अखिल भारतीय आयुर्वेद संस्थान
ALL INDIA INSTITUTE OF AYURVEDA

(आयुष मंत्रालय, भारत सरकार के अंतर्गत स्वायत्त संस्थान)

(An Autonomous Organization under the Ministry of Ayush, Govt. of India)

"End LTB Campaign-2025"

"टी.बी. से जंग जीतेंगे हम आयुर्वेद के संग"

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About the Lecture [PowerPoint Presentation]

The Power point Presentation can be download from *www.aiia.gov.in* and *www.ayush.gov.in

***The Power point presentation is a brief concept note and the lecture material maybe referred to keep the uniformity in lectures**

***The Power point presentation maybe translated into regional language as per the need**

***These lectures do not contradict to the National TB guidelines framed time to time by the Government**

*** These lectures do not intend to comment on other Medical systems**

The medicines mentioned may be taken under supervision of authentic Ayurveda *Vaidya

***Each Ayurveda graduate are expected to conduct minimum *05* public lectures on the provided theme and *100* screening through provided screening proforma and report back to their respective authorities and get the feedback of the community**

Background

Honorable Prime Minister pledges for TB Mukta Bharata by 2025. Government of India, under the aegis of National Inter-Ministerial Task Force on Tuberculosis initiates an integrative and collective approach to eliminate TB in India. In the 149th report of the DRPSC on Health and Family Welfare emphasize the pivotal role of Ayush system of medicine in supporting, educating, guiding and referring TB patients for diagnosis and treatment, especially in remote areas. The committee accepts that Ayurvedic professional can play a critical role in counseling the patients regarding nutrition and preventive care as well as importance of treatment adherence to complete the course of treatment, regular monitoring and post treatment recovery. MoA is well determined and completely dedicated to offer the extent of its services in every part of the disease from prevention to the management.

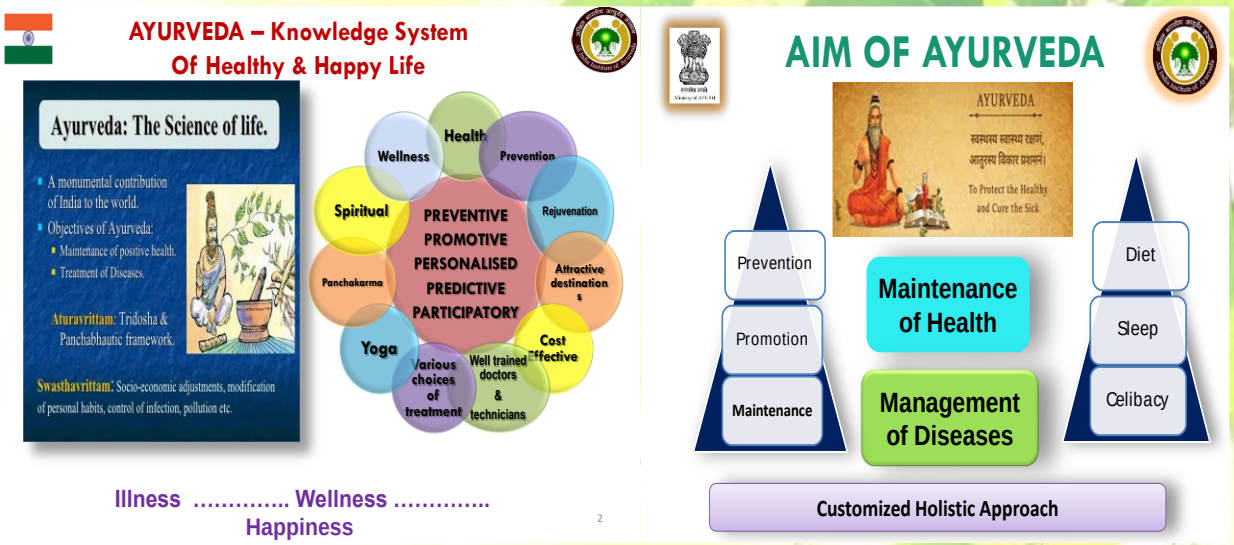
In association with the 100-day Campaign for TB elimination launched by the Ministry of Health and Family Welfare on December 7, 2024, the Ministry of Ayush, Government of India, is set to launch Training cum Awareness Program titled "End Latent Tuberculosis with Ayurveda." This initiative will encompass a series of lectures across India to raise awareness about the need for screening of latent TB, prevention and its management through Ayurveda. Given the significant public health challenge LTB poses in India, Ayurveda with its holistic approach to preventive, promotive, and curative healthcare, offers promising interventions. This campaign aims to integrate Ayurveda into the broader national health strategy for TB elimination, leveraging its principles for early diagnosis, effective management, and community outreach. Focusing the capacity building of Ayurvedic professionals for the prevention of Tuberculosis and for dissemination of right information about disease to the mass population by them it is very essential to first trained the Ayurvedic professionals. Targeting, the future goal for developing networks of

Ayush system parallel to the DOT'S center it is necessary to trained the hierarchy of Ayurvedic professionals. Ayurvedic professionals including academicians, physicians, medical officers and students can play a crucial role at national, state and district level for spreading awareness, making early diagnosis, providing nutritional support and managing post TB sequelae where they will have an opportunity to influence policy level decisions.

AIIA is the first institute to implement the PHI project funded by MoA for the management of Latent Tuberculosis by Ayurvedic medicines and *Rasayana* therapy. A separate specialized OPD for the patients of Latent Tuberculosis is operational in AIIA since 2023.

The main objective of the campaign is to create awareness through Lecture series to make common people aware of the Latent Tuberculosis and role of Ayurveda in its prevention and management. This campaign will assist to ensure the uniformity of information delivered to the target audience across India through series of lectures and screening individuals for LTB based on screening proforma. This campaign will be immensely beneficial in understanding the importance of Ayurveda in the Preventive, Promotive, Curative and Restorative management of LTBI.

"END LTB Campaign -2025"



Refer to slide no 2 & 3 from the standard PowerPoint Presentation

Ayurveda: Science of healthy, happy and long life (Hitayu & Sukhayu)

Ayurveda is science of life, it is doctrine of longevity with the restoration of health (both physical and mental). Its uniqueness is in the fact that it considers human being as a part of universe and gives the concept of harmonization of cellular to cosmic level. The word Ayurved is comprised of *Ayu* + *Ved*. Ayu denotes the healthy and happy life where as *Ved* is derived from *vid dhatu* which means the knowledge. Hence Ayurveda should be considered in true sense as Knowledge system about healthy and happy life. *Chikitsa Chatushpada* of Ayurveda consider the whole knowledge system viz. physician, medication, para-medicals and the patient –everyone had their participatory role, proving the worth of the whole knowledge system depicted in Ayurveda.

In LTB all the aspects of treatment including skilled physician, efficient medicines, community support as well as compliance of the patient have equal importance in deciding the outcome of management. Ayurveda with its entire treatment prototype including (1) *Shamana chikitsa* (palliative treatment) having medicines (both herbs and herbo-mineral preparation), rejuvenation therapy, Yoga, *satvavajaya chikitsa*

(2) *Sodhana chikitsa- Panchakarma* and (3) *Nidana Parivarjana chikitsa* (preventive treatment)- *Pathya-apathya, Dinacharya, Ritucharya, Achara Rasayana* helps to uproot the disease, cure it and also prevent its progression. Ayurveda shifts the paradigm of illness to wellness and wellness to happiness through a constant process rather than a time bounded treatment regimen as it advocate to opt healthy life style, practicing basic principles of health in day to day life for achieving the good quality of life.

As the Ayurveda is deep rooted in Indian society and is most trusted medical practice in Indian subcontinent, using Ayurveda for the treatment of LTBI is much convincing to the common public increasing the patient compliance to multi-fold. Chyavanprash is the best example of one of the rejuvenating medicine use commonly in most of the Indian family for combating the respiratory illness for years without any hindrance. Similarly, many useful herbs for the respiratory diseases are commonly use as Kitchen spices in daily Indian kitchen like *Dalchini, Launga, Kalimircha*, etc.

Aims of Ayurveda:

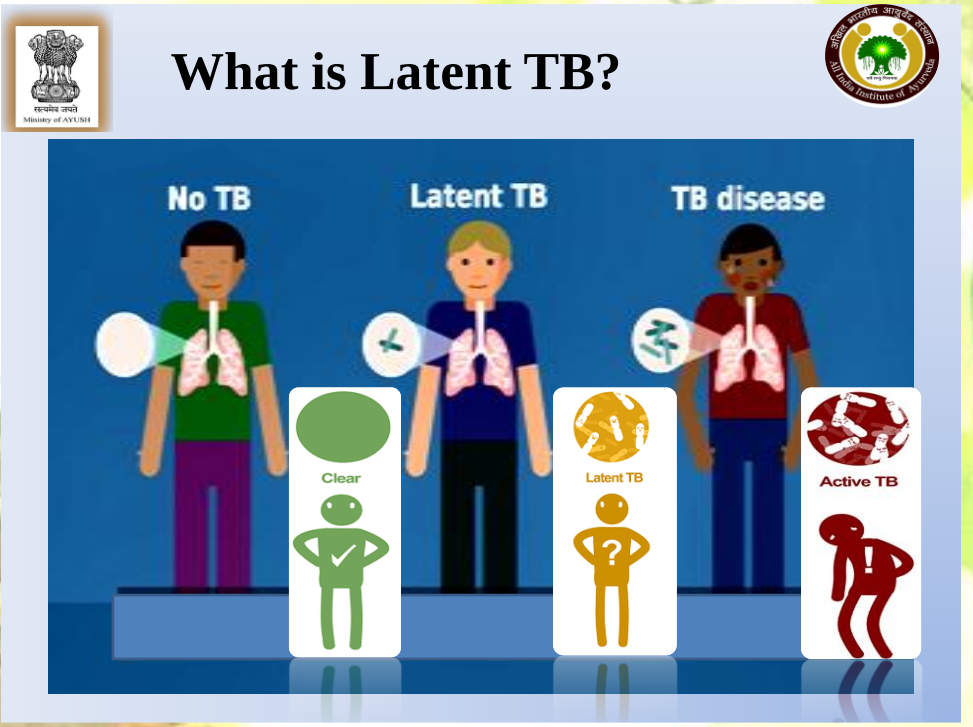
Ayurveda has two basic aims: First, to preserve the health of healthy people and to help them attain the four principle aims of life (virtue, purpose or wealth, pleasure, and release or liberation from cycle of rebirth); second, to treat illness and disease. Ayurveda is supposed to be efficient in treating chronic illness but its use in infectious diseases is still questionable. Latent tuberculosis is a unique disease due to its pathogenesis as the bacteria is present in dormant state the disease is infectious but not communicable and neither it is acute nor it is chronic. Although consequences (persistent immune response) of the dormant bacteria present in the body may manifests into various diseases affecting the quality of life of the patients.

Ayurveda consider every individual as a single functional unite of the universal system that has its own axis of control and therefore proper treatment requires personalized treatment. The approach of P5 medicine as Predictive, Preventive, Promotive, Personalized & Participatory is well incorporated in Ayurveda principles and not merely curative alone.

- ✓ **Personalized:** everyone is unique, we are interested in the personal profile of the individual (genetic, environmental, etc.).
- ✓ **Preventive**: health education aims to reduce the risk of disease (primary prevention), promote early detection (secondary prevention) and improve the quality of life of the sick (tertiary prevention). "Wellness" is at the centre of these different processes.
- ✓ **Promotive**: The immune modulators in form of Rasayana drugs like Amalaki, Ashwagandha, Guduci, etc. the health status is enhanced to its optimum in the desired way.
- ✓ **Predictive**: by establishing a personalized mapping of the risk factors and protective elements of a person's health, the risk of developing a disease can be assessed and the most appropriate drug and other treatments proposed.
- ✓ **Participatory**: patients are the creators of their own health and care. They are now considered "expert patients", with theoretical knowledge and subjective knowledge derived from experience of their disorders.

The comprehensive definition of health as mentioned in Ayurveda is a state of balance – physically, mentally & emotionally. Health is uninterrupted physical, mental, spiritual happiness and fulfillment; a

true balance of organs/systems, psyche and spirit, and balanced and creative relationships with fellow creatures and nature as a whole, family, friends, work, climate, ideals and customs. This holistic perspective is one of Ayurveda's basic principles.



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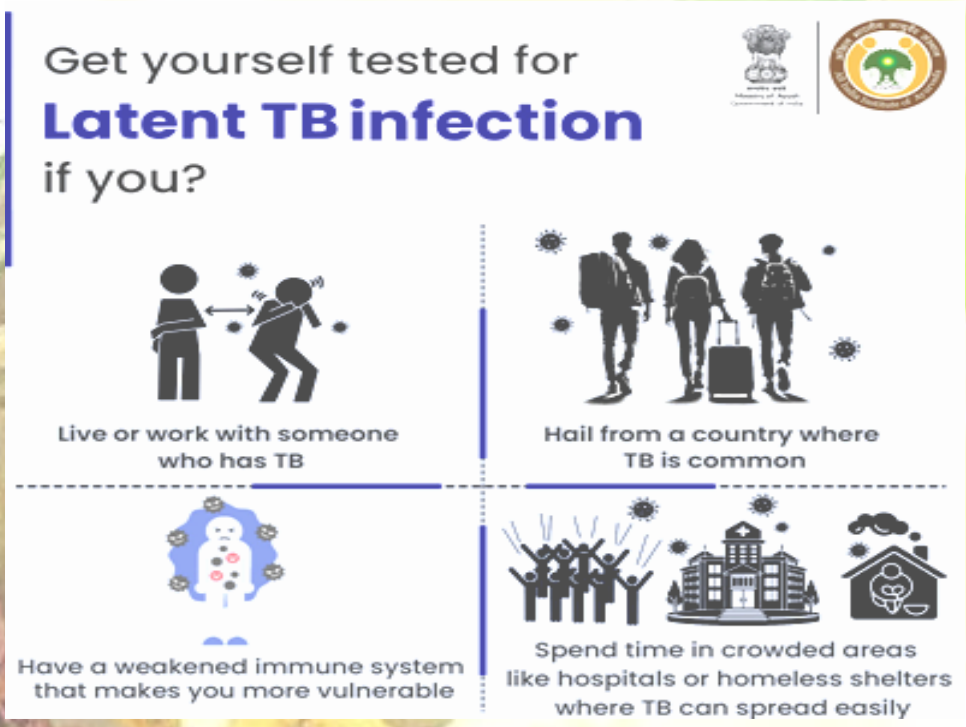
Pathogenesis of LTB:

According to conventional knowledge, inactive bacilli remain in the primary lesions located in the upper lobes of the lungs. Individuals with latent tuberculosis infection (LTBI) carry these bacilli throughout their lives. The activation of these dormant bacilli triggers the onset of tuberculosis, driven by resuscitation factors. Additionally, the increased pressure in the upper lobes promotes bacterial growth while diminishing immune responses.

The disease develops when a person breathes in droplet nuclei that contain tubercle bacilli, which then settle in the lungs' alveoli. Alveolar macrophages ingest these tubercle bacilli; while most of the bacilli are eliminated or contained, a small number of the dead macrophages may multiply within cells and release themselves. If these released bacteria remain viable and reproduce, they might spread to other tissues and organs via the lymphatic or circulatory systems (particularly in areas where TB is most likely to manifest: the lung apex, kidneys, bones, regional lymph nodes, and brain). This process of spreading prepares the immune system for a comprehensive response.



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Whom to test for LTBI?

Screening people and communities at risk of contracting an infection, developing or reactivating TB illness, or having both hazards present is the main goal of prioritized or targeted LTB screening. The goal of LTB screening is to identify patients who

may benefit from preventative therapy for LTBI and to identify cases at an early, asymptomatic stage that is readily curable. Screening of LTBI can be used for:

- **Close Contacts**: Attendant/ guardian with the active TB sufferers should have to be screened for LTBI because most of them have latent infection for many years developing further into active disease at any point of time. Therefore, all close contact should be thoroughly screened irrespective of the duration of contact/ severity of the disease of the person infected/ chronicity of exposure.
- **High risk population:** Targeted screening of individuals that are at high risk of being infected, such as individuals from TB endemic countries entering low burden countries or known populations with higher TB prevalence such as impoverished, homeless persons and also those having psychological disorders.
- **Immunocompromised clinical conditions:** Individuals having diabetes, chronic liver disease, chronic renal disease, malnutrition, heart failure should have to screen for LTBI.
- **Female Infertility:** Females having infertility should also be screen for LTBI for proper management.

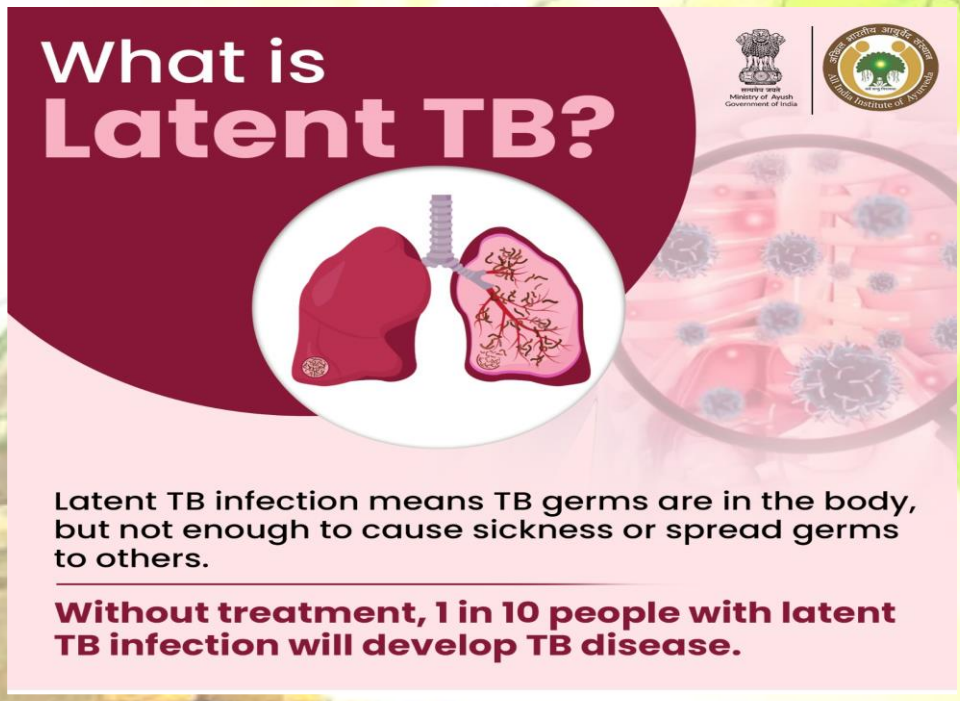
2. Congregate settings:

Congregate settings are places where transmission of communicable diseases is a real risk. Focused screening for disease and LTBI prior to entry into congregate settings reduces TB transmission through early identification of TB and preventive treatment of those at risk of developing disease in that setting.

