TUBERCULOSIS (TB): A LEADING INFECTIOUS KILLER CURABLE AND PREVENTABLE

What is Tuberculosis (TB)?

Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis.

How does Tuberculosis Spread?

TB is an airborne disease. When a person with TB coughs or sneezes, TB bacteria are released into the air and can stay suspended for hours.

TB usually spreads to household members and others who live or work closely with the affected person.

Latent TB

- TB bacteria are present in the body but inactive.
- No symptoms, normal chest X-ray.
- Not contagious but may become active later.
- Prevention: Medication can stop TB from becoming active.

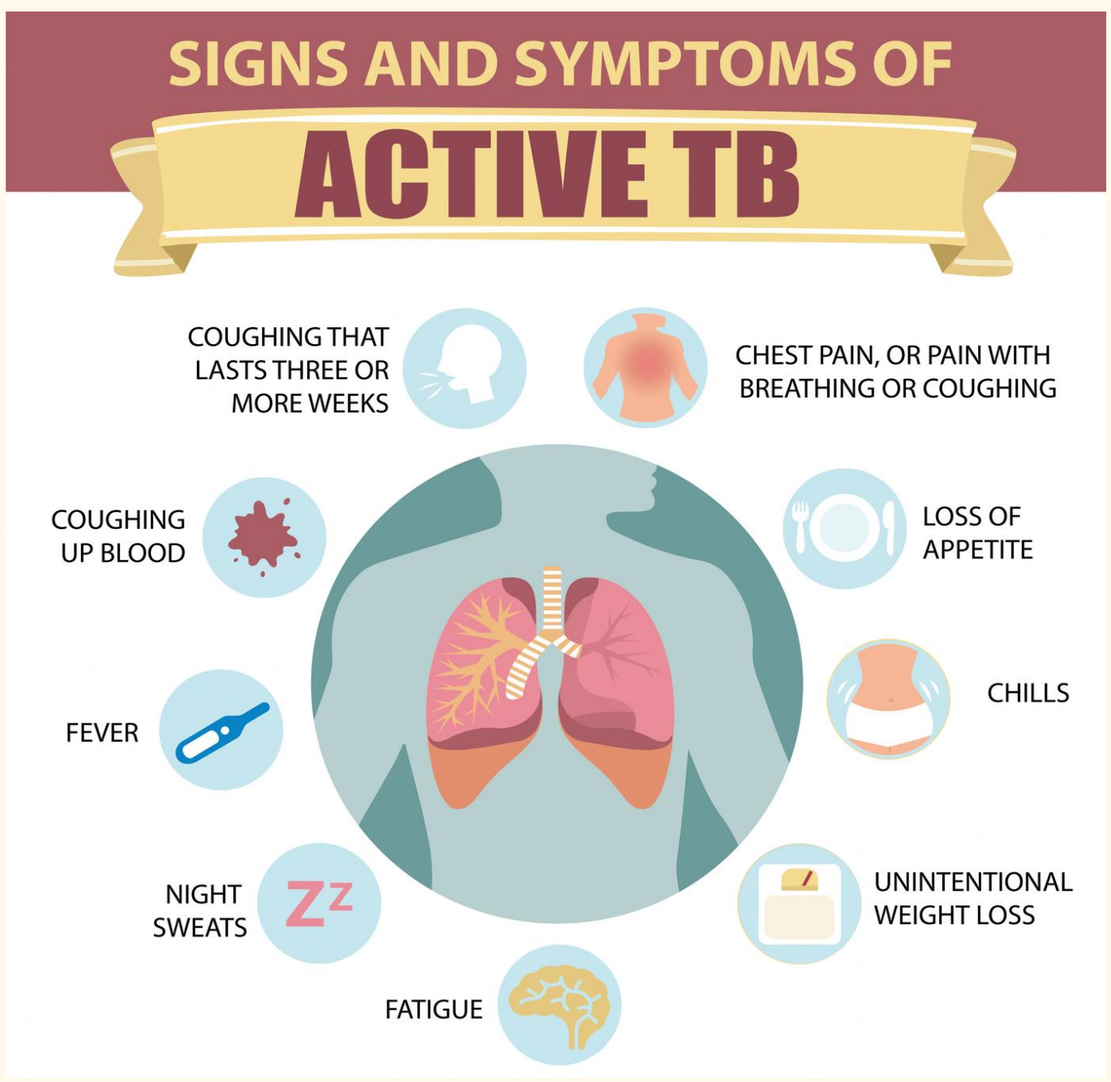
Active TB

- TB bacteria are multiplying in the body.
- Causes symptoms & can spread to others.
- Primarily affects the lungs but may spread to the lymph nodes, digestive system, kidneys, liver and bones.
- Requires immediate medical treatment.

TB Infection

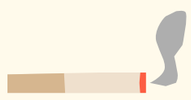
Once TB bacilli enter a person's body, they can infect the individual. The body's defences can build a wall around the bacteria, preventing them from causing disease.

However, in 10% of cases, it may develop into active TB if left untreated.(1)

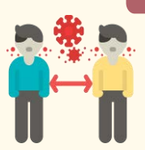


Risk Factors

HIV/AIDS



Smoking



Close contact of people with active TB disease

People with weakened immune systems (e.g. diabetes, cancer)

Overcrowded living conditions

Malnutrition

Global Statistics

TB remained the world's leading cause of death from a single infectious agent in 2023.(2)

In 2023, 10.8 million people were newly diagnosed with TB globally.(3)

In 2023, TB was responsible for an estimated 1.25 million deaths worldwide.(2)

Singapore Statistics

TB is common in Singapore, with older males making up a significant portion of new cases.(4)

In 2023, there were 1,201 new active TB cases among Singapore residents, with an incidence rate of 28.9 cases per 100,000 people.(4)

In 2021, Singapore reported 11 deaths due to TB.(5)

