

Estonia
Hospital Master Plan
2015

Final Report

April 17, 2000

SC Scandinavian Care Consultants AB

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0. EXECUTIVE SUMMARY

According to an International World Bank competitive bidding process arranged by the Ministry of Social Affairs of Estonia, two Swedish companies; Scandinavian Care Consultants AB and SWECO International AB were awarded the agreement to develop a Hospital Master Plan for Estonia 2015.

Scandinavian Care Consultants AB is a consultant company of experienced planners, medical experts, specialists on investment and costing, health care and hospital management, organisation and training.

SWECO is an architectural and technical consulting company with a Hospital Planning and Design division as well as mechanical and electrical engineering division.

The Hospital Master Plan (HMP) is a part of the reorganisation of the health care system in Estonia, which started in the 1990th. The HMP shall according to the contract “give recommendations regarding the future hospital network based on the best practise in the world”.

The Hospital Master Plan (HMP) was carried through between December 1999 and April 15, 2000 in a close co-operation with a Steering Committee from the Ministry of Social Affairs lead by Mr. Hannes Danilov, Secretary General at the Ministry of Social Affairs.

The study has been presented in the following sub-reports:

Inception Report	1999-12-21
First Interim Report	2000-02-07
Second Interim Report	2000-03-03
Final Report	2000-04-15

The following summary reflects some of the main results of the report

INTERNATIONAL TRENDS IN HEALTH CARE

There are some characteristic trends in the organisation of modern health care in Western countries such as:

- decentralisation of the simple
- centralisation of the difficult
- separation of different forms of emergency care
- more out-patient care and emphasis on primary care
- less in-patient care and a significant reduction in the average length of stay in hospital
- day care
- day surgery

- new less invasive treatment modalities
- emphasis on reconstructive surgery increasing quality of life
- new potent drugs

Medical technology is advancing at an increasing speed. Many laboratory tests can now be analysed in a decentralised fashion in the doctor's office, while other more complicated analyses are centralised. The new imaging techniques, such as MRI, have greatly improved the diagnostic capabilities.

Progresses in microbiology and gene technology will in some years make it possible to further improve patient treatment.

The duration of life is rapidly increasing in many Western countries. More and more people are getting older and older. This will put new demand on the care of the elderly and to differentiate this care in many different forms.

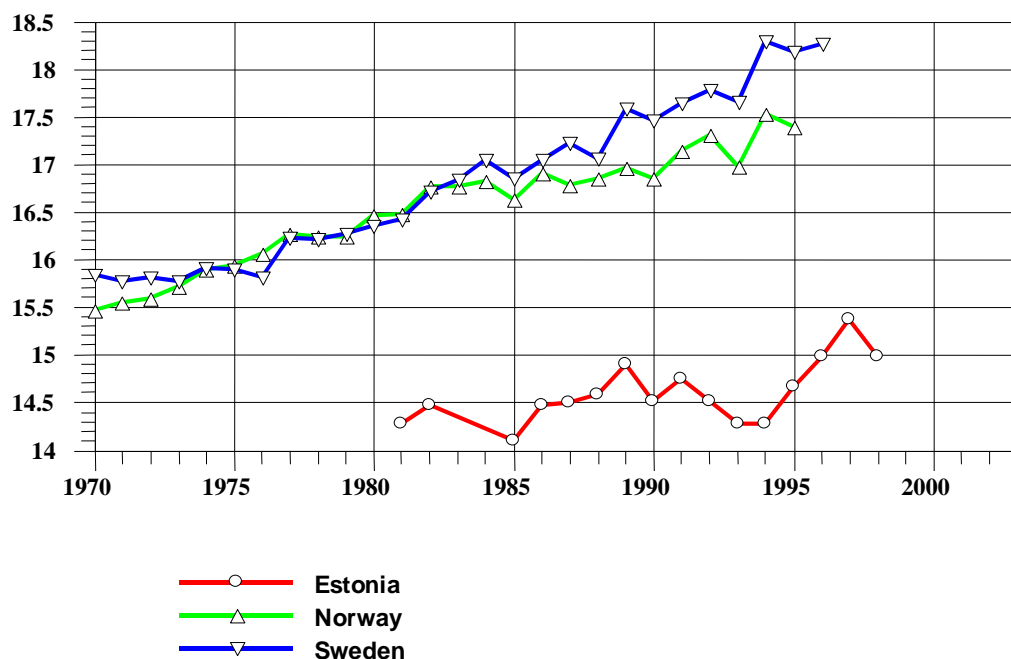
The progress in medical care will also influence the organisation of medicine. The organisation needs to become more and more flexible. Ear-marked resources such as special departments for each clinic will not be common in the future. Department borderlines will fade away and be replaced by team formations.

