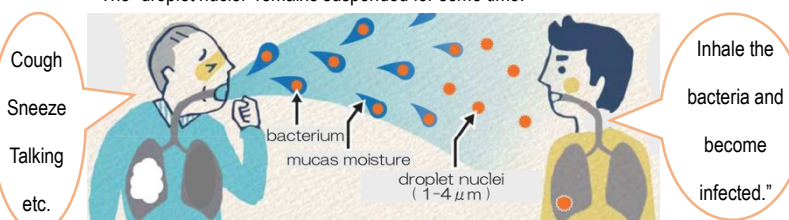


Tuberculosis

Tuberculosis (TB) is caused by a bacterium called “*Mycobacterium tuberculosis*”.

The droplets lose water and become lighter, changing the size.

The “droplet nuclei” remains suspended for some time.





The TB bacteria usually attack the lungs (about 90% in Japan) [1], but it can damage any part of the body such as the brain, kidneys, skin, or spine. Not everyone infected with the bacteria become sick. Only about 10% will develop TB during their lifetime [5]. As a result, two TB-related conditions exist: One is **latent TB infection (LTBI)** and the other, **active TB**. TB is curable and preventable, but if not treated properly, it can be fatal [2].

《 Signs or Symptoms of Active Pulmonary TB 》

Cough (2 weeks or longer) with or without sputum, coughing up blood, slight fever (2 weeks or longer), weakness or fatigue, chest pain, unexplained weight loss, loss of appetite, night sweats, etc.



《 Global & Domestic TB 》

- In 2021, 10.6 million people fell ill with TB, and 1.6 million people died worldwide [1][3].
- Multidrug-resistant TB (MDR-TB) is difficult to treat. It is caused by inappropriate use, incorrect prescription, poor quality drugs, and patients stopping treatment prematurely. In 2019, about 0.5 million people worldwide developed MDR-TB [1].  
- In 2021, 30 people were infected and 5 people died everyday in Japan [1].
- Approximately 10% of newly infected in 2021 were of foreign-born persons, in which around 70% of those were of the age 20 to 29 [1].
- Approximately 40% of reported TB patients were over 80 years old [1]. They were infected in childhood, and the virus became active later in their life.

《 Latent TB Infection (LTBI) 》

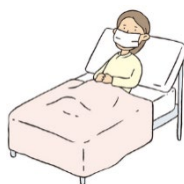
- Persons with LTBI do not have an active TB, and therefore do not have any symptoms.
- About 5-10 % [2][3] of the infected people without treatment will develop active TB at some time in their lives, especially within 2 years after the infection [1][2].

《 Risk of Infection 》 [2][4]

- Close contact with anyone known or suspected to have active TB
- Frequent / prolonged visits or born in areas that have a high incidence of active TB. ...etc.

《 Risk of Developing TB 》 [2][4]

- Cigarette smoking
- HIV infection
- Malnutrition, Diabetes mellitus, Chronic renal failure
- Taking oral steroid hormones
- Having had gastric ulcer or stomach surgery. ...etc.



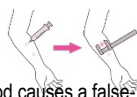
《 Clinical Assessment 》

TB blood test (IGRA):

The most preferred method for testing. The result is not affected by BCG and prevents false-positive reactions. [1][2].

Mantoux tuberculin skin test (TST):

Alternative method if IGRA is not available. BCG vaccination in childhood causes a false positive result [1][2].






Chest x-ray, Sample of sputum :


Used for the detection of TB-related chest abnormalities and existing bacteria in the sputum.



《 Preventions 》

- Keep healthy with exercise, good sleep, and balanced meals in order to maintain immunity. 
- Stop smoking 
- Take medical check-up including chest x-ray, every year.
- Infants, young children, and immunocompromised children (e.g. children with HIV) are at the highest risk of developing the most severe forms of TB [1]. Get BCG vaccination in childhood. But the effective protection lasts just about 10-15 years [6]. BCG for Adults is not effective [7]. 

《 Treatments 》

- Take medicines regularly as directed. 
- ※LTBI: 3-6 months, TB disease: 6-9 months
- Self-stop causes drug-resistance. And treatment becomes difficult.
- If the patient is expelling the bacteria, hospitalization is required.

《Footnotes》

[1] <https://jata.or.jp/english/> [2] <https://www.cdc.gov/tb/default.htm>

[3] <https://www.who.int/news-room/fact-sheets/detail/tuberculosis> [4] <https://www.acha.org/ACHA/Resources/Topics/TB.aspx> [5] https://jnuha.org/06_files/idcl2023_jpn.pdf

[6] https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/kenkou_iryuu/kenkou/kekaku-kansenshou03/index.html [7] <https://www.nhs.uk/conditions/tuberculosis-tb/>