1. World Health Organization (WHO). (2021). *WHO operational handbook on tuberculosis: Module 1: Prevention: Tuberculosis preventive treatment. World Health Organization.* https://www.who.int/publications/i/item/9789241548908
2. World Health Organization. (2024, October 29). *Tuberculosis resurges as top infectious disease killer.* https://www.who.int/news/item/29-10-2024-tuberculosis-resurges-as-top-infectious-disease-killer
3. World Health Organization. (2024). *Global tuberculosis report 2024.* https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2024
4. Ministry of Health Singapore. (2024). *Update on tuberculosis situation in Singapore.* https://www.moh.gov.sg/newsroom/update-on-tuberculosis-situation-in-singapore-2024
5. Tan Tock Seng Hospital. (2023). Number of TB cases in Singapore falls for 4th straight year. https://www.ttsh.com.sg/About-TTSH/TTSH-News/Pages/Number-of-TB-cases-in-Singapore-falls-for-4th-straight-year.aspx

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TUBERCULOSIS IS CURABLE WITH PROPER TREATMENT

WHY TREATMENT MATTERS

- Tuberculosis (TB) is curable with proper treatment.
- If left untreated, 50% of Active TB cases may be fatal within 5 years.[1]
- Treatment for TB typically involves a combination of 3 to 4 antibiotics, taken over a period of 6 to 9 months.

- Failure to complete the treatment course or using incorrect regimens can lead to:
  - Relapse of TB disease
  - Development of drug-resistant TB

Antibiotics Commonly Used for Active TB Treatment:

- Rifampicin
- Isoniazid
- Ethambutol
- Pyrazinamide

DIRECTLY OBSERVED THERAPY (DOT)

What is DOT?

- DOT involves taking TB medications under the supervision of a healthcare worker.
- It ensures compliance to treatment, preventing relapse and the spread of TB bacteria.
- Prevents the development of Multidrug-resistant TB (MDR-TB).

Why is DOT Important?

- Ensures patients take the correct dose of medication regularly without missing any dose.
- Nurses monitor patients for any side effects of TB medications.

