# Tuberculosis Control Programme 1998 – 2003

## Evaluation and Summary of Activities

TUBERKULOOSITÕRJE PROGRAMM

Tallinn 2004

# Contents

# 1. Summary

The incidence of tuberculosis started to increase in Estonia in 1990s and doubled by five years – in 1997 fifty-one new cases of tuberculosis were diagnosed per 100.000 population, an incidence almost ten times higher than in the Scandinavian countries. The tuberculosis epidemic in Estonia re-emerged due to an interaction of multiple causal factors such as insufficient and interrupted treatment and use of incorrect treatment regimens. The background was loss of attention to tuberculosis in the society and particularly in the health care system.

The Governmental Tuberculosis Control Programme was outlined in 1997 in a situation when the Estonian health care system with its division of work force and financing was not able to counteract the development of the tuberculosis epidemic. On October 30, Governmental Government ratified the programme, the main aim of which was the reorganization of the treatment strategy of tuberculosis. As a target for the year 2005 an incidence of 30 new cases per 100 000 population (i.e. half of the number of incidence in 1997-1998) was set up as an efficiency indicator.

Reorganization of the services according to the principles of directly observed treatment strategy (DOTS) was scheduled during the first year of the Tuberculosis Control Programme. The laboratory services as well as in-patients treatment was reorganized in a more cost-effective way. Directly observed treatment (DOT) started in 1999 in eight counties and it was expanded over the whole country by 2000. As a result of DOT, errors and deviations from the prescribed treatment decrease little by little with time. According to DOTS strategy medications obtained by governmental purchase are distributed to all TB patients for free, according to the treatment regimens. During the programme, TB treatment in penitentiary institutions was reorganized and by now the TB incidence in prisons has declined by half.

DOT units co-operate closely with the TB registry so that all TB patients receive treatment even if they change the place of residence or are released from a penitentiary institution. At the Registry the reports of case notification and treatment outcome are filled in monthly and quarterly. The TB register makes it possible for the Ministry of Social Affairs and other institutions involved to follow the trends in TB incidence, efficiency of treatment regimens, development of resistance, and to identify quickly the TB outbreaks in different areas and populations as needed.

The laboratory service was reorganized and today the microbiological diagnosis of TB in Estonia as for resources and know-how is on an internationally acknowledged high level. Continuous education and quality control guarantees quick and correct handling of the biological material. International co-operation and participation in research projects guarantees the reliability of the results.

At the present time one to two years supplies of the first and second line antituberculosis medications for all TB patients have been established by governmental-procurement using the favourable prices negotiated by the WHO. As a result of the

governmental procurement, it is guaranteed that the medication reach destination place in time and is delivered without interruptions to all patients according to the treatment plan. At the same time the cost of medication is economized without compromising the quality of the treatment.

Estimating the success of the Tuberculosis Control Programme by the established aim – 30 new cases per 100.000 population by the year 2005 is not a remote target as in 2002 the number of new cases had reduced to 38 per 100.000 population. However, taking into consideration the great number of multiresistant cases and the rising incidence of HIV-positive tuberculosis in the near future the decreasing trend will level out if the DOTS principles are not followed and if free directly observed treatment is not guaranteed to all patients. Due to the infectious nature of tuberculosis and the difficulties sometimes encountered in achieving good co-operation during treatment the tuberculosis control needs continuous co-ordination and firm administration on the governmental level.

# 2. Terms and abbreviations

**TB** – tuberculosis

**WHO** – World Health Organisation

**DOTS** – *directly observed treatment short-course* is the strategy recommended by the WHO (chapter 9). DOT is one of the main components of the DOTS strategy

**IUATLD** – International Union against Tuberculosis and Lung Disease

***Incidence case*** – tuberculosis has been diagnosed for the first time and the patient has never used anti-tuberculosis medicines or has used them less than a month.

***Tuberculosis relapse*** – tuberculosis has been diagnosed again in a person who has had tuberculosis, got the treatment and has been declared cured.

***Smear positive TB (BK+, bacillus Koch)*** – A case of lung tuberculosis, where the tubercle bacilli can be seen in the sputum smear by microscopy, i.e. the test result is positive. If the patient's sputum is seen to contain a lot of TB bacteria the patient is very contagious.



***Culture positive TB*** – A case of TB, where the result of the test made by the culture method for which the material is taken from the sputum is positive. In comparison with the smear positive case, the result of the culture positive analysis may have considerably less bacilli and these are possible to identify only after the TB agents have been cultured in special laboratory conditions for some weeks or whole month.

***Infectious cases*** – smear positive and / or culture positive tuberculosis cases all together.

***Drug resistant tuberculosis*** – a case of tuberculosis harbouring bacteria resistant to one or more main anti-tuberculosis drugs.

***Multiresistant tuberculosis (MDR-TB)*** – a case of tuberculosis harbouring bacilli resistant to at least isoniazide and rifampicin.

# 3. Tuberculosis as a contagious disease

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis*. Robert Koch discovered the bacterium in 1882. *Mycobacterium tuberculosis* is viable for a long time in dark and damp conditions and is resistant to drying, but perishes under direct sunlight. The infection of tuberculosis takes place by breathing in air containing tuberculosis bacilli. *Mycobacterium tuberculosis* that is able to invade the respiratory mucosa and get into the host starts to multiply and affect the immune system. In eight weeks the tuberculin skin test converts from negative to positive as a sign of an established infection. However, only 5-10% of infected people develop the characteristic symptoms and signs of tuberculosis (incidence case of TB). In most instances the lesion is confined and the characteristic symptoms of TB do not develop, although the bacteria may stay viable in the lesions for years. About one third of the population of the world is infected by *Mycobacterium tuberculosis*, 15-20 million people have active disease and three million deaths occur every year from TB.

The symptoms of respiratory TB are weakness, weariness, cough, temperature and changes in roentgenogram – i.e. the symptoms that are characteristic of many ordinary infections of respiratory organs. In Estonia 90% out of all TB is lung tuberculosis, other forms of the disease such as bone- or kidney tuberculosis occur more seldom.



At the same time TB is much less infectious than for example influenza, common cold or some other infections of the respiratory organs. Only a single cough or a sneeze can be enough to cause an infection in case of flu but need not be dangerous considering TB. The transmission of TB infection usually needs a long-term exposure to Mycobacterium tuberculosis. The resistance of the host organism to infection is influenced by various factors as malnutrition, stress, and co-morbidities.

The clinical suspicion of TB is confirmed by finding *Mycobacterium tuberculosis* in sputum or in other samples of body fluids taken for analysis. If there are numerous bacteria in the samples analysed, these can be seen directly by microscope. Such patients may be the source of infection if they are spreading the bacteria to the air by coughing. For such patients isolation in hospital may become necessary. Alternatively they may be treated at home in case they live alone and the risk of transmission of infection is considered to be small.

When the number of bacteria in the sample is small the task of growing them on different culture media can take several months. In some cases bacteria are neither found by microscopy nor culture, but symptoms and signs may nevertheless justify the diagnosis of TB. These patients are not dangerous for the others and it is not necessary to isolate them during treatment.

Newborn babies are subject to compulsory vaccination and until lately the schoolchildren as well. Vaccination against TB reduces children's risk of contracting serious forms of TB like meningitis, disseminated TB etc. but doesn't protect from infection.

Schoolchildren's compulsory vaccination was stopped in 2002 because of effectiveness reasons.

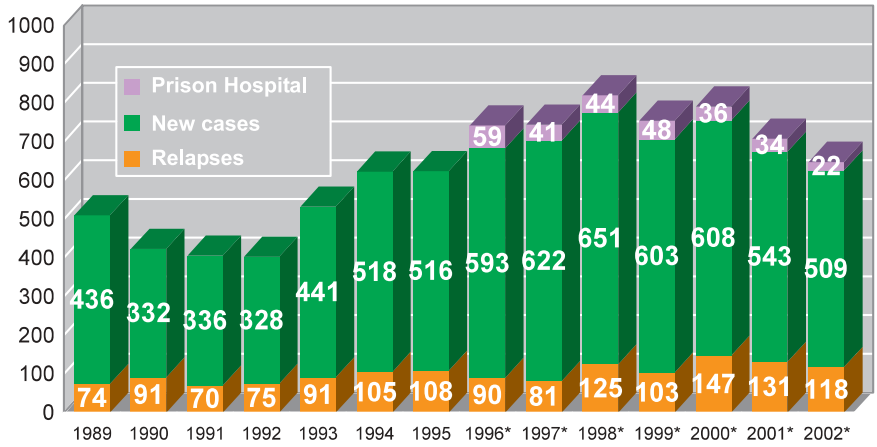
There are tens of anti-TB drugs. The most effective of them – isoniazide, rifampicin, pyrazinamide, streptomycin and ethambutol – are designated as the main or the first line drugs. The other anti-TB drugs are less effective and more often cause serious side effects. They are designated as the second line drugs or reserve drugs.

# 4. Increase in incidence of tuberculosis in Estonia in 1990s

According to the WHO one third of the population of the world is infected with tubercle bacilli and 5-10% of those develop symptomatic tuberculosis during their lifetime. In 1993 – 1996 the incidence of global tuberculosis increased by 13 %.

