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TUBERCULOSIS: A REVIEW ARTICLE ON PAST AND CURRENT SCENARIO WITH STRATEGIES

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ABSTRACT

Tuberculosis (TB) is communicable disease that is the major public health concern worldwide. It caused by the organism Mycobacterium tuberculosis through airborne droplets. WHO report delineate it as an epidemic, according to report it become major cause of death comprehensively and "the foremost cause of death from a single infectious envoy" It is spread through persons who are sick with TB expel bacteria into the air; for example, by coughing, sneezing etc. it can affect any organ in the body. Forecasts morbidity and impermanence of tuberculosis for the decade of 1990-99, new cases were estimated as 88 million of tuberculosis in which 8 million of 88 will be attributed to HIV infection. It more common to increases with coming year 10.2 (163 per 100 000) occurs in the year of 2000. In the end of the year of 1998, the WHO DOTS strategy were adopted and reported by 119 countries for controlling TB disease, they include all high burden countries (numbering 22 last year), despite a regular, although slow, decline in incidence over the last decade, as many as 8.6 million new cases and 1.3 million deaths were evaluate to have transpire in 2012. In the early year TB case discernment especially in resource-constrained settings and in marginalized groups remains a summons, and according the estimation about 3 million people are endure undiagnosed or not apprise and remain untreated. The global TB strategy has recently launched by WHO for "ending the comprehensively TB epidemic" by 2030. There are three foremost pillars of this strategy that emphasize patient-centered TB protection and prevention, supportive system and bold policies, and escalate research and innovation. This paper aims or vision is to provide a short and concise overview of this globally TB challenges and summarize the WHO reports on TB yearly bases, and also highlighted some of strategies for eliminating public health concern.

INTRODUCTION

Tuberculosis (TB) is an airborne bacterial infection which is caused by the organism called *Mycobacterium tuberculosis* that essentially affects the lungs, though it can affect any organs in the body. It unfurl person to person when infected one cough or sneezes out the bacteria, it escalate through the air to be breathed in by others. Not everyone infected with tuberculosis bacteria become sick. For this there are two situations exist: latent TB infection (LTBI) and TB disease. It became fetal when it's treated properly.

Past Scenario of (1980-2012)

TB or consumption was a major cause of death in past years around the world, however in the 1980 the integer of TB cause started to increase again. WHO report it as an epidemic, according to report it become major cause of death universally and "the leading cause of death from a solitary infectious agent". Forecasts morbidity and mortality of tuberculosis for the decade of 1990-99, new cases were estimated as 88 million of tuberculosis in which 8 million will be attributed to HIV infection

(because its easily grown or multiplied with HIV suffered persons), will occur in the world during the decade; the predicted value of died persons in that period were 30 million due to tuberculosis in the same period, including around 2.9 million attributed to HIV infection. In 1990 7.5 million (143 cases per 100 000) to 8.8 million (152 per 100 000) in 1995 new cases of tuberculosis occurs beyond prediction each year. It more common to increases with coming year 10.2 (163 per 100 000) occurs in the year of 2000. 2.5 million Individuals were estimated to have expired of tuberculosis disease in the year of 1990, also 3.0 million in 1995 and 3.5 in 2000 tuberculosis deaths predicted at the same extent of availability of treatment. Demographic element, such as population widening and changes in the age anatomy of populations will become increasing the predicted narration 79.5% of new cases.

Latent TB Infection	TB Disease
• TB bacteria can live in the body without producing sick. • It depend on immune system, the TB bacteria persist inactive for lifetime without spawn disease the body is able to fight the bacteria. • Features: ✓ Has no symptoms ✓ Does not feel sick ✓ Cannot spread TB bacteria to others ✓ Usually has a skin test or blood test result stipulated TB infection ✓ Has a normal chest x-ray and a negative sputum smear ✓ Requires treatment for latent TB infection to prevent TB disease	• This is the active form of TB bacteria that human body can't stop its multiplying process (growing) that cause TB disease. • Has symptoms that may include ✓ A substandard cough that lasts 3 weeks or longer ✓ Pain in the chest ✓ Coughing up blood or sputum ✓ Weakness or fatigue ✓ Weight loss ✓ No appetite ✓ Chills ✓ Fever ✓ Sweating at night • Usually discern sick • May outspread TB bacteria to others • Usually has a skin test or blood test result stipulated TB infection • May have an abnormal chest x-ray, or positive sputum smear or culture • Requires treatment to treat TB disease