DOT Services in Singapore

- Conducted by trained nurses in:
  - Government polyclinics
  - National TB Care Centre (NTBCC)

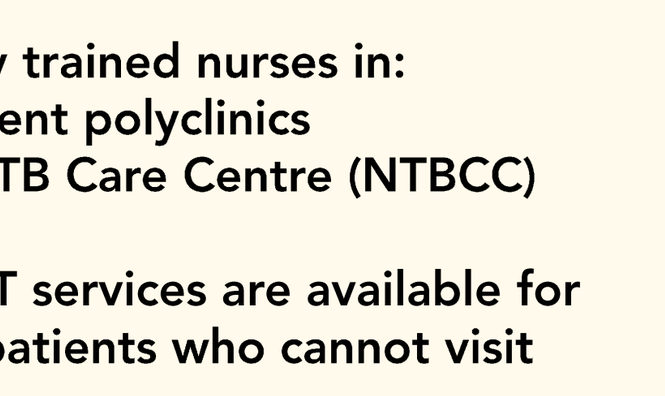
- Outreach DOT services are available for homebound patients who cannot visit polyclinics.

VIDEO OBSERVED THERAPY (VOT)

VOT involves taking TB medications under healthcare worker observation via video.

- Requirements for VOT:
  - Strong internet connection
  - Access to a video application
  - Meeting specific medical criteria

- Benefits of VOT:
  - A flexible alternative for patients unable to attend in-person DOT sessions.



1. Centers for Disease Control and Prevention. (2023). *Core Curriculum on Tuberculosis: What the Clinician Should Know. Chapter 2: Transmission and Pathogenesis of Tuberculosis.* https://www.cdc.gov/tb/education/corecurr/pdf/chapter2.pdf

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UNDERSTANDING TUBERCULOSIS (TB)

TB Treatment Failure

Failure of Tuberculosis (TB) treatment is primarily caused by:

Non-compliance with the full course of drug treatment.

Drug-resistant TB infection, which occurs less commonly.

How Can We Prevent the Spread of TB?

- If you have a persistent cough lasting more than three weeks or other symptoms of TB, seek medical advice immediately.
- Ensure people with TB are promptly diagnosed, treated, and cured.
- TB diagnosis is confirmed through chest X-rays and sputum tests.

- Patients must adhere to treatment under supervision to:
  - Prevent recurrence.
  - Achieve complete recovery, as TB bacteria remain in the body even if symptoms improve during the early weeks of treatment.

What Happens If the Full Course of TB Treatment is Not Completed?

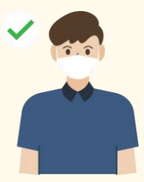
TB bacteria remaining in the body may multiply, causing illness again.

- Multidrug-resistant TB (MDR-TB) may develop, which:
  - Reduces the chance of recovery.
  - Increases the risk of spreading MDR-TB to loved ones.

- Medications to Treat MDR-TB:
  - Require a longer treatment period.
  - May cause more side effects.

Undergoing TB Treatment: Things to Note

Stay at home during the first two weeks of treatment.



Wear a mask around others during the initial phase of treatment.

Cover your mouth with a tissue when coughing or sneezing and dispose of tissues and masks properly.

- TB cannot be spread by:
  - Sharing food, cups, or utensils.
  - Touching objects used by a person with TB.
- Patients can continue to work while on treatment.

<u>Say NO to stigmatising TB patients:</u>

Stigma delays treatment, worsens outcomes and increases community spread.
TB is curable with proper care and support helps everyone.

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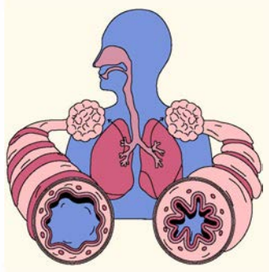
COMMON MYTHS ABOUT TUBERCULOSIS (TB)

MYTH: TB has been wiped out



TB remains a global health threat. In 2023, an estimated 10.8 million people were infected with TB and 1.25 million died, including 161,000 HIV-positive individuals.[1] Poverty, limited healthcare access, drug resistance and inadequate funding for control programs contribute to its persistence.[2]

MYTH: TB only affects poor people

TB is an airborne disease that can affect anyone. The risk is higher in crowded places with poor ventilation, limited access to healthcare and malnutrition. Vulnerable groups include people with weakened immune systems, the elderly and the homeless.