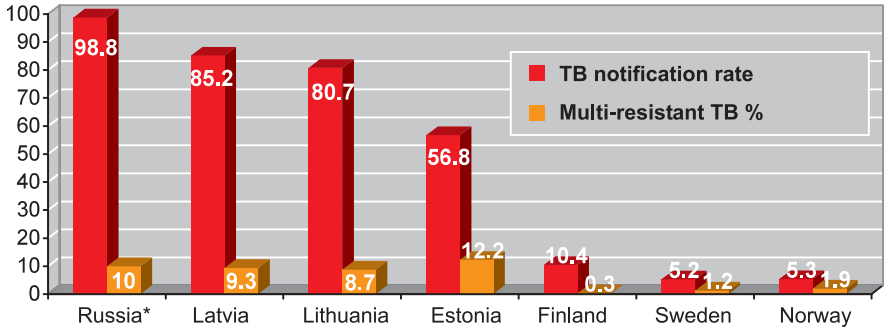
Before anti-TB drugs were taken into use TB as a cause of death was the same in Estonia as in other European countries. During the years after the war the incidence of TB was the highest in 1953 – 417 cases per 100.000 population. After that the incidence began to decrease year by year due to better tuberculosis control work and the improvement in the living conditions of population. The lowest incidence of TB during the last century was in 1991 – 21 cases per 100.000 population.

**Diagram No. 1**
**The incidence of tuberculosis in 1989 – 2002 (absolute numbers)**




**** Since 1996 TB cases diagnosed at the Prison Hospital are registered as well***

## Diagram No. 2
## The TB notification rate in 2000 and the percentage of never previously treated MDR-TB cases in Estonia compared with neighbouring countries

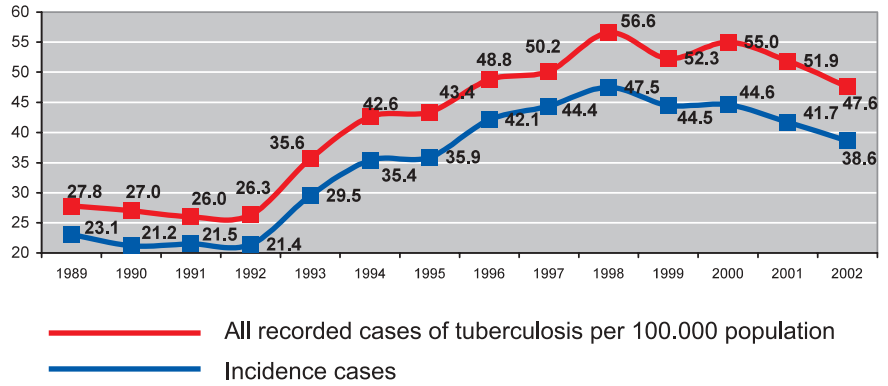



(Euro TB Annual Surveillance Report, 2000)

***Data of resistance in Russia are estimated – by surveys made in some regions***

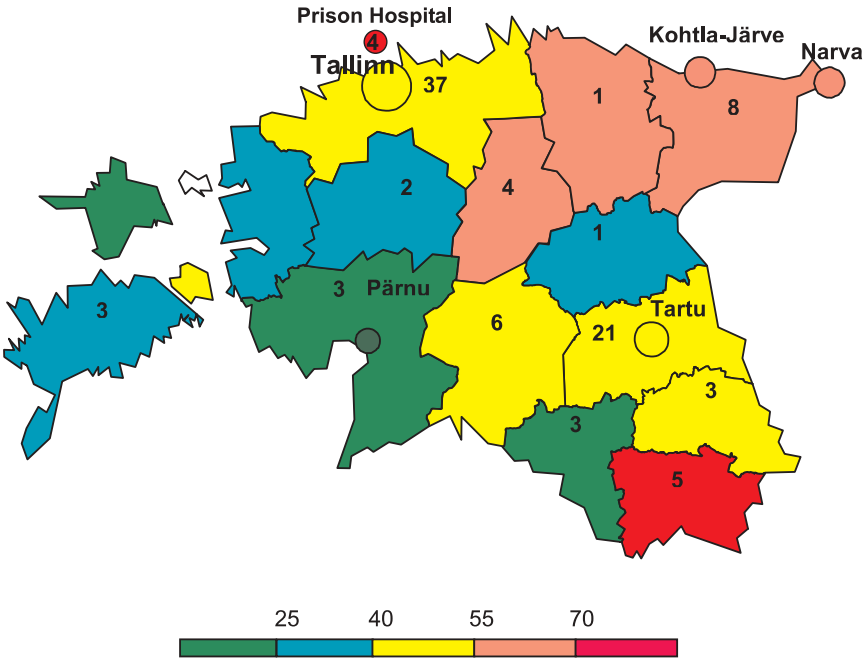


## Diagram No. 3
## The TB notification rate per 100.000 population in 1989 – 2002



The TB notification rate began to increase in 1990s and doubled by five years – in 1998 57 cases of tuberculosis were diagnosed per 100.000 population. Since 1996 the statistics includes the TB cases from prisons, which up to that time were recorded separately and make up about 5 % of all TB patients. The incidence of tuberculosis is about ten times more frequent in Estonia than in Scandinavian countries such as Sweden and Norway.

## Diagram No. 4
## Notification rate of TB per 100.000 population and the number of MDR-TB patients in 2002 by counties




*The map is taken from: A. Baburin, K. Gornoi, M. Leinsalu, M. Rahu. Atlas of Mortality in Estonia. Tallinn: Institute of Experimental and Clinical Medicine, 1997.*

It is not possible to give a single reason why tuberculosis has returned as problem in Estonia. As the TB incidence has increased in all Eastern and most Central European countries, changes of socio-economic factors are probably among the several reasons to be considered. Secondly, the changes in health care in all these countries have occurred, both in regulation and funding of medical care often undermining the stability of necessary treatment.

After Estonia regained its independence, a health insurance system was founded by which the medical expenses of the population were covered. Medical expenses of uninsured individuals were covered by the governmental budget (hospital budget) as a governmental of emergency. A large proportion of TB patients have no medical insurance and in order to guarantee continuous adequate treatment, a disability leave has sometimes been provided when deemed feasible.

The insidious development and the treatment period following the diagnosis of drug sensitive tuberculosis may extend over 9-12 months. The treatment of MDR-TB may extend over two years. There is a need to use several different anti-tuberculosis drugs at the same time – in the beginning of the illness at least three to four drugs and later at least two-three drugs up to the recovery. The treatment must be completed without interruptions or else the likelihood of relapse after completed treatment is highly increased.

It is difficult to monitor a treatment lasting for months if the patient is not sufficiently informed about the nature of tuberculosis and that interruptions in drug taking and / or way of living (alcohol) may not favour satisfactory treatment result. About 40% of tuberculosis patients suffer from alcoholism as well as TB and mostly these patients do not complete the treatment. The patients with less advanced disease and good treatment response initially may also not understand the importance of regularity and continuation of treatment up to at least 6 months especially in case the symptoms are mild and decrease in few weeks.



The continuous decrease in the incidence of TB during decades diminished the feeling of danger among both the doctors and the population. Both people in general and the medical care staff lost the readiness to recognize TB and the ability to treat it regularly and as a result we had tuberculosis epidemic back in Estonia.

It must be kept in mind that the incidence of tuberculosis increased both among people of lower socio-economic status (incl. people with alcohol problems) and at the same time among people with secure jobs and income. For example, extremely high incidence of TB in 1990s occurred in Estonia among the medical personnel engaged in treating TB patients and dealing with laboratory diagnosis. In these instances the blame often was an ignorance of elementary health protection requirements and principles of infection control, which supports the hypothesis that a loss of general alertness was the main reason for the returning of tuberculosis epidemic in Estonia.

A specific feature of the TB epidemic in Estonia is the increase in MDR-TB cases during the last years. Due to that reason Estonia together with Argentina, the Dominican Republic, Latvia and Russia was declared to belong to the ‘hot-spot’ countries

(dangerous zone countries) by WHO. In 1997 10% out of bacteriologically proven incidence cases were MDR-TB. The high incidence of MDR-TB tuberculosis in Estonia is due to the spread of MDR-TB bacteria from person to person in the open society and in the treatment facilities.

# 5. The first steps of the Tuberculosis Control Programme

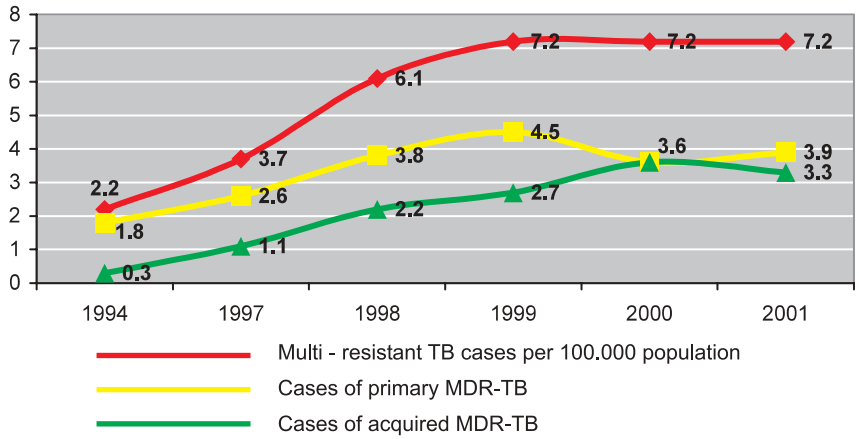
General vaccination is not enough to control TB as an infectious disease because it main effect is on the most serious forms of TB with little effect on the contagious form of TB. In order to prevent the spread of tuberculosis it is necessary to achieve a situation where all TB patients get full course treatment.

