PHARMA-BRIEF *SPECIAL*

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# Tuberculosis

## A global threat

**BUKO Pharma-Kampagne**
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## Contents



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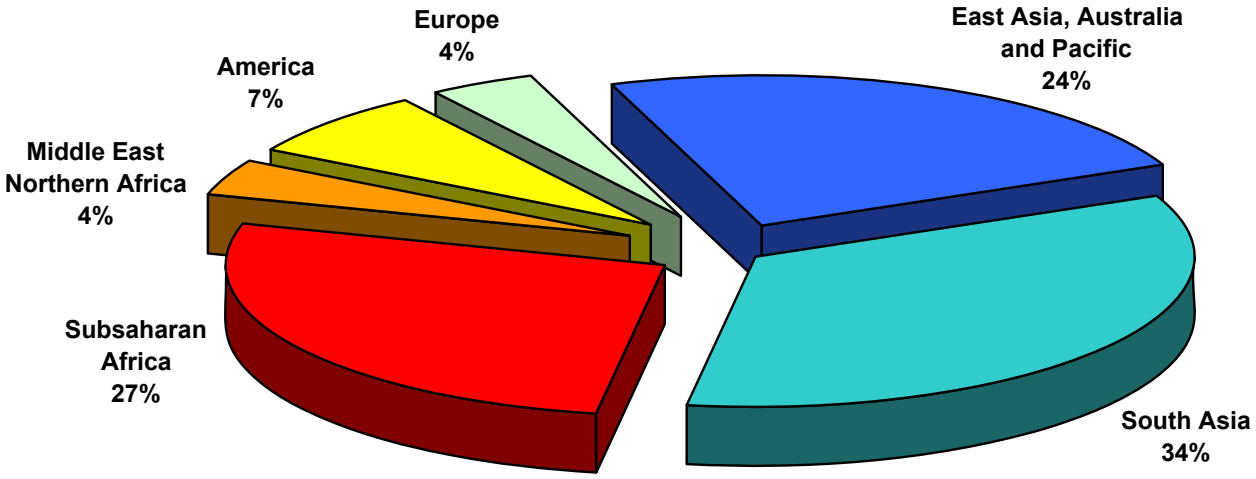
# Suffering from consumption

## An introduction to tuberculosis

**Tuberculosis (TB) is the most frequent infectious disease worldwide. One third of the world's population – i.e. about two billion people – carry the Mycobacterium tuberculosis. But only 5-10% of them develop the disease in the course of their lifetime. Poverty, bad living conditions and malnutrition are among the decisive factors and, at the same time, the main cause for the spread of the epidemic. People in Asia, Africa and the Middle East have the greatest risk of contracting tuberculosis.**




**Worldwide spread of tuberculosis** *Source : WHO 2007*

According to World Health Organization data, 1.6 million people died of tuberculosis in 2005. Nearly nine million new infections were counted, half of them in six Asian countries alone: Bangladesh, China, India, Indonesia, Pakistan and the Philippines. In Germany and other countries of Western Europe, however, the once so feared "consumption" has become rare. At most, the disease is considered a problem confined to marginal groups, such as migrants or Aids sufferers.

However, ignorance and trivialisation of the issue are not the answer: In many Eastern European countries the incidence of tuberculosis increased dramatically at the end of the 1990s. Even if rates are slowly decreasing again, the situation, e.g. in Russia or the Ukraine, is nonetheless dramatic. Resistant forms of the disease are a particularly difficult problem here (14% of all infections) and cannot be treated with standard therapies.[1]

## Transmission by droplet infection

Pulmonary tuberculosis is by far the most frequent form of tuberculosis (80%). Open pulmonary TB is transmitted by droplet infection, i.e. transmission occurs from coughing or speaking. Bacteria in infectious aerosol may survive in the ambient air for many hours and thus become a risk of infection for many other people.

Any person with active but untreated open pulmonary tuberculosis can infect 10-15 other people per year. Simple measures such as holding your hand in front of your mouth when coughing, airing rooms regularly and wearing mouth protection, reduce the infection risk. In industrial countries persons with open TB are isolated until they are no longer contagious. In poor countries, however, this is often not possible.

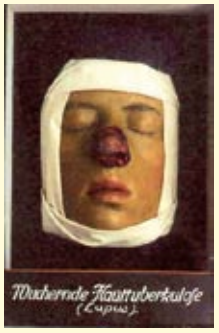
## Not everyone infected develops the full-blown disease

If the tuberculosis bacterium enters the body, it infects the macrophages of the immune system. These trigger an immune response in other specific defence cells, the lymphocytes (CD 4 and CD 8 cells). However, the defence cells often do not kill the bacteria, but include them into knots of tissue (tuberculous granuloma). From this time on there is a latent infection. It depends on the status of the immune system of a person whether he or she develops an active Tubercolosis.

Around 15,000 out of the 150,000 people who are infected by the tuberculosis bacterium worldwide every day develop a tuberculosis in the course of their lifetime. HIV infected patients with TB infection have a drastically increased risk[2] of developing the disease.[3] Also, poor general health condition or miserable life and working conditions are favourable to an active

## What is tuberculosis?

The most frequent form of TB is pulmonary tuberculosis. Five to six weeks after the infection, an inflammatory cell complex (primary complex) develops in the lungs. This may simply calcify and remain inactive. However, it may also develop into an active TB – even years or decades later. In this process the cells disintegrate (caseate) and generate cavities in the lungs. As soon as these cavities, so-called caverns, are connected to the bronchial system, it is called open pulmonary TB. The patients then cough out infectious fluids (exudate), sometimes up to 300 ml at once. In an advanced stage, the characteristic coughing up of blood may occur.



**Dermal tubercolisis**

*Photo: Deutsches Hygienemuseum Dresden*

In the event of a closed TB, the bacteria remain in encapsulated tubercles (knotty swellings) without connection to the bronchial system. But these tubercles may also cause severe symptoms.

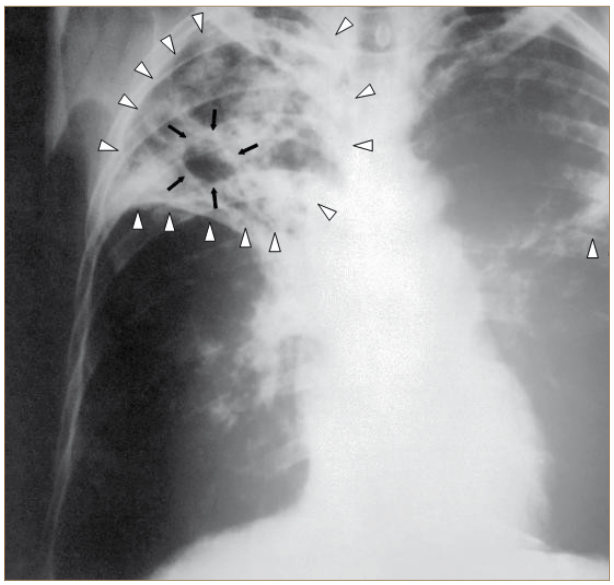
Without treatment, the lungs decay more and more in the course of the disease. The patients lose weight constantly, and their general health deteriorates steadily which is the reason why TB used to be called consumption. TB may also affect the lymph nodes and reach the bloodstream. Then, further organs, such as kidneys, skin, genitals, meninges or bones can also be affected. This is called organic tuberculosis. If TB is spreading all over the body it is called miliary tuberculosis. Before the discovery of antibiotic therapy this generalised TB form was nearly always fatal.

In rare cases some other organs in addition to the lungs may also be affected by tuberculosis, e.g. the lymph nodes, meninges, pericardium, bones, skin or genitals.

Some poor countries still have incidences of bovine tuberculosis where the granulomas are generated in the intestines. These can then spread through the bloodstream to other organs. The infection is usually caused by drinking the milk of infected cows.

Typical symptoms of TB include weight loss, (bloody) cough, discharge, dyspnoea, chest pain, night sweat, fever and fatigue.

TB. There is hardly any other disease for which this association is so clear. Thus, poverty is the most important cause of tuberculosis.