Congregate settings may include:

- hospitals/healthcare institutions
- residential facilities

- prisons/correctional facilities
- renal dialysis units
- homeless shelters
- military barracks
- certain settings of employment such as the mining industry.



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Understanding TB and LTB: National & Global Prospective

Tuberculosis remains a major public health challenge across the globe. Consequently, current national programs are primarily focused on treating individuals with active TB disease. Nevertheless, relying solely on this approach will not lead to the eradication of TB. Monitoring individuals with latent TB infection (LTBI) can serve as an effective strategy for TB eradication. There is a need for shorter and more efficient preventive and therapeutic measures, innovative

testing methods, and improved diagnostic tools with greater sensitivity for identifying high-risk patients who may experience TB reactivation. It is estimated that 5% to 10% of individuals with untreated LTBI will develop active TB at some point in their lives. Additionally, it is clear that to eradicate TB, it will be necessary to create new, safer drugs for LTBI treatment that healthcare professionals may administer for shorter periods and appropriate biomarkers to determine the treatment's efficacy.

Despite modern drugs treatment with 60 years of chemotherapy and 90 years of vaccination with various strategies to prevent and control tuberculosis (TB), globally TB ranks 13th in leading causes of mortality. In recent year 2021 Worldwide, TB ranks 2nd after COVID-19, in leading causes of infectious killer, killing about 1.6 million people in 2021 (including 187 000 people infected with HIV).

Prevalence of Latent Tuberculosis in India:

Although exact estimate for LTBI prevalence in India's population is unavailable, due to lack of any “Gold standard” diagnostic criteria and limitations of available diagnostic tools, but a rough estimate showed that approximately about 55% of India population may have LTBI. Every year, 1.5 million people die from tuberculosis (TB), which has the highest fatality rate of any other infectious disease. Latent TB patients do not exhibit any symptoms. Person having Latent tuberculosis infection acts as carrier of TB by activating the disease agent in the body.

Prevalence of Latent Tuberculosis in World

Latent TB infection (LTBI) is estimated to affect nearly 33% of the global population. An estimated 2.3 billion people worldwide, or "one-third" of the population, suffer from LTBI, according to standard estimates. According to WHO estimates, about one-third of the world's population, or around 2 billion people, are

TB carriers. However, this is still based on controversial assumptions in combination with tuberculin skin test (TST) surveys. Interferon-γ release assays (IGRAs) with a higher specificity than TST have since been widely implemented, but never used to estimate the global LTBI prevalence.

Nonetheless, the existing estimates of the LTBI burden clearly highlight a significant population of individuals vulnerable to active TB. Since 1990, the global incidence and mortality rates of active TB have been on the decline, with the incidence rate decreasing continuously since the WHO set its goals at the turn of the millennium. Enhanced focus on LTBI screening and preventive treatment has been emphasized as essential for achieving the End TB Strategy by 2050. It is hardly possible to eliminate TB unless progression to active TB is prevented, underlining the need to determine the actual prevalence of LTBI and define hot-spot areas.

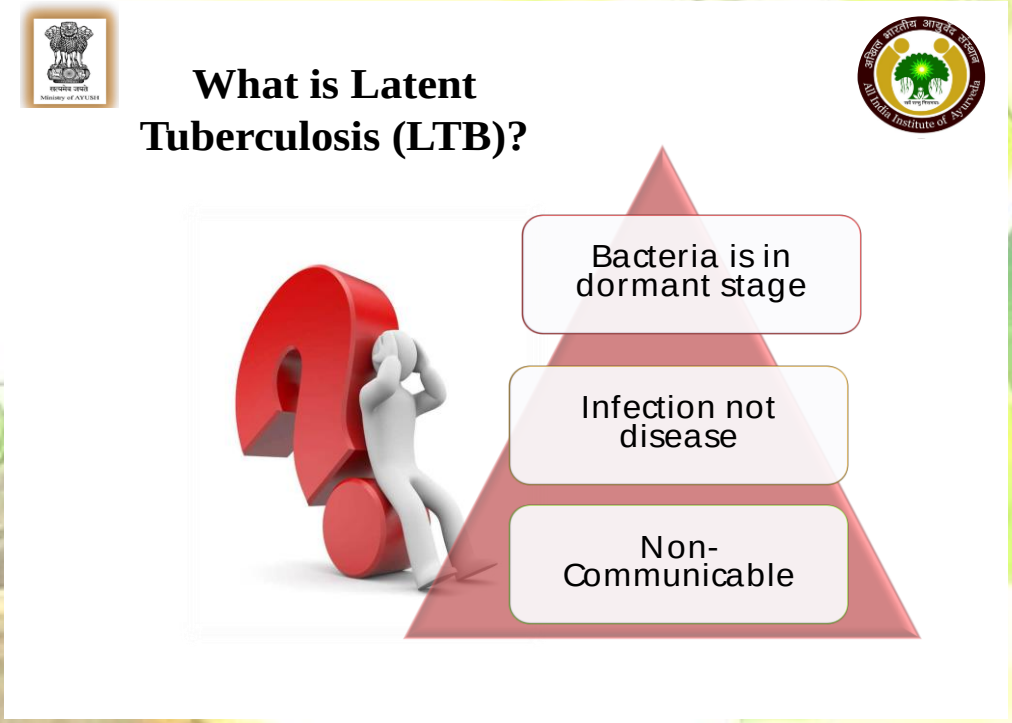
FIGURE 1: **Showing world map of countries with tuberculosis (TB) incidence. High, intermediate and low active TB incidence countries are shown, corresponding to average latent TB infection (LTBI) prevalence of 28–36%, 19–20% and 3–5%, respectively. Darker shades of the colors indicate areas with original LTBI prevalence data, lighter shaded colors indicate countries where the weighted estimate of the country's TB incidence interval has been used.**

The earlier estimate from the WHO relied only minimally on the tuberculin skin test (TST), accounting for just 13% , and was primarily based on the annual risk of infection calculated from the incidence of smear-positive cases using the STYBLO method, which is based on empirical data and assumptions regarding the duration of infectiousness and yearly transmissions. This calculation is predicated on the idea that a single smear-positive case spreads the infection to 10 individuals each year; however, a more recent estimate indicates that this figure could actually be as low as two to six infections.

In settings with limited resources, the average delay in treatment has been reduced to 3 months, which promotes faster sputum conversion and a reduction in infectiousness compared to when the guideline was first proposed. Additionally, transmission rates and levels of infectiousness greatly differ due to factors like age demographics, geographical locations, and access to medications, living conditions, and population density. Therefore, presuming that the Styblo rule, even in its revised version utilized for the most recent evaluation, remains applicable in today's global TB landscape could lead to an exaggerated estimate of the prevalence of LTBI.

Consequently, relying on a general guideline for LTBI prevalence, which is based on assumptions that may no longer hold true, is probably less accurate than utilizing actual data gathered from numerous populations across various countries that consider local conditions and do not hinge on conjectures about transmission rates or infectiousness. The Tuberculin Skin Test (TST) has been commonly employed as a screening method for LTBI due to its low direct costs and simplicity of use. In recent years, commercial interferon-γ release assays (IGRAs) have been developed, consisting only of antigens that are not found in strains of the bacille Calmette–Guérin (BCG) vaccine and do not necessitate a follow-up test. Thus, IGRAs have superior specificity to TST in BCG-vaccinated populations and in regions with

frequent non tuberculous mycobacteria exposure. To date, there has been no comprehensive global assessment of the prevalence of latent tuberculosis infection (LTBI) utilizing interferon-gamma release assays (IGRAs). It has been proposed that the prevalence of LTBI may be inflated when measured by the tuberculin skin test (TST) in comparison to IGRA, owing to the latter's enhanced specificity.



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What is Latent TB?

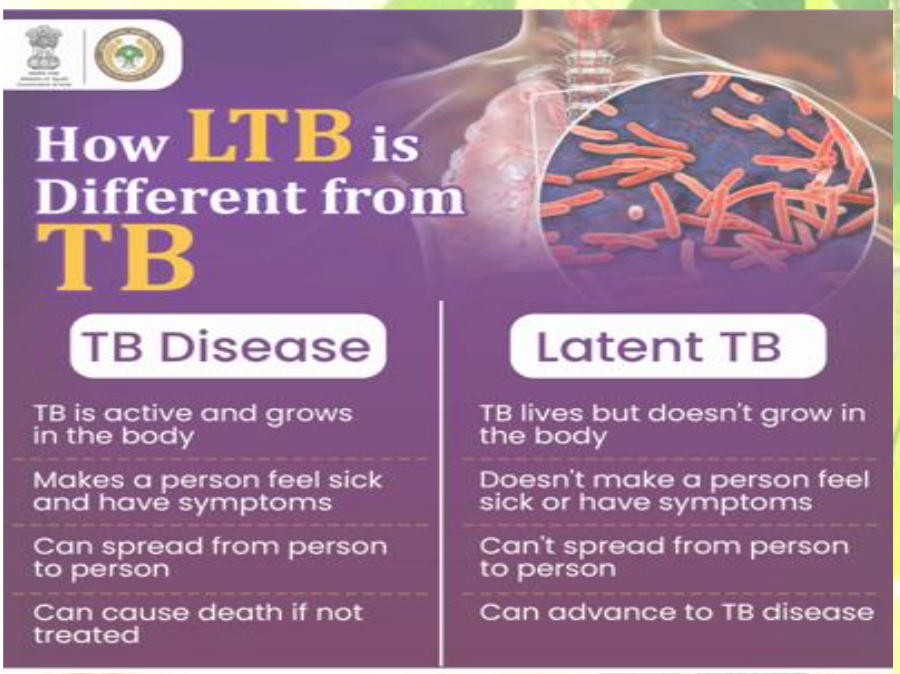
- World Health Organization (WHO) guidelines define LTBI as a state of persistent immune response to stimulation by *M. tuberculosis* antigens without evidence of clinically manifested active TB.
- Latent tuberculosis is not a disease; it is a condition when a person is infected with mycobacterium tuberculosis but has not developed the active disease.

- It is a condition when the person has mycobacterium tuberculosis bacterium in the dormant state, constrain by the body immunity.
- *It is supposed, that latent tuberculosis caused by the normal strain of the Mycobacterium tuberculosis* is carried in airborne droplet nuclei coughed into the atmosphere by patients with active tuberculosis (TB). The infected droplet nuclei remain suspended in the air and can be transmitted when inhaled.
- About 90% of infected patients can normally respond to *M. tuberculosis* infection by granuloma formation, without manifesting clinical symptoms of active TB disease, in a condition known as latent tuberculosis infection (LTBI). However, in 10% of infected patients with various immunological conditions, dormant mycobacterium begins to grow and LTBI develops into active TB.
- Transmission of TB to the community occurs in the endless repetitive cycle of contact, infection, and development of active disease.
- Current diagnostic tests for *M. tuberculosis* infection cannot distinguish between completely cured TB infections, active and latent TB. Therefore, in addition to positive testing for *M. tuberculosis* infection, proper diagnosis of LTBI requires that the presence of active TB disease must be excluded.
- Treatment of latent tuberculosis is given due emphasis in India with intermediate tuberculosis burden but more rationality is required in its applicability considering the quality of life of patients.
- Presently, the treatment (ATT) is recommended only for patient at risk for progression to active tuberculosis, those having close contact with tubercular patient or frequent exposure to active tubercular cases, and immunocompromised patients (e.g. HIV, diabetes, etc.).
- Treatment of LTBI comprises of isoniazid for six or nine months (6H / 9H) or rifampicin for four months or isoniazid and rifampicin for three months. The

utility of treatment is to reduce the chance of developing the active disease without eliminating the pathogen *M. tuberculosis*. However, 6H or 9H regimen is related with hepatotoxicity and low compliance. Four months of rifampicin regimen is characterized by less hepatotoxicity and better compliance than 9H, but has few evidence of clinical efficacy. Three months of isoniazid plus rifampicin was proved equivalence with 6H or 9H regimen in terms of efficacy and safety, which was recommended in NICE and WHO guidelines.

- Recently revised National Institute for Health and Care Excellence (NICE) guideline recommended that close contacts of individuals with active pulmonary or laryngeal TB, aged between 18 and 65 years, should undergo LTBI treatment. Various regimens for LTBI treatment were recommended in NICE, World Health Organization (WHO), and Centers for Disease Control and Prevention guidelines, and superiority of one recommended regimen over another was not yet established. Traditional 6 to 9 months of isoniazid (6H or 9H) regimen has an advantage of the most abundant evidence for clinical efficacy—60%–90% of estimated protective effect.

“END LTB Campaign -2025”



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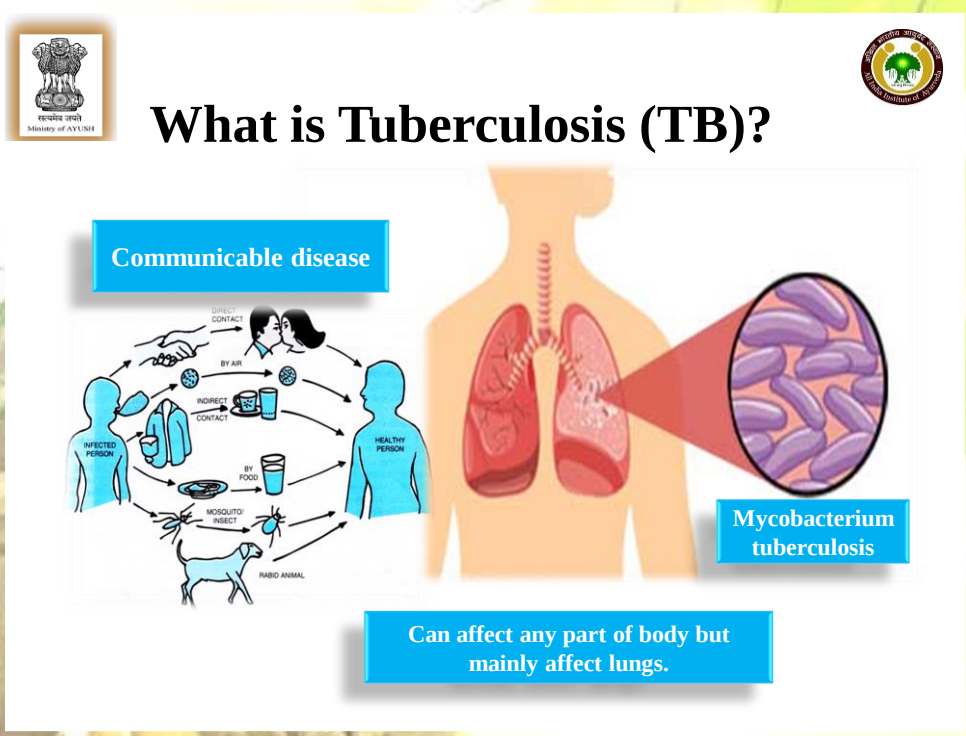
How latent TB is different from active TB disease?

- Latent TB infection (LTBI) is considered a 'carrier state' of M. tuberculosis infection.
- In LTBI, the infection is well contained by the host's immune system. Hence, unlike active TB, individuals with LTBI are asymptomatic, and not contagious to others. However, this condition may progress or reactivate to active disease in the future.
- LTBI are commonly offered preventative therapy to prevent active disease from occurring.
- Active TB is a disease state of uncontrolled M. tuberculosis growth which occurs when TB bacteria are able to overcome a person's immune system.
- Active TB can affect any organ of the body, but is most commonly a disease of the lung.

- Direct detection of M. tuberculosis bacilli in sputum or specimen culture is the hallmark of disease and is considered the gold standard of TB diagnosis.
- A person who has active pulmonary TB and is coughing, with the presence of M. tuberculosis in their sputum is infectious.
- Therefore, to eradicate TB it is necessary to eradicate LTBI so that the vicious cycle of active- dormant- re-activation can be cracked down.



