Nontuberculous mycobacteria (NTM) are organisms naturally found in soil and water. In some people, the organism infects the airways and lung tissue, leading to disease.

**Learn About NTM**

Nontuberculous mycobacteria (NTM) are naturally occurring organisms found in water and soil. NTM lung infection occurs when a person inhales the organism from their environment. Most people do not become ill but for some susceptible individuals, a slowly progressive and destructive disease can occur.

**Key Facts**

- NTM are organisms naturally found in soil and water.
- NTM infections can become chronic and require ongoing treatment. Some patients, however, do not require treatment for their less severe infections.
- Treatment of NTM requires antibiotics for 1 to 2 years.

**What Is NTM?**

NTM are mycobacteria found throughout nature in water and soil. NTM represent over 150 different species, most of which do not seem to cause human disease except in individuals with a weak immune system.

**How NTM Affect Your Body**

Exposure to environmental sources of NTM can lead to NTM entering the lungs. In most individuals, the NTM organisms are cleared from the lung naturally and do not cause infection. In some people, the organism infects the airways and lung tissue leading to disease. This causes inflammation in the respiratory system. Without treatment, many people, but not all, will develop a progressive lung infection characterized by cough, shortness of breath, fatigue, and often weight loss.

**How Serious Are NTM?**

There are about 50,000 to 90,000 people with NTM pulmonary disease in the United States, with a much higher frequency in older adults. However, NTM can affect any age group. In some people, NTM infections can become chronic and require ongoing treatment. Severe NTM lung disease can have a significant impact on quality of life. Death directly related to NTM lung disease is rare.

**NTM Symptoms, Causes, and Risk Factors**

The symptoms caused by NTM infection can vary from no symptoms to severe cough, fatigue, and weight loss. NTM disease is more common in individuals with underlying lung disease or weak immune systems.

**What Are the Symptoms of NTM Lung Infections?**

Not everyone with NTM pulmonary disease has symptoms, but most have a combination of lung and other symptoms. The more severe the infection, the more likely you will have symptoms.

Symptoms of NTM lung disease can be classified into two categories: symptoms that mainly affect the lungs and symptoms that affect the whole body.

The most common respiratory symptoms of NTM lung disease are:

- Cough that won’t go away
- Coughing up blood (hemoptysis)
- Shortness of breath when active
Other symptoms of NTM lung disease include:
- Fatigue
- Low-grade fever
- Night sweats
- Weight loss

**What Causes NTM Lung Infections?**
NTM lung infections are caused by mycobacteria that are found in the soil and water. Most people who are exposed to environmental NTM do not become sick. Doctors do not know why only some people develop NTM lung disease. In most cases, people who get sick from NTM have some other health condition like another lung disease or a weak immune system.

**What Are Risk Factors?**
- **Age:** NTM lung disease is more common in older people.
- **Lung disease:** Many people with NTM lung disease have another underlying lung problem like COPD, bronchiectasis, or lung damage due to previous infections such as tuberculosis.
- **Slender Caucasian women:** Some women appear to have an increased risk of developing NTM disease. These women share physical features like being tall and slender, having a curved spine, abnormalities of the breastbone, and mitral valve prolapse.
- **Weak immune system:** Illnesses that affect the immune system, like Sjogren's disease and rheumatoid arthritis, may increase the risk of NTM infection. Also, certain drugs that can weaken the immune system, such as prednisone and other steroids, can increase the risk of NTM infection.
- **Esophageal disorders:** Acid reflux (GERD) and other disorders of the esophagus can increase the risk of NTM lung disease due to spillage of gastric contents into the lung.
- **Environment:** Exposure to NTM in our environment can result in infection. High-risk sources include indoor hot tubs and pools and exposure to soil.

**When to See Your Doctor**
If you have a persistent cough, particularly if you also have fatigue, night sweats, shortness of breath or weight loss, you should see your doctor immediately. If your primary care provider cannot help your chronic cough, you might need to see a lung specialist.

**Diagnosing and Treating NTM Pulmonary Disease**
Diagnosis of NTM lung disease is often delayed because the symptoms are similar to other lung diseases like COPD, bronchitis, or bronchiectasis. However, once NTM infection is suspected, diagnosis is not difficult. When a specimen is sent to the lab, it can easily be identified whether or not the person has NTM and what species is causing the disease. This will influence the type of treatment you receive.