**X-ray of pulmonary tuberculosis**
*Photo: Public Health Image Library (PHIL)*

## Late diagnosis in Germany is a reason for concern

Because German doctors today only rarely have to deal with tuberculosis patients, the disease is relatively often missed or recognised too late. According to a study of the German Central Committee against Tuberculosis (DZK), months often pass until the correct diagnosis has been made - despite established diagnostics and effective treatment options. There is even a need for information concerning TB therapy: Around 40% of the patients did not receive the recommended medical combination consisting of four drugs at the beginning of the therapy. In about 20% of the cases, the therapy did not include the three most important antibiotics (INH, RMP, and PZA).[4]

The diagnosis methods are still the same as 90 years ago. The main ones are:

- A radiograph of the lungs (chest X-ray). Radiographs of infected persons often show a characteristic, moth-eaten pattern which is the reason why tuberculosis in Germany is also called "the moths". Radiological findings alone, however, do not provide a reliable diagnosis; laboratory analysis is also necessary.

- Laboratory analysis: Acid-fast, rod-like bacilli can be detected in the phlegm (sputum). This analysis enables a relatively reliable diagnosis of an open pulmonary TB as of 10,000 bacteria / ml. A reliable diagnosis in patients with low bacterial load and TB forms outside the lungs is only possible using blood or tissue cultures. However, this analysis takes several weeks and is much more expensive. It is frequently not possible to provide it in poor countries.

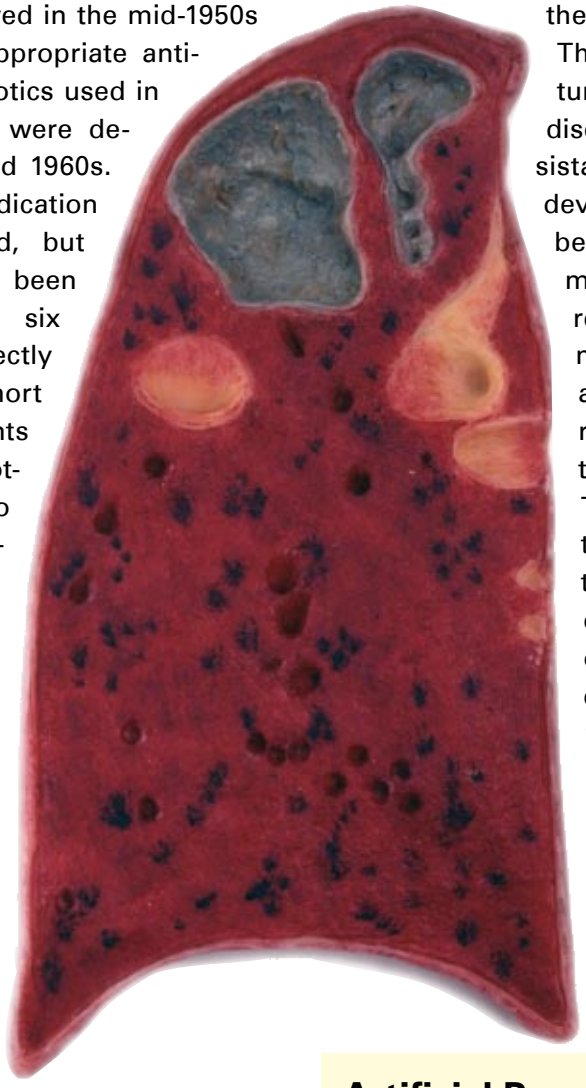
- The tuberculin skin test: Although the skin test provides evidence of an infection, it does not show whether someone is only infected or also suffering from full-blown TB. Unfortunately, it can also return a positive result for vaccinated persons. Furthermore, there is only a reaction if the infection has occurred at least six to eight weeks before.[5] As tuberculosis may be fatal in HIV patients within a few weeks, delayed diagnosis is a serious problem.

Thus there is an urgent need for a new diagnosis method which will diagnose newly infected persons, differentiate between vaccinated and infected persons and provide a better assessment of the risk of an outbreak of the disease in infected persons.

## Rest cures and well balanced diet then – effective medication today

It was not until the end of the 19th century that TB was considered curable. From the end of the 19th century until the 1950s, TB patients had been treated in resorts with rest cures, high-calorie diets and surgery. At that time, e.g. particularly affected parts of the lung were removed or the collapse of the deceased lung was artificially induced (artificial pneumothorax, see box on p 4) hoping that the cavities might disappear when the lung inflated again.

Although some success was achieved with these early methods, the real breakthrough in TB treatment was achieved in the mid-1950s with the invention of appropriate antibiotics. All of the antibiotics used in standard therapy today were developed in the 1950s and 1960s. Since the 1970s the medication has not been modified, but the period of intake had been reduced from nine to six months applying the Directly Observed Treatment Short Course (DOTS): Patients have to take four antibiotics initially for approx. two months and then two antibiotics for approx. four months. The standard drugs are called isoniazid, rifampicin, ethambutol and pyrazinamide. Streptomycin and thiacetacone are also available and used in case of intolerance.



**Lung with TB cavities (grey)**

*Photo: Deutsches Hygienemuseum Dresden*

## Strictly monitored therapy

The six-month intake of the medication is strictly monitored by the DOTS treatment strategy recommended by the World Health Organisation (WHO). The patients' health condition is then regularly controlled for two years. With the introduction of the standard therapy in the 1970s there was great hope of conquering tuberculosis worldwide. And even today DOTS is still the heart of the worldwide *Stop TB-Initiative* of the WHO. Because TB is curable if the medication is taken according to this program and if there are no resistant TB-strains.

Nevertheless, many patients terminate their therapy early. Be it because medication is no longer accessible or the symptoms of tuberculosis already disappear after some weeks of treatment. The medication also has considerable side effects: inflammation of the optic nerve, polyneuropathy, damage to the kidney or the internal ear.[6] The consequence of prematurely topped therapies: The disease returns and often resistant forms of the disease develop, which can no longer be treated with the standard medication. If a TB strain is resistant against the two most important standard antibiotics isoniazid and rifampicin, it is called multiresistant TB (MDR-TB). Then, doctors must switch to second-choice medication such as kanamycine, capreomycine, amikacine, ofloxacine or levofloxacine. The side effects of these drugs, however, are much stronger and the chances of healing

## Artificial Pneumothorax

The pleural cavity (thorax) is usually only a narrow gap between the lungs and chest wall in a state of vacuum. A treatment where you artificially introduce air into the thorax is called artificial pneumothorax. At a time when tuberculosis was still a wide-spread disease and no antibiotics were available, pneumothorax was applied as therapy. Air is allowed to enter the thorax by puncturing the pleura. Due to their high elasticity and the lack of a vacuum, the lungs collapses. It was believed that when the lungs collapse, the progress of disease is stopped and healing occurs. As soon as the air was removed from the thorax using suction equipment, the lungs could inflate again.

**Diagnosis of TB. Acid-fast rods (orange) in the sputum of a TB patient**

*Photo: Public Health Image Library (PHIL)*

much lower: only about 50%. Most of the second-choice drugs were not developed specifically for the treatment of tuberculosis. They are *also* effective in tuberculosis, but not as effective as specific antibiotics. Patients with multi-resistant TB must take up to 30 tablets daily. The treatment takes 14 to 21 months and costs between 8,000 and 15,000 US$. However, the medication for the DOTS therapy is available for only 10 US$.

## Multi-resistant TB: death sentence for the poor

Some second-choice drugs are under patent protection and thus very expensive, others are so rarely used that the suppliers have a de facto monopoly, although generic production would be possible. Then the price is extremely high, just as with medication under patent protection.

## Vaccination against tuberculosis?

The BCG-vaccination against TB was developed in 1921. It has been used on a large scale since the 1950s. It has never been particularly effective and provides protection only against severe TB progress in children. It provides no protection against pulmonary tuberculosis in adults. This is why an effective and safe new vaccine is urgently required.

In the meantime, five candidates for a TB vaccine have reached the clinical trial phase.[9] No vaccination can be expected, however, before 2015. But only an effective vaccine would offer a realistic chance of wiping out TB by the year 2050, as the WHO intends in its Global Plan to Stop TB.[10]

Therefore, a multi-resistant TB is frequently a death sentence for the poor. They are not able to pay the costs of a MDR therapy and the required drugs are rarely available in poor countries. It is only a few years since the WHO introduced second-choice medication to its DOTS-plus strategy and started an initiative to make the drugs available.[7]

Resistance against all standard antibiotics and against at least one injectable reserve antibiotic is occurring more frequently, particularly in African countries, but also in Eastern Europe. In 2006, TB bacteria was found in South Africa which did not react to any antibiotic at all. 52 of 53 humans affected died.[8]

Highly resistant forms of TB (XDR-TB) are hardly treatable. The chance of a cure is only approx. 30%. In addition to this, with MDR-TB and in particular with XDR-TB the course of the disease is often significantly more dramatic than in non-resistant forms. Instead of a creeping course of the disease over many years, resistant forms may be fatal within a few weeks.

