



Nontuberculous Mycobacteria (NTM)

Germs, like plants and animals, have been classified into similar groups. The groups are called "families." One such family of germs is known as the *Mycobacteriaceae*. Within this family there are a number of species. Some species can cause human diseases (pathogenic). Others species do not cause human diseases (saprophytic).

Mycobacterium tuberculosis is an infamous species. This is the organism that causes human tuberculosis. *Mycobacterium leprae* is the organism that causes leprosy.

What is the Difference between TB and NTM?

The Nontuberculous mycobacteria (NTM) refers to all the species in the family of mycobacteria that may cause human disease, but do not cause tuberculosis (TB). Every year in the United States approximately two people per 100,000 population develop infections caused by these lesser-known "cousins" of TB and leprosy. In fact, for unknown reasons, data suggest that there may be rising numbers of cases in certain parts of the country. The most common NTM's that require treatment are *M. avium*, *M. intracellulare*, *M. kansasii*, *M. abscessus*, *M. chelonae*, *M. fortuitum*, *M. terrae*, *M. xenopi* and *M. simiae*. Among the NTM, there are [three species](#) which predominantly involve the skin: *M. leprae*, *M. ulcerans*, and *M. marinum*.



Unlike TB, which is spread from person to person, NTM infections are **not** considered contagious. There is no evidence that the infection can be transmitted from one person to another. Just how and why people become infected with NTM is not clear.

Although the germs are found easily in water and soil, they do not affect most people.

Doctors believe that some people who become infected have an unknown defect in their lung structure or function or in their immune systems. People who have damaged lung tissue from diseases such as emphysema, bronchiectasis, adult cystic fibrosis or previous TB infection appear to be at greater risk for developing a NTM infection. People who are immunocompromised such as those who receive strong immunosuppressant medications such as prednisone or some newer immunosuppressants such as TNF inhibitors have a greater risk of developing a NTM infection that affects all organs of the body, not only the lungs. People with AIDS may also develop NTM infections.

Currently there is a "hypothesis" or "theory" about acquiring NTM from a shower. In considering an apparent increase in the number of NTM lung disease cases seen over the past 25 years, it has been noted by researchers in the field that NTMs may be commonly recovered from home water systems.

We speculate that in the recent past people tend to take showers rather than bathe in a tub, and when showering in a closed stall the concentration of NTMs could be higher. Additionally, to save energy, water heaters have lower temperatures now, which could allow more NTM growth in the water. These are preliminary findings and further research is required to confirm these theories.

Additionally, there are newer data to indicate that aspiration of water that we drink associated with reflux may be an additional way that mycobacteria gain access to the lungs and causes disease.

What are the Different Types of NTM?

Under the microscope, NTM and TB appear quite similar. Careful lab studies must be performed to tell them apart. Most labs are capable of carrying the testing process far enough to determine whether they are dealing with an NTM. Fewer labs are equipped to determine exactly **which** organism it might be and what its susceptibility is to drugs.



The importance of identifying the exact organism can be illustrated with two of the organisms, *Mycobacterium gordonae* and *Mycobacterium scrofulaceum*. These two are very similar and react the same way in many lab tests. However, they react in different ways in the human body. One organism causes disease, the other organism does not cause disease. In this case, if the organism turns out to be *M. gordonae*, treatment is seldom indicated. *M. gordonae* is often a lab contaminant and not a cause

of human disease. In fact, *M. gordonae* is found in water supplies so often that it is nicknamed "the tap water bacillus". *M. scrofulaceum*, on the other hand, is known to cause disease and may require specific forms of treatment.

What are the Symptoms of an NTM Infection?

Like TB, an NTM infection affects the lungs so the symptoms are similar. Most NTM infections and resulting symptoms progress slowly. Symptoms may include:

- Fever
- Weight loss
- Cough
- Lack of appetite
- Night sweats
- Blood in the sputum (phlegm)
- Loss of energy

How is an NTM Infection Diagnosed?

An NTM infection can be more difficult to diagnose than TB. It is important for your health care provider to determine if the infection is TB or NTM. If it is NTM, which specific type of NTM is important. In addition, it is important for the health care provider to determine whether the NTM infection requires treatment. Some people harbor the germs and remain well. They may need to be observed without treatment. Others have or may be developing serious and progressive illness. A diagnosis is often based on the following:

- A complete medical history and physical examination by a health care provider.
- A chest CT scan (a specialized X-ray which produces detailed slice-like pictures) of the lungs.
- A sputum culture – Several sputum cultures are often necessary and must be done at specialized labs. One positive test does not always mean disease is present.
- Other procedures such as bronchoscopy may be used.

What is the Treatment of NTM?

Most of the NTM infections are naturally resistant to many common antibiotics. It is often necessary to use some of the same medications that are used to treat TB. In order to overcome drug resistance, you may need to take several different antibiotic medications at the same time. Because many of these medications have side effects, close monitoring is important. Furthermore, treatment may be necessary for as long as two years. Sometimes treatment is ongoing, depending on the severity of the disease.

The most common organisms involved in human infection are *M. kansasii*, *M. avium*, *M. intracellulare*, *M. chelonae* and *M. abscessus*. *M. kansasii* is easier to treat and often can be killed with only three anti-TB medications. On the other hand, organisms such as *M. avium*, *M. chelonae* and *M. abscessus* are among the most stubborn germs. They are more difficult to treat. Three to five medications may be needed. Depending on how localized the disease is, surgery also may be helpful.

Living with NTM Infections

Living with a *nontuberculous mycobacteria* (NTM) infection presents unique challenges. The symptoms of NTM, as well as the long course of treatment for

NTM, can take a toll on a person's state of well being. Anxiety, depression, and fear of the future can all accompany a diagnosis of NTM and its treatment. NTM patients are often bewildered and lonely.

The good news is that you are not the first, nor the only person who suffers from an NTM infection. In fact, there are lots of people who have had NTM, and who are still infected with NTM, that are involved in support groups to help each other. Becoming involved in a support group can help alleviate the fear and anxiety you may feel. Discussing the special challenges that NTM poses with other people like you can be extremely helpful.

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