td>
</tr>
<tr>
<td>2013</td>
<td>44604</td>
<td>33536</td>
<td>75%</td>
</tr>
</tbody>
</table>

Case fatality rate (CFR) among HIV-positive TB patients in India

The case fatality rate (CFR) among the notified HIV positive TB patients in India is about 13%, which is four times higher than that among HIV-negative TB patients (Table ). Key determinants of mortality among HIV-positive TB patients are delayed detection of HIV or TB; delayed enrolment into HIV care; and delays in starting ART. However, in 2008 to 2012 have witnessed a steady decline in CFR, likely due to improved coordination between the two national programmes, improved referral and linkages, and scale-up of testing and ART services, etc.

Table: Trend of case fatality rate among TB/HIV cases in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Total TB/HIV cases</th>
<th>New Number (%) Successfully treated</th>
<th>Number Died (%)</th>
<th>Case fatality rate</th>
</tr>
</thead>
</table>
Implementation of TB/HIV collaborative activities in India started in 2001 with six high HIV prevalence states. Early collaborative activities included joint training of TB and HIV programme staff and cross-referral of patients. The cross-referral included intensified case-finding (ICF) at HIV testing and counselling (HTC) centres and referral to RNTCP designated microscopy centres (DMCs), as well as referral of TB patients at high risk of HIV for HTC. These activities were expanded to eight additional states in 2004, and then nationwide by 2008. Additional TB/HIV activities were incorporated based on evidence generated through operational research commissioned by the NACP and RNTCP. One study demonstrated feasibility of decentralized distribution of co-trimoxazole preventive therapy (CPT) to all HIV positive TB patients using RNTCP service delivery infrastructure. Another study demonstrated feasibility of provider-initiated HIV testing and counselling (PITC) for all TB patients in high HIV prevalence states.

In India, out of total PLHIV attending ART Centre number of PLHIV with presumptive TB tested for TB diagnosis is 55939 (cumulative Till July, 2016) of which 7762 PLHIV were diagnosed with TB. Among these TB diagnosed cases 7424 were put on daily ATT and 171 out of 208 Rifampicin resistant TB cases were put on Cat IV.

**Intensified TB Case Finding (ICF) activities in India**

Under ICF, all ICTC clients are screened by ICTC counselors for presence of TB symptoms at every encounter (pre, post, or follow-up counseling). Clients who have symptoms or signs, irrespective of their HIV status, are referred to RNTCP diagnostic and treatment facility located in the same institution. The cross referrals between NACP and RNTCP have consistently shown
improvement, with 5,33,810 presumptive TB cases identified and referred to RNTCP and
detection of about 36, 318 i.e. 7% TB cases out of which 4, 549 found co-infected with TB/HIV
at ICTC in FY 2016-2017 (till Sep. 2016). In 2016-17 (till July, 2016) there were 9,978 out of
13, 886 Designated Microscopic Centres (DMCs) co located with HIV/TB testing facilities i.e.
70% as per the recommendation of NTCC & NTWG HIV-TB. Rapid diagnostic test i.e.
CBNAAT is used for early diagnosis of TB among PLHIV at ART centres. Linkage of
CBNAAT facility for ICTC clients is planned. For up-scaling of innovative intensified TB case
findings and early diagnosis of TB & Rif resistant TB in India, total 601 CBNAAT are available
nationwide.

**Isoniazid (INH) Preventive Therapy in India**

IPT is a key public health intervention for the prevention of TB among people living with HIV
and has been recommended as part of a comprehensive HIV and recommended as part of a
comprehensive HIV and AIDS care strategy by world health organization (WHO) the joint
Collaborative activities in India (Nov. 2013) and Standards of TB Care in India Operational
Manual for Isoniazid preventive Therapy has been developed in 2016. Training for ART centre
staff Basic Service Division officer & Revised National TB Control Programme (RNTCP) staff
were conducted during 2015 & 2016

In India WHO has conducted a case study for the success of TB/HIV Collaboration activities in
2013. Lessons learned during this study are listed below.

1. Highest level of political and administrative commitment is necessary for successful
implementation of collaborative TB/HIV activities (e.g. the secretary government of India and
state health secretaries who are highest authorities chair TB/HIV coordination committees in
India and they ensure a meeting every quarter).

2. HIV-associated TB affects performance of both NTP and NACP. It is therefore important that
collaborative TB/HIV activities are owned jointly by both the national programmes, (e.g.
NACP and RNTCP in India have included collaborative TB/HIV activities in their respective
national strategic plans since their inception).

3. A joint national policy to govern implementation of collaborative TB/HIV activities is critical
to ensure role clarity for NTP and NACP managers and staff at all levels of health system,
(e.g. adoption of a joint national policy framework for collaborative TB/HIV activities in India).

4. It is important to establish a mechanism for ongoing dialogue between programme managers and staff in order to create an enabling policy environment; plan and allocate resources; review implementation; redress grievances; and take prompt decisions (e.g. TB/HIV coordination committees are established at the national, state and district levels in India and their functioning is meticulously monitoring in India).

5. Mechanisms for technical discussions through data exchange and performance reviews is important for programme improvement and guide policy change (e.g. technical working groups are established at national and state level along with monthly coordination meetings of programme staff at district level in India).

6. Joint supervision and monitoring provides the backbone for successful implementation of collaborative TB/HIV activities (e.g. review of collaborative TB/HIV activities through the international monitoring missions, centrally driven internal evaluations of state and state internal evaluation of districts at regular intervals, as promoted by the NACP and RNTCP in India).

7. The NACP and NTP should allocate resources for coordination of implementation at national, sub national and facility levels (e.g. allocation of resources by RNTCP and NACP to hire nodal persons for coordination of TB/HIV activities at national, state and district levels).

8. It is critical to ensure decentralized availability of HIV and TB testing and treatment services in order to enhance uptake and improve quality. This can be achieved through optimal utilization of existing human resources and integrating service delivery (e.g. facility integrated ICTC, link ART centres and HIV testing through TB microscopy services in India).

9. Strong management information systems under the NACP and NTP which are compatible with each other is important to generate quality programme data and guide policy decisions. Use of web-based data systems facilitates this process (e.g. RNTCP and NACP incorporated collaborative TB/HIV activities both in the paper based system as well as web based systems called Nikshaya and SIMS (strategic information management system)).

10. It is important to monitor implementation of key interventions in addition to basic TB/HIV activities, by adding relevant data variable in HMIS and using additional indicators.(e.g. NACP and RNTCP collected specific data such as co-location of HIV and TB
testing facilities; timeliness of ART initiation, conduct of coordination committee meetings etc. in addition to routine data).