MYTH: I will get TB if I am exposed to someone who has it

TB does not spread through casual contact; the risk is higher with prolonged exposure in an enclosed space with someone who is infectious.

MYTH: TB is hereditary and runs in the family

TB is caused by bacteria and spread through the air. Genetics do not affect transmission, but family members can contract it from close contact with an infected person.

MYTH: Tuberculosis is caused by smoking

Smoking in itself does not cause TB. TB is caused by the bacterium Mycobacterium tuberculosis. However, there is a greater risk of acquiring TB if someone smokes.

1. World Health Organization. (2023). *Global tuberculosis report 2023*. https://www.who.int/teams/global-tuberculosis-programme/tb-reports
2. Ortblad, K. F., Salomon, J. A., Bärnighausen, T., & Atun, R. (2015). Stopping tuberculosis: a biosocial model for sustainable development. *The Lancet*, 386(10010), 2354-2362. https://doi.org/10.1016/S0140-6736(15)00324-4

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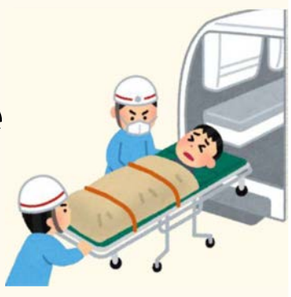
COMMON MYTHS ABOUT TUBERCULOSIS (TB)

MYTH: Tuberculosis only affects the lungs

While TB mostly affects the lungs (85% of cases), it can also occur outside the lungs (extrapulmonary TB) and affect other parts of the body, such as the brain, spine and kidneys.[2]

MYTH: People with Tuberculosis must be hospitalized to prevent infection

Most TB patients can be treated at home. Effective treatment quickly makes them non-infectious, allowing them to stay at home and continue their daily routines.[3] Hospitalization may be necessary for severe cases, certain drug-resistant TB forms or patients with complications.[4]



MYTH: My employer can fire me if I have Tuberculosis

The Tripartite Alliance for Fair and Progressive Employment Practices (TAFEP) prohibits terminating workers with illnesses like Tuberculosis if they are deemed fit for work by a doctor. For workplace discrimination issues, contact TAFEP at 6838 0969or visit https://www.tal.sg/tafep

MYTH: Tuberculosis is fatal and leads to certain death

With the appropriate treatment, deaths from Tuberculosis can be greatly reduced. However, patients must adhere to treatment until it is successfully completed.

1. Centers for Disease Control and Prevention. (2023). *Deciding When to Treat Latent TB Infection.* https://www.cdc.gov/tb/topic/treatment/decideltbi.htm
2. Centers for Disease Control and Prevention. (2023). *Clinical Overview of Tuberculosis Disease.* https://www.cdc.gov/tb/hcp/clinical-overview/tuberculosis-disease.html
3. National Institute for Health and Care Excellence. (2016). *Tuberculosis: Information for the public.* https://www.nice.org.uk/guidance/ng33/ifp/chapter/treatment-in-hospital
4. Nahid, P., et al. (2019). *Clinical Infectious Diseases,* 68(10), e96-e248. https://doi.org/10.1093/cid/ciy874