## Treatment like a 100 years ago?

In case of MDR and XDR-TB doctors have to revisit old therapies from the first half of the 20th century, such as surgically removing parts of the lungs. This requires intensive drug research: There is an urgent need of new medication against resistant TB forms, but also of a standard therapy with shorter treatment time. All this, however, is still in the remote future. In the period from 1984-2004 only three new TB drugs have been developed. Six drugs are presently in the clinical trial phase. Whether one or several of them show efficacy and safety is still unknown.

1 Tuberculosis Facts, Stop TB Partnership, WHO, 2007
2 In general, the risk of TB infected persons developing tuberculosis in the course of their lifetime is ca. 10%. However, 50% of all double-infected (HIV and TB) develop full blown TB. Their annual risk of developing the disease is 10%.
3 Stefan H.E: Kaufmann, Envisioning future strategies for vaccination against tuberculosis, Nature, Vol. 6, September 2006
4 www.aerztekammer-berlin.de/25_Aerztl_Fb/03_Fachbeitraege/060_FrueherkTB.html (accessed 23.10.2007)
5 Gerd Herold, Innere Medizin, Köln 2005

6 www.wikipedia.org/wiki/Tuberkulose
7 First-choice medication is available through the Global Drug Factory, the second-choice medication through the Green Light Committee within the framework of the DOTS-plus strategy.
8 www.who.int/tb/xdr/faqs/en/index.html Genf, WHO, 2007
9 Stefan H.E: Kaufmann, Andrew J McMichael, Annulling a dangerous liaison: vaccination strategies against AIDS und tuberculosis, Nature Medicine Supplement, Vol. 11, No 4, April 2005
10 Tuberculosis Facts, Stop TB Partnership, WHO, 2007

# Poverty is causing illness – everywhere in the world

## Fighting tuberculosis means fighting poverty

**Healthy diet, good housing and clean drinking water are still a privilege enjoyed only by a minority of the world's population. But even in the wealthy countries, the gap between rich and poor is growing. The impact on health of social disadvantage and poor living conditions is widely documented. Extreme poverty weakens the immune system and makes people susceptible to all types of diseases, particularly the poverty disease tuberculosis.**

## Germany: rich country – poor people

In Germany the TB statistics are still in decline. In 2005 the number of new infections (incidence) was just 7 out of 100,000 inhabitants – a very low infection rate in the global comparison. But on closer observation we can also see poverty-related problems in wealthy Germany. Socially weak groups, e.g. unemployed, social welfare recipients and homeless, contract tuberculosis at an above-average rate.[1] People with a migration background are at particular risk: Around 45 per cent of the patients had been born abroad.

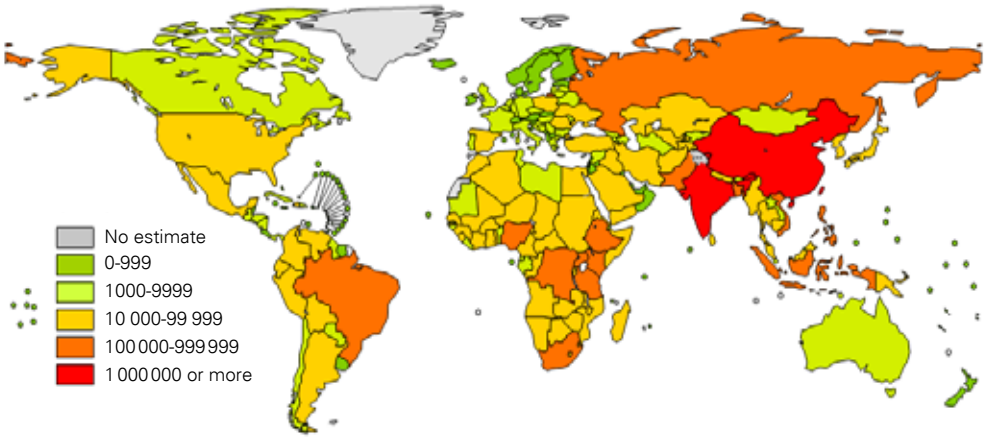
## Migrants particularly affected

The infection rate for migrants is more than five times higher than that for the German population (27.4 versus 5.1 / 100,000 inhabitants). Although migrants often bring a TB infection with them from their home countries, confined living conditions (for example in refugee camps and communal accommodation) as well as generally poor living conditions for this group in Germany are also important risk factors. Thus the risk potential for migrants is quite similar to the situation in Eastern Europe. In Macedonia, for example, the incidence is 32.3/100,000. While in Germany only 2.7% of the cases are MDR-TB, in migrants the figure is 4.7%.[2]

## Europe – not a strong community

The large poverty gradient within Europe is also disturbingly reflected in the data for the spread of tuberculosis: only 4% of new infections globally occurred in the European region (426,717 cases). 72% of the newly infected Europeans, however, live in Eastern Europe. The situation is particularly dramatic in Russia: According to the WHO, 83% of the worldwide tuberculosis cases occur in only 22 countries, whereby Russia is the only European country. A total of 156,047 cases of TB were registered there, i.e. 110 per 100,000 inhabitants.[3] The WHO even assumes that the actual incidence may be as high as 150/100,000 inhabitants,[4] as the state registration system is only working to a limited extent since the collapse of the Soviet Union.

**New TB-cases worldwide[8]**




In the European Union (EU) the average incidence is 18 /100,000, whereby the new EU-members (all from Eastern Europe) account for one third of all TB cases in the EU. The poorest new members, Bulgaria (43 / 100,000) and Romania (135 / 100,000), hold the sad EU record.

## Dramatic situation in Eastern Europe

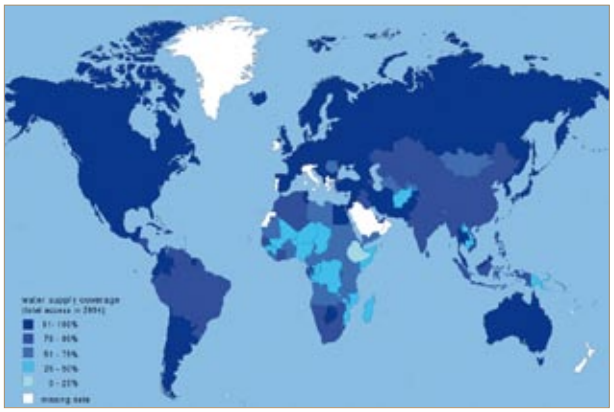
In Eastern Europe on average 105 new cases of tuberculosis were registered per 100,000 inhabitants. This means that the rate of registered TB cases rose in this region by 4.3%. However, the WHO assumes that while the rate of registration is rising, the actual TB incidence, for example in Russia, is falling slightly. At 144 / 100,000, Kazakhstan has the highest registration rates in Eastern Europe.[5]

In Russian jails (just as in the prisons of other Eastern European states) the TB situation seems to have run completely out of control. An incidence of 7,000 / 100,000 is reported here.[6] The catastrophic situation in the prisons is the infection risk number 1 and also the main reason why multiresistant tuberculosis has been able to spread dramatically (from 6.7% of the TB cases in 1999 to 14% in 2005). Patients with MDR-TB often die within just a few weeks from this highly aggressive form of the disease and also infect others with the resistant pathogens. Hardly anybody in Eastern Europe can afford treatment for MDR-TB. In many cases a diagnosis is a death sentence.

## The poor carry the heaviest burden

2.2 billion people in the world are carrying the tubercle bacillus. 1.2 billion have no access to clean drinking water. When we compare these poverty indicators, it becomes clear that it is always the poorest who have to carry the heaviest burden.[7]

**Access to drinking water 2004**



## Swaziland: poor and forgotten

A look at Swaziland gives us an illustration of what this means in concrete terms. The forgotten African country is home to 1,032,000 people. In 2005 Swaziland had one of the world's highest rates of new infection with TB at 1262 / 100,000 inhabitants. 75% of the TB patients were also HIV-positive.[8] The health situation in the bitterly poor country is catastrophic: a quarter of the population is starving. At 38 years, the life expectancy is the lowest in the world. There is one doctor


**Swaziland is one of the countries with the highest rates of TB and Aids**

*Foto: zakysant /GNU*

for every 6,250 people and one nurse for every 2,400 people. 77% of the population live in rural regions. Only 37% of these have access to clean drinking water. As well as the highest TB rates, Swaziland also has the world's highest HIV rate: 38.8% of the adult population are HIV positive. The poorest part of the world only has a chance if the world community manages to tackle TB, poverty and HIV jointly. Whether this succeeds is a question of political will.