11. Use of simple technology for exchange of information and tracking of referral and feedback should be encouraged. This includes inter alia the use of computer spreadsheets, google docs and customized software to track linkages by NACP in Indian states.

12. Operational research to guide programme policy is a key area for joint work under TB/HIV collaboration (e.g. the NACP and RNTCP undertook joint research to answer programmatic questions such as feasibility of decentralized provision of CPT, feasibility of provider-initiated HIV testing and counselling in TB patients etc.).

**Nepal**
- In Nepal, the NTP should carry out HIV testing on all TB patients, gradually rolling out to the remaining 40 districts currently uncovered and data from all tests should be recorded and reported.
- It is estimated that around 8% of HIV are co-infected with TB and around 1.8% of TB with HIV in Nepal (TB HIV sentinel survey, Nepal, 2016).
- TB HIV sentinel survey, Nepal, 2013 has revealed that 8.5% of HIV was co-infected with TB and around 1.1% of TB with HIV in Nepal. NTP tested around 54% (Increased from 17% to 54%) of all TB in Nepal where 1.3% of them had HIV positive. Of them around 93% were found to be on ART.

**Pakistan**
In Pakistan, TB/HIV Co-infection activities continued at 17 Sentinel sites across the country, 13092 compared to 12238 tested in 2015 and 71 were reported positive in 2016 against 59 in 2015.

**Sri Lanka**
- In Sri Lanka, HIV testing of all TB patients was made mandatory since 2013. In 2016, 7952 (89.5%) TB patients were screened for HIV. Of these patients, 5 patients were found positive. In addition, there were 7 patients with known HIV status at the time of diagnosis of TB contributing to the total of 12 patients with HIV/ TB co-infection in 2016.

**Figure 51: Percentage of TB patients tested for HIV**
Graph shows the screening of HIV among TB patients in Sri Lanka from 2010 to 2016. On the other hand, all newly diagnosed PLHIV and PLHIV with symptoms are referred to NPTCCD for screening to exclude TB. During 2016, 25 PLHIV were diagnosed as having TB. All of them were started on anti-TB treatment. INAH prophylaxis was started on 87 PLHIV during 2016 for latent TB infections in Sri Lanka. (Annual report Sri Lanka 2016 Sri Lanka HIV/AIDS Programme)
6. TB PREVENTION SERVICES

Prevention of new infections of *Mycobacterium tuberculosis* and their progression to tuberculosis (TB) disease is critical to reduce the burden of disease and death caused by TB and to achieve the End TB Strategy targets set for 2030 and 2035. In 2016, WHO developed standard indicators to monitor and evaluate the provision of TB preventive treatment. A total of 910,124 people who were newly enrolled in HIV care were started on TB preventive treatment in 2015 globally. However in SAARC countries TB preventive treatment coverage among HIV positive patients are very low.

Globally in 2015, there were an estimated 1.2 million children aged under 5 years who were household contacts of bacteriologically confirmed pulmonary TB cases and who were eligible for TB preventive treatment. In comparison, only 87,236 children in this age group (7.1%) were reported to have been started on TB preventive treatment in 2015.

There are three major categories of health interventions currently available for TB prevention:

1. Treatment of LTBI – through isoniazid daily for 6 or 9 months, or isoniazid plus rifampicin daily for 3–4 months, or rifampicin daily for 3–4 months or isoniazid plus rifapentine once a week for 3 months with particular attention to children aged under 5 years who are household contacts of TB cases with bacteriologically confirmed pulmonary disease, and people living with HIV
2. Prevention of transmission of *Mycobacterium tuberculosis* through infection control
3. Vaccination of children with the Bacille-Calmette-Guérin (BCG) vaccine
HIV testing for TB patients, provision of CPT and ART to HIV-positive TB patients, and initiation of IPT for people newly enrolled in HIV care, 2014

<table>
<thead>
<tr>
<th>Country</th>
<th>TB patients with known HIV status</th>
<th>HIV-positive TB patients</th>
<th>HIV-positive TB patients started on</th>
<th>HIV-positive people provided with IPT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>10443</td>
<td>32</td>
<td>4</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1110</td>
<td>&lt;1</td>
<td>45</td>
<td>4</td>
</tr>
<tr>
<td>Bhutan</td>
<td>703</td>
<td>55</td>
<td>7</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>India</td>
<td>1034712</td>
<td>61</td>
<td>44171</td>
<td>4</td>
</tr>
<tr>
<td>Maldives</td>
<td>130</td>
<td>99</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nepal</td>
<td>3254</td>
<td>9</td>
<td>369</td>
<td>11</td>
</tr>
<tr>
<td>Pakistan</td>
<td>10715</td>
<td>3</td>
<td>90</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>7418</td>
<td>78</td>
<td>21</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Regional</td>
<td>1068485</td>
<td>-</td>
<td>44707</td>
<td>4</td>
</tr>
</tbody>
</table>

TB infection control

TB infection control is one of the key components of the second pillar of the End TB Strategy and is also one of the collaborative TB/HIV activities that falls under pillar one. If effective TB infection control measures are in place, the relative risk of TB in health-care workers compared with the general adult population should be close to one. The ratio of the TB noti
lication rate among health-care workers to the TB notification rate in the general adult population is a good indicator of the impact of TB infection control in health facilities. In 2015, globally 9977 health-care workers were reported with TB from 67 countries.

**TB vaccination**

BCG vaccination has been shown to prevent disseminated disease; this category includes TB meningitis and miliary TB, which are associated with high mortality in infants and young children. All SAARC Countries currently has a universal BCG vaccination programme.

### BCG Vaccination Coverage –SAARC Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>BCG Coverage (%) (2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>97%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>99%</td>
</tr>
<tr>
<td>Bhutan</td>
<td>100%</td>
</tr>
<tr>
<td>India</td>
<td>87%</td>
</tr>
<tr>
<td>Maldives</td>
<td>100%</td>
</tr>
<tr>
<td>Nepal</td>
<td>87% (2016/17)</td>
</tr>
<tr>
<td>Pakistan</td>
<td>87%</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>99%</td>
</tr>
</tbody>
</table>


**Prevention of TB Nepal**

The intervention which was implemented in 2016/17 for TB prevention are: treatment of LTBI for people living with HIV (PLHIV); infection control; and Bacille-Calmette-Guérin (BCG) vaccine. A total of 2044 PLHIV were started on TB preventive treatment in 2017, based on data from NCASC. Despite progress in providing TB preventive treatment to people living with HIV, much more remains to be done on TB prevention for children under five years of age who are contact of TB cases. IPT for children under five years of age who are contact of TB cases was initiated last year in high burden districts of Nepal and total of 82 children were enrolled in treatment. There is a need to improve initiation, completion reporting of TB preventive treatment for this risk group. BCG vaccination is being provided as part of national childhood
immunization programmes. The coverage of BCG vaccine was 87% in 2015/16. There was one particular risk groups for whom specific efforts to diagnose and treat LTBI were done which was among PLHIV.