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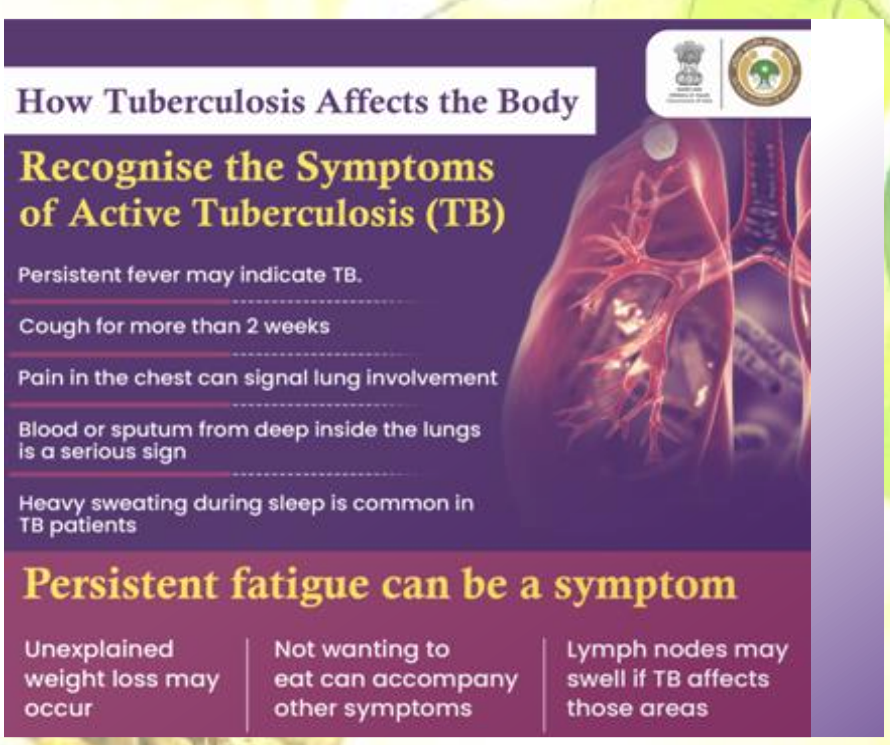
What is Tuberculosis?

- Tuberculosis (TB) is an infectious disease caused by bacteria called 'Mycobacterium Tuberculosis'. It is an air born disease that spreads through mucous droplet suspended in air by the spitting, coughing or sneezing of someone having active TB.

- TB mostly affects the lungs (causing pulmonary TB) but can affect all organs (except hairs and nails) including skin, intestines, bones and joints, kidneys, brain, genitals, urinary tract, spine, lymphatic system, etc. and is known as Extra-pulmonary tuberculosis.
- Air droplet carrying bacteria spores may enter into respiratory tract via nostrils and may get settled in the lungs causing Pulmonary TB. However, the bacteria can spread to the other organs of the body via blood and lymph.
- One's own body immune system plays a vital role in the development of diseases and manifestation of symptoms. Many people do have strong immunity to resist the multiplication of bacteria and development of disease, such people are having dormant bacteria and the condition is known as Latent Tuberculosis.
- In India, the prevalence rate of latent tuberculosis is very high (~40%).
- Latent tuberculosis can develop into active tuberculosis if immunity weakens. Malnutrition, HIV, diabetes, chronic liver diseases, and chronic kidney disease are risk factors for latent tuberculosis as the person being immune-compromised may progress to have active tuberculosis.
- Other factors like smoking, air pollution are also a risk factor as it weakens the lungs immunity.
- Less explored factors like deficiency of Vitamin D and respiratory allergies are also play a vital role in determining the prognosis of the disease.
- Chronic use of Alcohol is also a risk factor for development of tuberculosis as it causes liver disease and thereby weakens the body immunity and also interfere the treatment.
- Latent tuberculosis is itself a potent risk factor for tuberculosis and the probability of developing TB is highest among those who are having positive contact history.

- Susceptibility of developing TB is highest among children with positive contact history or on exposure to direct infection.
- TB can affect anyone, anywhere at any time but with proper awareness it can be prevented and with early diagnosis, it can be properly managed.
- Government of India, through Revised National Tuberculosis Program provides free treatment for the tuberculosis patients.



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Signs/symptoms of active TB disease

- Cough (2-3 weeks or more)
- Blood with sputum
- Chest pains
- Fever
- Night sweats

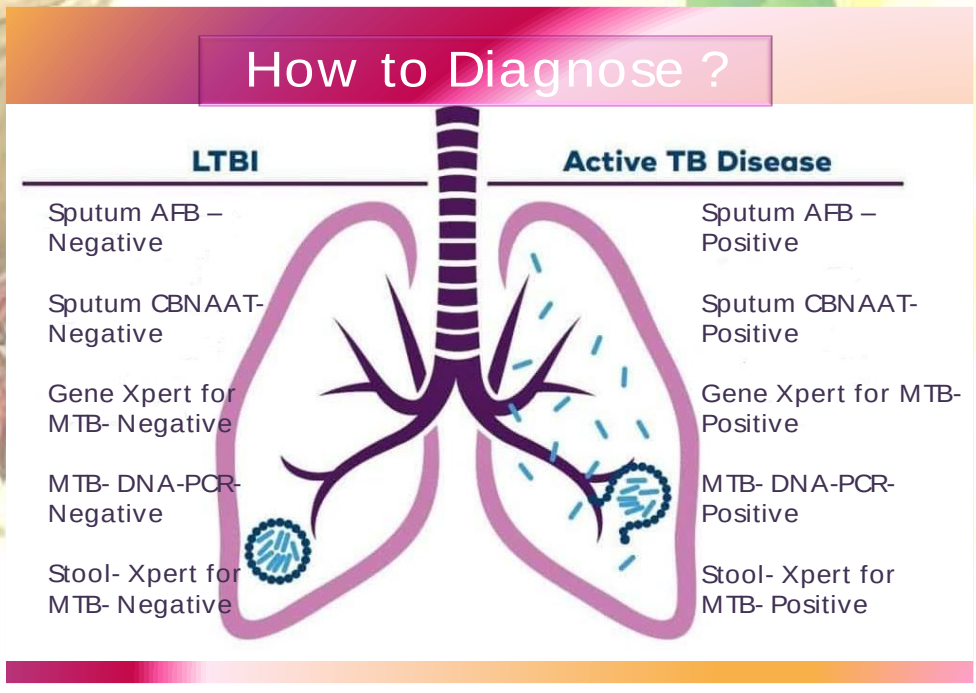
- Feeling weak and tired
- Weight loss
- Decreased or no appetite

Symptoms of Extra pulmonary TB disease

Extra pulmonary TB disease affects organs in addition to or instead of the lungs. It may cause symptoms related to the part of the body that is affected.

Symptoms of extrapulmonary TB disease include:

- Blood in the urine (S/O renal TB)
- Headache or confusion (S/O TB meningitis)
- Back pain (S/O spinal TB)
- Hoarseness of voice (S/O laryngeal TB)
- Swollen lymph nodes (S/O TB lymphadenitis)
- Swollen, painful joint (S/O bone TB)



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How to Diagnose LTB & TB?

- **Diagnostic tools:**
  - ✓ **For LTBI:**
    - **TST (Tuberculin Skin Test)/ Mantoux Test**: A substance called purified protein derivative (a preparation of inactivated TB bacterial components) is injected under the skin and if a person reacts to at the site of injection, it indicates the presence of an immune response to TB and, therefore indicates infection with the TB bacteria. However, the Mantoux test cannot be used to determine TB disease but only the immune response to the bacteria. In a country like India, where prevalence of LTBI is as high 40% of total population, Mantoux test can't be consider as diagnostic evidence for active tuberculosis.
    - IGRA (TB Gold- QFT- G): QFT is an assay that detects TB infection by measuring the cell mediated immune response to TB-specific antigens. It can be used as a diagnostic aid for M. tuberculosis complex infection, whether active tuberculosis disease or LTBI, however, when using QFT in a person suspected of having active TB, it should not replace appropriate microbiological and molecular investigation. QFT cannot distinguish between active and latent TB infection and should therefore never be used as a sole diagnostic test.
    - T-SPOT: T-SPOT.TB is an enzyme-linked immunospot assay (ELISPOT) performed on separated T lymphocytes. The result is reported as number of IFN-γ producing T cells.

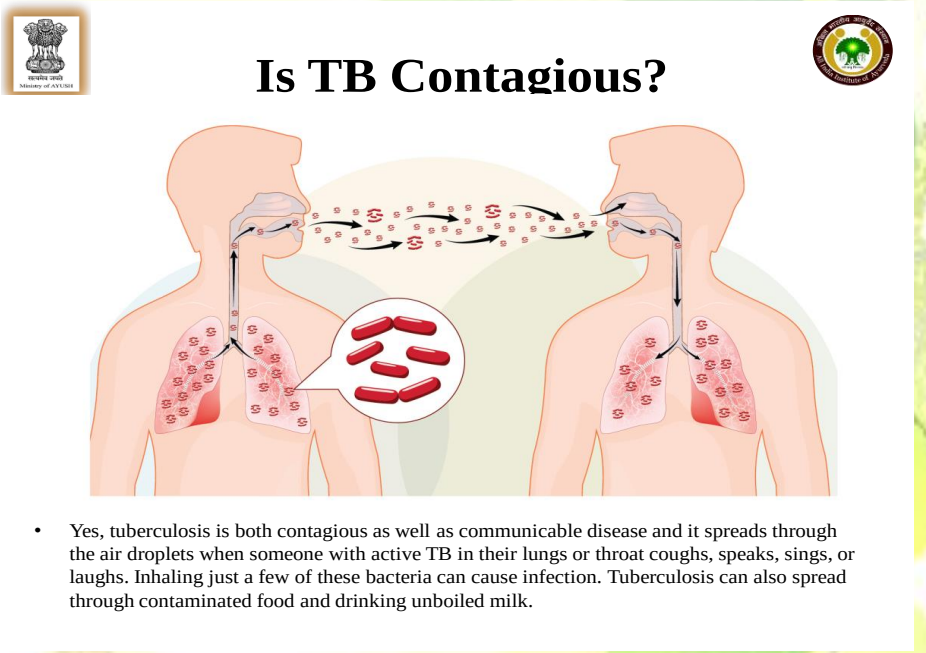
✓ **For active TB:**

- Sputum analysis for AFB (it requires testing of two specimens: one spot and one early morning sputum)
- Direct sputum smear microscopy- Gold Standard
- CBNAAT/ TrueNAAT
- Gene Xpert for MTB/RIF
- DNA-PCR-MTB
- Alveolar lavage culture

*Biological sample for CBNAAT are Sputum and Urine whereas for X pert it is blood, sputum or tissue.

*Bacterial load is higher in early morning and therefore sputum sample collection of early morning is recommended in false negative cases.

In persons with symptoms, signs, or radiographic evidence of TB disease, and in those at increased risk of progression to tuberculosis disease if infected, a positive result with either an IGRA or TST may be taken as evidence of M. tuberculosis infection. However, negative IGRA or TST results are not sufficient to exclude infection in these persons, especially in those at increased risk of a poor outcome if disease develops, and clinical judgment dictates when and if further diagnostic evaluation and treatment are indicated.



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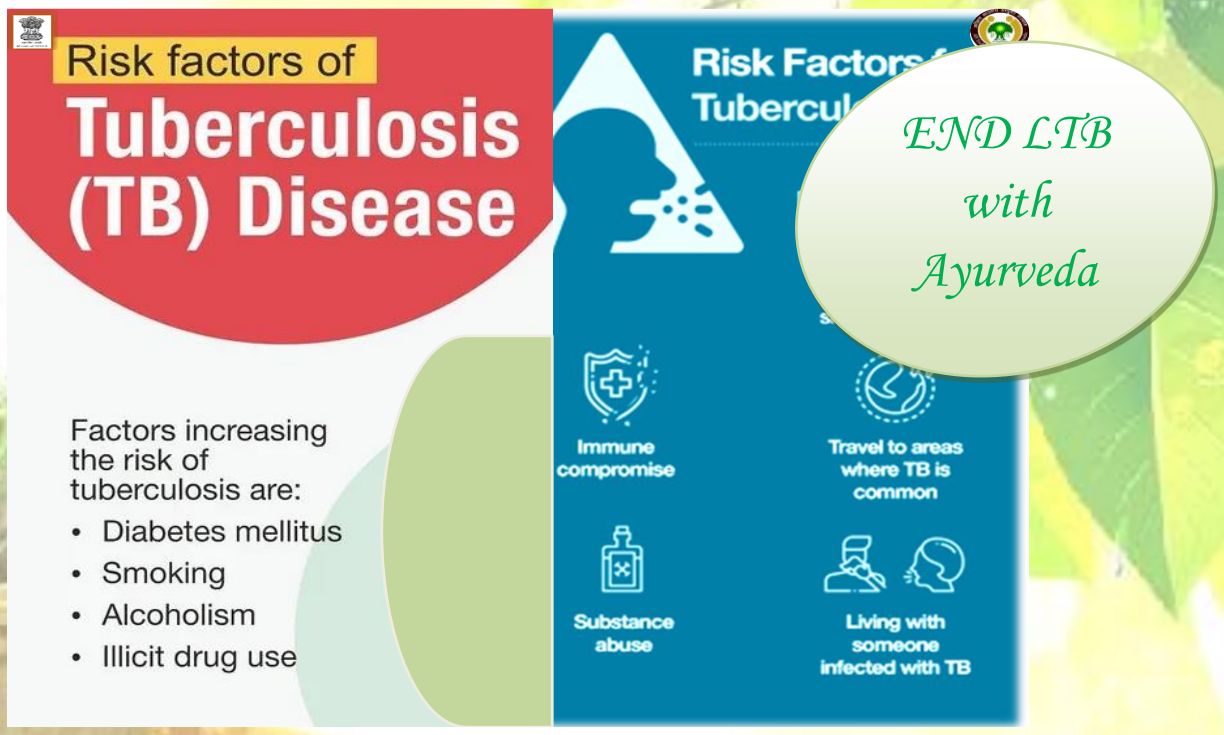
Is TB Contagious?

- Airborne disease / Shared airspace
  - TB germs are passed through the air when a person who is sick with TB disease coughs, sings, sneezes, or laughs
  - To become infected with TB germs, a person usually needs to share air space with someone sick with TB disease (e.g., live, work, or play together)
  - The amount of time, the environment, and how sick the person is all contribute to whether or not exposure of germs produces disease.

TB Germ does not spread through

- Through quick, casual contact, like passing someone on the street
- By sharing utensils or food

- By sharing cigarettes or drinking containers
- By exchanging saliva or other body fluids
- By shaking hands
- Using public telephones



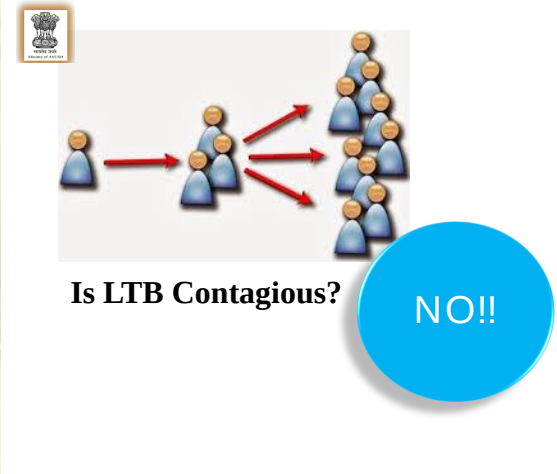
Refer to Slide no 13 from the standard Power Point Presentation

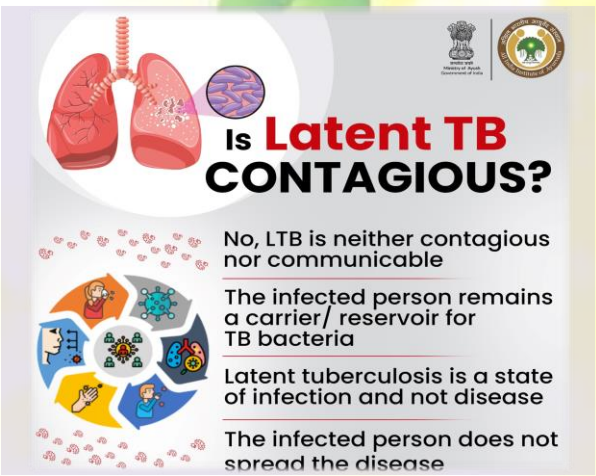
Risk factors of Tuberculosis *(TB) disease*

LTBI is a group of infections that includes early, subclinical, and eventually active TB cases. These infections can be intermittent, transitory, or progressive. There is no "gold-standard" test for determining the worldwide burden of LTBI. High-risk groups, including immigrants, residents and employees of congregate living facilities, and people with HIV, are recommended to get screened. Even though

LTBI treatment is difficult, India must prioritize LTBI diagnosis and treatment before it can actually claim to eradicate tuberculosis.

Numerous individuals are associated with a weakened immune system, including those with diabetes, cancer, those on immunosuppressive medications, and individuals with co-existing HIV. Tuberculosis (TB) infection is responsible for around 25% of deaths related to HIV. Research suggests that individuals infected with HIV may face a 10- to 110-fold higher risk of developing active latent TB infection (LTBI). Mycobacterium tuberculosis can remain in a latent or inactive form within human tissues, although many key questions about the mechanisms behind this latency are still unresolved. If all individuals with LTBI were to be identified and treated effectively, it could lead to an 80–90% reduction in the current number of TB cases in the population. Research has demonstrated that treating LTBI prevents the transition to active TB disease, regardless of how the infection goes latent.