The age-specific incidence rates are anticipated to plummet during 1990-2000 in the Western Pacific and Eastern Mediterranean Regions because of the effects of intervention strategies, but because of the decade of population growth the number of new instances will continue increases. WHO report introduce strategies for TB control, for this particular progress in implementing the WHO DOTS strategies (Target of World Health Assembly to ratify the global TB control): (1). to manage successfully 85% of detected smear-positive TB instances, and (2). to descry 70% of all such instances. Since in the year of 2000 these targets were not reached by the end of 2005 year the target has been re-set. According the report of WHO in 1995 global monitoring and estimation process carried out through Global Monitoring and Surveillance Project which described as:

- WHO were notified in the 1998 report 45% of all evaluated tuberculosis cases, and 40 % of smear-positive cases.
- In the end of the year of 1998, the WHO DOTS strategy were adopted and reported by 119 countries for controlling TB disease, they include all high burden countries (numbering 22 last year).
- Global population had access to DOTS around 43%.
- In 1998 22% of estimated smear-cases were delineate under DOTS strategy, an addition 220 000 smear-positive cases were outlined by DOTS programmes in 1998, compared with 1997.
- In 1997 under DOTS programmes the average treatment success rate was 78%, and 82% in high burden countries.
- In china, South Africa, India, Bangladesh and the Philippines were detected biggest improvement in

such cases, however in Indonesia, Pakistan, Russia and Uganda countries failing to make significant progress.

- The two high-burden countries Peru and Viet Nam ere only to have met the WHO targets for case discernment and cure.

In all reports data since 1994-2001 were compared the figures and results imply that much more effort will be needed if DOTS programmes, collectively, are to reach global targets by 2005. Ten consecutive year's data (1994-2003) to access progression towards the Millennium Development Goals (MDGs) are now available for TB control. Since 2005, to dig-out 70% of new smear-positive cases and successfully manage 85% of these cases; 2015, to have halted and begun to reverse incidence; between 1990 and 2015, to halve TB pervasiveness and deaths rates, these five MDG targets directly relevant to TB control target. The population of TB globally were estimated 9.4 million new cases equivalents to 136 cases per 100,000 in 2008. About 3.6 million cases for woman account that indicates in provisional estimation. The worldwide TB cases of 35% estimated for an alone on account of China and India. In 2008 there were estimated 11.1 million prevalent cases equivalents to 168 cases per 100,000 populations. TB situation globally aggravate TB-HIV co-infection and drug resistant tuberculosis.

HIV infection is the most potent risk factor for evolving active TB disease from a latent TB infection; however TB is a foremost cause of death in HIV infected persons. In 2008 9.4 million incident and 1.4 million (15%) were estimated HIV positive. In 2008 an estimated 1.8 million people died of TB, in which about 0.5 million patients related with TB/HIV co-infection. According to WHO report 2010 India is 17th among 22 high burden countries in terms of TB incidence rate. In 2009 the "National framework of joint TB/HIV collaborative activities" was raised which established uniform activities at art centers and ICTCs nationwide for intensified TB cases finding and reporting, and raised reporting formats and mechanisms better monitoring and evaluation jointly by the two programmes with a new monitoring framework. The aim is to scale up intensified TB-HIV package in the entire country by 2012. There are some Central TB Division Activities also initiate in the year of 2011 which are following:

- The ninth National Task Force Meeting for the involvement of medical colleges in RNTCP, for the year 2010, was held from 18th to 20th January 2011 in Hyderabad.
- The 19th National Laboratory Committee Meeting under RNTCP was held on 19th January 2011 in Hyderabad.
- A preliminary workshop for discussions on the results of the ARTI and the prevalence surveys undertaken in the country and to arrive at estimates for TB prevalence and incidence was held at LRS Institute, New Delhi on 5th-6th April 2011.
- The meeting of National Technical Working Group on HIV/TB Collaborative Activities was held at New Delhi, on 21st April 2011.
- The 'TB Epidemiology Course' was held at LRS Institute, New Delhi from 25th April 2011 to 13th May 2011 wherein the STOs, DTOs, STDC Director, RNTCP Consultants etc… had participated.
- Central Internal Evaluation of the programme performance and implementation status was held in the state of Megahalaya from 25th to 29th April 2011. The districts of East Khasi Hills and Ri Bhoi and the state level activities were evaluated.
- The Biannual National Review Meeting of State Tuberculosis Officers and RNTCP Consultants was held from 18th to 20th May 2011 in Surajkund, Delhi NCR with the theme of 'National scale up of DOTS plus (PMDT) services under RNTCP in India' and the objectives of 'To review the performance and quality of RNTCP services; To review the progress and challenges in the expansion of DOTS Plus (PMDT) services in the country and To update the STOs and Consultants on newer initiatives, policy changes etc…'
- The Joint Donor Review Mission was conducted from 31st May to 9th June 2011 coordinated by the Central TB Division (CTD) of the Ministry of Health and Family Welfare (MOHFW) and the World Bank, and included the following development partners: WHO, the Global Fund, DFID, USAID, the Bill and Melinda Gates Foundation and the Clinton Foundation.