**People living with HIV**

There has been a considerable increase in the provision of preventive TB treatment in recent years. As shown in the table below, PLHIV started on preventive treatment has increased from 43 in the year 2014 to 2044 in the year 2017.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of PLHIV enrolled in IPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>43</td>
</tr>
<tr>
<td>2015</td>
<td>1886</td>
</tr>
<tr>
<td>2016</td>
<td>1929</td>
</tr>
<tr>
<td>2017</td>
<td>2044</td>
</tr>
</tbody>
</table>

Most of this progress has occurred following introduction of a four-symptom algorithm for screening for TB among people living with HIV.

**Children contacts under 5 years of age who are household contacts of TB cases**

Children under 5 years of age who are in contact of TB cases are in high risk of developing TB due to low immune system. Even though importance of IPT among children under 5 has always been identified in NTP, IPT was only initiated in the year 2017. Initiation of IPT among children under 5 years old have been highlighted in National Strategic Plan of TB, 2016-21 and NTP has been implementing IPT among children under 5 years old, in 38 high burden districts of Nepal where contact tracing is being done. The total number of children enrolled in IPT was 82.

**TB infection control in Nepal**

The risk of TB transmission is high in health-care and other congregate settings. This puts healthcare workers at greater risk of TB infection and disease, and nosocomial outbreaks of DR TB. TB infection control as part of national infection prevention and control policy, and TB infection programmes at national and sub-national level have been envisioned in NSP-TB
2016/21 as well as several intervention have been planned to achieve it. Currently as a part of infection control, 17 DR treatment centers were provided with exhaust fan, Ultraviolet germicidal irradiation (UVGI), N95 mask and simple surgical mask. Beside this infection prevention sessions are incorporated in all TB related trainings.

**BCG Vaccination**

As per Annual Report by Department of Health Services 2015/16, National Immunization Programme (NIP) is one of the government’s highest priority programmes. It made a large contribution to Nepal’s achievement of Millennium Development Goals (MDG) 4 and 5 by reducing morbidity and mortality among children and mothers from vaccine preventable diseases. Coverage of BCG vaccine has reduced in 2015/16 (87%) compared to previous year (99%).
7. PREVALENCE SURVEYS IN SAARC REGION

As of now SAARC region has conducted national Prevalence surveys in following member states

1. Pakistan 2010/2011
2. Bangladesh 2008 and 2015
3. Nepal-2017

In addition one state of India (Gujarat) has conducted prevalence survey in 2012 and planning national wide survey in 2018.

TB prevalence survey: in Bangladesh-2015

The Government of Bangladesh decided to conduct a national TB prevalence survey in order to acquire a comprehensive understanding of the burden of disease caused by pulmonary mycobacterium tuberculosis, along with ways to improve TB control. The survey has been completed and the preliminary report shows the prevalence of bacteriologically confirmed pulmonary TB cases in Bangladesh among the population aged 15 years and above is 287 (95% CI: 244-330) and the prevalence of smear positive pulmonary TB cases among these population is 113 (95%(1:87-139) per 100000 population. The prevalence was higher among men compared to women, higher in urban compared to rural population. Higher prevalence was also found among older population.

The survey used a cross-sectional design. The sample size was determined by stratified cluster sampling, and was calculated to be 100,000, with a total of 125 clusters, each targeting 800±80 eligible invitees. The sampling units were mouza/village/para in rural areas, and moholla/para in urban areas. In total, the field operations were planned for one year (census and survey examinations).

Each participant was interviewed for TB symptoms and underwent a chest X-ray for screening in the field. Those with a positive screening result- either by interview or X-ray- were requested to provide spot sputum followed by next morning sputum. The two sputum samples were collected and transported to the National TB Reference Laboratory (NTRL) at Mohakhali, Dhaka, while maintaining the cold chain. Direct smear examination with LED fluorescent microscope (FM), Gene Xpert MTB/RIF, and culture by concentrated method in U media were conducted. The chest X-rays were reviewed by a central panel of experts.
India

- The estimates of TB disease burden in India published in the 2011–2015 global TB reports were based on the outcomes of a national consensus workshop held in Delhi in April 2011. Current estimates for India that have been revised substantially upwards compared with those published in 2011–2015, following accumulating evidence that the TB disease burden in India is higher than was estimated at that time. The revised estimates of TB incidence (absolute numbers) are based on extrapolation of the results from a prevalence survey in one state (Gujarat). This survey used methods recommended by WHO and is the largest as well as the only state-wide prevalence survey implemented in India to date. It was assumed that the national prevalence of TB disease is the same as the prevalence in Gujarat, with incidence then estimated using a standard methodological approach recently reviewed by the WHO Global Task Force on TB Impact Measurement.

- Results from a state-wide prevalence survey in Gujarat state in 2011.
  A prevalence survey was conducted in Gujarat. This was the country’s first state-wide survey (other surveys have been conducted in districts that were not nationally representative). Results were shared with WHO in 2015, and indicated a prevalence (adjusted for all ages and all forms of TB) of 390 cases per 100,000 population. This is much higher than the national estimate published by WHO in the 2015 global TB report of 250 prevalent cases per 100,000 population. Gujarat is among the wealthiest states in India, and given the link between overall levels of income and the burden of TB disease it seems unlikely that TB prevalence in Gujarat would be higher than the national average.

Nepal

Prevalence Survey of TB in Nepal, an effort to make the survey digital and paperless
Tuberculosis has been a major health issue in the country like most under-developed nations. The annual TB case notified in the country is around 156 per 100,000 which have been stagnant over a decade, despite many efforts to increase case finding in the country by its National TB
Program. It is estimated that the National TB program is missing to identify and manage nearly 8000-10,000 cases every year which are the potential source for constant spread of infection in the community. Nepal has adopted the Global END TB visions and has developed its program strategies in line with the END TB strategy and aims to reduce the case incidence by 20% in 2021 compared to 2015. But, to do this, the program has also realized that a true burden of TB needs to be identified. Based on its results, the program, can then shift and concentrate its efforts and plan accordingly. This is why Prevalence survey for TB has been planned to be carried out by the program for the first time in Nepal.