After analysing the increase in incidence of TB in 1990s, it may be said that it was mainly due to relapses of previously treated patients. It reflects an insufficient treatment with interruptions and use of wrong treatment regimens. Above-mentioned hypothesis found support in 1996 during a study that estimated the quality of previous TB treatment. MDR-TB responds much worse to first line tuberculosis drugs and even a successful treatment may take much more time. For the treatment of MDR-TB the second line drugs must be used, which are hundreds of times more expensive than the first line drugs. To prevent the spread of resistant bacteria it is very important to cure this form of tuberculosis properly.

The high rate of MDR-TB is at least partly caused by inappropriate regimens in the past together with insufficient infectious control.



**Diagram No. 5**
**Multi-resistant TB cases in Estonia per 100.000 population in 1994 and 1997 – 2001**



In 1997, when due to the previous organisation of work and financing activities the medical care services were not able to prevent the development of TB epidemic, the governmental tuberculosis programme was started. The working group outlining the programme consisted of specialists of lung disease, public health and health economics. Suggestions of the WHO, IUATLD and foreign experts were taken into account.

Tuberculosis Control Programme 1998 – 2003' was approved by the Government on Oct. 30, 1997, by the order No. 799-k (whole text in appendix) and the programme was financed from the governmental budget of 1998 to the extent of 5.5 million croons.

The main aim of the TB control programme is to re-organise the TB treatment strategy in the Estonian Republic in order to guarantee an efficient cure and to protect the population from the spread of TB. The indicators of the efficiency of the programme would be the reduction in the TB incidence to the level of maximum 30 new cases per 100.000 population by 2005 that is to the half of the incidence level in 1997-1998.

During the first year of the programme the incidence of TB continued to increase and reached its maximum in 1998 by 689 incidence cases, which is 47.5 cases per 100.000 population. In 1999 – 2000 the number of incidence stayed on the same level and it started to decrease again since 2001, when there were 570 incidence cases and it was 42 new tuberculosis cases per 100.000 population.

The increase in the incidence of TB during the first years of the programme suggests that the programme might be effective because more sick people are diagnosed and accurate records were kept. The high rate of MDR-TB in Estonia results indeed partly from the very efficient system of laboratory diagnosis of TB including the drug sensitivity tests. In comparison with the others countries, incl. those of the European Union, remarkably greater efforts are made in Estonia to find *Mycobacterium tuberculosis* – repeated analyses of sputum and other tests are done and the sensibility to tuberculosis drugs is always checked. The more analyses are done, the bigger is the likelihood to find Mycobacterium tuberculosis and MDR-TB. Resistance is not discovered without testing the drug sensibility. Microscopy and culture only are still the main tactics in many countries where the reported incidence of MDR-TB is not as high as in Estonia.

The aim set by the Tuberculosis Control Programme – 30 new cases per 100.000 population in Estonia by the year 2005 – is not remote considering that in 2002 the number of incidence cases had decreased to 38 per 100.000 population. The target can only be achieved and maintained on condition that the reorganised system of TB treatment would in the future be provided at least up to the same extent.

# 6. Activities of the programme and its subprojects

There are several ways to achieve the main aim of the tuberculosis programme:
- Organising a system of directly observed treatment (DOT);
- Updating the system of detecting new cases of tuberculosis;
- Effectual and targeted prophylaxis of tuberculosis;
- Centralization of laboratory service;
- Creating an integrated system of reporting and recording TB cases;
- Involvement of social welfare in the implementation of the TB control programme;
- Application of the principles of TB control programme in penitentiary institutions;
- Planning of scientific research according to the guidelines set out in the TB control programme.

Some of these above-mentioned items have been in work continually according to the planned programme. Work on others was more dispersed and not financed by the TB control programme. For example effectual and targeted prophylaxis of TB – the children's vaccination and tuberculin tests have been done continuously according to the vaccination timetable which has been established by the Minister of Social Affairs and it is financed by the governmental budget through the budgets of the National Health Protection Inspection and Health Insurance Fund.



In current summary the above-mentioned ways are discussed first by the courses of action and then by the budget and timetable.

## 6.1. Directly observed treatment

Directly observed treatment strategy (DOTS) is the strategy of tuberculosis control recommended by the World Health Organisation (WHO), which has been successfully applied in many countries. The term of DOT is one of the essential parts of the

strategy – the patient swallows the drug under the direct observation of the medical personnel. Patient is either in the hospital, has a special hospital appointment or the drugs are taken to the patient's home thus decreasing many times over the chances to forget and make errors in the prescribed treatment regime. DOT uses the anti-TB medication purchased by governmental procurement and distributed free of charge according to the planned treatment schemes.

DOT refers only very rarely to private rooms and special personnel. In most cases the TB patients get their medicine from the nurse, who works together with the TB specialist or family physician, and sometimes from the nurse or a social worker paying visits to the patients. While carrying out DOT it is important to separate (timetable) the TB patients from the other patients visiting the doctor ensuring minimal waiting time and low probability of spreading TB infection. Efficiency of DOT depends on the well-disciplined and helpful personnel's behaviour towards the patients. The ability to es-

tablish and maintain contact with the patient is of pivotal importance including the patients not interested in co-operation. To increase the patients' motivation to take the medication, they have a choice of incentives such as for example food packages with an average cost of 25 croons during the visit. In case of need the patients are compensated for the cost of public transport.

### Table No. 1
### Total number of visits made during DOT

| | Number of Visits | | | | Average Number of Patients per Month | | | |
|---|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 1999 | 2000 | 2001 | 2002 |
| Harjumaa, Raplamaa | * | 20 260 | 27 219 | 33 275 | – | 113 | 138 | 168 |
| incl. Tallinn | 11 358 | 18 565 | 19 993 | 25 431 | – | 107 | 108 | 135 |
| Hiiumaa | * | | 88 | | – | | | |
| Eastern Virumaa | * | 4 192 | 5 158 | 5 399 | – | 26 | 28 | 35 |
| incl. Kohtla-Järve | 1 012 | | | | – | | | |
| incl. Narva | * | 1 816 | 2 413 | 2 499 | – | 7 | 19 | 18 |
| Jõgevamaa | 1 260 | 1 590 | 2 107 | 1 456 | – | 10 | 13 | 8 |
| Järvamaa | * | 543 | 1 252 | 2 696 | – | 3 | 6 | 12 |
| Western Virumaa | 390 | 3 977 | 3 669 | 3 445 | – | 22 | 20 | 19 |
| Läänemaa | * | 631 | 410 | 816 | – | 5 | 3 | 6 |
| Põlvamaa | 1 839 | 1 441 | 1 567 | 1 174 | – | 8 | 8 | 8 |
| Pärnumaa | 1 282 | 2 403 | 2 174 | 2 479 | – | 13 | 12 | 13 |
| Saaremaa | * | 451 | 2 485 | 1 141 | – | 7 | 12 | 6 |
| Tartumaa | 7 832 | 8 691 | 8 666 | 7 476 | – | 59 | 56 | 42 |
| Valgamaa | 1 188 | 1 482 | 2 290 | 1 572 | – | 11 | 13 | 11 |
| Viljandimaa | 2 061 | 2 526 | 1 507 | 1 932 | – | 17 | 10 | 11 |
| Võrumaa | 1 953 | 1 560 | 2 229 | 3 263 | – | 8 | 11 | 17 |

***DOT was not covering this county that year***
***– Data not available***

The DOT system had been established in all Estonian counties by the year 2000. The work of 'DOT units with medicine cabinets' in Tallinn and Harju County was co-ordinated by the North Estonian Regional Hospital (Tallinn Kivimäe Hospital) and in Eastern Virumaa by Kohtla-Järve Lung Hospital. The rest of the DOT units were co-

coordinated by Tartu University Lung Hospital. To provide DOT the organization hosting the NTP made contracts with the county hospitals. The anti-TB drugs were distributed according to the contracts. The contract regulates the price of DOT and its arrangement in the counties. The hospitals in counties sub-contract the family doctor or family nurse. Due to change in health care system there have been short time difficulties reimbursing for the work of the nurses and social workers providing DOT. It is vital to secure their motivation to help the patients successfully complete the treatment.

DOT system has close co-operation with the TB registry so that no tuberculosis patient would be left without treatment in case he/she changes the place of residence or gets released from a penitentiary institution.