1 See also: Tuberkulose auf dem Vormarsch. Die Schwere der TBc-Fälle im Land ist besorgniserregend. Betroffen sind vor allem arme und obdachlose Menschen. Ostsee Zeitung. Wismarer Zeitung, 3.-4. March 2007, p 53

2 Tuberculosis in Germany 2005, Deutsches Zentralkomitee zur Bekämpfung der Tuberkulose (German Central Committee against Tuberculosis), 2007; www.pneumologie.de/dzk/epi_deutschland.html These figures correspond to the data from the Surveillance of Tuberculosis in Europe, EU Commission, WHO Collaborating Centre for the Surveillance of Tuberculosis in Europe, March 2007 deviate slightly from the estimates of the WHO (Global report) which see the total figure at 5949 and the incidence at 6/100,000 www.who.int/tb/publications/global_report/2007/download_centre/en/index.html

3 Surveillance of Tuberculosis in Europe, EU-Kommission, WHO Collaborating Centre for the Surveillance of Tuberculosis in Europe, March 2007

4 Global Tuberculosis Control, Surveillance, Planning, Financing, WHO, Genf 2007 www.who.int/tb/publications/global_report/2007/download_centre/en/index.html

5 www.who.int/GlobalAtlas/predefinedReports/TB/PDF_Files/kaz.pdf

6 Tuberkulosesituation in Deutschland 2005, Deutsches Zentralkomitee zur Bekämpfung der Tuberkulose, 2007; www.pneumologie.de/dzk/epi_weltweit.html

7 World Health Organization (WHO). Global tuberculosis control - surveillance, planning, financing WHO Report 2006: www.who.int/tb/publications/global_report/2007/download_centre/en/index.html

8 WHO 2007. www.who.int/whosis/whostat2007_1mortality.pdf As the poorest countries do not have a functioning registration system for diseases the WHO partly relies on estimates.

# The fight against resistance

## Global strategies against multidrug-resistant forms of tuberculosis required

**With the introduction of antibiotic therapy, it was believed that an old enemy of humankind, tuberculosis, was finally conquered. But since the 1980s doctors have increasingly had to face up to the fact that the standard drugs are no longer effective. Multidrug-resistant and highly resistant TB strains have been a severe global health problem for a long time now, but there is still no effective, low-cost therapy in sight. In the meantime the number of MDR infections is increasing, because everyone carrying a resistant pathogen also infects others with this resistant form of the disease.**

The particular structure of the TB bacterium provides it with a natural resistance to many antibiotics and in the course of treatment it can very easily become resistant to the few remaining antibiotics which are still effective against TB. In order to overcome these resistances, TB patients receive a combination of four antibiotics for two months and then two antibiotics for at least four months.[1] This special therapy program (DOTS[2]) can avoid resistances relatively reliably and is also suitable to conquer the extremely adaptable bacteria in the body of the patients. If single bacteria strains become resistant against one or two of the antibiotics in the course of the therapy, they may be killed by other antibiotics.

## Highly dangerous: obsolete therapies

The intake of the drugs, however, is accompanied by unpleasant side effects and very stressful for the patients. This is why many patients terminate the therapy too early. Old therapy programs are also highly problematic and often used in countries with deficient health infrastructure or due to missing financial resources: then the patients receive only two or even one antibiotic. The consequence is that drug resistance can build up very easily. Individual bacteria strains survive in the body of the patients and proliferate unimpeded. If the patients are not treated again, the resistant and infectious disease remains for their entire life. Such a resistance which is caused by incorrect intake or treatment is called secondary resistance. It differs from primary resistance when patients are already infected by a resistant germ.

If TB patients are resistant to rifampicin and isoniazid – the two most effective TB antibiotics – it is called multidrug-resistant tuberculosis (MDR-TB). If patients are additionally resistant to drugs of the second generation it is called extensively drug-resistant TB (XDR-TB).[3]

## Explosion of costs

Even in Europe, two cases of the disease showing resistance against all existing TB drugs were documented in Italy two years ago.[4] Hardly any treatment is possible against such extremely resistant TB forms. The basic principle applies: The higher the number of antibiotics against which the germs are resistant, the more expensive the treatment will become and the lower the chances of being cured.

### Price comparison South Africa 2007[5]

| TB form | Maximum drug cost in US$ |
|---|---|
| Non drug-resistent TB | 48 US$ |
| Recurring non drug-resistent TB | 123 US$ |
| MDR-TB | 1,030 – 2,016 US$ |
| XDR-TB | 12,706 US$ |

**Soweto, South Africa: Poverty, Tuberculosis and Aids are a deadly mixture** *Photo: Matt CC*

In many countries the costs for MDR-TB already amount to US$ 8,000 - 15,000. The stressful treatment takes 14 to 21 months in any case . The patients must take approx. 30 tablets a day. The chance of a cure is only approx. 50% compared to 98% in case of non-resistant forms, which can be treated with the DOTS program.[6]

## TB in front of our door

Every year approx. 420,000 people are infected with MDR-TB, thereof 25,000 with XDR-TB. In the meantime approx. 15% of all new infections in Eastern Europe and Central Asia are multidrug-resistant or extensively drug-resistant. 70,000 of the MDR-TB cases occur in the European region, 80% of them in Eastern European countries. 15% of these patients suffer from the hardly treatable XDR-TB.

For people in Eastern Europe and Central Asia the risk of being infected with the resistant TB forms is approx. 10 times as high as in the rest of the world. The 13 countries most affected by MDR-TB are in Eastern Europe. While the rate of new infections of MDR-TB is decreasing again in countries with good TB control programs (e.g. the Baltic countries), it is increasing to a threatening degree in other countries of Eastern Europe (e.g. Kazakhstan). It is a particular risk for homeless, drug-addicts and prisoners.[7]

## Prisons – breeding ground of TB

Miserable living conditions make prisons in many countries an ideal breeding ground for tuberculosis. 30 to 40 million people worldwide are serving prison sentences every year – frequently in overcrowded, badly ventilated cells. In many countries prisoners receive neither medical care nor sufficient healthy food. The consequence: The TB rate among prisoners is in some cases more than 100 times higher than in the remaining population of a country. Sometimes prisoners represent one quarter of the country-wide TB cases. Due to the bad health care in the prisons and a lack of infrastructure, approx. one quarter of the TB sufferers in prisons have MDR-TB, in some regions of Russia it is even half of the affected. They infect co-prisoners, the prison staff and their families with the resistant germs. The situation in the prisons becomes a threat to the health of the whole population – because resistant germs make no halt at prison walls. Efficient treatment programs for prisoners would be an urgently needed step to protect the population against tuberculosis. And not least of all, even prisoners have a right to appropriate health care.[8] Because the HIV rate in prisons in many places is far above the population average, prisoners are particularly at risk of contracting TB. 32,000 of the 445,000

TB patients in Europe are living in prisons, 30,000 of them in Eastern Europe alone. There, the TB rate among prisoners and prison staff is between 232 to 17,808 patients per 100,000 persons. Three particularly badly affected countries of Eastern Europe are Kazakhstan, Azerbaijan and Russia:

**Eastern European prisons: TB-foci[9]**

| | TB-cases / 100,000 in the entire population | TB-cases / 100,000 in prisons | Treatment success with DOTS (entire population) |
|---|---|---|---|
| Kazakhstan | 155 | 17,808 | 72% |
| Azerbaijan | 85 | 3,944 | 60% |
| Russia | 150 | 1,591 | 50% |

In Russia the situation in the prisons has improved slightly since 1999. In those days, 4000 per 100,000 persons suffered from TB; in 2005 the number decreased to "only" 1591 per 100,000.

However, this means that the situation in many prisons in Eastern Europe is still worse than in Southern Africa. In Swaziland, the country with the highest rate of TB infections worldwide, 1,211 of 100,000 inhabitants are infected with Tuberculosis.