Under the leadership of the Government of Nepal and chairmanship of the Health secretary, the protocol for the survey was developed and first draft endorsed in August 2015. This survey will be a cross-sectional survey, with estimated sample population of 57,610 throughout the country. Multistage cluster sampling has been done with PPS model to identify 99 clusters through the country with Hill, Mountain, Terai and Kathmandu valley as the main 4 domains for the study given the unique epidemiological characteristics of TB in these particular domains. There will be around 582 sample population from each cluster. Anyone above 15 years or more in sample areas, who are residing in the area for at least 1 day or more in last 2 weeks and who had been staying in the area for more than 2 weeks in last 1 month, will be eligible for the participating in the survey.

Each survey participants will be screened in the screening camps using two methods; Interview and Chest X-ray. Interview will be based on the symptom screening for TB. Any participants who are either suggestive of having TB symptoms via interview or via chest Xray, their sputum samples will be collected and transported to the central labs for confirmatory diagnosis. Xpert/MTB Rif testing is the main tool for confirmatory diagnosis supported by Culture (only done in 50% of participant’s sample). Any case which is Xpert/MTB Rif positive will be defined as a case for the survey and culture results will be used for extrapolation purpose. The total budget for the survey is around 4.3 million USD. The major technical partner for survey design and quality assurance, data analysis and report write up is Research Institute and technology (RIT) Japan together with WHO for this survey. The total duration of this survey will be around 2 years from the initiation of actual field operation. Dedicated software has been locally developed for this survey making whole data base management paper less from field to the center, increasing efficiency and minimizing data entry errors.
For central Laboratory work, three different labs; International Organization for Migration (IOM) lab in Damak, NATA/GENETUP Kalimati and NTC National reference Labs has been used. The three piloting for the survey has already completed by Feb, 2018 and the actual field operations has initiated by 1st week of March, 2018. The field work for all 99 clusters are expected to be completed by next 14 months and the final results are expected by end of 2019.

Pakistan

Findings of the Prevalence survey conducted in 2010/2011 in Pakistan

- The 4th nationwide TB prevalence survey was conducted between August 2010 and December 2011.

- A nationwide cross-sectional survey with multistage cluster sampling was conducted among adults (>15 years) in 95 clusters in 2010–2011. All consenting participants were screened for cough and by chest X-ray. Participants with presumptive TB submitted two sputum samples for smear microscopy, culture, and molecular testing if needed. The TB prevalence estimates were adjusted for missing data and the cluster design.

- Of 131,329 eligible individuals, 105,913 (81%) participated in the survey, of whom 10,471 (9.9%) were eligible for sputum examination. Survey revealed that 341 bacteriologically positive TB cases of whom 233 had sputum smear-positive TB. The adjusted prevalence estimates for smear and bacteriologically positive TB were 270/100,000 (95% confidence interval (CI) 217–323), and 398/100,000 (95%CI 333–463), respectively. Only 61% of the diagnosed TB cases screened positive on symptoms (cough >2wks), whereas the other TB cases were detected based on X-ray abnormalities. The TB prevalence increased with age and was 1.8 times higher among men than women. The prevalence-to-notification ratio of smear-positive TB was 3.1 (95% CI 2.5–3.7), was higher among men than women, and increased with age.

- In total, 341 TB cases were identified in the survey. Of 207 definite smear-positive TB cases, 49% had cough for more than 2 weeks and X-ray abnormalities suggestive for TB, 39% had no cough but an abnormal chest X-ray image, and 12% had only cough for
more than 2 weeks, but a normal chest X-ray image. Only 7.6% of the 341 participants with bacteriologically positive TB reported to be currently on TB treatment.

- According to the WHO estimated incidence and prevalence rates of all forms of TB were 231 (95% confidence interval (CI), 189–277) and 364 (95%CI, 154–611) per 100,000 population, respectively. These estimates were more or less similar to actual prevalence of Pakistan in 2011.

- Before this survey, the last TB prevalence survey in Pakistan was conducted in 1987–1989.

- Prevalence of bacteriologically positive TB was 1.5 times higher among men than women (p = 0.001) and 1.5 times higher in rural compared to urban areas (p = 0.009); it significantly increased with age and was highest in Sindh province.

- The prevalence of bacteriologically positive TB was 1.5 times higher and the P:N ratio was 1.7 times higher in men than women. A higher prevalence of TB among men has been reported from almost all other countries in the world. This suggests a higher TB burden among men combined with poorer health care seeking behaviour. Possible explanations for the higher TB burden in men are that men generally have more interaction with people outside their own home, are more often smoking, and are more exposed to risk factors during both work and leisure time.

- The TB prevalence increased with age; a similar pattern is also observed in the TB surveillance data of Pakistan. The higher TB prevalence among elderly population may be explained by the recurrence of TB from endogenous reactivation in combination with a weak immune system rather than recent transmission.

- The prevalence of bacteriologically positive TB was higher among rural than urban residents (adjusted prevalence, 471 vs. 309, p<0.0001), while TB is usually thought of as a disease of urbanization [31]. Although this effect is largely explained by the different
age distribution (mean age in rural versus urban areas 35.4 (SD, 23.0) versus 33.6 (17.6) years, p<0.0001), the higher TB prevalence in rural areas is probably also partially the result of longer disease duration, because of limited availability of health services and the longer distances to health facilities in combination with poverty and poor knowledge and awareness about TB.

➢ TB notification in a country is expected to be similar to the TB incidence if there is a well functioning NTP surveillance system and almost all cases are notified. Survey report a P:N ratio of 3.1, and a low proportion of TB cases being currently on TB treatment (7.6%). This suggests significant under-detection and under-reporting of TB in Pakistan. This was also the conclusion of a recent study conducted in 12 districts across Pakistan, which estimated the proportion of cases notified to NTP to be 32% [R].

➢ The P:N ratio was higher among males compared to females, among elderly compared to other age groups, and among the population of Gilgit-Baltistan compared to the population of other provinces, suggesting lower case detection and/or notification in these subpopulations. This suggests that NTP should accelerate its efforts of focusing on these subpopulations to increase TB case detection and/or improve case notification. Another reason for low TB case detection may be that the National guideline prescribes that only clients complaining of cough existing for more than 2 weeks are screened for TB, and this guidance is generally followed in routine settings. This screening algorithm is rather insensitive as shown by survey data: only 61% of the TB cases diagnosed in the survey screened positive on symptoms (cough >2wks), whereas the other cases had sputum examined based on X-ray abnormalities.