## 6.2. Tuberculosis register

Tuberculosis as an infectious disease has been subject to compulsory registration in Estonia since 1922. During the Soviet Union times the spread of tuberculosis and the co-ordination of diagnostics and treatment were carried out by a special dispensary system. Due to the decrease in incidence of tuberculosis in 1980s the system of dispensaries was given up and so by the starting of the programme nobody had exact data about tuberculosis or its management.

The main objective of the tuberculosis register is to record the diagnosed tuberculosis cases in Estonia, to analyse the efficiency of the overall programme and to work out new measures to counteract the disease. For this purpose data on tuberculosis cases are entered, analyses and descriptive statistics made on the progress and efficiency of treatment.



During the first years of the programme the basic elements of tuberculosis diagnosis have been re-evaluated and the system of registration has been re-organized. New registration forms for notifying tuberculosis patients were developed and a database was constructed. The establishment and maintenance of the tuberculosis database was laid down by the regulation No. 38 of the Minister of Social Affairs on March 30, 2001.

The Ministry of Social Affairs is responsible for the tuberculosis register and its authority is given to Tallinn Kivimäe Hospital since 1999 and its legal successor is SA North Estonian Regional Hospital. The tuberculosis register collects information about the incidence of tuberculosis from two sources – doctors who make a clinical diagnosis of a TB case and the microbiological laboratories where the special analyses for the eventual bacteriological confirmation are done.

Monthly and quarterly reports drawn up on the basis of the compiled data enable the Ministry of Social Affairs and other concerned to follow exactly the dynamics of incidence and the efficiency of treatment delivery, to identify in time the areas and the sub-groups of tuberculosis where interference would be needed. Data are available since 1998 on the homepage of the Ministry of Social Affairs:

***http://www.sm.ee/gopro30/Web/gpweb.nsf/pages/statistika0107***

As a result of the co-operation between the World Health Organization, tuberculosis-monitoring system Euro TB of the European Union and the Estonian Tuberculosis Register, the data of Estonian tuberculosis incidence are available on the Internet pages of these above-mentioned organizations:

***http://www.who.int/gtb/publications/globrep/index.html and***
***http://www.eurotb.org/***

The tuberculosis register needs above all improving in completed data compiling system of DOT tuberculosis and electronical data exchange.

The tuberculosis register publishes an annual yearbook of incidence since 2001.

## 6.3. Development of laboratory diagnosis

Although symptoms, signs and x-ray findings are important while diagnosing tuberculosis, the microbiological confirmation by identifying the *M. tuberculosis* in samples is decisive to alleviate doubt about a correct diagnosis of tuberculosis. It is also helpful in order to evaluate if the danger of spread of infection has passed and to choose the effective tuberculosis medicine.

Since 1995 the bacteriological service of tuberculosis in Estonia has been reorganized for optimum use of highly qualified personnel, valuable apparatus and expensive cultures. During the reorganization all former culture centres were closed because they did not meet the requirements of safety regulations necessary for this kind of work. Due to the small workload these centres were not able to guarantee either the skills of the personnel or the quality of the tests. In 1997 all the laboratories trained for tuberculosis laboratory service underwent the process of application for the license where the main emphasis was put on the occupational safety and the quality control.

At the present time all bacteriological work on tuberculosis is done at specialized microbiological laboratories. The cultures, which need experienced qualified staff, are done only in Tallinn, Tartu and Kohtla-Järve. The quality of the tests is regularly controlled by the Tartu University Clinics reference laboratory, which organizes the courses to guarantee the professionalism of the laboratories, and at the same time it is under the international control, mediated by the special laboratory (SIIDC) in Stockholm.



### Table No. 2
### Sensitivity of *M. tuberculosis* to drugs among incidence cases in 1994 and 1997 – 2001

| | 1994 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| All tests | 266 | 349 | 377 | 382 | 377 | 375 |
| Sensitive to the 1st line drugs | 191 | 247 | 238 | 258 | 272 | 250 |
| % | 72% | 71% | 63% | 68% | 72% | 67% |
| All resistant cases | 75 | 102 | 139 | 124 | 107 | 125 |
| % | 28% | 29% | 37% | 33% | 28% | 33% |
| incl. multi-resistant cases | 27 | 36 | 53 | 62 | 49 | 53 |
| % | 10% | 10% | 14% | 16% | 13% | 15% |

## Table No. 3
## Classification of microbiological analyses by microscopy and cultures in the second and third level laboratories in 1997-2002

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|
| **Microscopy** | | | | | | |
| Total number | 18 387 | 21 016 | 22 755 | 22 028 | 19 523 | 17 923 |
| Positive | 1 982 | 2 196 | 1 955 | 1 721 | 1 570 | 1 383 |
| % | 11 | 10 | 9 | 8 | 8 | 8 |
| **Cultures** | | | | | | |
| Total number | 17 422 | 20 093 | 21 727 | 22 028 | 19 423 | 17 923 |
| Positive | 3 011 | 3 391 | 3 660 | 3 111 | 2 707 | 2 341 |
| % | 17 | 17 | 14 | 14 | 13 | |

*Footnotes*

- ***Analysis is done by the number of analyses, not by the number of patients***
- ***Analysis reflects neither the working quality of the laboratory nor other parameters concerning the work of the laboratory (excl. the number of analyses)***
- ***Analysis reflects above all the sample and the sampling procedure***

In 1999 a transportation system for biological material was established to meet the increased demand that was created by the closure of microscopy laboratories.

At the present time the microbiological diagnosis of tuberculosis in Estonia is on an internationally acknowledged high level. Continuous schooling and work on the quality control guarantees a quick and correct handling of the material sampled. International co-operation and participation in research projects guarantees the reliability of investigation results.

## 6.4. Governmental purchase of medicines

Successful treatment of tuberculosis takes for granted that anti-TB drugs are available for all patients in proper time without interruptions. First governmental procurement for anti-TB drugs was organized in 1999 for the use of ambulatory treatment of tuberculosis patients in the DOT counties. By governmental purchase in 2000 all patients in need of ambulatory treatment were supplied with the first line drugs. In 2001, due to the sales discount negotiated by the WHO, the programme was able to establish 1—2 year supply of the first and second line tuberculosis drugs for all the tuberculosis patients in Estonia.

Delivery of medication to the medical establishments and DOT centres takes place on the ground of claim lists. The basis for the use of the second line anti-TB drugs is the decision of the work group of the treatment follow-up. Every month the medical establishments report on the treatment expenses of the previous month and the number of patients receiving treatment. Two different treatment cards are used for documenting day-by-day treatment delivery depending on if he/she is suffering from the drug sensitive form of tuberculosis (DS-TB) or the multi-drug resistant tuberculosis (MDR-TB).

The governmental procurement of anti-TB medication guarantees drug delivery in time and without interruptions to all the patients, observance of the efficient treatment plans and last but not the least low prices without any lowering of the quality of the treatment.



## 6.5. Improvement of treatment conditions in hospitals

In 1990s the incidence of tuberculosis was very high among Estonian medical personnel, especially among these engaged in treating tuberculosis patients and dealing with laboratory diagnosis. From one side the reason was the lack of minimum safety precautions and from the other side ignoring the elementary health-protection requirements. For patients treated in hospitals the tuberculosis departments were a source of nosocomial tuberculosis due to the lack of a proper ventilation system. After all tuberculosis is the infectious disease spreading by air.

As the MDR-TB is the biggest public threat a substantial part of the resources of the Tuberculosis Control Programme in 1999 was used for rebuilding and installing the ventilation systems in Kose department of Tallinn Kivimäe Hospital and in Tartu University Lung Hospital. Renovation works were supported in addition to the programme by NO-TB-Baltic project and by the hospitals themselves.

In 1998 the hospital treatment of the tuberculosis took place in six licensed hospitals: Tallinn Kivimäe Hospital, SA Tartu University Lung Hospital, Kohtla-Järve Lung Hospital, Narva Hospital, Rakvere Hospital and Jämejala Psychiatric Hospital. The programme planned to stop the treatment of TB patients in Narva and Rakvere Hospitals but up to now it has not been possible. In Jämejala Psychiatric Hospital patients suffering from psychiatric diseases and TB as well also get treatment for TB on the

spot. The preference in programme development is to increase ambulatory treatment and the number of TB beds in hospitals has decreased by 30% in comparison with 1996.



***Modern renovated tuberculosis hospital:***
***Kose Department of SA North Estonian Regional Hospital***

## 6.6. Training and supervision

One of the prerequisites of a good TB control programme is motivated and trained personnel. It was necessary to introduce the aims and activities of the programme to the heads of health care, medical personnel of different specialties and population as well. Up-to-date strategy of tuberculosis control differs considerably from the principles of treatment and prophylaxis that have been used for decades.

The training was meant mainly for the doctors and nurses treating the TB patients. The teachers were those working with the programme and the specialists from abroad. So-called supervision is included in the training as well. The elected supervisors counsel and observe the treatment delivery during visits to the treatment units.

The work group of MDR-TB (multi-drug resistant tuberculosis consilium) makes decisions about the MDR-TB cases and the use of the second line drugs. The only way to use these drugs is by the decision of the work group. Otherwise in several years the problem of drug resistance would be much more serious. Members of the workgroup include the managers of the programme and DOT sub- projects.

