

Diseases, Disorders and Injuries

Multi-Drug Resistant Tuberculosis (MDR-TB)

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What is multi-drug resistant tuberculosis?

Tuberculosis (TB) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis*. Tuberculosis is spread from person to person through the release of droplets from the lungs or airways when an infected person coughs, sneezes, sings, plays a wind instrument, or talks (to a lesser extent).

Multi-drug resistant tuberculosis (MDR-TB) is a form of tuberculosis that does not respond to at least two of the main "first-line" drugs used for treatment. In more severe cases, extensively drug-resistant tuberculosis (XDR-TB) is resistant to two or more of the "second-line" drugs, making it harder to treat.

Tuberculosis primarily attacks the respiratory system (lungs), although it can attack other organs as well. The symptoms of tuberculosis include fever, night sweats, weight loss, chest pain, and coughing.

See the OSH Answers fact sheet on [Tuberculosis](#) for more information.

How does tuberculosis become drug resistant?

Tuberculosis can become resistant when treatment is not completed properly. This drug-resistance may occur if a patient does not take the full course of medication, takes it inconsistently, or is prescribed an ineffective treatment plan. Incomplete or improper treatment allows the tuberculosis bacteria to adapt and develop resistance to the drugs.

Other contributing factors include limited access to healthcare, incorrect drug prescriptions, and poor-quality medications.

Why is multi-drug resistant tuberculosis more dangerous?

Multi-drug resistant tuberculosis is more difficult to treat and requires longer and more complex drug regimens. In addition, the patient remains contagious for a longer period, increasing the risk of transmission to others, including the public and healthcare workers.

Treating multi-drug resistant tuberculosis requires second-line drugs, which are less effective, have more severe side effects, and require a longer treatment duration, often 18 to 24 months.

Multi-drug resistant tuberculosis is often linked to weakened immune systems, such as individuals with human immunodeficiency virus (HIV) infection and acquired immune deficiency syndrome (AIDS). While HIV itself does not cause drug resistance, it accelerates the progression of tuberculosis infection into active tuberculosis disease, complicating treatment.

Is multi-drug resistant tuberculosis a concern in Canada?

While the overall risk of tuberculosis in Canada remains low, new cases are reported annually. Drug-resistant tuberculosis is a concern due to factors such as international travel and migration. Public health measures focus on early detection, effective treatment, and infection control to prevent the spread of multi-drug resistant tuberculosis.

Canada has one of the lowest rates of active tuberculosis in the world, and the overall incidence rate has remained steady at around 4.7 to 5.1 cases per 100,000 between 2018 and 2022. Active tuberculosis rates are higher among certain populations, such as Inuit, First Nations, and people born outside of Canada. Only a small percentage of tuberculosis cases show any resistance to first-line drugs (around 10%), and true multi-drug resistance is even rarer, fluctuating between 0.9% and 1.6%. Extensively drug-resistant tuberculosis is extremely rare, with only two cases identified between 2018 and 2022.

Globally, the World Health Organization estimates 410,000 people developed multi-drug resistant tuberculosis in 2022. While the treatment success rate for multi-drug resistant tuberculosis has improved over time, only about 63% of patients were successfully treated in 2020.

How is multi-drug resistant tuberculosis diagnosed?

Multi-drug resistant tuberculosis is diagnosed using laboratory tests such as sputum cultures, drug susceptibility testing, and molecular tests. Phenotypic drug susceptibility testing (DST) is routinely performed for the first positive culture isolates obtained from new tuberculosis patients. Rapid molecular tests are also recommended to predict drug resistant tuberculosis on new positive cultures or samples. However, conventional phenotypic drug susceptibility testing remains essential for confirming resistance.

Early and accurate diagnosis is essential to ensuring patients receive the appropriate treatment.

For more information, see Health Canada's [Chapter 3 of the Canadian Tuberculosis Standards: Diagnosis of tuberculosis disease and drug-resistant tuberculosis](#).

Can drug resistance be prevented?

Proper and complete tuberculosis treatment is essential for preventing drug resistance. The Public Health Agency of Canada recommends the use of directly observed therapy (DOT), where healthcare providers monitor patients to ensure they take their medications as prescribed. This approach significantly reduces the risk of developing drug-resistant tuberculosis.

Additional strategies include ensuring early detection, using appropriate drug combinations, and improving healthcare access in vulnerable populations.

How can we prevent the transmission of multi-drug resistant tuberculosis?

Preventing the transmission of multi-drug resistant tuberculosis requires strict infection control measures, especially in healthcare and community settings where there is risk (e.g., a heavily populated central area of a city (especially if you are homeless), a long-term care facility, a prison, a homeless shelter, or an overseas refugee camp). The Canadian Tuberculosis Standards provide detailed guidelines for managing TB in hospitals, long-term care facilities, correctional institutions, and other environments. Effective ventilation, personal protective equipment (PPE), and early diagnosis are key strategies to limit the spread of multi-drug resistant tuberculosis.

In occupational settings, workers at risk, such as healthcare professionals, should undergo regular screening, receive proper training on tuberculosis control measures, and use respiratory protection when necessary. Reducing overcrowding and improving hygiene in high-risk settings can also play an essential role in preventing multi-drug resistant tuberculosis transmission.

The Government of Canada's website has a series of documents on [Tuberculosis](#). From this site, the Canadian Tuberculosis Standards (8th edition) [Chapter 14: Prevention and control of tuberculosis transmission in healthcare settings](#) describes a recommended Tuberculosis Management Program, and lists control procedures in various occupational settings including hospitals, other health care settings, residential and community care settings, and correctional facilities.

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