There will be more severely ill patients in the secondary hospitals. That will have an impact on the number of staff and on the need for better wardrooms.

THE ESTONIAN SITUATION TODAY

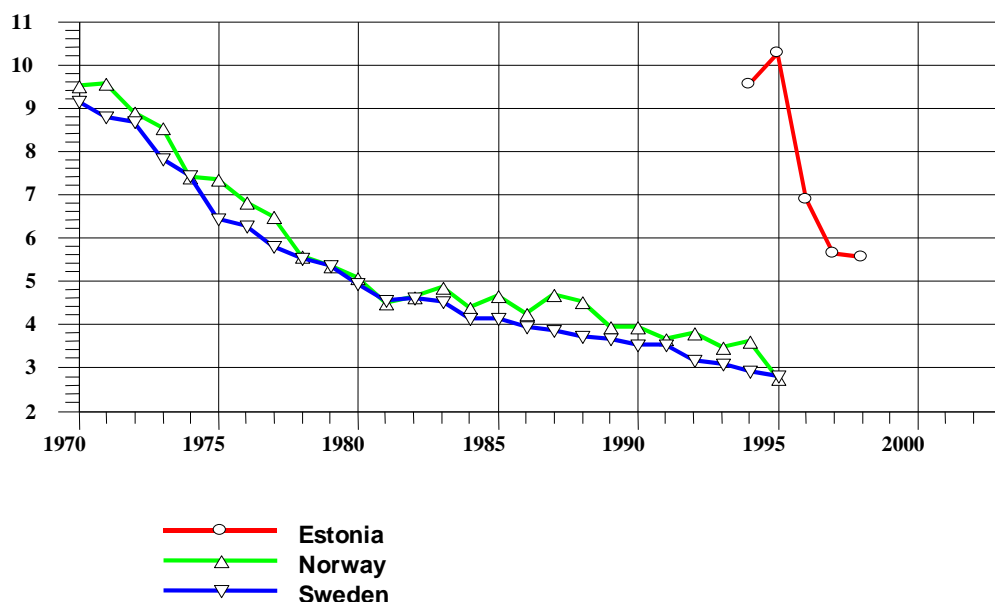
There is a difference in life expectancy between Estonia and the Nordic countries as can be seen in the following graph

Life expectancy at age 65, in years



Neonatal mortality rate in Estonia has a encouraging decreasing trend as showed in the graph and is probably caused by the child welfare programme.

Neonatal mortality rate per 1000 live births



Diseases and causes of death related to the socio-economic structure and to habits such as drinking, smoking and consumption of fat are significantly more common in Estonia than in Norway and in Sweden

NEED FOR CHANGES

The old Soviet health care system is a vertical system based on monoprofile and category hospitals. This system is in general insufficient from a quality point of view as well as from an efficiency point of view. The modern Western systems are horizontal population-based systems