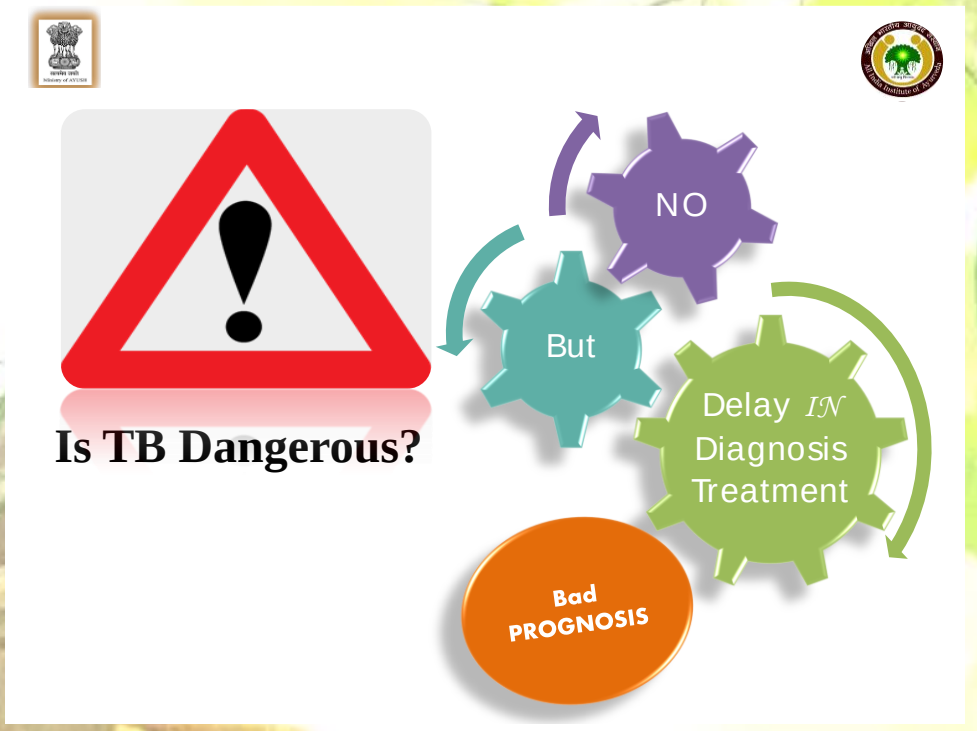


Refer to slide no 14 & 15 from standard Power Point Presentation

Is LTB Contagious?

- **No, LTB is neither contagious nor communicable.**

- **The infected person remains carrier/ reservoir for TB bacteria.**
- **Latent tuberculosis is state of infection and not disease.**
- **As the patients of LTBI do not have any symptoms they don't spread the infection until the bacteria becomes active.**

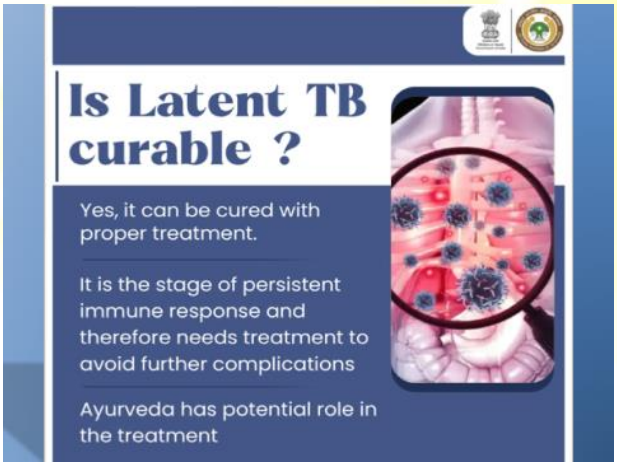


Refer to slide no 16 from the standard Power Point Presentation

Is TB Dangerous?

- No, can be cured with proper treatment.
- Delay in diagnosis and improper treatment affects adversely to the prognosis of the disease.
- If active tuberculosis (pulmonary) not treated timely can spread to more people.

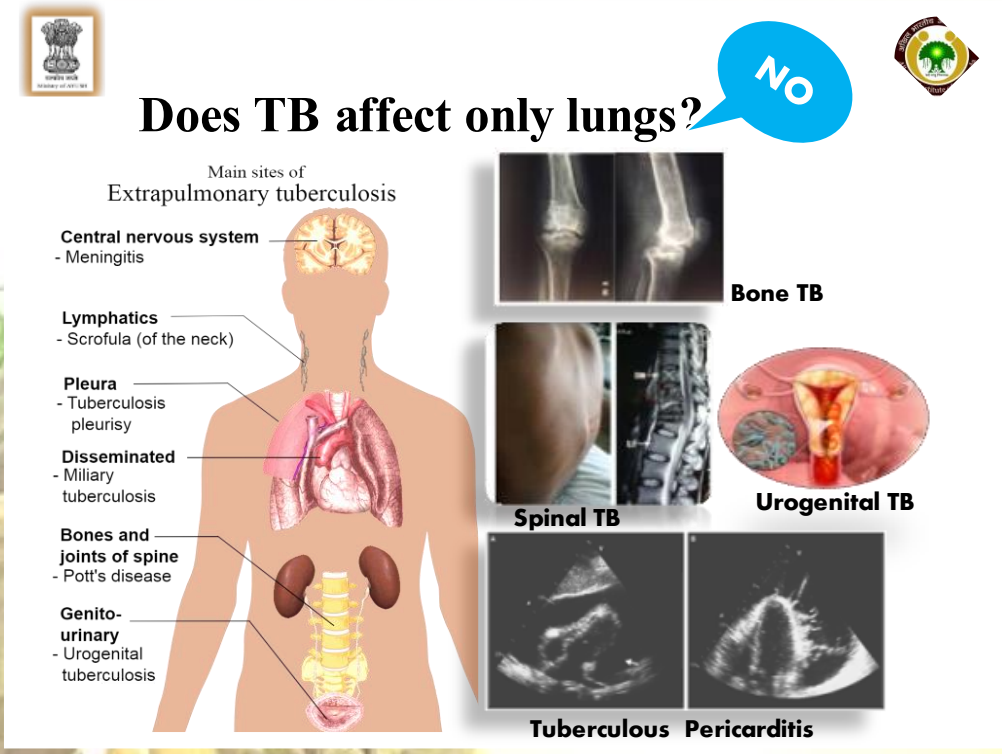
- Tuberculosis can be fatal if not treated properly. The focus of public health initiatives to control tuberculosis is on identifying active cases. However, to achieve these challenging targets, modelling shows that the LTBI reservoir needs to be reduced using preventive drugs. To significantly reduce TB transmission, the progression of LTBI to active TB needs to be stopped. Targeted treatment of infected individuals at risk of developing active TB disease is a key part of the strategy to eliminate TB.
- Currently, detection and treatment of LTBI is a priority area in the WHO TB elimination strategy. The reason is that people with LTBI are at significantly higher risk of developing active TB or having it reactivated than healthy people. International strategies such as the WHO "End TB Strategy" targets, the sustainable development goals and the "National Strategic Plan" present bold measures involving proportionate resources to eradicate TB in India by 2030.
- However, the situation is different in TB-endemic areas like India, where the primary goal of any TB control effort remains effective diagnosis and treatment of active TB cases, ignoring those who may have LTBI.



Refer to slide no 17 & 18* from *the standard Power Point Presentation

Is LTB Curable?

- Yes, can be cured with proper treatment.
- It is the stage of persistent immune response and therefore need treatment to avoid further complications.
- Ayurveda has potential role in the treatment.



Refer to slide no 19 from the standard Power Point Presentation

Does TB affect only lungs?

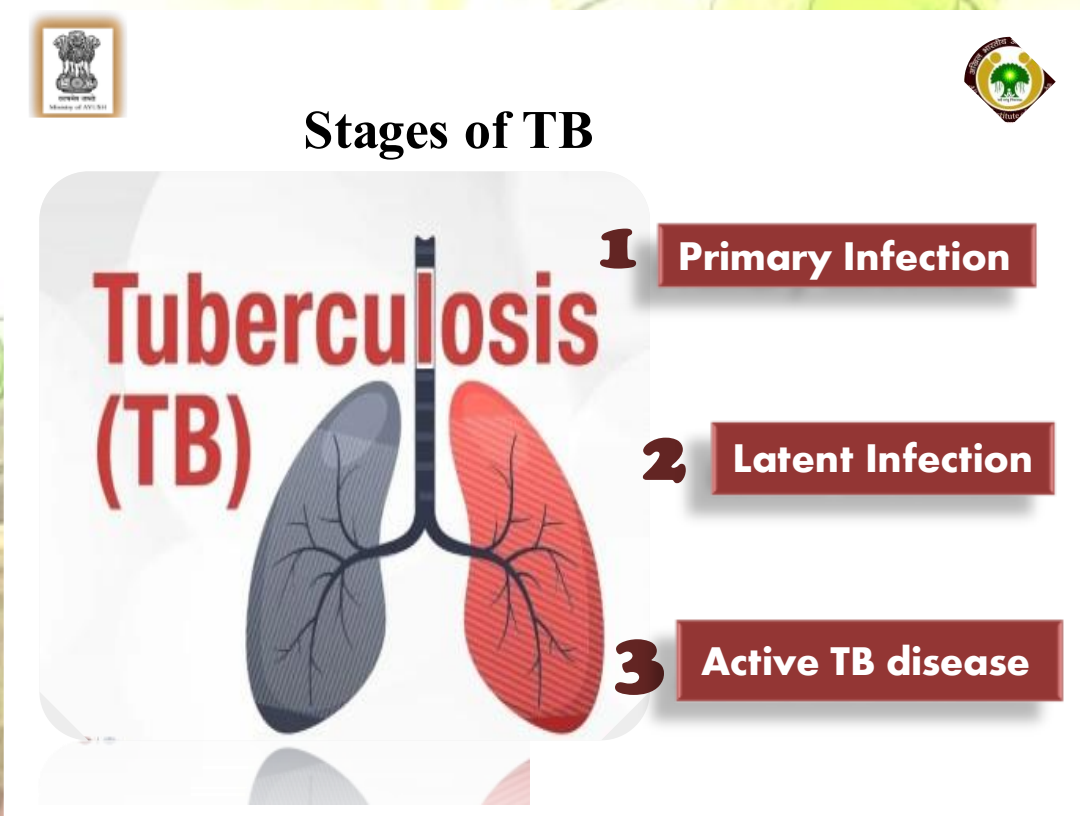
- No, tuberculosis can affect any organ.
- Based on the site involved tuberculosis can be of following types-
    - Pulmonary TB (PTB)

- Extrapulmonary TB (EPTB)
- Tubercular lympadenopathy
- Urogenital TB
- TB Meningitis
- Bone TB
- Tuberculous Pericarditis

What is Extra-pulmonary TB?

- Tuberculosis outside of the lungs is known as extrapulmonary tuberculosis (EPTB). EPTB comprises genitourinary (renal) tuberculosis, skeletal tuberculosis, Pott's disease (spine), scrofula (lymphadenitis), abdominal tuberculosis (sometimes with ascites), and tuberculosis meningitis. Both pulmonary and extrapulmonary areas are frequently affected by miliary tuberculosis, also known as disseminated tuberculosis. An estimated 15–25% of all TB cases are thought to be extrapulmonary TB (EPTB). EPTB rates are higher among HIV patients, particularly those with low CD4 counts. Skeletal tuberculosis is more common in children than in adults.
- Compared to pulmonary TB, EPTB is generally more difficult to diagnose and frequently necessitates invasive procedures to collect tissue and/or fluid samples. Usually, the indications and symptoms are particular to the organ system that is impacted. Any regional lymphatic system may be affected by lymphatic tuberculosis, which is more prevalent in Asians and Africans.
- Tuberculosis of head and neck has been an under diagnosed entity due to large number of smear negative cases, which results in missing out the positive cases, further increasing the burden of TB.

- Head and neck manifestations of tuberculosis (TB) are caused by the hematogenous or lymphatic spread of the bacteria to affect the larynx, oropharynx, maxillofacial structures, ear, mastoid, and cervical spine. Other cases of TB of the head and neck are from self-inoculation of open lesions of the aero–digestive tract with infected sputum.



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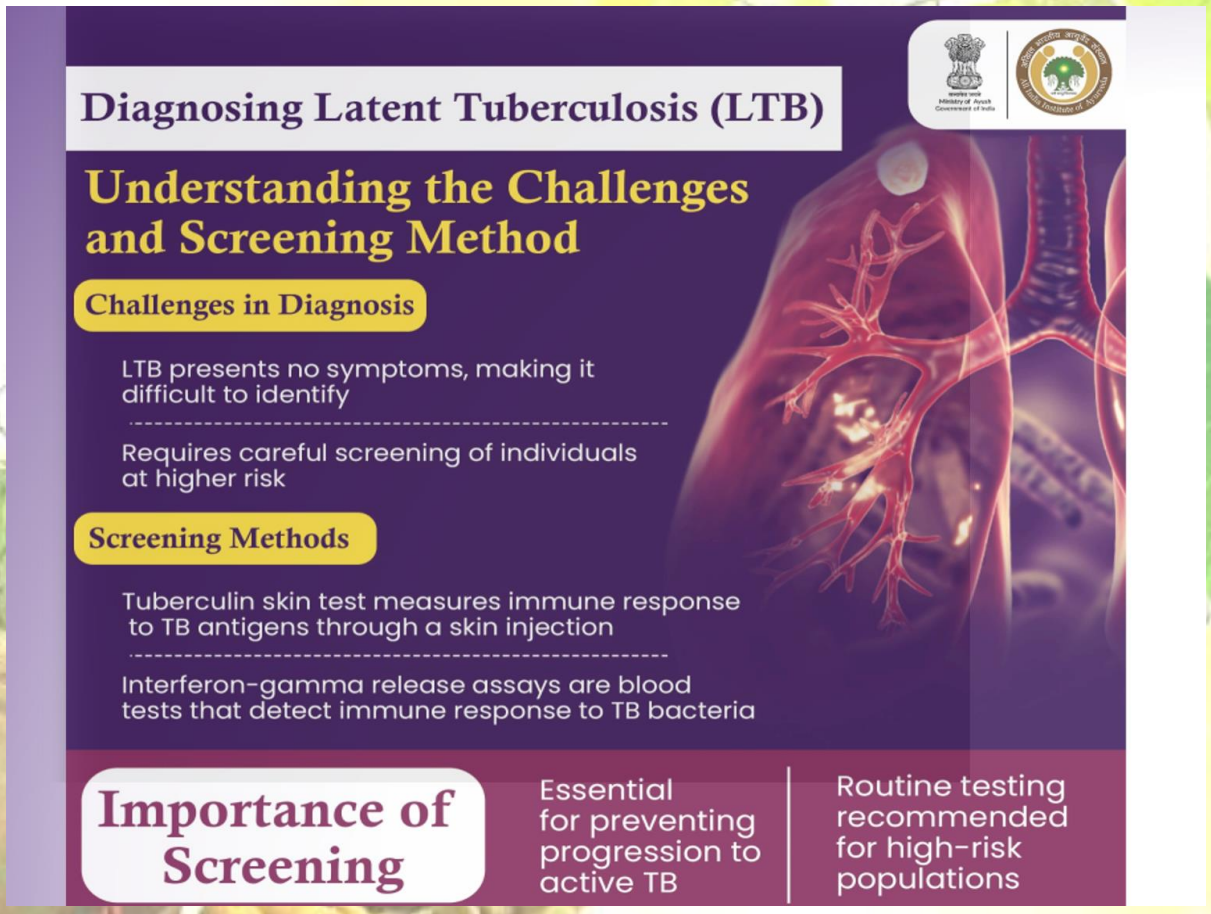
Stages of TB

- There are three stages of TB:
  - ✓ **Exposure/ Primary infection**: A person has been in contact with someone who has TB, but has no signs or symptoms.

- ✓ **Latent TB infection:** A person has TB bacteria in their body, but no symptoms.
- ✓ **Active TB disease**: A person has signs and symptoms of an active infection.

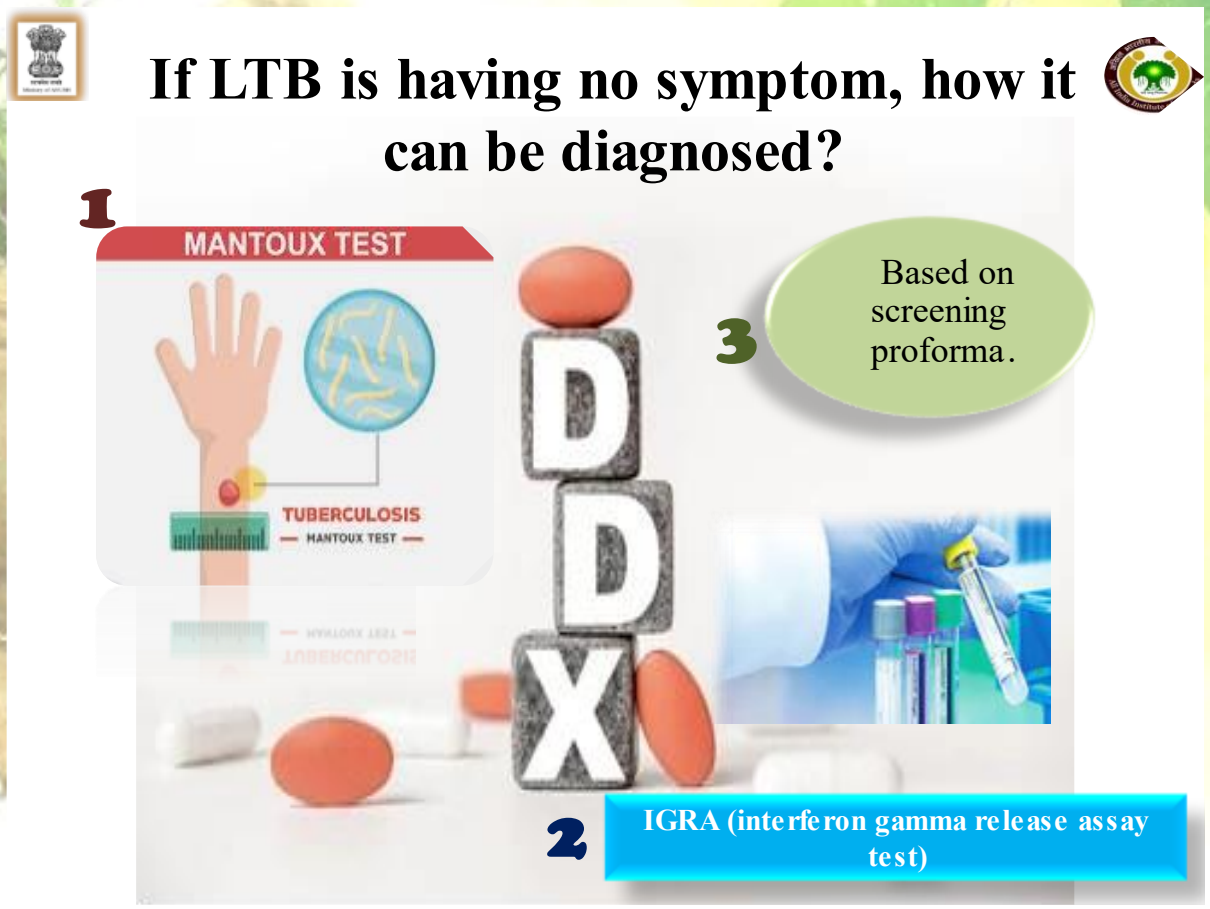


Refer to slide no 21 from the standard Power Point Presentation

Recommendations for Testing of LTBI

Effective administration of preventative treatments requires a proper and accurate diagnosis of LTBI. There is no comparable standard examination for identifying LTBI, despite the fact that bacterial culture is the gold standard for diagnosing active illness. Either a positive interferon-gamma release assay (IGRA) test or a TST is

required for the diagnosis of LTBI. Diagnosis of LTB is mainly investigation based because patients are asymptomatic but they have positive skin tuberculin test (TST) and IGRA (interferon gamma release assay test). Sensitivity and specificity of both the tests are different. The WHO recommends utilizing either IGRA or TST for LTBI testing in high-income and higher-middle-income countries; however, in lower-middle- and low-income countries, IGRA should not be used in place of TST. According to the WHO's post-2015 End TB Strategies, systematic testing and treatment for LTBI are strongly advised in higher and upper middle-income countries where the incidence of tuberculosis is less than 100 cases per 100,000 people.