➢ The results of this national TB prevalence survey among adults (> 15 years) suggest that the bacteriologically positive TB prevalence is high and TB remains a public health problem in Pakistan. Efforts should be made to increase TB case detection especially among men and elderly, especially in Azad-Jammu and Kashmir, Sindh and Gilgit-Baltistan, and to improve the TB surveillance system so that most TB cases will be
notified to NTP in the future. To achieve this, there is a need to strengthen TB case
detection, including introduction of innovative case finding techniques and strategies, as
well as to enhance TB case detection and notification by involving private providers

Reference: Population Based National Tuberculosis Prevalence Survey
among Adults (>15 Years) in Pakistan, 2010–2011 Ejaz Qadeer1, Razia
Fatima1, Aashifa Yaqoob1, Sabira Tahseen1, Mahboob Ul Haq, Abdul
Ghafoor, Muhammad Asif, Masja Straetemans#, Edine W. Tiemersma

Sri Lanka
Annual risk of tuberculosis infection in Sri Lanka:2009

- A school-based, cross-sectional tuberculin survey of 4352 children aged 10 years
  irrespective of their BCG vaccination or scar status was conducted. The sample was
  selected from urban, rural and estate strata using two-stage cluster sampling technique.

- The prevalence of TB estimated for urban, rural and estate sectors were 13.9%, 2.2% and
  2.3%, respectively. The national estimate of the prevalence of TB was 4.2% (95% CI =
  1.7-7.2%). ARTI for the urban, rural and estate sectors were 1.4%, 0.2% and 0.2%,
  respectively, and the national estimate was 0.4% (95% CI = 0.2-0.7%). The estimated
  annual burden of newly infected or re-infected TB cases with the potential of developing
  into the active disease (400/100 000 population) was nearly 10-fold higher than the
  national new case detection rate (48/100 000 population). They concluded that the
  national estimate of ARTI was lower than that reported in many developing countries.
  However, a relatively high risk was observed in the urban sector as compared with the
  estate and rural sectors. Although still far from the ideal, the relatively lower ARTI at the
  national level may reflect improving socio-economic status, the better and organized
delivery of general healthcare as well as organized TB control activities. Despite this
lower risk, nearly 10-fold low annual new case detection rate relative to the expected
annual burden of newly infected and re-infected cases based on the study is a concern.
Therefore, in the light of findings, the National TB Programme needs to strengthen its
efforts to detect newly infected or re-infected disease load capable of progressing to the
disease. In addition, a fresh approach for a package of control activities in urban areas of
the country is required.(R)

(R) Annual risk of tuberculosis infection in Sri Lanka: a low prevalent country
with a high BCG vaccination coverage in the South-East Asia Region
8. OVERVIEW ON HIV/AIDS IN SAARC REGION

In SAARC region, an estimated number of people on HIV/AIDS has decreased from 2.37 million in the year 2006 to 2.29 million in the year 2016 (figure 52). Likewise, an estimated number of deaths due to AIDS also decreased from 0.08 million in the year 2000 to 0.07 million in the year 2016.

Figure 52: Trend of estimated PLHIV in SAARC Region, 2000-2016

Source: http://aidsinfo.unaids.org/ (data sheet)

Figure 53 shows the trend of estimated adults (15+) living with HIV-by sex, 2000-2016. Male adults (15+) decrease from 1.44 million in the year 2005 to 1.33 million in the year 2016. However female adults (15+) increased from 0.68 million in year 2000 to 0.86 million in the year 2016 in SAARC region.
The overall adult HIV prevalence in SAARC region remains low. However, there are important variations existing between countries. Bangladesh, India, Nepal and Pakistan have reported concentrated epidemics among the key affected populations. The estimated HIV prevalence has decreased from 0.18 % in year 2005 to 0.15 % in year 2016 (figure 54).
Figure 55 shows, the trend of estimated no. of PLHIV on ART and ART Coverage in SAARC Region. Both indicators are in increasing order. Number of people on ART has increased from 0.04 million in year 2010 to 1 million in year 2016 and its coverage also increased from 18% in year 2010 to 46% in year 2016.

**Figure 55: Number of people on ART and ART Coverage (%) in SAARC Region, 2010-2016**

![Graph showing number of people on ART and ART Coverage (%) in SAARC Region, 2010-2016](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>ART Coverage</th>
<th>No. of ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>18</td>
<td>419600</td>
</tr>
<tr>
<td>2011</td>
<td>23</td>
<td>525600</td>
</tr>
<tr>
<td>2012</td>
<td>29</td>
<td>644210</td>
</tr>
<tr>
<td>2013</td>
<td>35</td>
<td>789170</td>
</tr>
<tr>
<td>2014</td>
<td>38</td>
<td>869650</td>
</tr>
<tr>
<td>2015</td>
<td>42</td>
<td>949240</td>
</tr>
<tr>
<td>2016</td>
<td>46</td>
<td>1061720</td>
</tr>
</tbody>
</table>

9. COUNTRY PROFILES FOR HIV/AIDS

AFGHANISTAN

BANGLADESH

BHUTAN

INDIA

MALDIVES

NEPAL

PAKISTAN

SRI LANKA
AFGHANISTAN

The HIV epidemic in Afghanistan is low and on the verge of being concentrated; this means that HIV positives are mainly among key affected populations. The recent Integrated Biological Behavioral Surveillance Survey (IBBS) in 2012 shows an overall 4.4% of HIV prevalence among (People Who Inject Drugs (PWIDs). Prevalence of HIV among general population was 0.1%.

Figure 56 shows the trend of estimated number of PLHIV in Afghanistan from 2000 to 2016. A total 7500 estimated Number of People Living with HIV/AIDS (PLHIV) in the country in 2016. From the year 2000-2006 an estimated newly infected PLHIV were less than 500 and from 2007-2016 less than 1000 cases. Similarly, an estimated number of deaths due to AIDS till 2007 were less than 200, however less than 500 estimated deaths were between the years 2008 to 2016. TB/HIV related deaths among people living with HIV remain less than 100 from year 2000-2016.

Figure 56: Trend of estimated no. of PLHIV (all ages) 2000-2016

![Graph showing the trend of estimated number of PLHIV (all ages) from 2000 to 2016.](source)

Source: [http://aidsinfo.unaids.org](http://aidsinfo.unaids.org) (data sheet)

Figure 57 shows the trend of estimated adult (15+) living with HIV, 2000-2016 The cases has increased from 1800 in 2000 to 7200 in 2016.
Trend of estimated Adults (15+) living with HIV-by sex, 2000-2016 also is in increasing trend. Male adults (15+) increased from 1300 in the year 2000 to 5200 in the year 2016. However female adults (15+) increased from less than 500 in year 2000 to 2100 in the year 2016. (Figure 51)

Source: http://aidsinfo.unaids.org/ (Graph table)
Figure 59 show the cumulative no. of reported PLHIV is also increasing order. The cases have increased from 100 in the year 2004 to 2290 in the year 2016.