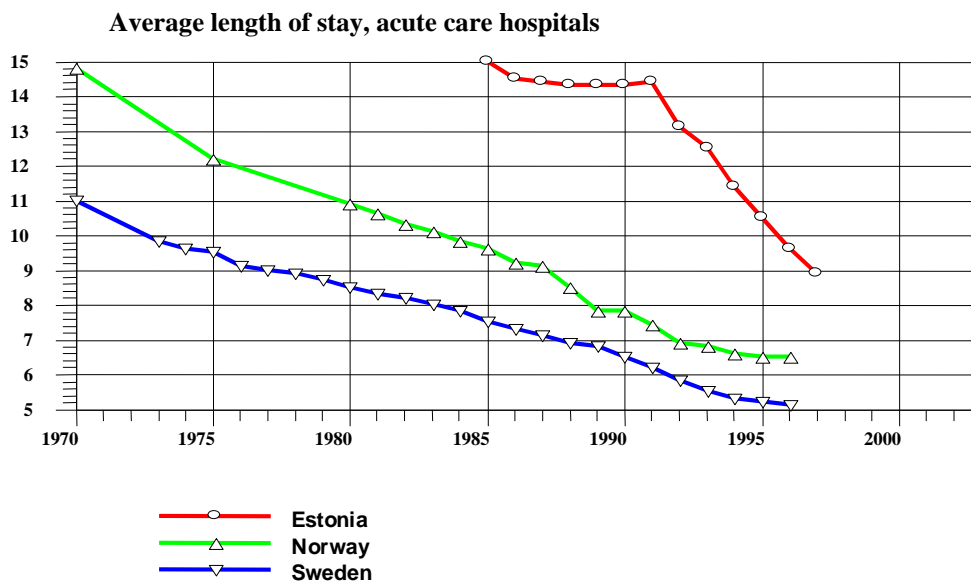
Estonia has a population of 1,45 mill inhabitants and currently 17 catchment areas for acute care hospitals. According to WHO a catchment area for an emergency hospital shall consist of at least 75 000 – 100 00 inhabitants.

The consultants have since December 1999 examined relevant facts about the health care in Estonia and visited sixty hospitals all over the country. A questioner was sent to the hospitals before our arrival. We have had open discussions with hospital managers and staff members, with members of some municipalities, with social care officials and with officials at the Ministries.

There are at present 78 hospitals in Estonia. They are very diversified in terms of age, size condition, suitability etc. Most hospitals are 20 years old or more. Many of the old buildings are solidly built while the buildings from the 60's, 70's and 80's generally are in a poor condition. Most buildings have been partly rebuilt during last years. This has not been done according to long-range plans but more on an ad hoc basis. In nearly all hospitals there is a urgent need to make profound reconstruction's and to update the infrastructure with respect to area standards, hygiene facilities, ventilation, fire protection, lifts etc.

The secondary hospitals are generally too big, and the rate of occupancy is often low. There is much empty space in the hospitals, despite that the wardrooms are often overcrowded. The environmental conditions are not satisfactory for the patients or for the staff.

The number of hospital admissions and the average length of stay have decreased in Estonia but is still much higher than in Norway and Sweden. This is probably to some extent due to differences in technology available as well as treatment methods, but most likely differences in tradition.



It is obvious both from a medical point of view as from an economical, that the present situation need to be changed.

Concentrating care of patients, who need qualified treatment to fewer hospitals, will improve the quality of treatment. Staff members (doctors, nurses) will maintain their professional skills with a larger number of cases. The economy of scale will improve by concentrating the more sophisticated and expensive medical equipment to fewer hospitals.

New and better diagnostic methods often leads to increased investment costs. Angiographic laboratories and Radiography equipment like CT and MR will be of still more importance, when treating patients suffering from for instance, stroke and cardiovascular diseases. An angiographic laboratory needs a catchment area of 250 000 inhabitants and a CT needs 50 000.

By concentrating care of acute patients to fewer hospitals it will be easier to make necessary investments in medical equipment.

As for the secondary and tertiary care hospital buildings it is more cost efficient to upgrade fewer buildings.

THE NEW HOSPITAL STRUCTURE

Our proposal regarding the location of hospitals is based among factors such as demography, the size of the catchment area and communications (roads etc). A condition has been that most Estonians should live within 70 km (one hour of transportation) from an acute care hospital.