Improvement in the results of treatment and especially the decrease in the number of treatment interruptions have been the direct result of training. Successful completion of treatment depends mainly on the ability of personnel to communicate with the

patient and remain in contact with him throughout the necessary treatment period. It is difficult to deal with the side effects of the drugs without special knowledge and extensive experience.

Systematic continuous training and supervision are necessary for the quick solution of the key questions arising in everyday work. Continuous training in the knowledge of infectious control has helped in establishing safe work conditions. Training correlates directly with the correct registering of tuberculosis cases and the documentation of the treatment follow-up. The tuberculosis database enters only the data sent by the medical treatment personnel.

## 6.7. Tuberculosis control in penitentiary institutions and involvement of social care system

The up-to-date treatment and diagnosis of TB in penitentiary institutions were financed in 1999 – 2000 by the Open Estonia Foundation. Since 2001 the tuberculosis control in the penitentiary institutions is co-coordinated with the plans of activities of the governmental programme although the financing is done from the funds of the Ministry of Justice. The supply of all necessary anti-TB drugs, training of the hospital and laboratory personnel and evaluation of the treatment quality is guaranteed by the programme. As a result of this the TB treatment in penitentiary system takes place according to the international standards and the efficiency of the TB treatment in the Prison Hospital has increased. The number of cases has decreased from 48 cases in 1999 to 22 cases in 2002. Further attention is needed to guarantee the consistency of treatment for the tuberculosis patients released from the prison by co-operation with the tuberculosis register and DOT system.



Involvement of social care system including the task of social workers to observe the treatment and support the tuberculosis patients, has taken place during the programme according to the particular needs for carrying out DOT on the spot. In three bigger regions (Tallinn, Tartu, Kohtla-Järve) a hospital social worker has been employed on a contractual basis and his/her task is to help and counsel tuberculosis patients with the view of guaranteeing their maximum interest in being cured. To secure the additional social guarantees for the tuberculosis patients in case of longer treatment, especially multi-resistant cases, it is necessary to work out new solutions in co-operation with the social care system. Such innovations might be incentives delivered after the completion of successful treatment.

# 7. Budget and timetable

Table No. 4 gives the outline of the Tuberculosis Control Programme financing through the governmental budget. Given numbers do not include the greater part, or by all means all the costs of tuberculosis treatment in Estonia. Both hospital treatment and ambulatory treatment costs of all insured patients are covered by health insurance fund and part of the treatment costs of uninsured patients comes additionally from the governmental budget.

### Table No. 4
### Financing of the Tuberculosis Control Programme

| | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|
| **Total costs** | **5 035 000** | **11 6326 200** | **7 799 999** | **11 446 000** | **11 197 620** |
| DOT | 423 506 | 2 172 870 | 4 182 053 | 4 843 531 | 5 546 995 |
| TB register | 170 000 | 429 000 | 487 000 | 316 000 | 400 000 |
| Laboratory services | 650 000 | 389 813 | 382 756 | 342 874 | 416 000 |
| Drugs | | 3 173 569 | 1 688 264 | 4 458 597 | 2 818015 |
| Training and supervision | 133 185 | 288 756 | 101 300 | 414 693 | 656 399 |
| Administration* | 178 309 | 982 192 | 958 626 | 1 070 305 | 1 360 310 |
| Treatment of uninsured persons | 3 480 000 | | | | |
| Investments, incl. | | 4 200 000 | | | |
| Kivimäe Hospital (Kose department) | | 3 100 000 | | | |
| Tartu University Lung Hospital | | 1 000 000 | | | |

**** Administration costs include management costs since 1999 in addition to the labor costs, rent of the programme offices, transport costs for supervision / DOT (since 2001) and costs of publishing & printed matterial plus teaching materials***

In addition to the governmental Tuberculosis Control Programme the tuberculosis treatment in Estonia was financed from three sources (foreign aid). By the stipend of the Open Estonia Foundation tuberculosis diagnosis, purchase of medicines and training in penitentiary institutions was financed in 1999 – 2000 for 3 million kroons altogether. The association of Finnish lung doctors FILHA financed the purchase of 3 necessary tuberculosis drugs for 200 TB patients of South Estonian counties (Tartu, Valga, Võru, Viljandi, Jõgeva, Põlva) in 2000 –2001.

The greatest foreign aid was received due to the co-operation with NO-TB-Baltic. NO-TB-Baltic is the project of five Scandinavian countries (Finland, Sweden, Norway,

Denmark and Iceland) to help the Baltics (Estonia, Latvia, Lithuania) in the tuberculosis control which financed the laboratory diagnostics, purchasing of the second line medicines, data protection in the tuberculosis registry, training of medical personnel and renovation of medical establishments. In 2000 — 2001 NO-TB-Baltic contributed the tuberculosis treatment in Estonia with 9 million kroons in all, from which 2,8 millions were used to purchase medicines, 1,5 millions to develop laboratory service, 1,6 millions to carry out DOT and 2,1 millions for renovation.

The activities of the Tuberculosis Control Programme have proceeded through different establishments. First year it was the Tartu University Lung Hospital; in 1999 – 2002 it was the Health of the People and Social Training Center and since 2003 Estonian Health Schooling Center. Above-mentioned changes among leading establishments have not prevented the fulfilling of the tasks of the programme, although as a result it has complicated the use of the means of the budget and has disturbed the accomplishment of the plan of activities at a fixed date. Planning the activities of the leading establishments and drawing up the budget takes place in co-operation among the head of the programme, heads of projects and committee in accordance with the legislation and priorities set by the Ministry of Social Affairs and according to the financial resources.

During the first year of the control programme activities (1998) the needs and possibilities of the tuberculosis treatment in Estonia were mapped, hospital treatment and re-organization of laboratory services and the principles of DOT and its implementation in Estonia were planned. The contacts for the international co-operation of tuberculosis control with Baltic and Scandinavian countries were developed. 69% out of the Tuberculosis Control Programme budget of 1998 was used for covering the treatment costs of uninsured persons.



During the second year (1999) 41% out of the budget of the Tuberculosis Control Programme was used for the renovation of tuberculosis hospitals and building ventilation systems. DOT was started in eight counties and the activities were extended to Tallinn (incl. prisons), laboratory service of tuberculosis was reorganized, training and the work of tuberculosis register were started. First time the governmental procurement for purchasing medicines took place and these medicines were used for the ambulatory treatment of TB patients in the counties where DOT was used.

In 2000 53% out of the Tuberculosis Control Programme resources were used for starting DOT-system all over Estonia and this task was completed by the end of the year. Besides, part of the resources went to establish the DOT centers. By the governmental procurement of medicines all patients in need of ambulatory treatment were guaranteed by the first and second line anti - tuberculosis drugs.

During the fourth year of the Tuberculosis Control Programme (2001) 38% out of the programme budget was used for purchasing medicines and as a result of this, due to the reduced price from the WHO, the programme was able to establish the 1 – 2 year reserve of the first and second line tuberculosis drugs for all tuberculosis patients in Estonia.

In 2002 the ambulatory part of DOT increased concomitantly with the decrease in the number of beds in hospitals. The help of the medical personnel and social system was more and actively used to find the patients who did not complete the treatment. 48% out of the programme budget was used to finance the ambulatory DOT. The co-operation with WHO continues in the form of the WHO supported DOTS-PLUS project, which started in 2001 in Estonia (system of treatment and follow-up of the MDR-TB).

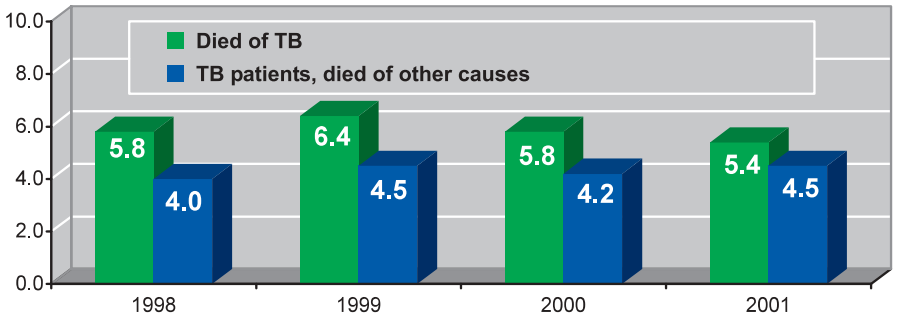
# 8. Achievements of the programme

Estimating the efficiency of the programme on the basis of the aim set five years ago – 30 new cases per 100.000 population in Estonia by 2005 – this aim is still achievable, because in 2002 the number of new cases decreased to 38 per 100.000 population.

By the estimation of the WHO it is possible to cure 85% of tuberculosis patients by the assistance of governmental tuberculosis programmes. The result of the treatment may be undermined by several factors, including AIDS and high frequency of MDR-TB cases.

Despite the explosive growth in incidence of AIDS in Estonia in 2001, the concurrent tuberculosis and AIDS is still quite rare. In 2001 7 patients and in 2002 19 patients had the concurrent TB and AIDS. In 1998 – 2001 the death rate in tuberculosis stayed stable 5—7 cases per 100.000 population a year.