**Figure 59: Trend of cumulative no. of reported PLHIV, 2004-2016**

![Cumulative No. of Reported PLHIV](image)

*Source: Presentations by Dr. Sameer, Afghanistan National AIDS Control Program, during SAARC-Regional Meeting on HIV & TB Thimphu Bhutan 29-31 May 2017*

Figure 60 shows, the trend of estimated number of PLHIV on ART and ART Coverage. Both indicators are in increasing order. Number of people on ART has increased from 60 in year 2010 to 560 in year 2016 and its coverage also increased from 1% in year 2010 to 7% in year 2016.

**Figure 60: Trends of estimated no. of people on ART and ART Coverage (%), 2010-2016**

![Estimated ART Coverage](image)


http://aidsinfo.unaids.org (data sheet)*
BANGLADESH

National AIDS Policy and National AIDS committee was formed in 1985 even before the detection of the 1st HIV case in the country in 1989. The 1st comprehensive HIV prevention program was started in the country in the mid 90 by NGOs. Government initiated prevention program in 2004 under health sector program. The Global Fund has been supporting in HIV/AIDS program since 2004. In Bangladesh -61 pediatric cases has diagnosed, among them one case from blood transfusion and remaining 60 cases are vertical transmission.

Bangladesh still a low prevalent country in the region with prevalence of less than 0.1% among the general population and less than 1% among Most at risk population except transgender. Figure 43 shows the trend of estimated PLHIV and New HIV infections from 2000 to 2016.

A total 1400 estimated Number of People Living with HIV/AIDS (PLHIV) & less than 500 estimated new HIV infections in the country in the year 2000 has increased to 12000 no. of PLHIV and 1500 new HIV infections in year 2016. From the year 2000-2006 an estimated deaths due to aids were less than 500 and from 2007-2016 less than 1000 cases. TB/HIV related deaths among people living with HIV remain less than 100 from year 2000-2016. (figure 61)

Figure 61: Trend of estimated no. of PLHIV (all ages) and New HIV infections 2000-2016

Source: http://aidsinfo.unaids.org (data sheet)
Figure 62 shows the trend of estimated adult (15+) living with HIV, 2000-2016. The cases have increased from 1400 in 2000 to 11000 in 2016.

**Figure 62: Trend of estimated adult (15+) living with HIV, 2000-2016**

Source: http://aidsinfo.unaids.org/ (Graph table)

Trend of estimated Adults (15+) living with HIV-by sex, 2000-2016 also is in increasing trend. Male adults (15+) increased from 1100 in the year 2000 to 7500 in the year 2016. However, female adults (15+) increased from less than 500 in year 2000 to 3900 in the year 2016. (Figure 63)

**Figure 63: Trend of estimated Adults (15+) living with HIV-by Sex, 2000-2016**

Source: http://aidsinfo.unaids.org/ (Graph table)
Figure 64 show the cumulative no. of reported PLHIV is also increasing order. The cases have increased from 658 in year 2005 to 4721 in year 2016.

**Figure 64: Trend of cumulative no. of reported PLHIV, 2004-2016**

Source: www.bdnasp.org/home/general/128, Presentation by Dr. Mohammad Rashedul Hassan, Deputy Program Manager, AIDS/STD Programme (ASP), Directorate General of Health Services (DGHS), MoHFW, (11 September, 2017 during Exposure visit on best practice on HIV/AIDS, in Nepal)

Figure 65 show, the trend of estimated no. of PLHIV on ART and ART Coverage. Both indicators are in increasing order. Number of people on ART has increased from 450 in year 2010 to 1800 in year 2016 and its coverage also increased from 5% in year 2010 to 16% in year 2016.

**Figure 65: Trends of estimated no. of people on ART and ART Coverage (%), 2010-2016**

http://aidsinfo.unaids.org (data sheet)
BHUTAN

The first case of HIV was detected in 1993, and the number of cases increased from the year 2000 onwards, with more than 80% of the total cases reported within the last 10 years. The case detection has improved with increasing uptake of HIV counseling and testing services. Less than 500 estimated Number of People Living with HIV/AIDS (PLHIV) in the country in year 2000 has increased to 1100 in year 2016 (figure 66).

Figure 66: Trend of estimated no. of PLHIV (all ages), 2000-2016

![Graph showing trend of estimated number of PLHIV (all ages), 2000-2016.](source)

Source: [http://aidsinfo.unaids.org](http://aidsinfo.unaids.org) (data sheet)

As it was well understood that Bhutan is one of the few countries in South Asia that continue to experience a low adult (15-49 years) HIV prevalence. Figure 67 show the trend of adult HIV prevalence, which has increased from less than 0.1 in the year 2000 to 0.1 in the year 2016.
Since 2006 no less than 25 cases have been detected every year and in the last three years the average yearly detection was 53 cases. Figure 68 show the trend of reported cumulative PLHIV and new HIV/AIDS cases both were increasing order.

Source: Presentation by Mr. Lekey Khandu (BSc, MPH, Program Officer, NACP, Dept Of Public Health, MoH during "SAARC-Regional Meeting on HIV & TB, Thimphu Bhutan, 29-31 May 2017"
Figure 69 show, the trend of estimated number of PLHIV on ART and ART Coverage. Number of people on ART has increased from 56 in year 2010 to 260 in year 2016 and its coverage has decreased from 24% in year 2011 to 21% in year 2014.

**Figure 69: Trends of estimated no. of people on ART and ART Coverage (%)**

2010-2016


http://aidsinfo.unaids.org (data sheet)
INDIA

The estimated number of PLHIV in India has maintained a steady declining trend from 2.3 million in 2006 to 2.1 million in 2016. An estimated 0.3 million new HIV infections in the country in the year 2000 has decreased to 0.1 million in the year 2016. (Figure 70)

**Figure 70: Trend of estimated no. of PLHIV (all ages) and New HIV infections**

![Graph showing trend of estimated number of PLHIV (all ages) and new HIV infections from 2000 to 2016.]

Source: [http://aidsinfo.unaids.org](http://aidsinfo.unaids.org) (data sheet)

Figure 71 show trend of estimated adult (15+) living with HIV has decreased from 2.2 million in the year 2005 to 2.0 million in the year 2016.