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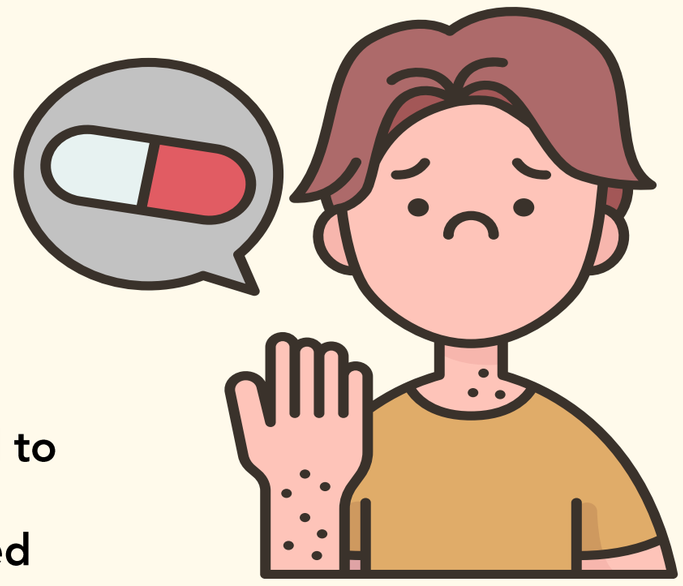
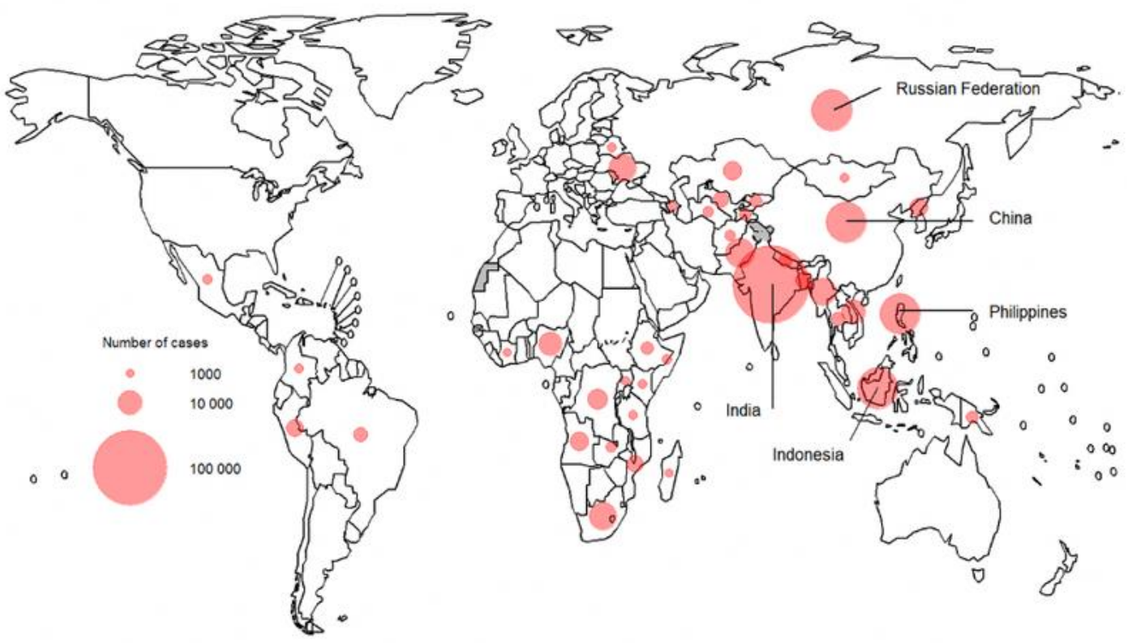
MULTIDRUG-RESISTANT TUBERCULOSIS (MDR-TB)

Multidrug-resistant TB (MDR-TB) is a form of TB that is resistant to the two most important anti-TB drugs: Rifampicin and Isoniazid.



- MDR-TB requires longer treatment (up to 20 months) with second-line medications.(1)
- It is more difficult and expensive to treat than drug-sensitive TB.(1)
- The global treatment success rate for MDR-TB is approximately 60%, compared to 86% for drug-sensitive TB.(1)
- The World Health Organization (WHO) estimates that 400,000 people developed MDR-TB or Rifampicin-Resistant TB (RR-TB) in 2023.(2)

Fig. 1.3.5 Estimated number of people who developed MDR/RR-TB (incident cases) in 2023, for countries with at least 1000 incident cases



How MDR-TB Develops

1. Mismanagement of TB treatment:
   - Inappropriate or incorrect use of TB drugs
   - Premature treatment interruption

2. Person-to-person transmission in crowded settings.

Prevention

The best way to prevent MDR-TB is to ensure that patients with drug-sensitive TB complete their full course of treatment.

This is achieved through Directly Observed Therapy (DOT), where healthcare workers supervise patients taking their medications to ensure adherence and proper treatment.