## What needs to happen?

Special TB programs need to be developed for prisons to provide prisoners, employees, relatives and the general population with effective protection. Prisoners and prison employees must be tested regularly for TB and receive free effective therapies if they are ill. Employees must be informed about TB. All TB patients must be tested for resistances and be treated accordingly. Health infrastructure inside and outside the prisons must be improved. Treatment must continue seamlessly after prisoners are discharged. DOTS programs can prevent the spread inside and outside the prisons. TB control programs must work in close interaction inside and outside the prisons.

Only by treating MDR-TB the spread of MDR-TB can be prevented. This also means that second-line drugs must be available for everybody at an affordable price, inside and outside the prisons. Persons who are double-infected with HIV and TB must be treated for both diseases.[10]

The human right to treatment, access to health care services and essential drugs applies to all people, including prisoners. Public awareness must be raised to combat stigmatisation.

Effective TB control programs require broad political support. They can only be effective if the persons concerned take active part in the design and implementation. Initial programs have been introduced with the help of the World Health Organisation, e.g. in England, Russia, Moldavia and Rumania. Falling TB rates in these countries give reason for hope. Nevertheless, the situation in prisons, in particular in Eastern Europe, remains one of the most urgent health and political problems in Europe.

1 Rifampicin, isoniazid, pyrazinamide and, usually, ethambutol should be given in the initial phase, followed by rifampicin and isoniazid in the maintenance phase.
2 Directly observed treatment, short-course www.who.int/tb/dots/whatisdots/en/index.html
3 According to the WHO definition a resistance to fluoroquinolones as well as to at least one of the three injectable drugs kanamycin, amikacin, capreomycin must be present.
4 Fact Sheet EU TB, Multidrug-resistant and extensively drug resistant tuberculosis, WHO Europe, Copenhagen, September 2007
5 Information Prof. Andy Gray Dept of Therapeutics and Medicines Management, Centre for the AIDS Programme of Research (CAPRISA), Nelson R Mandela School of Medicine University of KwaZulu-Natal, South Africa, October 2007
6 World Tuberculosis Day: Treatment of multiresistant TB in almost every second patient was without success. MSF, Berlin/Geneva, 22 March 2007
7 Fact Sheet EU TB, Epidemiology of tuberculosis in Europe, WHO Europe, Copenhagen, September 2007
8 www.who.int/tb/challenges/prisons/en/
9 Prevalence in 2005 according to WHO: www.who.int/countries/en/#A and Status Paper on Prisons and Tuberculosis, WHO Europe, Copenhagen 2007
10 Tuberculosis in Prisons, WHO 2007 www.who.int/tb/challenges/prisons/story_1/en/index.html

# TB and Aids – a lethal combination

## Double-infection is a bitter reality in Africa

**Around 5-10% of all those infected with tuberculosis suffer from full-blown TB in the course of their lifetime. The risk of HIV positive persons, however, of developing the full-blown disease is significantly higher: half of all HIV positive persons, infected with the Mycobacterium tuberculosis suffer from TB in the course of their lifetime. The double-infection with TB and HIV is a menacing combination: Tuberculosis is among the leading killers of people living with HIV: 12% of all Aids deaths is due to TB.[1]**

USA, beginning of the 1980s: In Chicago doctors suddenly diagnose an increasing number of cases of tuberculosis. First they cannot explain why the disease, which they considered almost conquered, has broken out again. But they soon find out why: Aids!

In 2005[2] more than one third of the 40 million HIV-infected persons worldwide – about 15 million people – were also infected with tuberculosis. In contrast to people with a healthy immune system, the probability of HIV-infected persons catching TB and becoming ill is significantly higher.[3] Once it breaks out, the disease frequently progresses very quickly and may be fatal within a few weeks – in many cases before it would even be possible to diagnose TB.

## The poorest countries of the world are affected

Because HIV-positive persons with increasing immunodeficiency tend to suffer from atypical organ tuberculosis and generalised miliary tuberculosis, the disease is often much more difficult to detect in them, which means that they frequently do not receive treatment.

Modern diagnosis methods are often prohibitively expensive in poor countries. 30 million of the world's HIV-positive persons, however, live in Sub-Saharan Africa. In some African countries over half of all TB patients are HIV-positive.

**TB in African countries in 2005 (per 100,000 inhabitants)**

| | TB cases Incidence[4] (and prevalence[5]) | Share of HIV-positive among new TB infections | HIV-positive deaths from TB | HIV-negative deaths from TB | Deaths from HIV |
|---|---|---|---|---|---|
| Mozambique | 597 (447) | 50% | 66 | 58 | 707 |
| Swaziland | 1,211 (1,262) | 75% | 197 | 107 | 1,550 |
| South Africa | 511 (600) | 58% | 41 | 30 | 675 |
| Kenia | 936 (641) | 57% | 44 | 95 | 409 |

*Source: WHO 2007[6,7]*

## The lack of Aids therapy increases TB spread

Only one quarter of the HIV-positive persons who would be in need of treatment worldwide receive life-sustaining drugs (ARVs) according to the WHO.[8] This provides fertile ground for the spread of TB, because Aids drastically weakens the immune system. Even if a double-infected

**Ethiopia: A TB-patient is carried to hospital by her sons** *Photo: WHO / Alem Kitama*

person was treated successfully against TB, it is very probable that tuberculosis will break out in him or her again. An Aids therapy reduces this risk, because it stabilizes the immune defence. A new infection also involves a significantly higher risk of catching one of the therapy-resistant TB forms. When a highly resistant TB strain killed 52 of 53 patients within just a few weeks after diagnosis in South Africa in 2006, 44 of them were HIV-positive.[9]

## Nursing staff in extreme danger

Infectious open pulmonary TB may also infect HIV negative persons with resistant TB forms. According to Dr. Kevin de Cook, director for HIV/TB at the World Health Organisation (WHO)[10]: "Perhaps the most dangerous concept currently developing is that it is risky to look after patients with TB, not because the health worker might get TB but that they might get incurable TB. I think this is an extremely serious issue."[11]

## Recommendations of the WHO

The WHO has formulated important recommendations to reduce the risk of HIV/TB-double infections.[12] First, all TB-infected persons should also be examined for HIV and vice versa. The infrastructure of the already established TB programs should also be used for HIV programs and vice versa. In addition, HIV-positive persons should be protected against a double-infection with the TB bacterium by preventive measures. In order to diagnose TB in Aids patients faster and more successfully, more intensive research is required. This means that special TB therapies for HIV-positive persons must be developed.

## Promising first approaches

One example from Ethiopia shows how the double burden of both infections can be fought successfully: The Zewditu Hospital in Addis Ababa has been running a successful model project since August 2005: All HIV patients are tested for TB here with X-ray diagnosis, a sputum test (coughed out phlegm) and by clinical examination. Furthermore, all TB patients are tested for HIV. If a double infection is detected, both diseases are treated. For this purpose the patients visit the hospital once a week. After successful TB therapy, the treatment of HIV continues, if necessary.[13] This

**Tuberculosis hospital in Ethiopia** *Photo: World Lung Foundation*

procedure reduces the risk of new infections with TB and thus also the danger of resistant TB forms. Resources are saved, because new cases of the disease are avoided and an existing infrastructure is used twice: The patients are informed both on potential side effects of the TB und Aids drugs and on the necessity of a regular and permanent intake of both drug combinations.[14]

## A drug reduces the risk

The WHO recommends in its therapy guidelines a preventive administration of isoniazid in HIV-positive patients with latent TB infection. This may reduce the probability of a TB outbreak. However, the drug is rarely used, because poor countries do not have the resources to pay for it. Until 2001 only one percent of the Aids patients worldwide were treated with this drug.

The simultaneous administration of ART and isoniazid needs further intensive research. The initial results are promising: up until now a study with 1096 double-infected patients has shown that the preventive administration of the TB standard antibiotic isoniazid in combination with the HIV therapy (ARVs) reduces the probability of a tuberculosis by 76%.[15] However, more research is urgently needed to effectively overcome the double burden – HIV and TB.