**Figure 71: Trend of estimated adult (15+) living with HIV, 2000-2016**

![Graph showing trend of estimated adult living with HIV (15+) from 2000 to 2016.]

Source: [http://aidsinfo.unaids.org](http://aidsinfo.unaids.org) (Graph table)
Figure 72 show the trend of estimated Adults (15+) living with HIV by sex, 2000-2016. Male adults (15+) decreased from 1.4 million in the year 2005 to 1.2 million in the year 2016. However female adults (15+) increased from 0.67 million in years 2000 to 0.8 million in the year 2016.

**Figure 72: Trend of estimated Adults (15+) living with HIV by Sex, 2000-2016**

![Graph showing the trend of estimated Adults (15+) living with HIV by sex, 2000-2016.](Graph table)

According to UNAIDS HIV Estimations 2016, the adult (15-49 years) HIV prevalence at national level continued its steady decline from the estimated level of 0.4% in 2000 to 0.3% in 2016 (Figure 73)
Figure 73: Trend of Estimated Adult HIV Prevalence 2000-2016

Source: http://aidsinfo.unaids.org/ (data sheet)

Figure 74 show from the year 2000-2006 an estimated deaths due to aids were decline from 150 000 in the year 2007 to 62 000 in the year 2016. TB/HIV related deaths among people living with HIV also decline from 98 000 in the year 2003 to 12 000 in the year 2016 (Figure 75).

Figure 74: Trend of estimated AIDS related Deaths, 2000-2016

Source: http://aidsinfo.unaids.org/ (data sheet)
Figure 75: Estimated TB related deaths among PLHIV, 2000-2016

Source: http://aidsinfo.unaids.org/ (data sheet)

Figure 76 shows the trend of estimated number of PLHIV on ART and ART Coverage. Both indicators are in increasing order. Number of people on ART has increased from 412,000 in year 2010 to 1,036,000 in year 2016 and its coverage also increased from 19% in year 2010 to 49% in year 2016.

Figure 76: Trends of estimated no. of people on ART and ART Coverage (%), 2010-2016

Source: http://www.unaids.org/en/regionscountries/countries/India/
http://aidsinfo.unaids.org (data sheet)
Maldives has a low prevalence of HIV, with high risk for potential concentrated epidemic. The first case of HIV in the Maldives was reported in 1991, as end of 2016, cumulative number of HIV cases in the Maldives was 23. Figure 77 shows the trend of estimated no. of PLHIV (all ages) from the year 2000 to 2016. Maldives bears a low burden of HIV; the estimated adult HIV prevalence was <0.1% from the year 2000 to 2016 (Figure 78).

**Figure 77: Trend of estimated no. of PLHIV (all ages), 2000-2016**

[Graph showing trend of estimated number of PLHIV (all ages) from 2000 to 2016]

Source: http://aidsinfo.unaids.org (data sheet)

**Figure 78: Trend of Adult HIV Prevalence, 2000-2016**

[Graph showing trend of adult HIV prevalence from 2000 to 2016]

Source: http://aidsinfo.unaids.org (data sheet)
Figure 79 shows, the trend of reported cumulative PLHIV since 2000 to 2016. The PLHIV cases, has increased continuously increased from 6 cases in the year 2000 to 23 cases in the year 2016.

Figure 79: Trend of Reported cumulative PLHIV, 2000-2016

![Graph showing the trend of reported cumulative PLHIV from 2000 to 2016.](image)

Source: SAARC Epidemiological response on HIV/AIDS & Country Presentation of Maldives during SAARC Regional Training on Management Information for Action (MIFA) for TB and HIV/AIDS Control Programs, 1-5 September 2017

Figure 80 shows, the trend of estimated no. of PLHIV on ART and ART Coverage. Number of people on ART has increased from 2 in year 2010 to 9 in year 2016 and its coverage has decreased from 26% in year 2012 to 19% in year 2013.

Figure 80: Trend of estimated no. of people on ART and ART Coverage (%), 2010-2016

![Graph showing the trend of estimated no. of people on ART and ART Coverage from 2010 to 2016.](image)

NEPAL

The first HIV infection has detected in 1988 in Nepal. Since then HIV epidemic has evolve from low to concentrated among key affected populations (people who inject drugs, female sex worker, clients of female sex worker, Men who have sex with men, Male labor migrants). The estimated number of PLHIV in Nepal has maintained a steady declining trend from 40 000 in 2008 to 32 000 in 2016. An estimated 5300 new HIV infections in the country in the year 2000 has decreased to less than 1000 in the year 2016. (Figure 81)

Figure 81: Trend of estimated no. of PLHIV (all ages) and New HIV infections 2000-2016

Source: http://aidsinfo.unaids.org (data sheet)

Figure 82 show the trend of estimated adult (15+) living with HIV has decreased from 39 000 in the year 2007 to 31 000 in the year 2016.
Figure 82: Trend of estimated adult (15+) living with HIV, 2000-2016

Source: http://aidsinfo.unaids.org/ (Graph table)

Figure 83 show the trend of estimated Adults (15+) living with HIV-by sex, 2000-2016. Male adults (15+) decreased from 27 000 in the year 2006 to 19 000 in the year 2016. However, female adults (15+) increased from 7800 in years 2000 to 12 000 in the year 2016.

Figure 83: Trend of estimated Adults (15+) living with HIV-by Sex, 2000-2016

Source: http://aidsinfo.unaids.org/ (Graph table)

According to UNAIDS HIV Estimations 2016, the adult (15-49 years) HIV prevalence at national level continued its decline from the estimated level of 0.3% in 2008 to 0.2% in 2016 (figure 84).
An estimated death due to aids were decline from 2700 in year 2007 which was the highest and it was continuously decline from the year 2007 to 1700 in the year 2016 (figure 85). TB/HIV related deaths among people living with HIV were less than 100 from the year 2000 to 2016.