We propose that Estonia is subdivided into four main catchment areas and that the new hospital structure is based on that. In each of the regions there will be a central or regional/university hospital. The new hospital structure in Estonia for secondary and tertiary

care shall be gradually implemented during the coming 10-15 years. Appendix L is a map showing the proposed catchment areas

The number of acute care hospitals will be reduced from 27 to 13 in 2015. The number of beds will also be reduced down to about 3100. We are convinced that such reduction is not difficult to implement. The average length of stay will become shorter and shorter, and a significant part of the care will with time be transferred to an outpatient setting.

Hospital proposal

North-east

A new central hospital in Kohtla-Järve/Jöhvi
Secondary hospitals in Narva and in Rakvere

North-west

One regional hospital and two central hospitals in Tallinn
Secondary hospitals in Haapsalu (Läänemaa Haigla) and in Paide (Järvamaa Haigla)

South-east

One university hospital in Tartu (preferably a new construction)
Secondary hospitals in Võru and in Viljandi

South-west

A new central hospital in Pärnu
Secondary hospital in Kuressaare

In total this is 13 hospitals; one university hospital (Tartu), one regional (Mustamäe), 4 central hospitals (Kohtla-Järve/Jöhvi, Tallinn Central, Tallinn West and Pärnu), 7 secondary hospitals (Haapsalu, Paide, Rakvere, Narva, Kuressaare, Viljandi, Võru)

Former secondary care hospitals

Hospitals, which no longer will have secondary in-patient care, can be converted to health care centres with primary care facilities, specialist out-patient care, day surgery, and day care with facilities for long-term care or to nursing homes.

Monoprofile hospitals

Most of the monoprofile hospitals of today will be integrated in the secondary and tertiary hospitals. There will be monoprofile hospitals only for tuberculosis, for some parts of psychiatric treatment and some facilities for medical rehabilitation.

Other special issues

In Estonia there are 18 obstetrics departments. At 12 of them there were less than 500 deliveries last year, in some locations less than one per day. That is too few to maintain the

professional skills and for securing patient safety. We propose that deliveries are centralised to fewer hospitals.

The situation in Estonia with respect to tuberculosis is alarming. We support the rebuilding of Kose hospital to a centre for care of patients suffering from multiresistant TB.

The mental hospitals must be rebuilt but with fewer beds since more patients with psychiatric diagnoses will be treated as out-patients.

Local hospitals

Some of the local hospitals are small and in a poor condition. They are not even after rebuilding suitable for health care in the long run and should be closed. Other local hospitals can after rebuilding be used for long-term care, as nursing homes and for active rehabilitation. Together with clinics for family doctors and some specialists they can form small health care centres.

The Tallinn hospital structure

For the Tallinn area we propose a new organisation based on three geographic areas. The hospitals in each of these areas will be grouped into one management organisation and functionally merged over time. These hospital groups are:

The *south-west* with Mustamäe hospital serving as the centre and becoming a full regional hospital. The Children's hospital should be merged with Mustamäe. A department of obstetrics and gynaecology should be opened at Mustamäe. The Dermatology Hospital should be moved to Mustamäe as well as the Oncology Hospital in due course. The Tallinn-Järve Hospital will be administratively integrated into Mustamäe as a rehabilitation clinic.

Mustmäe Hospital must be re-planned and extended with new buildings. The old buildings should be renovated and upgraded.

The *west*, centred on Merimeeste and Pelgulinna Hospitals. Together with the Tallinn Psychiatric Hospital they will be merged under one management into a central hospital. Merimeeste and the Psychiatric hospital are located close to each other and there is plenty of land around the Psychiatric Hospital. That gives possibilities for expansion. Merimeeste will then after re-planning and rebuilding be best suited to become the future West hospital.

The *centre*, with the Central Hospital and Magdalena Hospital which should be joined in one management and serve as a central hospital for secondary care for central and eastern Tallinn. Magdalena hospital should gradually be merged into the Central Hospital. The Magdalena Hospital building can then be used for other purposes.

This plan for Tallinn can with respect to the grouping in three groups be implemented within a very short time. It is then up to the local management within each of the groups to implement the merger over time. Realistically this can be implemented within two or three years. We are convinced that there are too many beds in the Tallinn area today and there is thus an obvious

need for a considerable consolidation of the system. An important issue is to clarify the ownership status of the hospitals before merger. This is a political decision, which must be taken.