1 www.who.int/tb/challenges/hiv/facts/en/index.html
2 As this Pharma-Brief-Special forms a unit with the training material on tuberculosis, the numbers for 2005 were generally used. Much of the data on TB for a later period were not available at the time of print. Later data for Aids is available at www.unaids.org
3 While HIV-negative persons who are infected with the bacterium have a risk of 10% of suffering from tuberculosis in the course of their life, the risk in HIV-positive persons rises to 10% per year.
4 Incidence is the number of new infections of a disease which occurs in the course of one year.
5 Prevalence implies all already existing cases of a disease at a certain time, including the new infections.
6 WHO: www.who.int/whosis/whostat2007_1mortality.pdf Geneva 2007
7 The number of existing TB infections in Swaziland, Zambia and South Africa is lower than the number of new infections because many persons die of TB in the course of the first year. HIV-infected persons in particular can die of TB within a few weeks.
8 UNAIDS, Global facts and figures, December 2006
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10 WHO TB/HIV web site: www.who.int/tb/hiv/en/
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12 Interim policy on collaborative TB/HIV activities: www.who.int/tb/publications/tbhiv_interim_policy/en/ WHO, Geneva 2007
13 If possible, the HIV therapy does not start until the TB therapy has ended in order to reduce side effects.
14 Stop TB Partnership, TB/HIV Update, September 2007
15 Golub JE et al. The impact of antiretroviral, therapy and isoniazid preventive therapy on tuberculosis incidence in HIV-infected patients in Rio de Janeiro, Brazil. AIDS, 2007, 21:1441–1448, abstract under: www.aidsonline.com/pt/re/aids/abstract.00002030-200707110-00007.htm;jsessionid=G7LQf6Jp4yWP3ynslZprDw5T6RGshCL1tynr1vB6TnGys2qnjf2g!2112021004!181195629!8091!-1 The study was performed by CREATE (Consortium to Respond Effectively to the AIDS/TB Epidemic) www.tbhiv-create.org

# Money makes the world go round

## Why there is hardly any research against tuberculosis

**The standard treatment against TB hasn't changed since the 1970s. The antibiotics still being used today were invented in the 1940s, 1950s and 1960s. Due to increasing resistance against these agents, the fight against TB is at risk of failure. The only TB vaccine - which has at best moderate efficacy - is from the 1920s. Nobody, however, is expecting a new, better product before 2015. Even the diagnosis methods are insufficient and about 100 years old.[1] This misery is due to purely economic considerations.**

Although several suppliers are competing with patent-free drugs, many tuberculosis sufferers cannot afford these – even if they are cheaper than patented drugs. If, as it is often the case with poverty diseases, the demand is not backed by hard cash, there will be no market for the product. Most of the TB sufferers are so poor that it is not lucrative enough for the manufacturing companies to produce for them. Due to low production volume and the lack of competition, TB drugs have remained relatively costly even without patent protection.

### Worldwide monopolies aggravate the situation

The situation concerning new, patent-protected drugs is even worse: The incentive for pharmaceutical companies to research and develop new drugs is the prospect of a 20-year worldwide patent. As this time-limited monopoly means that there is only one supplier, he can increase the price almost as he likes and thus shorten the supply, i.e. even at low production, the monopolist can achieve high profits.[2] These economic laws have a serious impact on poor people's access to patent-protected drugs, for example in the case of a multiresistant TB (MDR-TB), whose treatment also requires these patent-protected drugs. The therapy costs between 8,000 and 15,000 Euro – a fatal price for the poor.

But tuberculosis occurs particularly in those people who live in poverty, who are neither able to pay for over-priced patent-protected drugs nor for vaccinations and diagnostic agents. This is why the incentive to research new therapies against TB is extremely low. This makes the demand even higher! US$ 900 million would have to be spent every year to cover the research needs for tuberculosis. In 2005 it was just under US$ 206 million.[3]

### What is being researched?

If you consult a book on economics for the definition of business enterprise, it will say the following:[4] The interest of utmost importance of business enterprises is profit maximisation. Any other interest, such as health, is subordinate to this primary interest. The international humanitarian organisation *Doctors without borders* has compiled information on the fields on which pharmaceutical companies focus their research (see table). It becomes obvious that most research is done on cardiac diseases and cancer. These are diseases affecting millions of affluent patients. 178 companies are running cancer studies; only 12 companies focus their research on tuberculosis as a disease of the poor. This mismatch is driven by economic priorities and implies that fifteen times as many companies commit themselves to important and lucrative cancer research than to TB research – which is at least as important but not lucrative.[5]

### New therapies in the remote future

The fact that research in TB got new impetus at all at the end of the 90s, is mainly because the disease has become a serious threat in Eastern Europe and the USA and thus even rich nations

**Research priorities and healthy life years lost**

| | Tuberculosis | Cancer | Cardiovascular diseases |
|---|---|---|---|
| Number of drugs in clinical studies | 6 | 399 | 146 |
| Number of pharmaceutical companies involved | 12 | 178 | 82 |
| Healthy life years (DALY) lost due to disease in 2005[6] | 34,736,000 | 77,284,000 | 148,190,000 |
| Healthy life years lost per new drug | 5,789,000 | 194,000 | 1,015,000 |

are concerned. Six new drugs are currently in the early clinical study phase. It is yet uncertain how many of them, and indeed whether any of them at all, will actually achieve marketability. In any case, the therapy situation will hardly change before 2015.[5]

Since 1970 only three new specific TB drugs have been introduced.[7] In addition to this, some other antibiotics which were already available have been approved as second or third-choice TB drugs. However, they are less effective and have stronger side effects. This is why there is a low chance of healing TB caused by resistant forms, often only 50%.

## High demands on research

The old BCG vaccine is almost 90 years old and is hardly effective anymore. It protects only children and even these to only a restricted degree. At the moment there are five vaccine candidates in the early clinical trial phase. However, a result can only be expected between 2015 and 2020. Furthermore, it is not likely that a single vaccine will be sufficient, as in principle there are three cases where it would have to be applied:

1. The effect of BCG vaccination decreases in vaccinated persons at the age of approx. 15 years. The vaccination in these young people therefore would have to be refreshed with a new or upgraded vaccine.
2. Patients with latent TB infections must be protected against an outbreak of the disease by a vaccination, or the bacteria which are already in the body must be killed.
3. Furthermore, a new vaccine would have to provide safe protection of non-infected persons against an infection.


It is not probable that a single new vaccine will cover all three fields of application. The five vaccine candidates are improved variants of the BCG vaccine, as well as one new type

of development. It is very probable that vaccinations will be combined or additional substances must be studied to be able to meet present demands.[8]

## Hope for many: An effective vaccination

However, the development of an effective vaccination, better diagnosis options and new drugs would be the only possibility of actually eliminating TB by 2050, as intended by the "Global Plan to Stop TB"[9]. Drug research based on this target, however, will hardly be able to meet market economy criteria. This is why public initiatives for research are so important. In Germany, the public Max-Planck Institute for Infection Biology, for example, has committed itself to the development of a TB vaccine.

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# Drug research as public good

## There is a change of paradigm in the debate on drug patents

**No patents, no innovation – this has been the battle cry of the drug industry and politics for decades now. Only strict patent protection combined with high profits can motivate companies to invest in research for new drugs – so their argument. However, there is a broad consensus among experts that this simplified formula is not suitable to control a complex entity such as the worldwide drugs market and to satisfy global health needs. New paths are being taken, and not only by the World Health Organisation (WHO).**

When Jonas Salk, who discovered the vaccine against polio, was asked who the patent would belong to, he said: "Who owns my polio vaccine? The people! Could you patent the sun?"[1] The polio vaccine became public property and could be used worldwide at an affordable price. With great success: over 200 countries are polio-free today.

## The poor get nothing

Examples such as the polio vaccine illustrate that there are alternatives to strict patenting and skyrocketing drug prices. But the reality almost always looks different. Essential, life-saving drugs are today unaffordable for many people in the world. And in many cases drugs are not even being developed for the diseases which prevail in poor countries. These are thus referred to as neglected diseases. Between 1975 and 2004, 1556 new chemical entities came on the market as drugs. But only three of these are suitable for the treatment of tuberculosis, a further 18 for the treatment of other neglected diseases.[2] In most cases these innovations were the result of public or military research or they came about as incidental discoveries made while researching other diseases.

*Photo: Jörg Schaaber*

Neglected diseases account for around 10% of the global disease burden – i.e. of healthy life years lost worldwide. But only around one per cent of all drugs which came on the market in the last three decades can be used to treat these diseases.[2]

Even for patients in the industrialised countries, few new drugs actually provide any real therapeutic advance. The US FDA rates less than one quarter of all new drugs as a therapeutic advance. Real innovations are even more seldom. Does the current patent system therefore really serve as an incentive towards requirements-oriented research which can help overcome the health problems in the northern and southern hemisphere?