Refer to slide no 22 from the standard Power Point Presentation

Diagnosis of Latent Tuberculosis

"Intention to test is intention to treat"

There is no way to directly diagnose LTBI, as the M. tuberculosis cannot be recovered from the host unless active TB is present. An indirect immunological assessment of exposure is made instead by ascertaining the reactivity of host lymphocytes to mycobacterial antigens, either by testing the in vivo response with the TST or in vitro with INF-α release assays (IGRAs).

Tuberculin Skin Test (TST)

Advantages:

1. Cost effective and simple investigation.
2. Wide availability
3. Non-invasive test

Disadvantages:

1. Low specificity because of previous BCG vaccination
2. Low sensitivity in immunocompromised patients
3. Depends upon the expertise of health professionals to avoid variability of the results
4. Requires two clinical visits which is practically not feasible for some patients
5. Complications are painful and warrant it wide use as diagnostic tool.
6. Limited predictive value for Active TB

IGRAs (Interferon Gamma Release Assays tests)

Advantages:

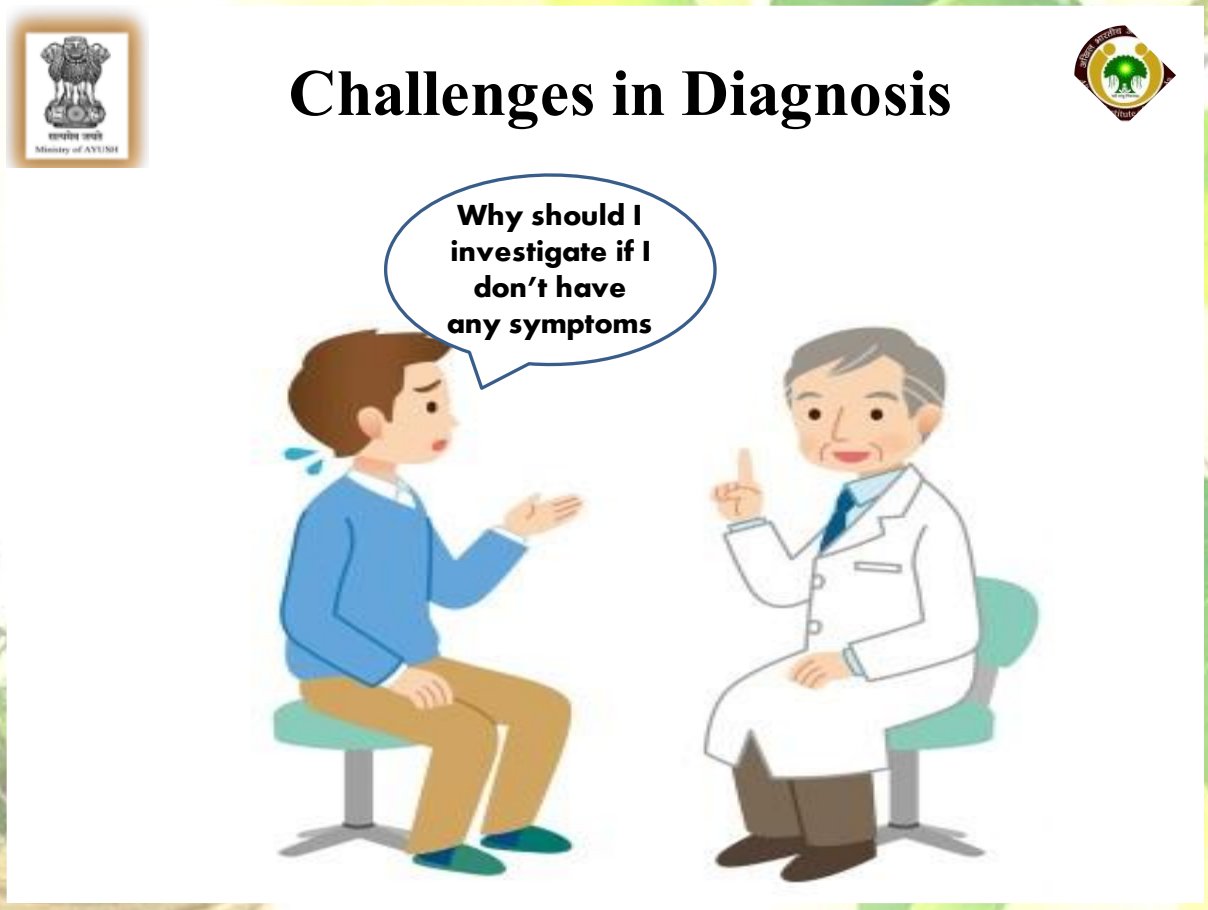
1. Good sensitivity and specificity
2. Single visit test
3. Quick results
4. No “booster phenomenon”

Disadvantages:

1. Higher cost
2. Requires blood sample
3. Not confirmatory for Active TB
4. Potential for technical error

Screening based on Screening Proforma:

As diagnosis of latent tuberculosis lack any “gold standard” investigatory tool and also no available investigatory tool can be use for assessing the LTBI in mass population it is utmost important to develop some alternative tool. Screening based on screening proforma is one of the cheapest, safest and easier way for quick assessment of LTBI.



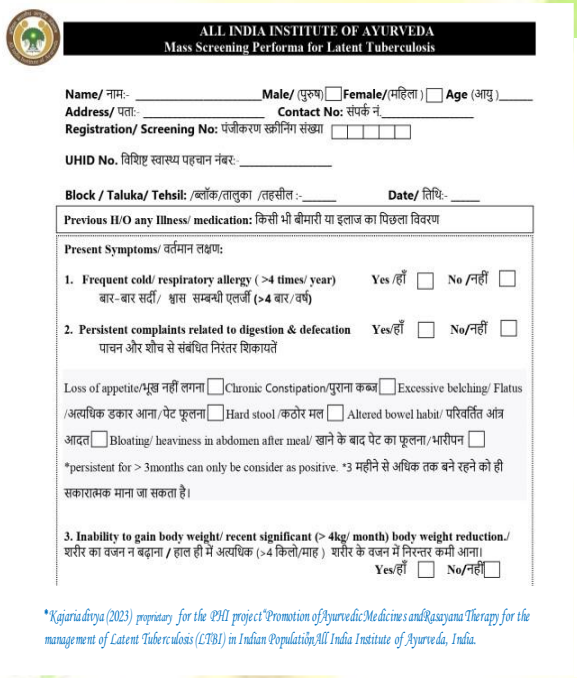
Refer to slide no 23 from the standard Power Point Presentation

Challenges in Diagnosis of LTB

- Latent TB is challenging to diagnose as there are no symptoms.
- Diagnostic tests involve screening individuals at higher risk, such as those with recent exposure to active TB cases.
- Thus, people with LTBI should be treated to prevent them from acquiring TB illness. About 90-95% infected with primary infection of TB contained the disease due to good immune response and prevent the bacteria from multiplying. Only 5-10% develops active TB. Latent tuberculosis is the

state of persistent immune response without any clinical sign of active disease. But due to persistent immune activation and hypersensitivity state patients have various other inflammatory diseases. If LTBI is remained untreated, 5-10% develops active TB disease throughout their lives. The transition phase from LTBI to active TB infection can remain long (duration is variable and depends upon many factors).

- Majority of individuals are asymptomatic and are categorized as having latent tuberculosis infection (LTBI). However, the understanding of tuberculosis (TB) infection dynamics has advanced to illustrate a spectrum that exists between "latent" and "active" states, encompassing a wide array of clinical presentations.
- Since LTBI patients do not exhibit any symptoms, screening LTB patients through testing is essential before beginning treatment. After LTB screening, the treatment option is decided. LTBI screening is beneficial for those who are at risk of acquiring an M. tuberculosis infection and developing active TB. Frequent testing in areas that aren't considered high risk wastes money and raises the possibility of getting false-positive findings. The most used technique for LTBI screening is the customized Mantoux tuberculin skin test (TST). In order to stop and reverse the increasing worldwide disease burden, improved TB diagnostics are crucial.



ALL INDIA INSTITUTE OF AYURVEDA
Mass Screening Performa for Latent Tuberculosis

Name/ नाम:- _____ **Male/** (पुरुष) ☐ **Female/**(महिला) ☐ **Age** (आयु)_____
Address/ पता:- _____ **Contact No:** संपर्क नं._____
Registration/ Screening No: पंजीकरण स्क्रीनिंग संख्या ☐☐☐☐☐

UHID No. विशिष्ट स्वास्थ्य पहचान नंबर:- _____

Block / Taluka/ Tehsil: /ब्लॉक/तालुका /तहसील :-_____ **Date/** तिथि:- ____

Previous H/O any Illness/ medication: किसी भी बीमारी या इलाज का पिछला विवरण

Present Symptoms/ वर्तमान लक्षण:

1. **Frequent cold/ respiratory allergy (>4 times/ year)** Yes /हाँ ☐ No /नहीं ☐
   बार-बार सर्दी/ श्वास सम्बन्धी एलर्जी (>4 बार/वर्ष)
2. **Persistent complaints related to digestion & defecation** Yes/हाँ ☐ No/नहीं ☐
   पाचन और शौच से संबंधित निरंतर शिकायतें

Loss of appetite/भूख नहीं लगना ☐ Chronic Constipation/पुराना कब्ज ☐ Excessive belching/ Flatus /अत्यधिक डकार आना /पेट फूलना ☐ Hard stool /कठोर मल ☐ Altered bowel habit/ परिवर्तित आंत्र आदत ☐ Bloating/ heaviness in abdomen after meal/ खाने के बाद पेट का फूलना/भारीपन ☐

*persistent for > 3months can only be consider as positive. *3 महीने से अधिक तक बने रहने को ही सकारात्मक माना जा सकता है।

3. **Inability to gain body weight/ recent significant (> 4kg/ month) body weight reduction./** शरीर का वजन न बढ़ाना / हाल ही में अत्यधिक (>4 किलो/माह) शरीर के वजन में निरन्तर कमी आना। Yes/हाँ ☐ No/नहीं ☐

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4. **Excessive anger/ stress reflected by easy irritability** Yes/हाँ ☐ No/नहीं ☐
   अत्यधिक गुस्सा /तनाव के कारण चिड़चिड़ापन

5. **Persistent bodyache / Excessive Fatigue**
   लगातार बदन दर्द/ अत्यधिक थकान महसूस होना Yes/हाँ ☐ No/नहीं ☐
6. **Lack of enthusiasm/ loss of energy in daily life**
   दैनिक जीवन में उत्साह की कमी/ ऊर्जा की कमी Yes/हाँ ☐ No/नहीं ☐

7. **Amenorrhea > 3months/ Inability to conceive despite regular coitus for 2 years** अनियमित मासिक धर्म/ 3 महीने से मासिक धर्म का न होना/ 2 साल तक नियमित सहवास के बावजूद गर्भ धारण नहीं होना

Yes/हाँ ☐ No/नहीं ☐

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8. **Hospital visit due to various reason> 6 times/ year** Yes/हं
   विभिन्न कारणों से 6 बार या इससे अधिक अस्पताल जाना

9. **Difficulty in joint movements (< 2 joints)** Yes/हं
   एक अथवा दो जोड़ों में दर्द होना

10. **Frequent headache/ dizziness/ lightheadedness (> 4times/ week)** Yes/हं
    लगातार अथवा बार- बार शिरदर्द /चक्कर (>4 बार/सप्ताह) आना

11. Stages/ चरण:-

1-3 Low Risk ☐

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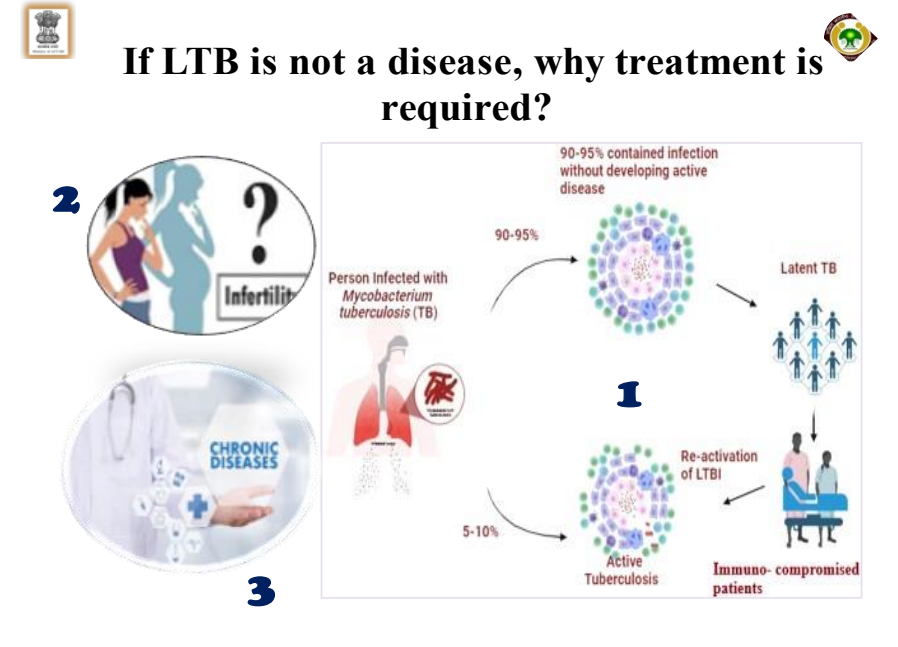
Refer to slide no 24, 25 & 26 from the standard Power Point Presentation

Risk stratification for LTBI based on screening profoma:

Diagnosis of LTBI is based on the investigations but the investigations recommended are very difficult to use practically for screening large population due to limitations of the diagnostic tests. The potential challenges with testing is the greater burden on patients, including discomfort, fear of injections or blood

collection, and the need for more visits (for measuring of induration in TST) with associated potential patient costs, time, delays and resulting losses from the cascade of care. False negative and indeterminate TB infection tests are also potential challenge. Such test outcomes are more frequent among immunocompromised individuals. IGRA is costly test and therefore can't be afford by low & middle class income patients. Therefore, a screening proforma (risk prediction model) is prepared for stratifying the risk of LTBI in large population.



Refer to slide no 27 from the standard Power Point Presentation

If LTB is not a disease, why treatment is required?

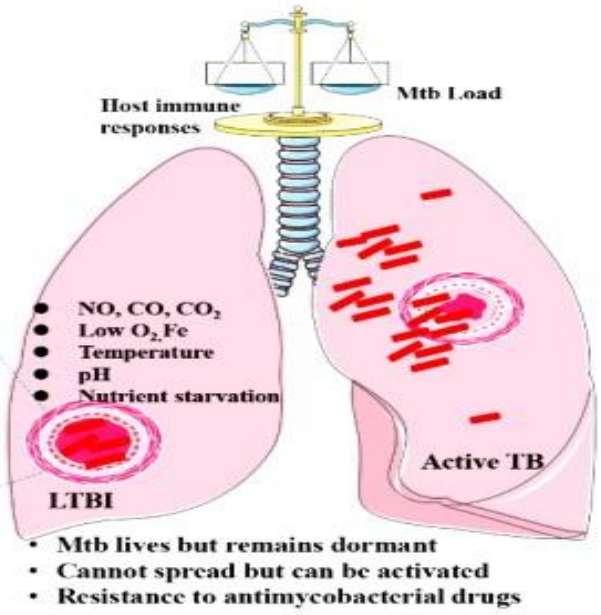
- To prevent progression in active TB in immuno-compromised people like HIV, Diabetes, Chronic Kidney Disease, Chronic Liver Disease, Autoimmune –hepatitis, drug abusers, Chronic obstructive pulmonary

disease (taking steroid therapy from long duration), Rheumatoid Arthritis (taking steroid therapy from long duration), auto-immune disorders, etc.

- Though it is not yet established but based on survey data it is found that LTBI has strong relationship with primary infertility in Indian population.
- LTB is found to have strong association with chronic diseases; through the cause-consequence relation is not defined.
- As noted in the NSP, there was previously no clear policy on the management of LTBI, except for children under 6 years of age exposed to patients with pulmonary tuberculosis or HIV. LTBI diagnosis and treatment are now planned to be used as an initial strategy in program-defined low-incidence settings.