1. World Health Organization. (2023). *Global tuberculosis report 2023*. https://www.who.int/teams/global-tuberculosis-programme/tb-reports
2. World Health Organization. (2023). *Figure 1.3.5: Estimated number of people who developed MDR/RR-TB (incident cases) in 2023, for countries with at least 1000 incident cases* [Graph]. In *Global tuberculosis report 2023*. https://www.who.int/teams/global-tuberculosis-programme/tb-reports

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TUBERCULOSIS & TOBACCO

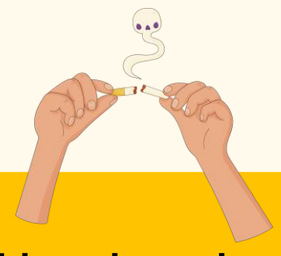
In 2021, nearly 0.7 million TB cases were linked to tobacco smoking.[1]
Smokers are twice as likely to develop active TB and tobacco use worsens treatment outcomes.[2]
Reducing tobacco consumption is key to controlling the global TB epidemic.

DID YOU KNOW

Tobacco use significantly impacts tuberculosis (TB) risk and treatment outcomes.

Tobacco use increases both TB infection risk and disease severity.[2]

In 2017, 17.6% of TB cases and 15.2% of TB-related deaths in high-burden countries were attributed to smoking.[3]

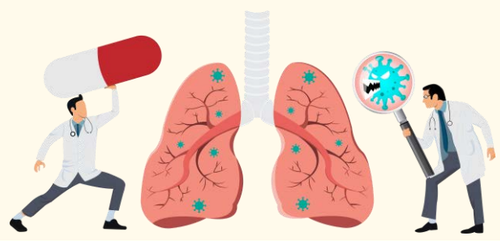


Second-hand smoke exposure increases TB infection risk, especially in children.[2]

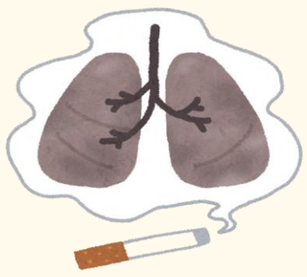
Why smoking increases TB risk

Damages lung tissues, impairing the lungs natural defences.

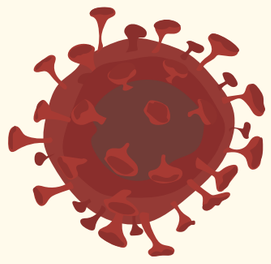
Weakens the immune system, making it easier for TB bacteria to infect and spread.



Impairs ciliary function, reducing the ability to clear bacteria from the airways.



Tobacco Control and TB



- **Tobacco control is crucial for reducing TB incidence and improving treatment success.[2]**
- **Integrating tobacco cessation interventions into TB control programs can improve TB treatment outcomes and overall public health.[4]**

Thinking of quitting smoking?

Support is available at every step. Explore these resources to help you on your journey:

I Quit Programme Quitline: 1800 438 2000

Website: IQUITSMOKING.GOV.SG

Community Retail Pharmacist Referral:

1. World Health Organization (WHO). (2023, May 31). *World No Tobacco Day 2023: Grow food, not tobacco, to end TB.* https://www.who.int/news/item/31-05-2023-world-no-tobacco-day-2023-grow-food-not-tobacco-to-end-tb
2. World Health Organization (WHO). (2022, May 31). *Tobacco exposed - Poisoning our planet and a key driver for the TB epidemic.* https://www.who.int/news/item/31-05-2022-tobacco-exposed---poisoning-our-planet-and-a-key-driver-for-the-tb-epidemic
3. Amere, G. A., Nayak, P., Salindri, A. D., Narayan, K. M. V., & Magee, M. J. (2018). Contribution of smoking to tuberculosis incidence and mortality in high-tuberculosis-burden countries. *American Journal of Epidemiology*, 187(9), 1846–1855.
4. Lin, Y., Wang, L. X., & Qiu, L. X. (2019). A collaborative model for integration of tuberculosis control and smoking cessation services. *The International Journal of Tuberculosis and Lung Disease*, 23(9), 979-984. https://doi.org/10.5588/ijtld.18.0700

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