> "The States Parties to the present Covenant recognize the right of everyone: [...] to enjoy the benefits of scientific progress and its applications."
>
> *International Covenant on Economic, Social and Cultural Rights"*[12]

## Research as public responsibility

The WHO says no. It thus established in resolutions in 2006 and 2007[3]: The protection of intellectual property is not a sufficient incentive to research drugs for neglected diseases and can hinder access to drugs by the poor. In order to find new research incentives, the WHO set up an Intergovernmental Working Group (IGWG) which will draw up a plan of action by May 2008.[4] The WHO is thus assuming public responsibility for drugs research. This is a clear political statement: where the market fails, public intervention is necessary. There is also a broad consensus that greater public commitment to the needs of the developing countries is required. It is also obvious that there are a lot of problems concerning research

for the needs of the industrialised countries. Nonetheless, the resistance of the USA and the EU countries so far has prevented the necessary political conclusions being drawn.

## Patent-free development

Regarding drugs, vaccines and new diagnostic methods as a public good means producing them on a patent-free basis and researching them with public funding. Basic research on many diseases is already publicly funded while the pharmaceutical industry concentrates on lucrative product development.

Publicly-financed, patent-free developed drugs belong to the public. They can be produced from the very start by a number of competing companies simultaneously and supplied as generic drugs. In addition to this, there are no legal restrictions on the further development of an effective substance as is the case under patent protection. An open, cost-free exchange of know-how is possible – this is illustrated, for example, by Linux Software or the online encyclopaedia Wikipedia.

Under the present system patients pay twice for every medicament: first in the form of higher prices at the pharmacy or in higher health insurance premiums, and second in the form of taxes to finance basic research by the public sector. In addition to this, the pharmaceutical companies receive considerable tax breaks for their research.

## The 800 million dollar fraud

The researching pharmaceutical companies justify the high drugs prices during the term of the patent by arguing that they would need US$ 800 million for the research on a single drug, which they have to refinance. This sum, however, includes almost US$ 400 million in opportunity costs. These are purely virtual costs which are "lost" because the money is invested in research rather than in something else like shares. This virtually lost profit is then calculated as a cost factor. A highly controversial procedure. If we then subtract the tax savings the company is granted for its research efforts, the remaining expenditure is no more than US$ 250 million.[5] Independent research initiatives have even shown that it is possible to research and develop a drug for around US$ 100 million.

## Product partnerships

The Drugs for Neglected Diseases Initiative (DNDi)[6] proves that patent-free and low-cost drugs are not a utopia. In this international research initiative six research institutes are cooperating to develop drugs up to market maturity without any commercial interests. In 2006 the DNDi launched two patent-free malaria drugs on the market for the first time.[7]

The Global Alliance for TB Drug Development (TB-Alliance), the Global TB Vaccine Foundation (Aeras) and the Foundation for Innovative New Diagnostics (FIND) were founded to combat tuberculosis.[8] Just as DNDi, these foundations research TB drugs, vaccines and diagnostics in the form of product partnerships which can be made available worldwide as patent-free public property at an affordable price. So far the budget of the TB Alliance has amounted to US$ 193 million. A further US$ 100 million are needed to conclude the development of five TB drugs which are presently in the clinical trial stage. Pharmaceutical companies who are generally happy to use such product partnerships for image transfer and PR purposes have so far been largely unwilling to provide money for the development of the important drugs. Less than 0.2% of the TB Alliance budget comes from drug companies.

## No patents – less costs?

Product partnerships are currently regarded as an important model for carrying out research on neglected diseases. It would also be well worth extending this model to other research areas. Industrial research operates inefficiently in many areas and is too expensive. Pharmaceutical companies spend twice as much money for advertising and administration

as they invest in their research departments and they refinance these costs with their high prices. In the USA alone additional costs of US$ 25 billion are incurred annually through the higher prices for patented drugs.[9] If drugs research was exclusively publicly funded from now on and the new drugs sold patent-free under competitive conditions, the US state healthcare system could save US$ 110 billion over a period of ten years.[10]

## Where will all the money come from?

The money for public research could, for example, be raised by an international research fund into which countries would feed according to their economic strength. This fund could then commission research projects. The research results would be basically patent-free. The larger sums which the countries have to contribute for research would be more than saved by reduced drugs prices. Another advantage alongside reduced drugs prices would be a need-oriented research. Research would be carried out where there is an actual lack of effective drugs and not where the most profits can be made.[11]

**Poverty in Germany today still means a higher risk to become ill**

*Photo: Jörg Schaaber*

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# Combating poverty is active health policy!

## Prerequisites for effective elimination of tuberculosis worldwide

**Drugs alone cannot stop the worldwide spread of TB. Combating poverty must also be made a central element of health policy. In 1978 the WHO recognised poverty as one of the main causes of disease.**

As early as 1848 Rudolf Virchow had identified the connection between health and the socio-political environment of the human being: "Medicine is a social science and politics is medicine on a higher level." In 1875 Sir Benjamin Ward-Richardson described utopian cities with clean air, public transport, small healthcare centres for each city district, homes for the old and the disabled, cities without tobacco and alcohol, which were healthy and secure for all.[1]

### Taking a look at the social aspects

At the latest with the discovery of antibiotics, medicine developed as a science in which there was hardly any place for holistic approaches. There is no doubt that antibiotics are indispensable for the treatment of infectious diseases. But unless the socio-political aspects are also taken into consideration it will hardly be possible to successfully combat TB and other poverty-related diseases.


**Bad housing and poor living conditions promoted the spread of tuberculosis**
*Picture: Deutsches Hygienemuseum, Dresden*

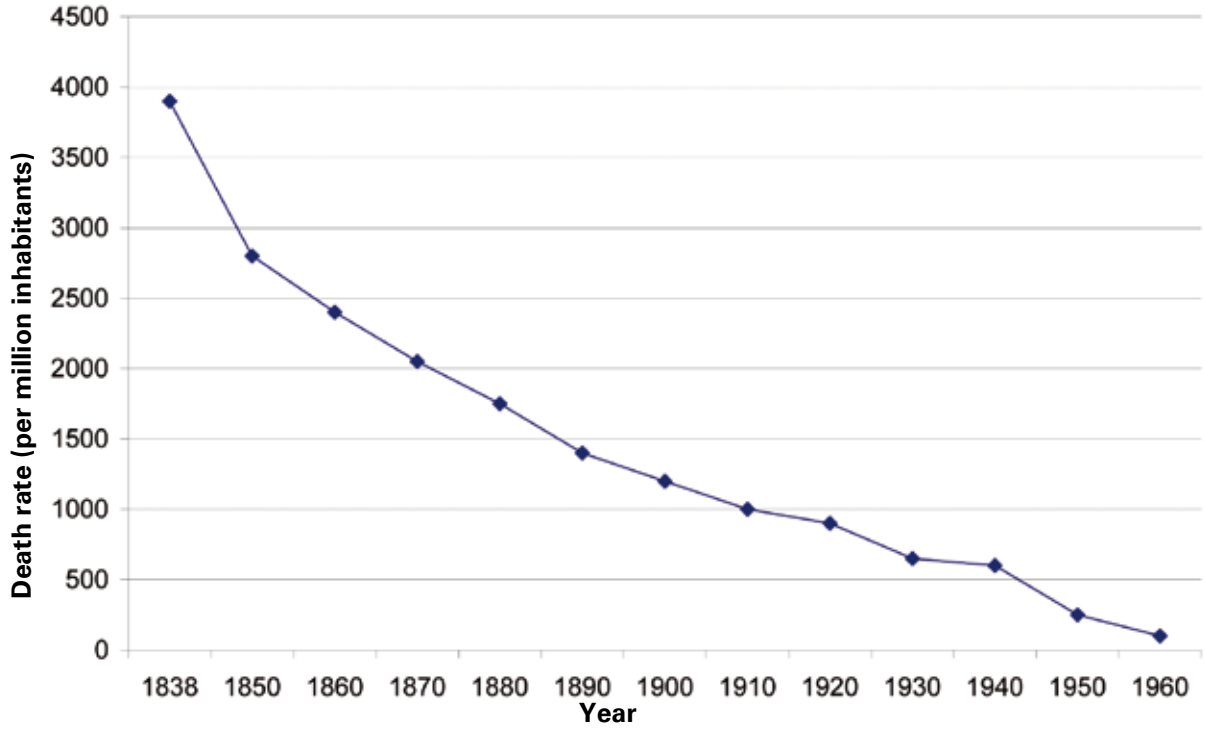
In the 19th century the living conditions of wide sections of the population not only in Germany but throughout Europe were miserable and unhealthy – not unlike the situation in many poor countries today. Tuberculosis thrived in the slum districts of the rapidly growing European cities. It was one of the main causes of death in the 19th century.