**What to Expect**
If you are diagnosed with NTM pulmonary disease, you may never have symptoms or have them only after many years. However, once symptoms develop, it may be difficult to completely relieve all symptoms with treatment. Therefore, early diagnosis and treatment are essential for good outcomes.

**How It’s Diagnosed**
A typical diagnostic evaluation by your health-care provider will include:
- Detailed medical history
- Physical examination
- Computed tomography (CT) scan
- Sputum culture

A chest x-ray may provide the first hint that NTM are present. However, a CT scan is often required to show more detail that can help confirm NTM. The
CT scan can show the presence of small nodules (sometimes referred to as “tree-in-bud” because of their branch-like appearance). The CT scan can also identify cavities or holes in the lung, which represent a more destructive form of infection.

A definitive diagnosis of NTM infection is through culture of a respiratory specimen, usually mucus you cough up (sputum). In some cases, where sputum cannot be produced, a bronchoscopy is performed to obtain the specimen.

**How It’s Treated**

NTM are relatively resistant to antibiotics and can become more resistant if only one antibiotic is used to treat the infection. Effective treatment requires two to three drugs: the exact drug and combination of drugs depending on the NTM species involved, how bad the infection is, and results of drug susceptibility testing. Treatment should continue until the respiratory culture results have been negative for at least 12 months.

- Treatment of *Myobacterium avium complex* (MAC) and *Myobacterium kansaii*, the most common causes of pulmonary NTM disease, require three drugs given either 3 days a week or daily, depending on the severity of disease.

- Treatment of *Myobacterium abscessus* is more complicated and associated with poorer treatment outcomes compared with MAC and *M. kansasi*. Patients require several months of treatment with one to two intravenous (IV) drugs in combination with oral and sometimes inhaled antibiotics.

Some patients will need surgery to remove the most damaged areas of the lung. However, this should only be considered after consultation with experts in NTM and surgery. In most cases, surgery can be performed using VATS (video-assisted thoracoscopic surgery).

Side effects of drug treatment are common, but most people can complete treatment as prescribed. You may need to get your blood tested regularly to make sure you are taking the right levels of drugs and to make sure your body is handling the drugs well. You may also need to have a vision and hearing test before and during treatment to make sure the drugs are not affecting your sight or hearing.

**Living With NTM**

**What to Expect**

Most people with NTM lung disease experience chronic cough and fatigue. This can make you feel isolated, anxious, or depressed. Treatment is long and often has many side effects. A complete cure can be expected with some NTM species and not with others. Re-infection is common, so some lifestyle modifications may be necessary.

**Managing the Disease**

Most patients with NTM pulmonary disease have another underlying lung disease, such as COPD or bronchiectasis. Treatment of these illnesses can help improve some of the symptoms of NTM disease, like cough and shortness of breath.

Fatigue is a common symptom. It is important for patients to maintain their weight through proper nutrition and use nutritional supplements if necessary. Exercise is also important and may improve feelings of fatigue.

While being treated with antibiotics, patients should take the medications as recommended. Working with a provider or pharmacist can be helpful to determine the best time to take your medications or if you should take the medication on an empty stomach. If symptoms develop, it is important to communicate with your provider. In most cases, these symptoms can be lessened by changing the type or amount of medication you take.

**Finding Support**

NTM lung disease is a serious infection that can
have a significant impact on your life and that of your families and friends. Depression and anxiety are common, and you should feel comfortable discussing these feelings with your provider and family. Communicating your needs and feelings is important.

The Lung Association recommends patients and caregivers join our Living With Lung Disease Support Community to connect with others facing this disease. You can also call the Lung Association’s Lung Helpline at 1-800-LUNGUSA to talk to a trained respiratory professional who can help answer your questions and connect you with support.

You can also visit the NTM Info & Research (NTMir) website, the not-for-profit foundation for patients with NTM disease. For patients who do not live near a support group, NTMir provides an online forum for patients.

Questions to Ask Your Doctor About NTM Pulmonary Disease

Making notes before your visit, as well as taking along a trusted family member or friend, can help you through the first appointment with your doctor.

- Which strain of NTM do I have?
- What will happen if I am not treated for the infection?
- If treated, what drugs will I take and for how long?
- What are the potential side effects of treatment? How will you monitor me?
- Should I have surgery to remove the infected part of my lung?
- What is my chance of cure?
- Can I get infected again? If so, how can I prevent getting infected again?
- Am I contagious?
- Besides taking antibiotics, what other treatments can I take to improve my symptoms?

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