**Diagram No. 6**
**Death rate of tuberculosis in 1998 – 2001**



## Table No. 5a
## Incidence of tuberculosis in 1997 – 2007 in counties, incl. cities

| | Number of patients | | | | | |
|---|---|---|---|---|---|---|
| | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** |
| Harjumaa | 254 | 300 | 305 | 288 | 288 | 244 |
| incl. Tallinn | 209 | 230 | 264 | 230 | 228 | 189 |
| Hiiumaa | 2 | 1 | 2 | 4 | 1 | 3 |
| Eastern Virumaa | 97 | 105 | 64 | 117 | 101 | 101 |
| incl. Kohtla-Järve | 35 | 31 | 16 | 33 | 25 | 17 |
| incl. Narva | 31 | 40 | 24 | 42 | 37 | 42 |
| Jõgevamaa | 14 | 18 | 16 | 21 | 17 | 13 |
| Järvamaa | 20 | 12 | 21 | 25 | 9 | 23 |
| Western Virumaa | 49 | 55 | 49 | 57 | 38 | 39 |
| Läänemaa | 9 | 13 | 5 | 11 | 10 | 10 |
| Põlvamaa | 14 | 18 | 13 | 22 | 14 | 14 |
| Pärnumaa | 37 | 49 | 35 | 26 | 29 | 23 |
| incl. Pärnu | 14 | 34 | 17 | 16 | 16 | 11 |
| Raplamaa | 14 | 14 | 12 | 19 | 20 | 12 |
| Saaremaa | 20 | 22 | 8 | 21 | 15 | 13 |
| Tartumaa | 100 | 98 | 103 | 86 | 68 | 70 |
| incl. Tartu | 76 | 82 | 77 | 64 | 44 | 45 |
| Valgamaa | 14 | 15 | 18 | 13 | 23 | 9 |
| Viljandimaa | 37 | 45 | 29 | 27 | 12 | 24 |
| Võrumaa | 25 | 13 | 26 | 18 | 29 | 29 |
| Prison Hospital | 39 | 42 | 48 | 36 | 34 | 22 |

## Table No. 5b
## Incidence of tuberculosis in 1997 – 2002 by counties, incl. cities, per 100.000 population

| | Incidence per 100.000 population | | | | | |
|---|---|---|---|---|---|---|
| | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** |
| Harjumaa | 48.0 | 56.8 | 57.8 | 54.7 | 54.9 | 46.6 |
| Incl. Tallinn | 51.7 | 57.1 | 65.7 | 57.4 | 57.0 | 47.4 |
| Hiiumaa | 19.0 | 9.5 | 19.1 | 38.2 | 9.6 | 28.9 |
| Eastern Virumaa | 52.8 | 57.5 | 35.3 | 64.9 | 56.5 | 56.9 |
| incl. Kohtla-Järve | 71.7 | 64.0 | 33.2 | 69.0 | 52.7 | 36.1 |
| incl. Narva | 44.4 | 57.6 | 34.7 | 61.0 | 54.0 | 61.7 |
| Jõgevamaa | 31.1 | 46.5 | 41.5 | 54.7 | 44.5 | 34.2 |
| Järvamaa | 50.7 | 30.6 | 53.8 | 64.3 | 23.3 | 59.7 |
| Western Virumaa | 71.2 | 80.3 | 71.8 | 83.9 | 56.2 | 57.9 |
| Läänemaa | 30.9 | 44.8 | 17.3 | 38.3 | 35.0 | 35.2 |
| Põlvamaa | 41.9 | 54.3 | 39.4 | 67.2 | 43.0 | 43.3 |
| Pärnumaa | 40.0 | 53.2 | 38.2 | 28.5 | 31.9 | 25.4 |
| incl. Pärnu | 30.1 | 73.6 | 37.0 | 35.1 | 35.3 | 24.4 |
| Raplamaa | 36.7 | 36.8 | 31.7 | 50.5 | 53.3 | 32.2 |
| Saaremaa | 54.9 | 60.6 | 22.1 | 58.3 | 41.8 | 36.4 |
| Tartumaa | 66.4 | 65.2 | 68.7 | 57.4 | 45.5 | 46.9 |
| incl. Tartu | 75.0 | 80.9 | 76.0 | 63.2 | 43.5 | 44.5 |
| Valgamaa | 38.5 | 41.4 | 49.9 | 36.3 | 64.5 | 25.4 |
| Viljandimaa | 62.8 | 76.7 | 49.7 | 46.5 | 20.8 | 41.8 |
| Võrumaa | 61.3 | 32.1 | 64.6 | 45.0 | 73.0 | 73.5 |
| Prison Hospital | 814.2 | 959.1 | 1018.7 | 750.6 | 712.3 | 460.9 |

Incidence of tuberculosis in Estonia is divided rather evenly between counties (Tables 5a and 5b). Differences between counties and cities as well as difference between different years are two- and threefold. Incidence is a bit smaller in Hiiumaa, Saaremaa, Läänemaa and Pärnu. Incidence is higher in Lääne-Virumaa, Võrumaa and Tartu. In Estonia the results of the treatment of sensitive *M. tuberculosis* have improved during the existence of the programme, 77,1% in 1998 and 85,2% in 2000. However, the result of the treatment of multi-resistant cases has been less efficient according to expectations – in 1998 – 2000 52 –57% of the multi-resistant TB cases recovered.

## Table No. 6
## The results of the tuberculosis treatment in 1998 – 2001 by counties, incl. cities

| | Incidence per 100.000 population | | | | | |
|---|---|---|---|---|---|---|
| | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** |
| Harjumaa | 48.0 | 56.8 | 57.8 | 54.7 | 54.9 | 46.6 |
| Incl. Tallinn | 51.7 | 57.1 | 65.7 | 57.4 | 57.0 | 47.4 |
| Hiiumaa | 19.0 | 9.5 | 19.1 | 38.2 | 9.6 | 28.9 |
| Eastern Virumaa | 52.8 | 57.5 | 35.3 | 64.9 | 56.5 | 56.9 |
| incl. Kohtla-Järve | 71.7 | 64.0 | 33.2 | 69.0 | 52.7 | 36.1 |
| incl. Narva | 44.4 | 57.6 | 34.7 | 61.0 | 54.0 | 61.7 |
| Jõgevamaa | 31.1 | 46.5 | 41.5 | 54.7 | 44.5 | 34.2 |
| Järvamaa | 50.7 | 30.6 | 53.8 | 64.3 | 23.3 | 59.7 |
| Western Virumaa | 71.2 | 80.3 | 71.8 | 83.9 | 56.2 | 57.9 |
| Läänemaa | 30.9 | 44.8 | 17.3 | 38.3 | 35.0 | 35.2 |
| Põlvamaa | 41.9 | 54.3 | 39.4 | 67.2 | 43.0 | 43.3 |
| Pärnumaa | 40.0 | 53.2 | 38.2 | 28.5 | 31.9 | 25.4 |
| incl. Pärnu | 30.1 | 73.6 | 37.0 | 35.1 | 35.3 | 24.4 |
| Raplamaa | 36.7 | 36.8 | 31.7 | 50.5 | 53.3 | 32.2 |
| Saaremaa | 54.9 | 60.6 | 22.1 | 58.3 | 41.8 | 36.4 |
| Tartumaa | 66.4 | 65.2 | 68.7 | 57.4 | 45.5 | 46.9 |
| incl. Tartu | 75.0 | 80.9 | 76.0 | 63.2 | 43.5 | 44.5 |
| Valgamaa | 38.5 | 41.4 | 49.9 | 36.3 | 64.5 | 25.4 |
| Viljandimaa | 62.8 | 76.7 | 49.7 | 46.5 | 20.8 | 41.8 |
| Võrumaa | 61.3 | 32.1 | 64.6 | 45.0 | 73.0 | 73.5 |
| Prison Hospital | 814.2 | 959.1 | 1018.7 | 750.6 | 712.3 | 460.9 |

** 5% of the registered cases in 2001 were still on treatment in March 2003*

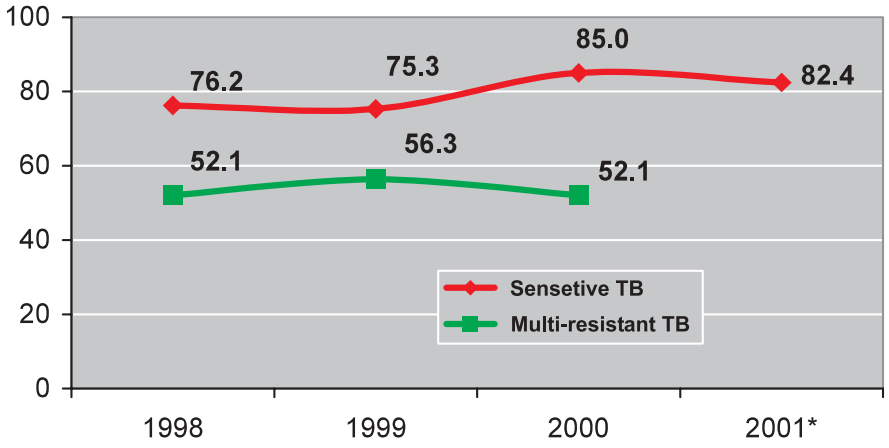
## Table No. 7
## The efficiency of treatment (%) concerning sensitive and multi-resistant cases in 1998 – 2001

| | 1998 | 1999 | 2000 | 2001* |
|---|---|---|---|---|
| **Drug sensitive cases** | **421** | **398** | **408** | **358** |
| Success | 76.2 | 75.3 | 85.0 | 82.4 |
| Died | 14.2 | 12.8 | 6.1 | 5.6 |
| Failure | 1.9 | 2.0 | 1.5 | 2.2 |
| Defaulter | 7.6 | 9.8 | 7.4 | 9.8 |
| **Multi-resistant cases** | **98** | **112** | **102** | **98** |
| Success | 52.1 | 56.3 | 52.0 | 26.5 |
| Died | 26.5 | 16.1 | 19.6 | 11.2 |
| Failure | 7.1 | 6.3 | 7.8 | 9.2 |
| Defaulter | 14.3 | 21,4 | 20.6 | 16.3 |
| Still on treatment | – | – | – | 36.7 |