Potential Reactivation

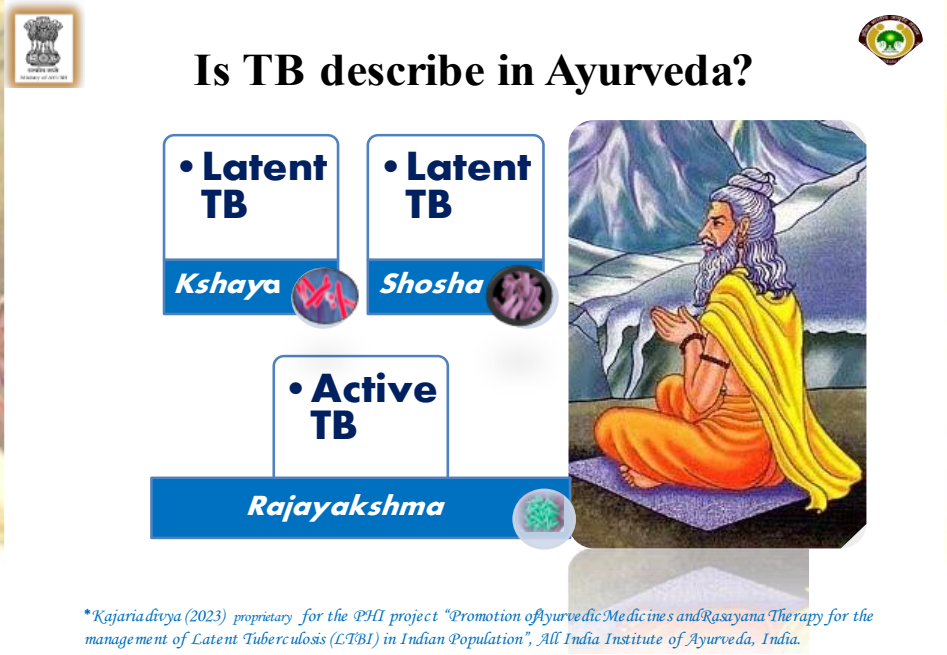
- Latent TB can remain dormant for years, but there's a risk of reactivation.
- Reactivation can occur if the immune system weakens, leading to active TB disease.



Refer to slide no 28 from the standard Power Point Presentation

Reactivation of LTBI

The rate at which latent tuberculosis infection (LTBI) progresses to active tuberculosis is debated, in part because reinfection can happen, but mainly due to the absence of techniques to identify LTBI individuals who are at the highest risk of developing active TB. The estimated lifetime risk of developing active TB for an individual with confirmed latent TB infection (LTBI) is between 5% and 15%, with most cases arising within the first five years following the initial infection. Nevertheless, the chance of latent TB infection progressing to active tuberculosis is influenced by a combination of bacterial, host, and environmental factors. Preventive treatment can help prevent the reactivation of TB. The advantages of treatment should be weighed carefully against the likelihood of adverse effects related to the medication. For individuals in high-risk populations who are infected, the expected benefits generally outweigh the possible risks. Therefore, it is crucial to identify which groups are likely to gain the most from treatment.



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Refer to slide no 29 from the standard Power Point Presentation

Understanding LTB and TB through Ayurveda

- All classical text of Ayurveda has described disease named as *Rajayakshma*, *Shosha*, *Kshaya* and *Kshatakshina*.
- The nomenclature of this disease is sufficient to describe the pathophysiology of the disease.
- Different stages of the clinically evident disease is as follows:
    - ✓ ***Shosha*:** Clinically manifested as loss of body weight or inability to gain weight; stage of latent infection; can be prevented from progressing into active disease by avoiding four etiological factors.
    - ✓ ***Rajayakshma***: Clinically manifested as syndrome having 3, 6 or 11 diseases; stage of active disease; includes both pulmonary as well as extra-pulmonary tuberculosis; can be prevented from developing complications by proper treatment including diet, medicine and stress management therapy.
    - ✓ ***Kshaya*:** Clinically manifested as reduced working capacity (loss of energy + loss of strength); immunocompromised stage, stage of complications due to chronic disease stage (post tubercular complications like bronchiectasis, consolidation, collapse of lungs, etc. where patient is having impaired lung functions and ultimately causing decline of metabolic functions of the body).
- *Shosha* may directly converted into *kshaya* if it is not associated with *Upsarga* i.e. it may possible that infection remains in the dormant stage to cause persistent inflammation and revoke immune response (i.e allergic reaction) and produces complications. Chronic inflammation and hypersentivity causes decline in the metabolic functions of the body. Therefore, Ayurveda strongly advocate the avoidance of causative factors for prevention of progression of

disease. As per Ayurveda, two factors i.e. (1) Immune response and (2) Infection both have equal contribution in determining the prognosis of disease. Any factor that weakens the immune response can causes *Rajayakshma*, it may be malnutrition, it may be excessive work load, it may be food intolerance or it may be autonomic nervous system imbalance caused by suppuration of natural urges.

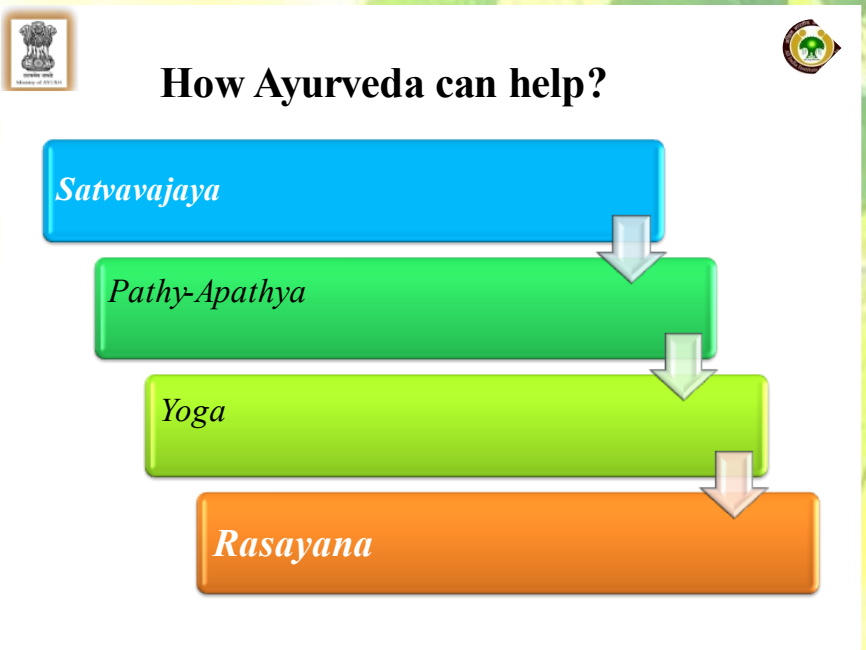
- There may be two possible ways of malfunctioning of immune system:
  1) Weak immune response manifest as immunocompromised state.
  2) Hyper immune response manifest as autoimmune disorders or allergic diseases.
- **Role of immunity in *Rajakshma***: Immunity plays a crucial role in development of disease, determining its prognosis and ultimately effect of treatment. In Ayurveda, strength of immunity is assessed by *Oja* and the status of Oja is as follows in various stages of the disease:
  - ✓ *Shosha*: Mild –Oja strength reduced (mild to moderate) but Oja dushti is not present.
  - ✓ *Rajayakshma- Oja dushti* present it may be *Oja visramasa, vyapad*, or *kshaya*
  - ✓ *Kshaya- Oja kshaya* is present.
- **Sign & Symptoms of *Rajayakshma*:**
  - Cardinal symptom of *Rajayakshma* is *Jvara* (fever).
  - There may be presence of 3,6 or 11 symptoms to be diagnosed as *Rajayakshma* as follows:
    - ✓ **3 Symptoms**: *Jvara* (fever), *Santapa- Karapada* (burning sensation in hands and feet) and *Ansha-Parshva-abhitapa* (pain/ great distress/ agitation at the lateral sides of the chest and scapular region/ shoulder blade region)

- ✓ **6 Symptoms:** *Jvara* (fever), *Kasa* (cough), *Svarbheda* (hoarseness of voice), *Arochaka* (anorexia), *Parsvashula* (pleuritic chest pain), *Atisara* (diarrhea)
- ✓ **11 Symptoms:** *Shvasa* (difficulty in breathing), *Ansatapa* (great distress/ pain/ agitation at scapular region, at the shoulder blade region), *Shirahshula* (headache), *Kanthodhvansa* (irritation in throat region), *Raktasthivana* (sputum with blood), *Kaphapraseka* (excessive salivation).

- Severity of the disease is assessed by the presence of number of symptoms.
- Differentiating symptoms of *Rajayakshma* based on etiological factor:
  - ✓ ***Sahasajanya Rajayakshma*:** Hemoptysis, Severe chest pain
  - ✓ ***Vegasamdharana Rajayakshma*:** *Chardi* (Vomiting), *Atisara* (Diarrhea), Altered bowel habit
  - ✓ ***Kshayajanya Rajayakshma*:** *Shvasa* (Dyspnea)
  - ✓ ***Vishamashanajanya Rajayakshma*:** *Rakta vamana* (hematemesis), *Chardi* (vomiting)

Symptoms of psyche involvement (*Purvarupa*):

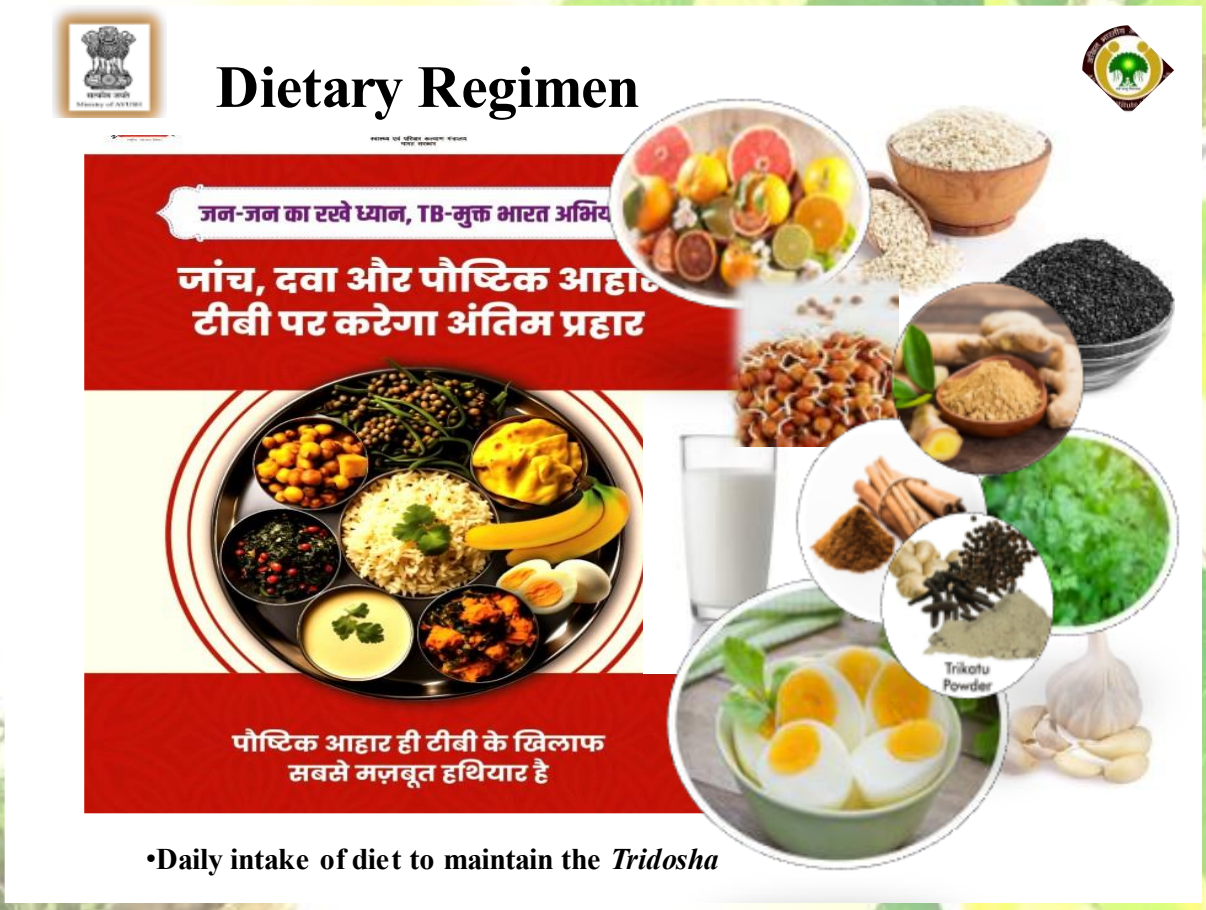
1) *Doshadarshanam* (having complaints with everything)
2) *Kaye bibhatsadarshanam* (seeing abnormalities in own body)
3) *Ghrina* (feeling of hatred/ dislike with everything)
4) *Makshika ghuna keshanam trinanam patanani prayo-annapane* (feeling that insect/hair/pollen/ foreign particle drops into meal/ water and spoil it)
5) Abnormal dreams



Refer to slide no 30 from the standard Power Point Presentation

Role of Ayurvveda in the Prevention and Treatment of LTBI

Ayurveda with its four-fold treatment strategies viz. (1) *Sattvavajaya* (2) *Pathy-apathya* (3) Yoga and (4) *Rasayana* therapy helps in prevention and management of Latent TB. This four-fold treatment strategy works to improve (1) understanding of the patient about the disease (2) helps to accept the actual facts about the disease (3) taught about the faulty dietary and daily habits to be avoided for strong immune system (4) help to adopt healthy life style for good digestion and mental health.



•Daily intake of diet to maintain the *Tridosha*

Refer to slide no 31 from the standard Power Point Presentation

Diet Regimen

Dhatu-agnimandya is the root cause of *Shosha* and if *Agni* is not restored to its normal state the disease progress into *Rajayakshma* (a severe immune-deficiency state manifest as cluster of diseases). *Agni* directly relates to *Oja* and *Oja* relates to the prognosis of the disease. According to Ayurveda, there is no medicine as like food. If a person follows the principle of Ayurveda for defining healthy food, dietary habits and method of cooking definitely one will remain disease free always.

3

1. **Definition of healthy food according to Ayurveda**
2. **Principle of healthy dietary habits**
3. **Principle of healthy cooking**

1. Defining healthy food:

Ever Wholesome Diet

1.Shashtika Shali (60 Days Rice)

2.Shali (Rice - oriza sativa Linn)

3.Mudga (Green Grams)

4.Saindhava (Rock Salt)

5.Amalaka (Goose Berry)

6.Yava (Barley)

7.Dugdha (Milk)

8.Ghruta (Ghee) and

9.Jangala Mansa (Meat of animals residing in the dry land)

2. Principle of healthy dietary habits: 5 'Rights' of AYURPOSHAN:

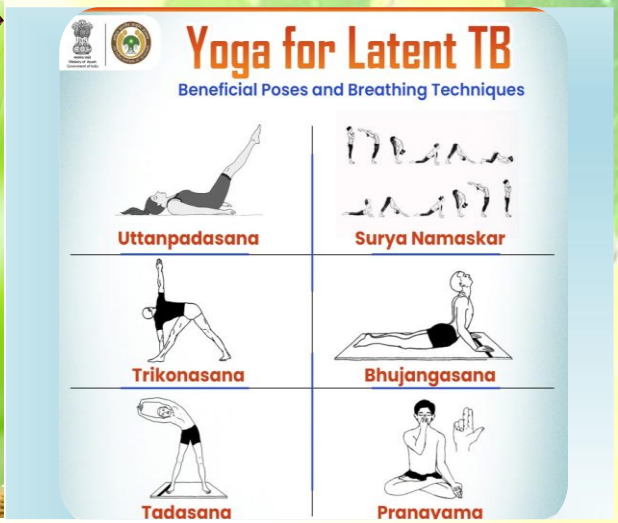
Based on the Principles of Ayurveda, one should follow……

1. The Right Time
2. The Right Quantity
3. The Right Quality
4. The Right Methods and
5. The Right Place

3. Principle of healthy cooking: Eight Factors - *Ashta aahar vidhi-visheshayatana* as described in Ayurveda should follow for preparing the food.

The diet should include *Deepan-Pachan* herbs to maintain the Agni.

***For more detail please visit the official website of All India Institute of Ayurved (IEC material related to LTB)**



Refer to slide no 32 & 33 from the standard Power Point Presentation

Yoga for Mental wellbeing

Research studies have found that Yoga (relaxing postures) lower stress hormones in body and simultaneously increase beneficial brain chemicals like endorphins and GABA (gamma-aminobutyric acid). These feel-good chemicals help in decreasing anxiety and improve mood. Some simple *Yoga-asanas* like-

- Sukshma vyayama (warm up)loosening exercises for all joints

- Sitting postures
- *Yogasana* in supine postures
- *Yogasana* in Prone position
- Relaxing postures : *Shavasana, Makarasana*
- Pranayama: Deep Breathing
- Meditation : 10 minutes

Are very helpful in combating relentless thought processing, it gives time to the brain for re-wiring itself (neuroplasticity) and remodeling itself according to the need of the body.

Yoga for rejuvenation of lungs:

Pranayama (breathing exercises) and yogic postures may play an impressive role in improving cardio-respiratory efficiency and facilitating gas diffusion at the alveolo-capillary membrane. Yoga regimen was found to improve lung functions and diffusion capacity in CAD patients besides improving cardiovascular functions. Thus, it can be used as a complimentary or adjunct therapy along with the conventional medicine for their treatment and rehabilitation.