**Figure 85: Trend of estimated AIDS related Deaths, 2000-2016**

Source: http://aidsinfo.unaids.org/ (data sheet)

Figure 86 shows, the trend of estimated no. of PLHIV on ART and ART Coverage. Both indicators are in increasing order. Number of people on ART has increased from 4900 in the year 2010 to 13 100 in the year 2016 and its coverage also increased from 13% in year 2010 to 40% in year 2016.
Figure 86: Trends of estimated no. of people on ART and ART Coverage (%), 2010-2016

Source: http://www.unaids.org/en/regionscountries/countries/India/
http://aidsinfo.unaids.org (data sheet)
PAKISTAN

Pakistan’s Federal Ministry of Health initiated a National AIDS Prevention and Control Program (NACP) in 1987. Adult HIV Prevalence was less than 0.1 in year 2016. The estimated number of PLHIV in Pakistan has increased from 2700 in the year 2004 to 130 000 in the year 2016. An estimated 1600 new HIV infections in the country in the year 2000 has increased to 19 000 in the year 2016. (Figure 87)

Figure 87: Trend of estimated no. of PLHIV (all ages) and New HIV infections 2000-2016

Source: http://aidsinfo.unaids.org (data sheet)
Figure 88 show the trend of estimated adult (15+) living with HIV has increased from 1100 in the year 2003 to 130 000 in the year 2016.

**Figure 88: Trend of estimated adult (15+) living with HIV, 2003-2016**

![Graph showing the trend of estimated adult (15+) living with HIV, 2003-2016](http://aidsinfo.unaids.org/ (Graph table))

Figure 89 show the trend of estimated Adults (15+) living with HIV-by sex, 2005-2016. Male adults (15+) increased from 8500 in the year 2005 to 91 000 in the year 2016. However female adults (15+) increased from 3400 in years 2005 to 40 000 in the year 2016.

**Figure 89: Trend of estimated Adults (15+) living with HIV-by Sex, 2005-2016**

![Graph showing the trend of estimated Adults (15+) living with HIV-by sex, 2005-2016](http://aidsinfo.unaids.org/ (Graph table))

Source: http://aidsinfo.unaids.org/ (Graph table)
Figure 90 shows the trend of estimated AIDS related deaths, 2000-2016. The deaths has increased from 1300 in the year 2010 to 5500 in the year 2016. Estimated TB related deaths among PLHIV was also increased from 1800 in the year 2011 to 2100 in the year 2016. (Figure 91)

**Figure 90: Trend of estimated AIDS related Deaths, 2000-2016**

![Graph showing trend of AIDS related deaths, 2000-2016](source)

**Figure 91: Estimated TB related deaths among PLHIV, 2000-2016**

![Graph showing trend of TB related deaths among PLHIV, 2000-2016](source)

Figure 92 show, the trend of estimated no. of PLHIV on ART and ART Coverage. Both indicators are in increasing order. Number of people on ART has increased from 1900 in year
2010 to 8900 in year 2016 and its coverage also increased from 3% in year 2010 to 7% in year 2016.

**Figure 92: Trends of estimated no. of people on ART and ART Coverage (%), 2010-2016**

Source: http://www.unaids.org/en/regionscountries/countries/India/

http://aidsinfo.unaids.org (data sheet)
SRI LANKA

Sri Lanka has been categorized as a country with a low level HIV epidemic. The term ‘low-level epidemic’ is used for epidemics where HIV prevalence remains less than 1% in the general population and below 5% in any key population. In such a scenario, HIV case reporting and monitoring of HIV programmatic data plays a vital role in understanding the HIV epidemic in the country.

The estimated number of PLHIV in Sri Lanka has increased from 1000 in the year 2006 to 4000 in the year 2016. Estimated new HIV infections in the country were less than 100 to less than 1000 from the year 2000 to 2016. (Figure 93)

**Figure 93: Trend of estimated no. of PLHIV (all ages) and New HIV infections 2000-2016**

Source: http://aidsinfo.unaids.org (data sheet)
Figure 94 shows the trend of estimated adult (15+) living with HIV has increased from 1000 in the year 2005 to 4000 in the year 2016.

Figure 94: Trend of estimated adult (15+) living with HIV, 2000-2016

![Graph showing the trend of estimated adult (15+) living with HIV, 2000-2016](http://aidsinfo.unaids.org/)

Source: http://aidsinfo.unaids.org/ (Graph table)

Figure 95 shows trend of estimated Adults (15+) living with HIV-by sex, 2000-2016. Male adults (15+) increased from 1200 in the year 2009 to 3100 in the year 2016. However female adults (15+) PLHIV lies between less than 200 to less than 1000.

Figure 95: Trend of estimated Adults (15+) living with HIV-by Sex, 2000-2016

![Graph showing the trend of estimated Adults (15+) living with HIV-by sex, 2000-2016](http://aidsinfo.unaids.org/)

Source: http://aidsinfo.unaids.org/ (Graph table)
Figure 96 shows the trend of estimated AIDS related deaths, 2000-2016. The estimated AIDS related deaths lie between less than 100 to less than 200.

Figure 96: Trend of estimated AIDS related Deaths, 2000-2016

Source: http://aidsinfo.unaids.org/ (data sheet)

Figure 97 shows the trend of reported HIV cases by sex during last 10 years. Although the percent increase in number of HIV cases reported is nearly 110% over last 10 years, this increase is mainly due to increase among males. The percentage increase among males is 190% whereas number of females has increased only by 13% during this period. In addition to increase in new HIV infections, increase in testing facilities and better reporting have contributed to this trend.
Figure 97: Trend of reported HIV cases by sex 2007-2006

![Chart showing trend of reported HIV cases by sex from 2007 to 2016.](chart)


Figure 98 shows age categories of reported HIV cases during the last ten years. Consistently the majority have been between 25-34 and 35-49 age categories. Cases in the age category 0-14 are due to mother to child transmission. There were only 2 such cases reported during 2016. The number in 15-24 age category showed a decline during 2016 (20 cases).

Figure 98: Trend of age categories of reported HIV cases, 2004-2016

![Chart showing trend of age categories of reported HIV cases from 2004 to 2016.](chart)


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According to figure given below, the proportion of male to male HIV transmission is gradually increasing. Nearly 50% of all males reported with HIV gave a history of male to male sexual contacts. Most of these men are married, thus causing added implications on spousal transmission and mother to child transmission of HIV.

**Figure 99: Probable modes of HIV transmission of reported HIV cases 2012-2016**

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Figure 100: Percentage of male to male transmission among reported male HIV cases, 2007-2016


The figure 101 illustrates the number of CD4 and viral load tests carried out by the NLR from 2011 – 2016.

Figure 101: HIV testing at NRL, 2011-2016

Figure 102 shows, the trend of estimated no. of PLHIV on ART and ART Coverage. Both indicators are in increasing order. Number of people on ART has increased from 270 in year 2010 to 1100 in year 2016 and its coverage also increased from 15% in year 2010 to 27% in year 2016.

**Figure 102: Trends of estimated no. of people on ART and ART Coverage (%), 2010-2016**

Source: http://www.unaids.org/en/regionscountries/countries/India/
http://aidsinfo.unaids.org (data sheet)