** 5% of the registered cases in 2001 were still on treatment in March 2003*



## Diagram No. 7
## The percentage of sensitive and multi-resistant TB cases in 1998 – 2001 *




** 36,7% out of multi-resistant TB cases registered in 2001 are still on treatment in March 2003 – that is why it is not possible to estimate the result of the treatment of multi-resistant patients at the moment*

# 9. Recommendations for strengthening of the Tuberculosis Control Programme

The strategy of tuberculosis control is based on five principles:
- Governmental commitment to the Tuberculosis Control Programme;
- Priority to the passive case finding of TB cases (by patient's appointment) over active case finding in risk groups;
- Administration of standardised 6 – 8 month directly observed treatment regimens;
- Uninterrupted supply of all necessary TB medicines;
- Centralized system of registration and follow-up.

All above-mentioned five principles are followed in Estonia in 2003 and their stability must be guaranteed in the nearest future. Due to the special character of TB the tuberculosis control needs continuous co-ordination and firm management on the governmental level. The situation has developed by now where the bigger independence of health care institutions sets new challenge in front of unitary principles of Tuberculosis Control Programme. Dispersing of the responsibility between different institutions causes confusion in organization of tuberculosis treatment, arrival of data in time and use of finances.

The experience of the one or two decades in Estonia proves that only few years lack of readiness increases TB problem in the society. Looking into the future it is too early to say if the decrease in incidence of TB is permanent or only temporary.

Taking into consideration the explosive spread of HIV in Estonia during last years, the end of TB in Estonia is not to be expected. HIV weakens the immune system and HIV-positive person has 30 times bigger chance to get infected with tuberculosis in comparison with HIV-negative. As in the beginning of 2003 there were about 3000 HIV-positives in Estonia, it is likely that in a few years the HIV related tuberculosis will increase dramatically.

## Recommendations

- To continue the governmental planned and purposeful financing of the TB control programme activities at least up to 2008, to guarantee
  - Free treatment for all patients
  - Co-operation of the work of different medical establishments concerning tuberculosis control
  - Training of medical personnel.
- To find the firm solution for the financing of the diagnosis and treatment of unin sured and insured TB suspected and TB cases in co-operation with the Ministry of Social Affairs, Health Insurance Fund and the Ministry of Justice.
- To regulate the system of applying for license for tuberculosis laboratories.
- To guarantee the laboratory work of mycobacteriology it is necessary to apply for the corrections in the pricelist of Health Insurance Fund. It would enable to de crease the financing of the project of laboratory through the control programme. To plan the financing of the reference activities according to the law of prevention of infectious diseases and their control.
- To define the risk groups of TB and the extent of the medical services to them.
- To pay still greater attention to the evaluation of the activities of the Tuberculosis Control Programme and it's planning.

# Addition

*Text of the Governmental Tuberculosis Control Programme in Estonia*
*(RT I, 11.11.1997, 77, 1319)*
*Approved by the Government*
*on Oct. 30,1997 by the decree No. 799, 1997*

## Tuberculosis Control Programme in Estonia 1998 - 2003

### 1. Present situation

Tuberculosis is one of the most widespread infectious diseases, caused by Mycobacterium tuberculosis. The organs mostly affected are the lungs, but tuberculosis may also affect the other organs. Tuberculosis is the most important cause of death in the world among the infectious diseases caused by one agent. During the last ten years the tuberculosis incidence has risen in several countries and it has been associated with the spread of AIDS, migration, decreased attention given to tuberculosis prevention, fall in the living standards of some people and also with the increased drug resistant forms of tuberculosis.

The incidence of tuberculosis in Estonia was the highest in 1953 – 417 cases per 100.000 population. Due to the more efficient tuberculosis work and the social welfare of population the incidence decreased steadily and reached 25,8 cases per 100.000 population by 1992. The worsening of the tuberculosis situation began in 1993 with the increase in the incidence of tuberculosis 32% (35,3 cases) in comparison with the year of 1992. During the following years the worsening of epidemiological situation took place. By 1996 the incidence increased up to 50,7 cases per 100.000 population. It means that the increase in incidence was 96,5% in 1992 – 1996, which needs efficient interference to improve the situation.

At the same time there has been rise in incidence among children and adolescents. In 1991 and 1992 the incidence in children was 1.2 cases per 100.000 of the children, but in 1996 the number of cases was 5,3. It meant the fourfold increase.

The changes in the incidence of tuberculosis are characterised by the fact that mostly people in best working age fall ill, mainly men (~70%) and among patients there is a tendency of rejuvenation, 75% of infected people are between 20 – 50 years.

Tuberculosis has become the real problem in the penitentiary institutions, where the incidence rate is up to twenty times as big as among other people. In 1996 59 new cases were discovered in prisons.

Tuberculosis in Estonia is characterized by frequent excretion of Mycobacterium tuberculosis and the presence of cavities, accordingly 75% and 66% out of new cases.

Tuberculosis incidence in Estonia is essentially higher than in most economically developed countries where the incidence is less than 15 cases per 100.000 population.

Tuberculosis epidemiology in Estonia is worsened due to the large percentage of drug-resistant Mycobacterium tuberculosis strains – up to 20 % out of all discovered new cases are caused by drug-resistant agents.

One of the main problems is the spread of nosocomial tuberculosis as the tuberculosis departments of lung hospitals do not meet the requirements of the present day demands on health protection.

The rise in the incidence of tuberculosis and the worsening of epidemiological situation are closely related to the social and economic changes in Estonia. The last four years have witnessed a fall in the living standards of many people, unemployment has risen considerably in some areas. About one third of the tuberculosis patients are without medical insurance and the system of the paying for their treatment has not been regulated once and for all.

Prevention of the spread of tuberculosis as a life threatening infectious disease should be the priority in health care of the Estonian Republic. The treatment and prophylaxis of tuberculosis cannot depend on the monetary situation of the certain medical establishment, health insurance fund or a patient. The programme should be financed by the governmental.



## 2. Aims and main objectives of the programme

In 1993 the World Health Organisation and the International Union Against Tuberculosis and Lung Diseases declared that the rise in the incidence of tuberculosis had become a threatening danger again. While each country draws up its own national Tuberculosis Control Programme it has been advised to include five basic principles, and the following of these principles would provide for better tuberculosis diagnosis and treatment, reduce tuberculosis incidence and use rationally the monetary resources allotted for the health care:

- Governmental commitment to the Tuberculosis Control Programme;
- Priority of passive case finding (patients self-reporting) and of active case finding in the risk groups;
- Administration of standardised 6 – 8 month unitary regimens of DOT;
- Establishment of a system of regular drug supply;
- Establishment of unified recording and reporting system.

The main aim of this programme is:

to reorganise the strategy of tuberculosis treatment in the Estonian Republic to guarantee the efficient treatment which helps to protect the population from the spread of tuberculosis.

By achieving this above-mentioned aim, it may be presumed that the tuberculosis incidence decreases to the level of maximum 30 new cases a year per 100.000 population by 2005. And the efficiency of the treatment of new cases is at least 85%.

## 3. The Strategy for the implementation of the programme

The strategy for the implementation of the programme is the following:

### 3.1. Starting and organisation of the system of directly observed treatment

Directly observed treatment is based on a patient-centred system with consistent, high quality treatment which is free for patients. The medicines are taken under the direct control of the medical personnel.

The directly observed treatment is based on the treatment regimens recommended by the World Health Organisation and the International Union Against Tuberculosis and Lung Disease (IUATLD).

Only properly trained tuberculosis specialists in the institutions with the appropriate licences provide the treatment of tuberculosis. The organisation of the treatment of tuberculosis in Estonia is co-ordinated by county doctors.

In the system of directly observed treatment all tuberculosis patients are guaranteed the treatment, which meets the approved quality requirements.

The organisation of the treatment of tuberculosis must be patient-centred (inc. supervision and treatment of patients at home).

The assessment of the efficiency of the treatment is based on the results of bacteriological analyses.



Tuberculosis medicines are bought centrally for both in-patient and ambulatory treatment and the purchases are financed from the governmental budget.