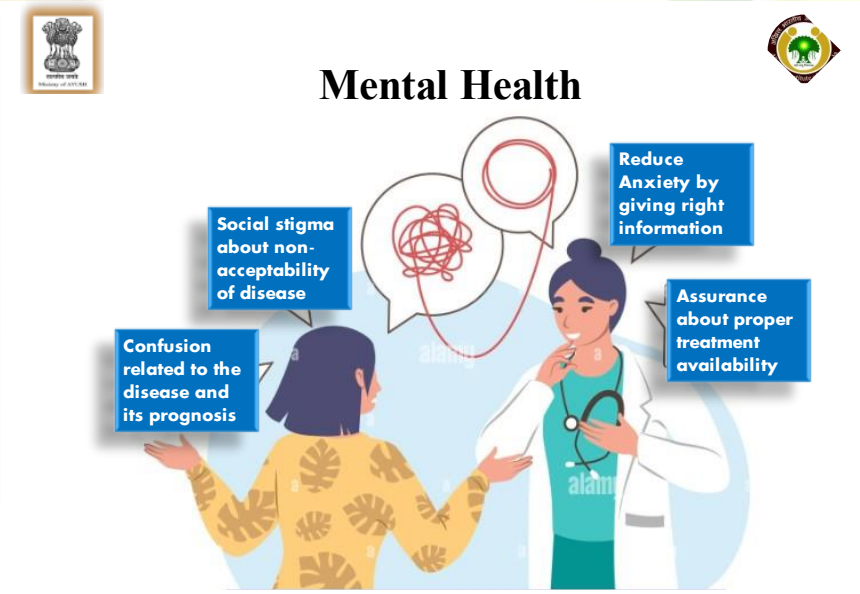
Yoga alters spontaneous respiratory regulation and reduces hypoxic and hypercapnic ventilatory responses. Regular yoga training in elderly definitely improves pulmonary function parameters like FVC and MVV. This may be due to regular slow and forceful inspiration and expiration during *yogasanas* leading to strengthening of respiratory muscles and increased release of surfactant too.

- ***Pranayama*** improved lung functions in numerous studies. Yoga involves isometric contraction and improves skeletal muscle strength. Yoga training improves the strength of expiratory as well as inspiratory muscles. There is

significant improvement in Vital Capacity, Tidal Volume, Expiratory Reserve Volume, Breath Holding Time, Peak Expiratory Flow Rate after Pranayama. ***Nadisuddi, Kapalbhati, Bhastrika*** **and** ***Bramhari*** **only for 5-10 mins for 2 months helps to improve the respiratory and circulatory system similar to 100m walk daily.**

- ***Surya Namaskar:*** *Surya Namaskar* has a deep effect in detoxifying the organs through copious oxygenation and has a deeper relaxing effect. It is a series of 12 physical postures. These alternating backward and forward bending postures flex and stretch the spinal column giving a profound stretch to the whole body. Yoga practice for long duration can significantly improves diastolic function with a minimal change in systolic function. Yoga is more effective than walking in improving cardiac function with high Pulse Pressure.

***For more detail, please visit the official website of All India Institute of Ayurved (IEC material related to LTB)**



Sattvavajaya(proper counseling)

Refer to slide no 34 from the standard Power Point Presentation

Sattvavajaya (proper counseling): Conveying right information

There are lots of false beliefs, fear, and social stigma related to the TB restraining the patients to take medical help at the earliest. Even in the 2025, common public are not much aware of Latent TB. Common man understand that TB is something that is related to the lungs and the only sign for its occurrence is blood in sputum/ weight loss and therefore there is complete denial of existence of TB without this sign. Most of the people never accept that they ever have any exposure of TB/ contact with the TB patient and therefore it requires lots of patience and effort to convince the patient that it really requires investigations to be done for proper diagnosis.

Once the patient is diagnosed as LTBI, there are many questions perplexing him and making him anxious and depressed. It is moral duty of the Physician to convey right information to the patient about the disease and its treatment. Physician should have to ensure that he/she is helpful in reducing the anxiety of the patient by proper counseling. Mental health plays a vital role in deciding the outcome of the treatment. Better treatment outcome can only be assured if the patient mind is relaxed.

Frequently asked Questions:

1. ***If I am having LTBI, do I need to be isolated?***

    - As the LTBI is neither communicable nor contagious, you don't need to get isolated, you can play with your children, carry your daily personal and social work, you are only infected but you don't have any disease.

2. ***If I have LTBI, then which part of my body is affected?***

   or,

   Which organ of my body has sleeping bacteria?

   - The bacteria are sleeping in your immune blood cell without affecting any specific organ and therefore you are still not develop the disease.

3. ***Is it curable?***

   - Yes, it is curable; Ayurveda will help you in boosting your immunity and prevent the progression of disease into active TB.

4. ***Do I need to prohibit my sexual activity?***

   or,

   Does my sex partner also get infected?

   - No, you don't need to prohibit your sexual activity and the infection will not transmit to your sexual partner.

5. ***What precautions should I need to take?***

   - You don't need to have any specific precautions, just take healthy diet, do regular Yoga, have sun exposure at least for 30 minutes, use mask at social place avoid overcrowding and don't over think about the disease.

6. ***If it is not TB, then why I need treatment?***

   - You need treatment to prevent the progression of disease into active TB. Treatment will help you to boost your immunity and restore your health.

7. ***What is TB Gold test? Does it confirm that I have active TB?***

   - TB Gold is a blood investigation for the diagnosis of Latent TB; it does not confirm that you have active TB.

8. ***If I have LTBI, can I get married?***

- Yes definitely, the disease is not communicable and only 5-10% infected people may develop active TB.

9. How Ayurveda can help me?

- Ayurveda with its holistic approach helps you to enhance your immunity, prevent the progression of disease and maintain your overall wellbeing.

Refer to slide no 35 from the standard Power Point Presentation

Rasayan Therapy

Rasayana, a branch of Ayurveda, includes a number of specialized approaches aimed at prolonging life, preventing aging and diseases, eliminating degenerative processes, and promoting excellent health.

The expression "*Rasayana"* is a unified state of two words – "*Rasa* and *Ayana*". In general terms it refers to the flow of nutrients or more specifically to the acquisition of excellence of vital fluids of the body to achieve a state of positive health, youth and disease free senescence. *Rasa* denotes the initial nourishing *Dhatu*. In Ayurveda, *Dhatu* describes the fundamental units of the body that both support and nurture it. Based on its structural and functional characteristics, it can be likened to "lymphoid plasma," which is thought to be the nourishing fluid component of blood that has leaked from blood vessels and nourished the tissues. *Ayana* signifies acquisition; in this context, it refers to the methods or techniques (both pharmaceutical and non-pharmaceutical) used to obtain optimal *Rasa dhatu*. Thus, *Rasayana* refers to all pharmaceutical as well as non-pharmaceutical methods by which vitality and body immunity can be enhanced for the promotion and maintenance healthy tissues, for the replenishment of daily wear and tear and for regeneration of tissues.

Rasayan like Amalaki(*Phyllanthus emblica*), Ashwagandha (*Withania somnifera*), Giloy (*Tinospora cordifolia*), Neem (*Azadirachta indica*), Pippali (*Piper longum*), Triphala, Shilajeet, Lauha bhasma, Swarna bhasma, etc., can be use for enhancing immunity.

- **Chyawanprash:** Chyawanprash is an ancient Indian formulation (a polyherbal), prepared according to a traditional Ayurvedic recipe, enriched with several herbs, herbal extracts, and processed minerals. Chyawanprash is formulated by processing around 50 medicinal herbs and their extracts, including the prime ingredient, *Amla* (Indian gooseberry), richest source of vitamin C. Chyawanprash preparation involves preparing a decoction of herbs, followed by dried extract preparation, subsequent mixture with honey, and addition of aromatic herb powders (namely clove, cardamom, and cinnamon) as standard.

- **Agasta Haritaki Rasayana:** *Agastya Haritaki Rasayana* is also an Ayurvedic proprietary medicine use as lung tonic to potentiate lung functions and to prevent respiratory diseases like dyspnea, cough, common cold, allergic rhinitis, etc. It contents like Dashamoola, Atmagupta, Sati, Bharangi, Citrakamula, etc. gives it characteristic phamacodynamic properties like anti-tussive, mucolytic, antioxidant, anti-allergic, anti-inflammatory and mild laxative. Agastya Rasayanam is also very useful in chronic respiratory problems.

PREVENTION

- Getting a diagnosis and treatment early.
- Staying away from other people until there is no longer a risk of infection.
- Wearing a mask, covering the mouth, and ventilating rooms.
- Should wear mask in right way.

Refer to slide no 36 from the standard Power Point Presentation

PREVENTION

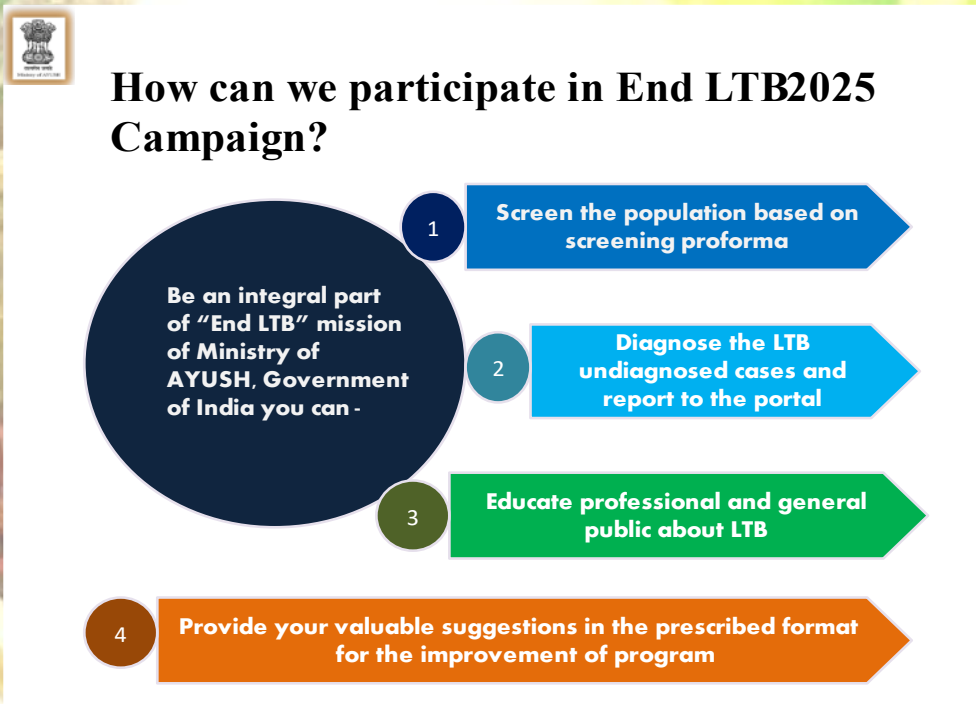
- People with pulmonary tuberculosis or respiratory infection should follow respiratory hygiene and cough etiquette.
- Avoid spitting on public places.
- People with tuberculosis should cover their nose and mouth when coughing and sneezing, especially in the first few weeks after diagnosis.
- Patients with tuberculosis should live or work in well-ventilated rooms.
- The BCG (Bacillus Calmette Guerin) vaccine is the only vaccine against tuberculosis currently available. It is a weakened strain of tuberculosis that causes the body to become immune to tuberculosis. BCG protects young children against severe forms of tuberculosis such as meningitis and disseminated tuberculosis. It does not prevent pulmonary tuberculosis in children or adults. BCG is also moderately protective against leprosy.
- Proper signage about the spitting etiquettes and wearing masks should be placed in heavy crowded places like buses, metros, trains, markets, hotels, etc.

Refer to slide no 37 from the standard Power Point Presentation

Community Responsibility
Psychological Support to TB sufferer and his/her family

- Like other long-term diseases, tuberculosis affects a person in many ways.
- In addition to the physical symptoms, tuberculosis also affects a person's earning capacity, people with tuberculosis are often unable to work or support their families.
- People with TB face significant stigma from their families, providers and communities and may be isolated or marginalized. Tuberculosis can destroy relationships and affect livelihoods.
- Tuberculosis is still associated with various age-old myths and misconceptions that exacerbate stigma. For example, many people think that tuberculosis is hereditary - it is not.
- Tuberculosis is a sex-specific disease that affects men and women differently.
- Men tend to face job and income loss and struggle to make ends meet, experience poverty and sometimes isolation.
- Most women, on the other hand, are isolated and ashamed of their family, friends and mother-in-law. Married women are sometimes kicked out of their homes. Women are often forced to take their treatment in secret and live in constant fear that people around them will find out they have tuberculosis.
- People with TB, especially post TB LTBI, are vulnerable to depression and require counseling and social support.
- Family and friends also play an important role at this time. During the treatment period, a person with LTB needs the support of family, friends, well-wishers and community members.
- A good support system can help prevent a person from spiraling into depression and giving up the treatment.

- Access to good nutritious food is important during LTB treatment.
- In April 2018, the government initiated the Nikshay Poshan Yojana – a scheme for provision of nutrition support to people with TB. The scheme provides a financial support of Rs. 500/month to each notified person with TB through Direct Benefit Transfer for the duration for which the person is on treatment.
- Health care provider should encourage patients for involving in daily practice of meditation and Yoga. These relaxing techniques are having positive impact on one's quality of life.
- Counseling should be given to the patient's family also so that they can understand the patient psychological and nutritional needs.

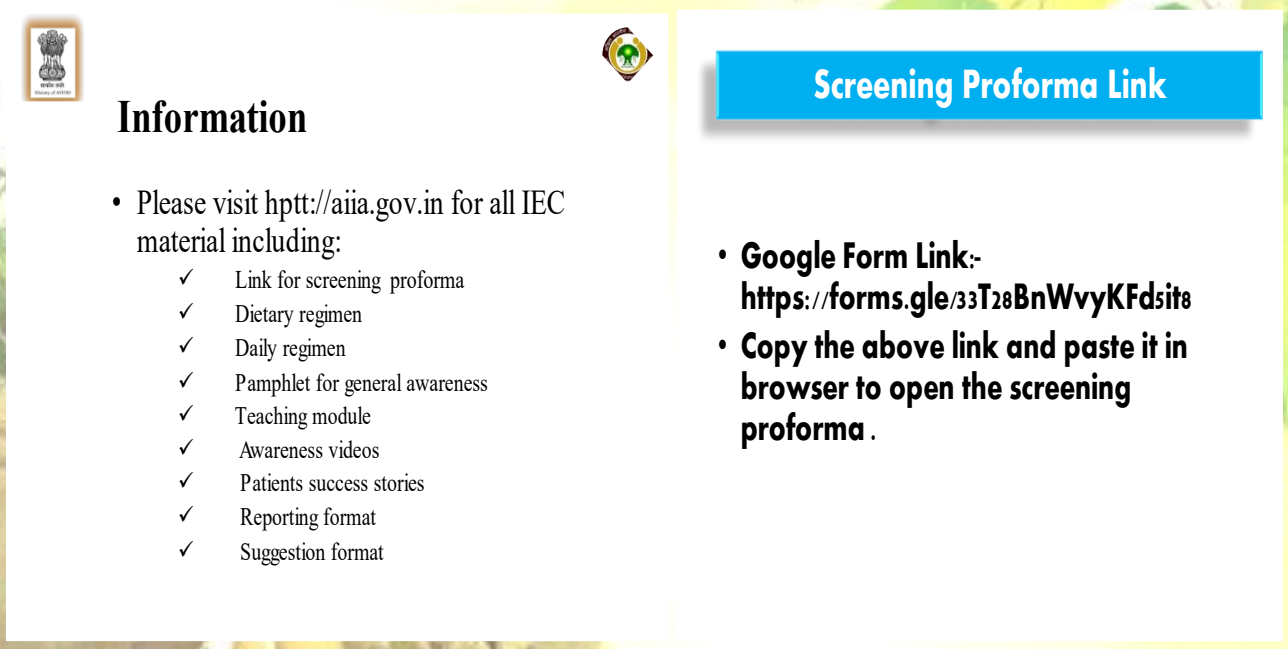


Refer to slide no 38 from the standard Power Point Presentation

How can I participates in END LTB Campaign (*Jan Bhagidari*)

Be an integral part of “End LTB” mission of Ministry of AYUSH, Government of India you can-

- Screen the population based on screening proforma
- Diagnose the LTB undiagnosed cases and report to the portal
- Educate professional and general public about LTB
- Provide your valuable suggestions in the prescribed format for the improvement of program



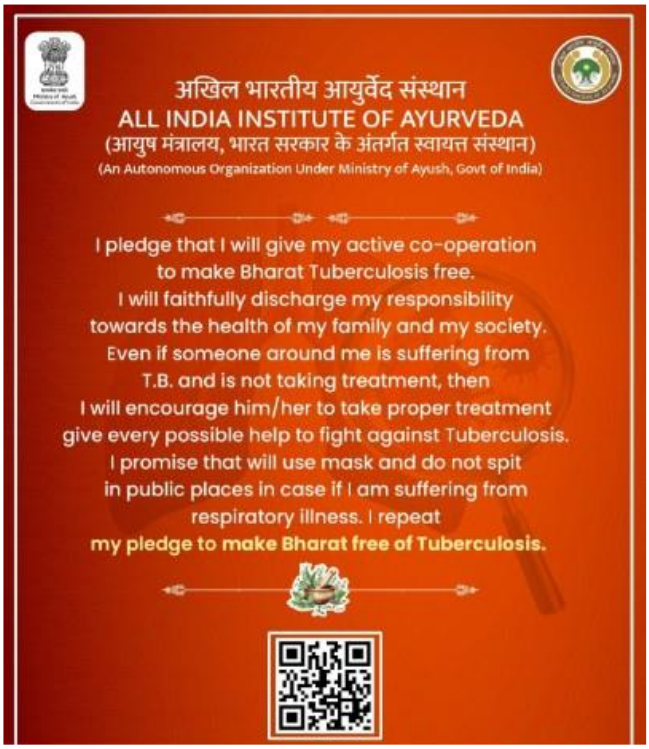
Refer to slide no 40 & 41 from the standard Power Point Presentation

Important information

- All the relevant information are available on **http://aiia.gov.in**
- Google Form Link:-https://forms.gle/33T28BnWvyKFd5it8

  (Copy the above link and paste it in browser to open the screening proforma)

Digital TB Pledge



Refer to slide no 42 & 43 from the standard Power Point Presentation

English and Hindi version of digital pledge ensure public commitment for their active participating in eliminating TB from India through prevention, proper treatment and maintaining social hygiene. The pledge will be helpful in realizing the responsibility of individual toward society and also make them aware about social etiquettes. The pledge will be helpful in demonstrating commitments toward achieving the goal of "END LTB-2025" and also promote shared responsibility.