  The major objective of the Review Mission was to provide feedback on the "National Strategic Plan for TB Control in India, 2012-2017.", with a focus on the important challenges to achieving the new more ambitious objectives of RNTCP and also to follow-up on the findings and recommendations of previous missions. from 459 per hundred thousand population in 1990 to 256per hundred thousand population by the year 2010 as per the WHO Global TB Report, 2011. The studies on ARTI, suggests estimated

decline in the annual risk of infection was estimated at 3.7% per year. 9

- The Zonal Task Force Workshop for involvement of Medical Colleges in RNTCP for the medical colleges of four zones - East, South, North and West were held during July to September 2011.
- Fourteen states were reviewed for their performance in RNTCP on a one to one basis along with their activity plans to improve programme performance in the respective states during July-September 2011.
- Workshop on TB disease burden estimation for India, 2010 was organized by Central TB Division at LRS Institute of TB and Respiratory Diseases, New Delhi, from 7thJuly 2011 to 8th July 2011.
- Central Internal Evaluation of the programme performance and implementation status was held in the state of Tamil Nadu from 13th July to 18th July 2011. The districts of Kanchipuram and Tiruchirapalli and the state level activities were evaluated.
- The 20th National Laboratory Committee Meeting under RNTCP was held on 13th July 2011 in Hyderabad.
- The 7th meeting of the National DOTS Plus Committee was held on 11th - 12th July 2011 at the LRS Institute, New Delhi.
- The status of DOTS Plus services for Multi-Drug Resistant TB was reviewed in Guwahati in July 2011 for all the North-Eastern states.
- The National Co-ordination Committee meeting for reviewing Global Fund Round 9 projects in Tuberculosis in India was held on 22nd and 23rd July 2011.
- Regional ACSM workshop for the state and district level RNTCP staff was held from 8th to 10th September 2011.
- The 'Leadership and Management Course' for STOs, Deputy STOs and DTOs involved in management of RNTCP was held from 5th to 9th September 2011 at LRS Institute, New Delhi
- Central Internal Evaluation of the programme performance and implementation status was held in the state of Goa from 21st September to 24th September 2011. The districts of North and South Goa along with the state level activities were evaluated.
- The meeting of Independent Expert Committee for Review of Estimation of TB Burden was held on 16th September 2011 at New Delhi.
- The training of trainers in Intensified TB-HIV package for the four UTs of Puducherry, Andaman & Nicobar Islands, Dadar & Nagar Haveli and Daman & Diu was held on 3rd to 4th October 2011.
- National Stakeholders Meeting for Tuberculosis and Diabetes Mellitus Collaborative activities was held on 11th& 12th October 2011 at Delhi which was attended by Programme Officials from RNTCP & the Non-Communicable Disease Control Programme and State TB Officers.
- The Biannual National State TB Officers and RNTCP Consultants Review Meeting was held from 3rd to 4th November 2011 and the RNTCP Consultants National Review Meeting was held from 31st October 2011 to 2nd November 2011 at Hotel Emporio Resorts, Dwarka, and New Delhi.
  The theme for the meeting was 'Quality services for universal access under RNTCP' and the objectives were 'To review the performance and quality of RNTCP services (DOTS, DOTS-Plus, TB-HIV, PPM, ACSM); To prepare focused action plan for underperforming areas and To update the STOs and Consultants on newer initiatives, policy changes.
- The review meeting for all the states implementing DOTS-Plus services for Multi-Drug Resistant TB patients was held on 17th-18th November 2011 at Pune, Maharashtra.
- The National Advocacy Communication and Social Mobilization (ACSM) Workshop for strengthening ACSM activities in the programme was held from 21st to 23rd November 2011 at New Delhi. The workshop involved all the State TB Officers, State IEC Officers, State RNTCP Consultants and other stakeholders as 6 TB INDIA 2012 Revised National TB Control Programme: ANNUAL STATUS REPORT participants.
- An 'Intermediate Reference Laboratories Experience Sharing Workshop' was held on 1st and 2nd December 2011 for State TB Officers, Microbiologists and RNTCP Consultants. Meeting of Human Resource Development Technical Working Group to finalize protocol for study on the Human Resource aspect for Health and TB management Integration was held on 1st December 2011.
- The tenth National Task Force Meeting for the involvement of medical colleges in RNTCP, for the year 2011, was held on 21st& 22nd December 2011.
- The National Technical Working Group for TB-HIV collaborative activities was held on 23rd December 2011.
- The National Standing Committee for Operational Research in RNTCP was held at LRS Institute, New Delhi on 22nd Dec 2011.