MEDICAL CARE FOR ELDERLY

Medical care of the elderly must be strengthened. More and more persons will get old. Sooner or later they will demand medical treatment, not only good long-term care but also secondary care. Today there is a significant difference in the consumption of hospital care for those over 65 between Estonia and the Nordic countries.

There will also be an increasing demand from the older patients to get the benefit of new methods of treatment which not readily available today, i.e. hip and knee replacement, by-pass surgery and cataract surgery. These methods are greatly improving the quality of life especially for elderly.

A condition for the new hospital structure for secondary care is that patients who need further medical treatment after a short hospital visit can be taken care of somewhere else.

Long-term care must increase its competence and have better physical resources. The long-term hospitals in Tallinn and in Tartu, which are in a very poor condition, must as soon as possible be replaced with other more adequate facilities adapted to modern medical care of elderly people. The clinics for "pikaravi" in the hospitals must be reorganised.

The number of beds for long-term care or in nursing homes in 2015 perspective is difficult to estimate today since it also depends on the progress of public health and on the ongoing development in social care. We have however estimated 6000-7000 beds in nursing homes in the year of 2015.

BUILDINGS

Estonian hospital buildings are generally in poor condition. There is a need to rebuild or renovate most them in a period of 10-15 years. Some urgent renovations must be done immediately. The total building cost for rebuilding/renovating the hospitals including new constructions is estimated to roughly 5 500 million EEK.

We strongly recommend all hospital managements that their future building investments shall be preceded by individual long-range hospital master plans. The future building and equipment standard shall correspond to modern Western European standards.

AREA STANDARDS

The area standard in Estonian hospitals is very low. Gross area per bed varies from 18 sqm in Tartu long-term clinic and 22,5 sqm in Tallinn Long-term Hospital and in Kallavere Hospital to 113 sqm in Pärnu (under planning). In Tartu University Hospital there is 50-70 sqm which is remarkable considering the advanced treatment and medical training given there.

In Sweden modern hospitals have 150-190 sqm gross area per bed , in Denmark 150.

The area standard must improve in Estonian hospitals, in particular in the ward departments. More one and two bedrooms must be created and the number of hygiene rooms must increase. Most of them should be connected to the ward rooms. More hygiene rooms are needed for disabled patients. The advantage of raising the area standards is that it will facilitate the work for the staff. It increases the possibility of using technical equipment such as hoisters and the patients can to a greater extent visit hygiene rooms without assistance.

We suggest an area standard for gross bed area according to the following to be used at new constructions and reconstruction of hospitals of different types as follows.

	New construction	Reconstruction
University hospital	130 sqm	120 sqm
Regional hospital	130	120
Central hospital	120	110
Secondary hospital	100	90
Long-term and rehabilitation	90	80
Nursing home	80	70

NUMBER OF BEDS AND RUNNING COSTS

Today Estonia has 10500 hospital beds. Of these about 8200 may be regarded as mainly secondary and tertiary care beds. The main objective of our proposal is to concentrate and consolidate secondary and tertiary care to about 3100 beds in the 2015 perspective. The majority of the remaining beds will be used for other purposes, and primarily for the care of the elderly.

A rough estimation of the annual operative expenses for the acute hospitals in Estonia is 2110 million EEK. This is based on 8200 beds. A reduction to 3100 beds in combination with a conversion of surplus area into long term care, rehab or nursing homes reduces the costs to 1445 million EEK – a difference of 665 million EEK per year.

At the same time both technical and area standard will highly improve and so will the number of nursing home beds.

SICKNESS FUNDS

The current situation with 17 sickness funds and 17 catchment areas is not efficient in a country with 1,5 million inhabitants.

The Central Sickness fund shall remain and its position shall be strengthened. In the new catchment areas there will be local sickness funds, working on the field with local priorities and planning for the Central Sickness fund.