Refer to Slide no 44 from the standard Power Point Presentation

Milestone achieved by AIIA-NTEP-AYUSH Division

- No. of Population screened for LTBI: Screened based on screening proforma for LTBI:- **-64,635 (Sixty four Thousand Six Hundred Thirty Five)**
- Pre-defined treatment beneficiary:- 1500
- Beneficiaries for medicines: 5893

- **Awareness Public Lectures:**
  - ✓ Public Awareness Lectures delivered: **-526 (100 lectures delivered under the 100 days campaign of "End -TB"**
  - ✓ Number of beneficiaries by awareness lecture: **46,532 (forty-six thousand five hundred thirty-two).**

- ✓ Call centre is established at NTPC D-010 for resolving the quarries related to the disease, treatment, investigation and medicines. Operational from September 2024.
- ✓ IEC material published related to the dietary regimen, daily regimen, Yoga practices, Do's & Don'ts, awareness about the disease, etc.

ADDITIONAL READING

Potential Strategy for eliminating TB:

The long-term reduction of the TB burden can be achieved in two ways-

1. Prompt and early detection of all individuals having active TB and the implementation of appropriate treatment to render them non-contagious. As a result, fewer carriers will later acquire active TB, limiting transmission.

2. An alternative strategy is to identify those still suffering from LTBI and treat them to stop the later onset of the disease. Earlier (in 1950s) Government was using this strategy.

Limitation of the available treatment of LTBI:

1. Poor patient compliance: The prolonged course of therapy decreases patient compliance,

2. Adverse side effects: significant adverse effects including hepatitis, further discourages patients and healthcare professionals from accepting therapy.

Why alternative medicines required for the treatment of LTBI:

1. It is evident that to eradicate TB, it will be necessary to develop new, safer medications for LTBI treatment that providers can give for shorter periods.

2. Ayurveda due to ethnic belief is the most trusted/ accepted medical practice in India, can provide better patient compliance and better outcomes in early diagnosis, breaking the social stigma and fear related to the prognosis of disease.

3. Easily availability and habitual practice of taking herbs help will encourage the vast coverage of population in least economic burden and outreach activities.

Challenges in the treatment of LTBI

- Lacking awareness about the disease
- Lacking awareness about the need for diagnosis and treatment
- Perplexity related to the diagnostic criteria
- Variability in the treatment module

Essential clinical diagnostic criteria for LTBI:

- **Exclusion of active TB**: Prior to initiating LTBI treatment, providers must ensure there are no indications of active TB by thoroughly reviewing the patient's history, conducting a physical examination, performing comprehensive tests such as chest X-rays, and, if necessary, carrying out bacteriological assessments.

- **Judicious selection of investigation:** In latent TB infections, the bacillary load is low; therefore, tubercle bacilli are typically non-recoverable from sputum and other places of a TB disease individual and therefore negative result of this investigation should not be consider for exclusion of LTBI treatment.

Current status of TB in India:

TB CASES IN INDIA OVER THE YEARS			
	India TB Report 2020	**2023**	**2024**
Estimated TB cases	**26.9 lakh**	**27.4 lakh**	**27.8 lakh**
Number of cases reported	**24.04 lakh**	**24.2 lakh**	**25.5 lakh**
Reporting from private sector	**6.8 lakh**	**7.3 lakh**	**8.4 lakh**
% cases from private sector	**28.20%**	**30%**	**32.9%**
Estimated mortality	**4.36 lakhs**	**3.2 lakhs**	**3.2 lakhs**

*India TB report 2024

In the ten-year period from 2010 to 2020, tuberculosis claimed the lives of approximately 1.5 to 2 million individuals annually. This disease predominantly impacts populations in low-income countries, particularly the impoverished and vulnerable groups. As indicated in the World Health Organization's Global TB Report 2021, India accounts for 25% of the world's tuberculosis cases, with 2.59 million reported cases. India has observed a decline of over 20% in case notifications. In 2020, the country recorded 1.8 million tuberculosis cases, a decrease from 2.4 million in 2019. This reduction is not attributed to a genuine decrease in

the incidence of the disease but rather to under-reporting. The apprehension surrounding COVID-19 lockdowns and the associated economic pressures have deterred individuals from seeking medical attention to report their condition and receive necessary treatment.

What are the causes behind high occurrence of TB in India?

1. **Poverty:** A significant number of tuberculosis (TB) patients in India are affected by malnutrition. The constraints of poverty hinder their access to adequate nutrition and medical treatment, thereby increasing their vulnerability to both the onset and persistence of TB.
2. **Unhealthy Habits:** More than one hundred million individuals in India engage in tobacco smoking, which is a significant risk factor for both the onset of TB and mortality associated with the disease. The strong dependence on tobacco often leads individuals to continue its use even during TB treatment, complicating the healing process.
3. **Underreporting:** A critical contributor to the prevalence of TB in India is the underreporting of cases. This situation heightens the risk of transmission to healthy individuals. The inaccurate assessments of the tuberculosis burden in India from 2000 to 2015 have resulted in the World Health Organization (WHO) significantly underestimating the TB epidemic.
4. **Social Stigma:** Many patients are reluctant to seek medical attention or may outright deny their condition due to fears of social stigma and discrimination. Furthermore, even after receiving a diagnosis, they often do not complete their treatment, which can lead to the development of multidrug-resistant TB. Additional challenges, such as shortages of healthcare personnel, delays in

payments, procurement issues, and drug shortages, further exacerbate the prevalence of TB.

What steps have been taken by Government of India for combating TB?

- **National Strategic Plan for TB elimination (2017-25)**: It plans to provide incentives to private providers for following the standard protocols for diagnosis and treatment as well as for notifying the government of cases. Further, patients referred to the government will receive a cash transfer to compensate them for the direct and indirect costs of undergoing treatment and as an incentive to complete treatment.
- *Nikshay*: It is an online tuberculosis reporting system for medical practitioners and clinical establishments that aims to increase the reporting of tuberculosis, especially from the private sector.
- **TB-free India Campaign**: It was launched to take the activities under the National Strategic Plan for TB Elimination forward in a mission mode for ending the epidemic by 2025.
- **Bacillus Calmette-Guérin (BCG) vaccine** is presently the sole vaccine available for the prevention of Tuberculosis (TB). However, its efficacy is very less in countries on or near the equator like India, Kenya and Malawi, where the burden of TB is higher.

COVID-19 impact on tuberculosis incidence in India:

In spite of several similarities in manifestation and differences in etiology, there is still lack of full knowledge about the epidemiological relationship between TB and COVID-19.

- In the year 2020, during the COVID-19 pandemic, a notable global decline in tuberculosis (TB) incidence was observed, with cases dropping from 7.1 million in 2019 to 5.8 million in 2020, representing an 18 percent decrease. India is recognized as one of the top three countries contributing to this global reduction, alongside Indonesia and the Philippines, collectively accounting for 67 percent of the decrease. According to data from The World Bank, India's annual TB incidence had been on a continuous decline since 2000; however, it experienced an increase in 2021, rising to 210 per 100,000 individuals from 204 per 100,000 in 2020. A modeling analysis indicated that the lockdown measures resulted in an 80 percent reduction in TB notification rates in India. Given that India ranks fourth in terms of COVID-19 infections and fatalities, there is a concern that the easing of COVID-19 restrictions may reveal a rise in TB cases and deaths in the coming years.
- There is an increase of 7.79 percent in TB case detection during the COVID-19 period. First COVID-19 year i.e. 2020 there is significant reduction in number of new (TB) cases detected by 580869 numbers or 24.29 percent in comparison to last pre-COVID-19 year i.e. 2019. The number of new (TB) cases detected increased continuously during pre-COVID-19 years by 29.59 percent in 2018 and 18.49 percent in 2019.
- Before the Covid pandemic, it was assumed that a third of all individuals with TB were undiagnosed, and were likely spreading the disease in their communities. In the past two years, case detection has dropped, suggesting that the proportion of such ‘missing cases’ is likely to have increased.

What are the similarities between TB and COVID-19?

- Both are transmissible and airborne infections.

- Both are more likely to spread in crowded settings, and harm people with immuno-compromising conditions.
- Both have impacted a huge number of people across the globe and can be controlled with collective efforts.

Latent Tuberculosis and HIV Infection: Serious threat

The prevention of tuberculosis through the screening and treatment of latent tuberculosis infection (LTBI), in conjunction with the commencement of antiretroviral therapy (ART), constitutes a fundamental aspect of HIV care. Despite the global increase in access to ART, the initiation and completion rates of LTBI treatment among individuals living with HIV remain significantly low. The simultaneous administration of TB-preventive therapy and ART presents challenges due to potential drug–drug interactions; **however, these issues can be effectively managed by using Ayurveda.** Further research is essential to inform TB-preventive strategies for children, pregnant women, and those affected by drug-resistant tuberculosis (DR-TB).

Individuals living with HIV face a 15 to 22 times higher likelihood of developing active TB compared to those without HIV, making TB the foremost cause of mortality among HIV patients globally. Active TB can manifest following recent exposure to Mycobacterium tuberculosis (primary disease) or through the reactivation of a latent infection. For individuals with untreated HIV, the annual risk of developing TB due to the reactivation of latent infection is estimated to be between 3% and 16%, which is comparable to the lifetime risk of TB (5% to 10%) in individuals without HIV. The heightened risk of active TB begins within the first year following HIV infection and escalates with advancing immunodeficiency.

Role of Ayurveda in the management of Tuberculosis: Indian Prospective

- Ayurveda showed its efficacy in the management of latent tuberculosis and Multiple Drug Resistance Tuberculosis with clinical evidence but it requires to be disseminated among health sector especially in National Health Programme in the best interest of patient.
- Failure of ATT, long duration of treatment, multiple side effects are the major concern that need urgent solution especially in post-COVID era, when drop-up cases are much more than estimated. Safe and complete cure of Tuberculosis is only possible with an Integrative approach, including Yoga & *Rasayan* therapy and this is not only requirement for India only but it needed for globe.
- Couple of single and compound Ayurvedic drugs including both herbal and hero-mineral have been used for the management of TB. However, none of the medicine till now have reported the true anti-TB activities in vivo or in-vitro. Most of the Ayurvedic medicines are reported to reduce associated symptoms and the adverse drug effects of ATDs (anti-TB drugs). Furthermore, some of the preparations showed potential hepato-protective properties that can be simultaneously administered with ATDs.
- Distressingly research on the role of Ayurveda in the management of TB is very scanty and mostly limited to adjunct or supportive therapy. Being a global public health crisis, it is highly recommended to carry out clinical trials on TB patients using Ayurvedic drugs and therapeutic regimens.

Initiatives by Ministry of AYUSH for 100 Days End TB Campaign:

1. Engagement of all institutions and organizations of Ayush in the 100 days campaign.
2. Display of IEC materials in all offices and institutions.
3. Awareness generation of all staff on TB.
4. Organize Ni-kshay Shivir (screening camps) by AYUSH institutions to be organized in consultation with State nodal Health department during the period from 3rd February to 15th February 2025.
5. Dissemination of anti-TB messages on social media of the Ministry.
6. Taking the Ni-Kshay Shapath (pledge) during the period from 27th January to 2nd February 2025.
7. Communicate to all state functionaries on TB campaign seeking their support.
8. Register new Ni-kshay Mitra in all institutions and organizations and Ministry of AYUSH.

Initiative by All India Institute of Ayurveda for 100 Days End TB Campaign:

Launching of "End LTB with Ayurveda" Campaign:

The campaign embodies a holistic approach to addressing Latent Tuberculosis by combining ancient wisdom with modern public health strategies. Through mass awareness, community engagement, and strategic implementation, Ayurveda will significantly contribute to India's goal of eliminating TB by 2025.

The campaign, named **" End LTB with Ayurveda"** aimed to spread awareness about LTBI and role of Ayurveda in its management among mass population

through Ayurveda practitioners, institutions, and communities nationwide. The key objectives include:

1. **Raising Awareness:** about the need for screening of LTB in Indian population through over 1 lakh lectures delivered by Ayurvedic practitioners and students.
2. **Early Detection and Management:** Screening approximately 50 lakh individuals for LTB and promoting early diagnosis of LTB.
3. **Integration with National Health Initiatives:** Promoting collaboration between Ayurveda and mainstream healthcare sectors.

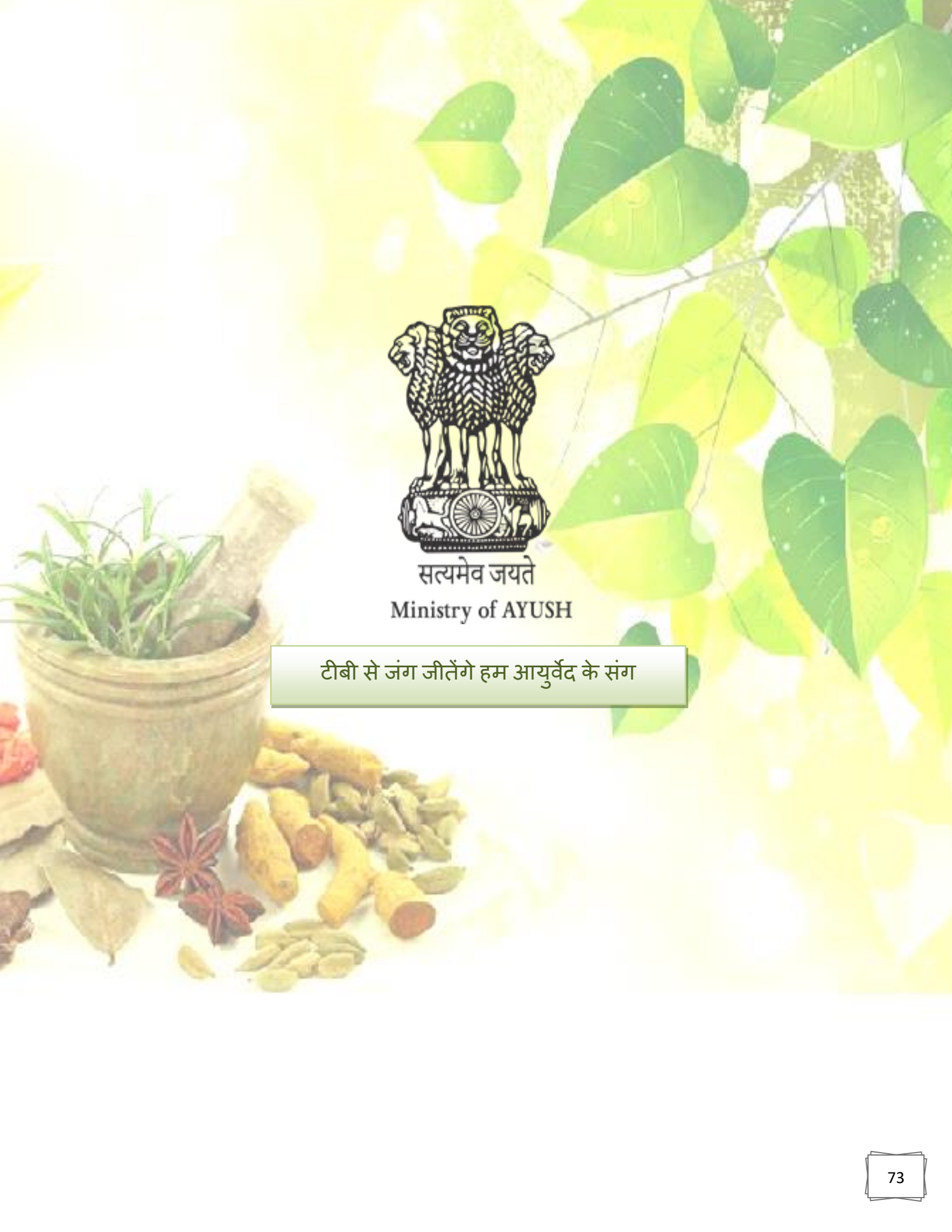
Key Components of the Campaign:

- **Training of Trainers (TOT):** Online sessions to equip state AYUSH directors, college principals, and practitioners with standardized materials.
- **Mass Awareness Drive:** Conducting lectures in local languages using regionally adapted PowerPoint presentations and booklets.
- **Community Engagement:** Outreach programs targeting schools, NGOs, Gram sabhas, and urban societies.

Technical Support: Providing dietary guidelines, Yoga practices, and Ayurvedic regimens tailored for LTB management. The campaign envisions active participation from Ayurvedic college faculty, postgraduate scholars, general practitioners, and NGOs. Technical oversight will be ensured by AIIA, with periodic progress reporting by state AYUSH directors.

Expected Outcomes:

- Awareness creation among Indian citizens.
- Strengthened integration of Ayurveda in national health missions.
- Early diagnosis and preventive management for vulnerable populations.



सत्यमेव जयते

Ministry of AYUSH

टीबी से जंग जीतेंगे हम आयुर्वेद के संग