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Current Scenario of (2012-2017)

The 12th five year plan of The Revised National TB Control Programme (RNTCP) has implement the National Strategic Plan during 2012-2017 with following objectives and visions: "TB free India Goal": For quality TB diagnosis & treatment for all pulmonary and extra pulmonary TB patients including drug resistant and HIV associate TB initiate the Universal Access. Objectives: are following-

- To achieve 90% notification rate for all types of TB instances
- To achieve 90% success rate for all new and 85% for re-manage instances
- To significantly improve the successful outcomes of management of Drug Resistant TB
- To achieve decreased morbidity and mortality of HIV associated TB
- To improve outcomes of TB care in the private sector

A wide cross section of the stakeholders and experts was prepared the "National Strategic Plan (2012-2017) through a consultative process in the programme. For development of this plan more than 150 experts from various disciplines and organizations were involved. For development National Strategic Plan the innovation and consensus were the highlights of the process adapted for this plan. Strategic vision to proceed towards universal access: "TB-free India" is the vision of the Government of India, with pruning of the burden of disease until it is no longer a major public health muddle. Universal access for quality diagnosis and management for all TB patients in the community the programme has now adopted the new objectives to achieving this vision.

- Improving and strengthening the quality of basic DOTs services
- under NHRM it further strengthen and align with health system
- rapid diagnosis deploying improved at the field level
- expend efforts to engage all cares providers
- strengthen urban TB control
- for drug resistant TB expend diagnosis and treatment
- improve outreach and communication
- implementation of improved tools and strategies and promote research for development

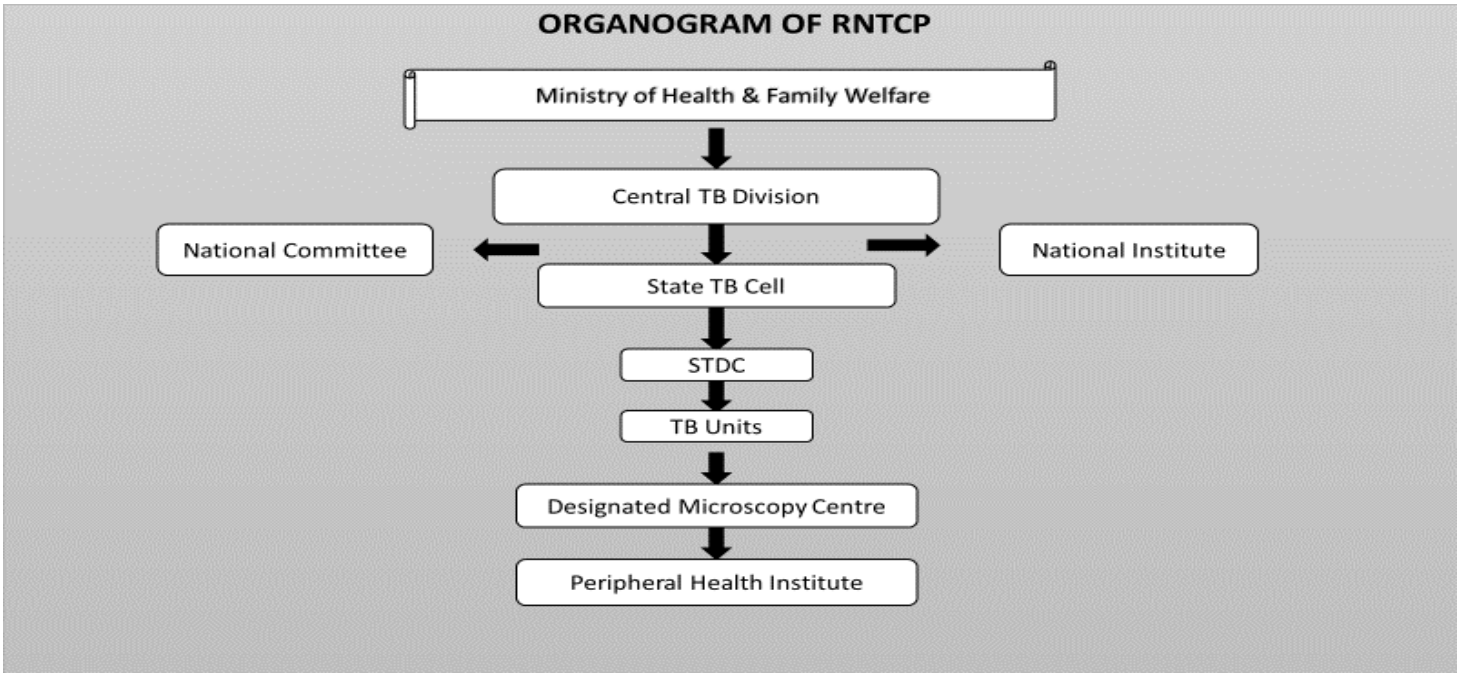
After this programme RNTCP promoting the OR (Operational Research) in that several strategies and questions are made but over years, RNTCP has made progress in not promoting research in TB control but has also created environment to support the research initiatives by collaborating and use the scientific evidence created for policy changes. The examples of these research studies under RNTCP in India that led to impact the programme policy, these are following examples:

Current strategies or towards 2020 milestone of the end of the TB strategies

Most of WHO regions and many high TB burden countries are not on track to reach the 2020 milestones of the end TB strategies currently, as a whole world. The average rate globally decline in the TB incidence rate was 1.6% per year in the 2000-2018, and in 2017-2018 it is 2.0%. in 2015 and 2018 the cumulative reduction was only 6.3%, considerably 20% reduction between 2015 and 2020 in the short of the end TB strategy milestone. In between of 2015 and 2018 the global reduction in the total number of TB deaths was 11%, also less than one third of the way towards the end strategy milestone of a 35% reduction by 2020.

The global treatment success rate of 85% in the latest treatment outcome data for new cases of TB in 2017, and in 2016 it increase from 81%. This improvement was mainly due to progress in India. The National facility-based survey completed by 14 countries (including seven high burden countries) from 2016 to 2019, of costs faced by TB patients and their households. Catastrophic ranged from 27% to 83% best estimates of percentage facing total costs that were all forms of TB, and from 67% to 100% for drug-resistant TB. Service delivery and social protection that will reduce these costs, these survey results are being used to inform approaches to financing. In 2019-2020 further 37 surveys are underway or planned. UN high-level meeting target of treating 40 million people for TB diagnosis and treatment achieving with between 2018 and 2020 requires about 7 million people treating in 2018 and about 8 million people in subsequent years. This targets were built on the WHO Flagship initiative "Find. Treat. All. #End TB".

STUDY TITLE	IMPACT	REFERENCE
Characteristics and programme-defined treatment outcomes among childhood tuberculosis (TB) patients under the national TB programme in Delhi.	This operations research study was conducted by Central TB Division. The study showed that the RNTCP strategy of treating children using pediatric patient wise boxes is effective in achieving programme defined treatment success rate.	Plos One (2010) 5:e1333810.1371/journal.pone.0013338 [doi].
Tuberculosis 'retreatment others': profile and treatment outcomes in the state of Andhra Pradesh, India.	In response to the raising notification rates of retreatment TB cases across the country, particularly that of the 'retreatment others', this operations research study was conducted by Central TB Division in co-ordination with the State TB Cell of Andhra Pradesh. The notification of 'Retreatment others'. 'Retreatment others' were predominantly sputum smear-negative TB, with significantly better treatment outcomes than among smear-positive retreatment patients.	INT J TUBERC LUNG DIS (2011) 15(1):105-109
Will Adoption of the 2010 WHO ART Guidelines for HIV Infected TB Patients Increase the Demand for ART Services in India?	This operations research study was undertaken from Central TB Division, to understand the resource implications of adopting the 2010 WHO ART guidelines. This study showed that in Karnataka, India, about nine out of ten HIVinfected TB patients were eligible for ART according to 2006 WHO ART guidelines. The efficiency of HIV case finding, ART evaluation, and ART initiation was relatively high, with 78% of eligible HIV-infected patients actually initiated on ART, and 80% within 8 weeks of diagnosis. This study recommended that ART could be extended to all HIV infected TB patients irrespective of CD4 count with relatively little additional burden on the national ART programme.	Plos ONE (2011) 6(9):e24297. Doi: 10.1371/journal.pone.0024297
Source of Previous Treatment for Re-Treatment TB Cases Registered under the National TB Control Programme, India, 2010.	This operations research study was conducted by Central TB Division, to understand the implications of rising numbers of re-treatment tuberculosis cases across the country. The study showed that nearly half of the re-treatment cases registered with the national programme were most recently treated outside the programme setting. Enhanced efforts towards extending treatment support and supervision to patients treated by private sector treatment providers are needed to improve the quality of treatment and reduce the numbers of patients with recurrent disease. In addition, the study recommended that reasons for the large number of recurrent TB cases from those already treated by the national programme require urgent detailed investigation.	PLoS One (2011) 6:e22061.10.1371/journal.pone.0022061 [doi]; PONE-D-11-07281 [pii].