### Working class disease

When Robert Koch described the tuberculosis pathogen in an article in the Berliner Klinische Wochenschrift on the 10th of April 1882, he wrote: "Statistics show that tuberculosis kills 1/7 of all people, and that if we take only the middle productive age classes, the disease kills one third of these and often more." In the 19th century 100,000 – 120,000 people died every year from TB in what was then the German Empire.[2] These figures are similar to those for the world's poorest countries today.

As of 1840 tuberculosis declined throughout Europe long before the mycobacterium tuberculosis had been identified as the cause, long before x-ray diagnosis, vaccination and effective antibiotics had been invented. So what, then, was the cause of this decline in the disease?

## Tuberculosis deaths in England and Wales




*Source: McKeown 1976*

## McKeown – Pioneer of social medicine

The medical historian and exponent of social medicine, Thomas McKeown, regarded it as proven that people's health had improved decisively over the last three centuries because fewer people were contracting infectious diseases and dying of them. In his pioneering work "The role of medicine" (1976) he cites better hygiene, better diet and thus a stronger immune system as the reasons for the decline in infectious diseases. Medical treatment only ever played an insignificant role in this decline.[3] According to McKeown the reason was the decline in severe poverty. In particular, general improvements in the living conditions and standards of living reduced the mortality rates from tuberculosis and other infectious diseases. This insight does not, of course, mean that medicaments should be withheld from poor people. Fighting poverty, however, must be made a central element of health policy. TB programs aimed solely at fighting the disease itself will not lead to success.

## Health for all

The WHO recognised poverty as the main cause of disease as early as 1978. At the end of the seventies one billion people were living in bitter poverty, with no access to even the most basic healthcare facilities. With the Alma Ata Declaration[4] the WHO acknowledged that to achieve an acceptable level of health for all, social and economic development is just as important as combating individual diseases. The Alma Ata declaration has lost nothing of its relevance to the present day.

## Global development goals

From 6 – 8 September 2000 the Millennium summit of the United Nations in New York again raised the issue of the social situation of humanity. In an inventory it established that, just as in the seventies, over a billion people were still living in extreme poverty, i.e. they have less than one US dollar a day to live on. More than 700 million people are hungry; more than 115 million children cannot read or write. Over

**A poor water supply is harmful for health – Refugee camp in Sudan** *Photo: Elisabeth Lipsewers*

one billion people still have no access to clean drinking water. The consequences: millions of avoidable deaths and lost years of life due to diseases of poverty such as tuberculosis.

The 189 states at the summit thus agreed on eight concrete world development goals (Millennium Development Goals /MDGs), each with measurable target and time specifications. The overriding goal is to halve poverty in the world by the year 2015. Under the auspices of the Ministry for Economic Cooperation, the German government also developed a plan of action for how it wants to participate in the realisation of the MDGs.[5]

## The Global Plan to Stop TB

In MDG 6 the world community committed itself to bringing a halt to the spread of serious diseases by the year 2015 and to gradually achieve a reversal in the trend. One of these diseases is tuberculosis. By 2015 the number of people suffering and dying from tuberculosis is to be considerably reduced. The proportion of tuberculosis cases diagnosed and cured with the aid of DOTS (directly observed treatment, short-course) should increase accordingly.

The Stop TB Partnership was also founded in 2000 with the aim of fully eliminating TB by the year 2050. 500 partners have joined the initiative: countries, international organisations, donors from the public and private sectors, government and non-governmental organisations, and individual persons. Of all of these, the World Health Organization (WHO) is the most important organisation. In order to eliminate TB by the year 2050, the various initiatives and the WHO have drawn up the "Global Plan to Stop TB, the implementation of which is reviewed every year.

The aims: by 2005 70% of TB cases worldwide were to be registered and 85% cured. According to data from the WHO[6], the target was missed by a small margin: in 2005 approx. 60% of the worldwide TB cases were diagnosed and 84% cured. The target was reached in South-East Asia, the most severely affected region.

**Tuberculosis patients, Ethiopia** *Photo: WHO/ Alem Kitmama*

By 2015 the cases of death and illness from TB are to be halved relative to 1990. Although a reversal in the trend as envisaged by the MDGs by 2015 has already been achieved on the global level due to a fall in the absolute infection figures, there are still areas where the infections rates are increasing dramatically. These include many countries in Eastern Europe, the Middle East and Africa. Whether the cases of death and infection can really be halved by 2015 without increased efforts is more than questionable.

By 2050 there should be less than one case of the disease per million people worldwide. This would mean that the disease had been effectively eliminated.

## Concrete measures:

- Every person must have access to effective prevention, diagnosis and therapy. Treatment with the DOTS standard therapy must be available to all patients worldwide. Equally, all persons suffering from multiresistant TB and doubly infected with HIV and TB must be effectively treated.

- Healthcare personnel and patients should play an active role in the implementation of the global plan.

- The social conditions must be improved as they play a central role in the spread of TB. Healthcare systems and infrastructure must be improved and reinforced.

- New prevention, diagnosis and therapy options must be explored. This means that new drugs and vaccinations must be found to identify and cure the disease more quickly.

Implementation of the global plan will require US$ 57 billion by 2015. So far there is a shortfall of 31 billion. It is encouraging however, that the sum of US$ 2.3 billion required for 2007

**Home of a former TB patient in India** *Foto: WHO*

was provided practically in full. 57 billion: that sounds like a lot of money, but the figure is relativised by other statistics: so far the war in Iraq has swallowed up six times that much, i.e. 340 billion.[7] Stopping TB is thus mainly a question of the political will to do so.

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## The eight Millenium Development Goals of the United Nations[8]

### MDG1: Eradicate extreme poverty and hunger

- Reduce by half the proportion of people living on less than a dollar a day
- Reduce by half the proportion of people who suffer from hunger

### MDG 2: Achieve universal primary eduction.

- Ensure that all boys and girls complete a full course of primary schooling

### MDG 3: Promote gender equality and empower women

- Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015

### MDG 4: Reduce child mortality

- Reduce by two thirds the mortality rate among children under five

### MDG 5: Improve maternal health

- Reduce by three quarters the maternal mortality ratio

### MDG 6: Combat HIV/AIDS, malaria and other diseases

- Halt and begin to reverse the spread of HIV/AIDS.
- Halt and begin to reverse the incidence of malaria and other major diseases

### MDG 7: Ensure environmental sustainability

- Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources
- Reduce by half the proportion of people without sustainable access to safe drinking water
- Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020

### MDG 8: Develop a global partnership for development

- Develop further an open trading and financial system that is rule-based, predictable and non-discriminatory, includes a commitment to good governance, development and poverty reduction – nationally and internationally
- Address the least developed countries' special needs. This includes tariff- and quota-free access for their exports; enhanced debt relief for heavily indebted poor countries; cancellation of official bilateral debt; and more generous official development assistance for countries committed to poverty reduction
- Address the special needs of landlocked and small island developing States
- Deal comprehensively with developing countries' debt problems through national and international measures to make debt sustainable in the long term
- In cooperation with the developing countries, develop decentand productive work for youth
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- In cooperation with the private sector, make available the benefits of new technologies – especially information and communications technologies

Tuberculosis (TB) is the most common infectious disease in the world. One third of the world population – around two billion people - carry the Mycobacterium tuberculosis. Only 5-10% of those will ever become ill. Poverty, bad living conditions and malnutrition are the key factors and the main course for the spread of the disease. People from Asia, Africa and the Middle East have the highest risk to get TB.

**BUKO**
**Pharma-Kampagne**

BUKO Pharma-Kampagne is an independent non-profit NGO and part of the German Federal Coordination Internationalism (BUKO), a network of Third World solidarity groups. It promotes the global right to health with international lobby work and public awareness campaigns in Germany for more than 25 years. Pharma-Kampagne is one of the few organisations in Germany which exposes the dark side of the drug market in South and North. The campaign supports the right of access to essential medicines everywhere in the world. It promotes the rational use of drugs and the research for neglected diseases.

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