The directly observed treatment is applied in three different forms:

#### 3.1.1. Hospitalisation until the decrease in the excretion of tubercle bacilli

The criterion will be the result of bacteriological analyses.

Considering the number of population, the existence of medical establishments and up-to-date diagnosing facilities in them, the diagnosing and primary treatment of all new and serious patients in Estonia is done in three places:

a) Tallinn Kivimäe Hospital;

b) Tartu University Lung Hospital;

c) Kohtla-Järve Lung Hospital. In 1998 – 2003, there is the plan to reduce the number of diagnostic beds for tuberculosis patients by 25%.

Multi-resistant cases are treated only in two centres – Tallinn Kivimäe Hospital and Tartu University Lung Hospital.

The treatment of tuberculosis patients with concurrent psychiatric diseases who need a special control and regime takes place in Jämejala Psychiatric Hospital.

### 3.1.2. Ambulatory treatment until recovery or improvement

In organizing the network for the treatment of tuberculosis the priority should be given to supervised ambulatory treatment.

The part of ambulatory treatment will increase considerably in the conditions of directly observed treatment.

Ambulatory treatment is provided in all Estonian cities and counties under the supervision of the local lung doctor, using the special medical personnel (e.g. tuberculosis nurses) or social workers with respective training. The rural community doctor or city doctor is responsible for the organization of local ambulatory treatment.

The county doctor arranges working conditions of the county lung doctor and the so-called tuberculosis nurse. Rooms for the reception of tuberculosis patients are provided considering the special conditions.

A special kind of ambulatory treatment are departments of daily treatment, located usually at the stationary departments of tuberculosis hospitals and these are meant first of all for directly supervised treatment of low insured or asocial persons with a simultaneous provision of meals.

### 3.1.3. Long-term inpatient treatment for the patients in need of long-term treatment and infectious patients without a residence



There should be at least 2 – 3 such medical establishments in Estonia – for example in Narva, Kose and South Estonia, with a total of about 75 – 80 beds.

The treatment of new cases of tuberculosis takes 6—8 months according to the following treatment regimen: two first months with 4 preparations – isoniazid, rifampicin, pyrazinamide and streptomycin (ethambutol), in the treatment period following the intensive phase with 2 preparations – isoniazid and rifampicin.

The basic treatment of repeated cases with duration of 3 months is started with 5 preparations – isoniazid, rifampicin, pyrazinamide and streptomycin and ethambutol. In further treatment (during 6 months) the results of determining drug resistance are taken into account.

## 3.2. Updating the system of detecting new cases of tuberculosis

Considering the experience of many countries and the existing concrete possibilities, it has appeared that tuberculosis can be most effectively detected when the infected people themselves turn to the doctor.

The precondition is informing the population about the epidemiological situation of tuberculosis, the nature of disease, using for this all possibilities of the modern media. The Estonian Respiratory Society, regional anti-tuberculosis associations and the Estonian Red Cross are involved in this work.

In the preparation/training of doctors more attention should be paid to diagnosing tuberculosis. The appropriate training is done within the courses of the Tartu University Additional Training Centre for Doctors and Pharmacists organized by different institutions (centres, societies for lung disease).

The method of early detection of pulmonary tuberculosis is chest x-ray (roentgenogram or large-scale fluorogram) and bacteriological examinations. With children and adolescents tuberculin diagnostics is used also.

Active detection of tuberculosis is used only for people belonging to risk groups:

- people in contact with the tuberculosis patient (family members, work and house hold contacts, medical personnel, students of the faculty of medicine and students of medical school);
- immigrants/persons applying for a residence permit, people living in nursing homes for the homeless);
- HIV-infected people and AIDS carriers and other people suffering from immune deficiency;
- patients receiving hormone treatment.

All doctors of the first level must deal with the detection, supervision and referring to prophylactic examinations of persons belonging to risk groups.

The Ministry of Social Affairs establishes the list of workers subject to compulsory medical examination and sets out the procedure of their examination in co-operation with the National Health Protection Inspection and the Council of Tuberculosis Service.



In exceptional cases county doctors have the right to organize targeted prophylactic fluorographic examinations of the population. The costs are covered from the amount specially determined for the prophylaxis of tuberculosis.

## 3.3. Effectual and targeted prophylaxis of tuberculosis

All healthy newborn babies are subject to compulsory vaccination (BCG) in the maternity hospital. Paediatricians and family doctors do later vaccination of babies after the disappearance of contraindications.

Children are revaccinated at the age of 8. Revaccination is done only for tuberculin-negative children.

First regular tuberculin test (Mantoux test) is done in the third year of the child's life, the next one before revaccination.

Children in the risk groups should be done a Mantoux test not more often than once every 3 years (if the test is done more often there is a possibility of a false positive result). Thus, people considered belonging to risk groups are:

- Children from the place of infection (contact children from the areas of high incidence of disease);
- Children from asocial families, nursing homes and orphanages;
- Children without BCG vaccination;

BCG vaccine is bought through the National Health Protection Inspection with the means allocated from the governmental budget.

Preventive treatment is used for:

- Family members of an infectious patient;
- Children and adolescents who have been in contact with the person excreting bacteria.

## 3.4. Centralization of laboratory service

Each county must have a possibility of making bacterioscopic tests. The reference laboratory checks the quality of the tests regularly. The result is registered and fixed according to the established procedure (according to the respective standards).

Cultures for pathogenic organisms can be made only in the laboratories in Tallinn, Tartu and Kohtla-Järve that meat strictly the safety requirements. To overcome the problems of treatment of drug-resistant tuberculosis, it is necessary to get a quick result of determining drug resistance. In order to determine quickly the drug resistance, a well-standardized Bactec system has to be used.

Microbiological diagnostics of tuberculosis is controlled and co-coordinated by the reference laboratory for tuberculosis and mycobacteriosis.

It is necessary to work out appropriate regulations, train the personnel and guarantee the means (containers) for the safe transportation of infected biological material to the laboratories of a higher stage.



## 3.5. Establishing an integrated system of registration and control of tuberculosis (central register, local register, registration forms)

Tuberculosis is subject to compulsory registration together with complete information about the person.

The central register of tuberculosis must be current, enable the analysis of data by quarters concerning both the new registered cases and also the patients cured within the same period.

The preconditions are:

- Adjustment of the definition and classification of cases to the recommendations of the World Health Organization;
- Working out and taking into use simple and strictly uniform registration forms;
- Training of personnel working with the register;
- Sending of the registration form to the register independently both by the doctor who diagnosed the disease and the laboratory that found the pathogen;
- Operative and constant co-operation between the central register, local registers and the laboratory system (each quarter the central register sends the overall results both to local registers and laboratories – reciprocal control);
- The central register must contain information about the infected people in peni tentiary institutions.

## 3.6. Involvement of social care system in the implementation of the Tuberculosis Control Programme, social guarantees

All tuberculosis patients have the right to be on disability leaf for 8 months; during the same period their job has to be maintained for them.

For the infected people who despite repeated treatment still excrete bacteria and/or if they develop residual symptoms of tuberculosis that essentially limit their capacity to work, there is a legal right to apply for a disability group.

The social guarantees of the medical personnel for the case of an infection in hospital are created with safe working conditions. Until the establishment of safe working conditions, the medical personnel are compensated for the infection danger according to the price list of medical services.

The establishment of social guarantees both for tuberculosis patients and the medical personnel dealing with their treatment is the task of the social care system.

## 3.7. The application of the principles of the Tuberculosis Control Programme in penitentiary institutions

The diagnosing, treatment and registration of tuberculosis in penitentiary institutions are organized according to the same principles as in the society as a whole.

In governmental penitentiary institutions all inmates must go through a compulsory fluoro-roentgenographic examination at least twice a year. The examinations are financed from the funds of the Ministry of Justice.

To guarantee the consistency of treatment, the infected person released from the prison must be sent to the first-level doctor of his place of residence, where the respective data are also sent within 10 days.

## 3.8. The planning of scientific tuberculosis research according to the guidelines set out in the Tuberculosis Control Programme

Scientific research of tuberculosis has to concentrate on the most actual problems related to tuberculosis.

## 4. Financing of the programme

The total cost of the programme in 1998 is 5.5 million croons, a large part of which is the cost of treatment of the people without medical insurance. The total sum is used according to the main principles set out in the programme and the budgets approved by the council of the programme.

The detailed budgets are approved by the Minister of Social Affairs.

| Description of Activities | Costs (Millions of Estonian Croons) |
|---|---|
| 1. Making the working conditions of the tuberculosis laboratories adequate to safety requirements (ventilation, apparatuses) | 0.83 |
| 2. Completing the reorganization of the second level laboratories in Tallinn and Kohtla-Järve | 0.47 |
| 3. Establishing the transport system of infectious biological material | 0.05 |
| 4. Establishing an integrated system of registration (registration forms, treatment cards and their printing, computers and software, means of communication) | 0.20 |
| 5. Medical treatment expenses of people without medical | 3.09 |

Taking into consideration the possible increase in incidence of tuberculosis cases and the possible decrease in social standards among the people without medical insurance, the future budgets of the Tuberculosis Control Programme cannot be less than the budget of 1998.



Minister of Social Affairs **Tiiu ARO**