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CONCLUSION

The End TB strategy milestones for 2020 and 2025 within the context of progress towards universal health coverage (UHC), can only achieved if TB diagnosis, treatment and prevention services provided, and if there is multisectoral action to address the broader determinants that influence TB epidemic and their socioeconomic impact. The vision and meaning of UHC that everyone can obtain the health services whenever they need without suffering financial hardship. The two indicators to monitor are a UHC service coverage index (SCI), and the percentage of the population experiencing household expenditures on health care that are large in relation to household expenditures or income that is the target of SDG 3.8 is to achieve UHC by 2030. Without the intensified research and development the SDG and End TB strategy targets set for 2030 cannot be achieved. The annual decline in the global TB incidence rate can be accelerated to an average of 17% per year, so those technological breakthroughs are needed by 2050. Priorities include a vaccine or new drug treatment to cut the risk of TB disease and a vaccine to lower the risk of infection in the 1.7% billion people already latently infected, at the point of care rapid diagnostics use, shorten drug regimens for testing TB disease. In terms of the number of test the diagnostic pipeline appears robust, but no new technology emerged in 2019. There were 23 drugs, from various combination regimens and about 14 vaccine candidates in clinical trials, as of August 2019. Recently, the M72/AS01$_E$ vaccine candidate was found to be protective against TB disease in a Phase IIb trial among individuals with evidence of latent TB infection. This vaccine could transform global TB prevention efforts, if the findings are confirmed in a phase III trial. The latest data published by Treatment Action Group showed funding of US$ 772 million for TB research and development in 2017, much less than the target of at least US$ 2 billion per year set at the UN high-level meeting on TB. Progress towards End TB Strategy milestones for 2020 and the four global targets set in the political declaration at the UN high-level meeting on TB: latest status **(**End of 2018 except for funding for TB prevention and care (2019) and funding for TB research (2017).

MILESTONE AND TARGET

TB Incidence	**20% reduction by 2020 (compared with 2015)**
TB Deaths	**35% reduction by 2020 (compared with 2015)**
TB patients not facing catastrophic costs	**100% of TB patients by 2020**
TB treatment	**40 million people, 2018–2022**
TB preventive treatment	**At least 30 million people, 2018–2022**
Funding for TB prevention and care	**US$ 13 billion annually by 2022**
Funding for TB research	**US$ 2 billion annually, 2018–2022**

"Ending the global TB epidemic" by 2030 all leaders of UN member states have committed, backed up by concrete milestones and targets. Progress is being made. Reduction in TB instances and deaths is the global indication, increased financing are moving in the right direction and improved access to TB prevention and care. Seven high burden countries and one WHO region are on track to reach 2020 milestones for reductions in TB instances and deaths. Nonetheless, the pace of Progress worldwide and in most regions and countries is not yet fast enough. Annual financing for TB prevention and care for TB research needs to approximately double in the next 3 years, need to expand the access to TB care and prevention treatment, substantial costs faced by TB patients and their households must be mitigated and multi sectoral action on the boarder determinants of the TB epidemic needs to intensify. The UN Secretary-General's report to the General Assembly in 2020, to be prepared with WHO support, will provide the next opportunity to assess progress towards agreed TB targets and milestones. The UN Secretary-General's report to the General Assembly in 2020, to be prepared with WHO support, will provide the next opportunity to

assess progress towards agreed TB targets and milestones.

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