patient's sputum. The bacteria here can be stained in the laboratory and seen directly under a microscope. Moreover, it is tried to increase the tuberculosis bacteria in a so-called “culture”. Even if no bacteria can be seen readily under the microscope, they may grow after several weeks in a culture. In both cases, we speak of contagious tuberculosis – though a culturally proven tuberculosis is less contagious than a microscopically proven.

c. Bronchoscopy

A bronchoscopy may be required if the detection of tuberculosis bacteria in the laboratory does not succeed, but the X-ray or other critical circumstances give rise to a suspicion of tuberculosis.

If tuberculous bacteria are not detected in bronchoscopic respiratory secretions, a non-infectious tuberculosis could still be present and need treatment. Additionally, a tuberculous disease is possible outside the lungs. Therefore, you should mention all complaints to your doctor, even if they do not affect the lungs.

Latent Tuberculosis

Even if an active tuberculosis that requires treatment has been ruled out with certainty after a positive TST or IGRA, a so-called **preventive therapy** can be necessary in some cases. The decision whether to treat or not depends on how high the risk is for the contact person to develop tuberculosis. In children and in the immunocompromised, the risk is particularly high. When members of these groups have had sufficient contact with individuals suffering from contagious tuberculosis, a so-called **prophylactic treatment** should be started independent of TST or IGRA results.

The decision to opt for preventive or prophylactic therapy is dependent on many factors and should always be made by a tuberculosis specialist or the public health department.

Treatment

In active tuberculosis requiring treatment, the aim of therapy is to kill all tubercle bacilli so that the disease can be cured. The treatment usually lasts six months. For the first two months a combination of at least four drugs is administered. Of these, only two are used over the total of six months. Even if the patient feels much better shortly after the start of treatment and no longer coughs up bacteria, the prescribed medication must be taken consistently every day over at least six months!

If treatment is not taken long enough, a relapse may be caused which will often be much harder to treat.

Resistant tuberculosis

Resistance to one or more of the TB drugs arises from too short or irregular therapy. If the tubercle bacilli get resistant to a drug, this drug cannot be used for the patient any more. If resistance to the two main drugs of tuberculosis therapy is detected (multidrug resistance = MDR), the tuberculosis needs to be treated with even more drugs over at least 20 months. Even then, it may not be possible to cure all MDR-TB cases. The emergence of drug resistance must therefore be avoided at all costs.

Tuberculosis without resistance is a treatable and curable disease. But it is a prerequisite for healing that it is diagnosed in time and that the drugs are taken regularly and long enough.

More detailed information in:
„Was man über die Tuberkulose wissen soll. Eine Informationsschrift für Patienten und ihre Angehörigen (DZK).“
http://www.pneumologie.de/dzk

DEUTSCHES ZENTRALKOMITEE ZUR BEKÄMPFUNG DER TUBERKULOSE (DZK)

Information on Tuberculosis

What is Tuberculosis?

Tuberculosis (abbreviated as TB, for Tubercle Bacillus) is an infectious disease caused by ***Mycobacterium tuberculosis***.

Transmission

TB is transmitted almost exclusively through the air, from person to person. An individual with contagious tuberculosis releases droplets into the surrounding air containing the offending bacilli when he/she breathes normally, even more so when he/she speaks in a loud voice, sings, sneezes or coughs. These contagious droplets may then be inhaled by other people, leading to infection.

The risk of infection rises with the number of bacilli released into the air by the sick person. Tuberculosis infections of other organs than the lungs rarely spread the disease (e.g. through one's urine or stool).

TB is almost always transmitted by droplets.

Infection and Disease

The inhaled bacilli cause an inflammatory reaction in the lungs. The human body then activates its defences against the bacilli (immune system). If the immune system is functioning well, the bacilli are walled in and the infection ends. Whether an infection takes place depends on how well our immune system succeeds in fighting off the invading bacteria. Specific skin and

blood tests can detect an infection after about three months.
About 90 % of those infected with tubercle bacilli remain healthy.

Who may develop active tuberculosis?
Only about 10 % of those infected develop active tuberculosis during the subsequent weeks, months or even decades.
Immunocompromised individuals (i.e. those with an impaired immune system) have a greater risk of developing tuberculosis; in particular, small children (whose immune system is not yet fully developed) and those individuals whose immune system capabilities have been compromised or suppressed by chronic diseases or medication.
Immunocompromised persons are at high risk.

What happens in case of infection?
The invading bacteria develop a tuberculous lesion in the lungs, which can be demonstrated on X-ray. When this lesion disintegrates, bacilli may find an outlet into the airways. The bacteria may then get into the ambient air by coughing. Only in this case we speak of contagious tuberculosis.
Tuberculosis may also infect other organs like lymph nodes, pleura, kidneys, bones, meninges or abdominal organs. These infections are rarely contagious.

Signs of disease

The disease frequently starts with complaints that often seem harmless at the beginning, for example:

- **Cough**
- **Lack of appetite**
- **Weight loss**
- **Fatigue**
- **Slight fever (e.g. <38 °C or 100.4 °F)**
- **Night sweats**

Therefore, not everyone with tuberculosis feels seriously ill. A cough of unclear origin, lasting longer than expected, accompanied by one or more of the above-mentioned complaints, should be a sufficient reason to see a doctor.

Basically anyone can become infected without knowing. But especially if you´ve had contact with someone who is suffering from contagious tuberculosis, it is important to keep this disease in mind even if symptoms develop months or years later.
Tuberculosis often starts with non-specific symptoms.

Investigation of contact persons

If one should require treatment for tuberculosis there is an obligation of notification as set out by the Infectious Disease Control Act. Should it be a viable infectious tuberculosis, the public health department would review information of all the individuals with whom the sufferer has had intensive contact over a longer period. These individuals must have a check-up with the public health department – which is called a contact investigation.
All contact persons need to be investigated.

Contact, infection or disease?

The following testing methods are available to determine whether you have been infected with tubercle bacilli or whether you are suffering from active tuberculosis:

Infection

To determine whether someone has been infected with tuberculosis bacteria, there are two test procedures.

a. Tuberculin Skin Test (TST)
Tuberculin is injected into the skin of the forearm. If a palpable induration (hardening) occurs at the test site after 3-7 days, the test is considered positive. It is imperative that the test is read by experienced personnel.

b. Interferon-gamma Release Assay (IGRA)
A newer test method is the IGRA, which is determined from a blood sample. If the test result exceeds a certain limit, it is considered positive. This test has the advantage that it is not affected by tuberculosis vaccine, and no second date for reading the test result is necessary - as in the case of a skin test.

Should one of the two test methods show a positive result, it does not necessarily mean that the patient has a disease, or is contagious. However, an active tuberculosis should be ruled out by further investigations in this case.

Disease

The lungs should be examined after a positive TST or IGRA, because pulmonary tuberculosis is frequent and may be contagious. In many situations it may be necessary to examine the lungs even in the absence of a positive TST or IGRA result, for example in case of suspicious symptoms.

a. Chest X-ray
About 80 % of all tuberculosis cases in Germany affect the lungs. Often suspicious changes can be seen on a radiograph, indicating tuberculosis. Despite the radiation exposure, a CT scan may also be required.

b. Microbiological laboratory tests
Since many other diseases look similar to tuberculosis, respiratory secretions must be used to verify or rule out the presence of tuberculosis bacteria.
Initially one searches for tuberculosis bacteria in the