The Ministry of Social Affairs shall deal with policy matters and legislation concerning the social insurance system. The Ministry shall also have the overall responsibility for health care

provision and health care policy in the country.

HOSPITAL LICENSING

The hospital licensing system must be improved. There must be some norms for existing hospitals, such as a target number of inhabitants in the catchment areas, population per family doctor etc. The hospital licensing system should specify the type of hospital, not license individual specialities. The legislation may be improved by giving the Ministry of Social Affairs the right not to license new departments or hospitals even if they fulfil the criteria. If the Ministry of Social Affairs determines that there already exists an appropriate supply of a specific type of service in a particular catchment area there must be possibilities to deny licensing.

QUALITY ASSURANCE AND ACCREDITATION

There is a need for an independent regulatory authority in the Estonian health care sector. This authority shall work directly under the government, and support the legislator. In future, contracts between the sickness funds and receivers must include quality standards for care. The authority shall be responsible for medical audit.

The following are some areas suitable for quality audit.

- Stroke
- Lung cancer
- Breast cancer
- Pneumonia
- Diabetes
- Heart attack
- Heart failure

REIMBURSEMENT

The reimbursement system must be built on actual costs. In most countries providers deliver cost information to the insurer, who calculates the cost and decides the price lists. The cost information must be calculated on a patient level. The consultant suggests that the independent authority calculate all price lists by receiving information from hospitals and other providers. It is our experience that it is optimal if neither the insurer nor the legislator is involved in the calculation of price lists. A totally independent authority can be much more resistant to the influence of various special interest groups trying to influence the price list to their benefit

PRIORITIES

The implementation can be subdivided into immediate measures and planning activities.

Among the immediate measures we suggest are the phase-out and substitution of the long-term hospitals in Tallinn and Tartu, the completion of Pärnu new hospital building, the

establishment of a special hospital for tuberculosis and the concentration of all hospital beds in Valga to the new building.

Simultaneously the planning for a new Tartu University Hospital, a reconstruction and expansion of Mustamäe Regional Hospital and a new central hospital in Kohtla-Järve/Jöhvi should start.

IMPLEMENTATION

To finance the implementation, we suggest that Estonia set targets for healthcare expenditures. There are several methods for that.

One is that the total target for healthcare spending can either be set as letting the total healthcare expenditures increase by the same amount as the increase of funding in the Sickness funds.

Another target can be to let healthcare spending increase as a percent of the total GNP growth.

A combination of the above mentioned methods can also be used. That is preferable in situations where salary costs increase slower than the GNP growth (This situation occurs in many western economies from time to time).

Regarding the future size and structure of the healthcare personnel, we estimate minor changes in the total number, but certainly some movements of working places.

Depending on the future financial situation in Estonia we suggest 3 alternative scenarios for the rebuilding process:

1. All major hospitals, one in each catchment area, will start their planning and constructing at once. All necessary steps for evacuation and reorganisations in accordance with this start simultaneously. The rest of the hospitals will be rebuilt afterwards.
2. The 4 major hospitals will be rebuilt one after another during 10-15 years. The rest of the hospitals will be rebuilt in the same way.

A more economic alternative is to continue to use some of the existing buildings and/or postpone some new constructions. In this alternative Pärnu, Mustamäe and Tartu will start their process immediately, but the relocation of some units to these hospitals will have to wait for some time. The new oncology department at Mustamäe may serve as an example. In Tallinn the future new central hospital building in the east can also wait for a while. The concept in Tartu will in such a scenario be based on a reconstruction of Maarjamõisa Haigla and to connect it to a new neighbouring building.

1. INTRODUCTION

1.1 Background

On November 22, 1999 an agreement was made between the Ministry of Social Affairs of Estonia and SC Scandinavian Care Consultants AB, in co-operation with SWECO International AB, to develop a Hospital Master Plan for Estonia.

The Hospital Master Plan (HMP) shall give recommendations regarding the future hospital network based on the best practice in the world. The need for increased quality and efficiency can only be achieved if there is a considerable consolidation of the present hospital network. An aspect of particular importance will therefore be how to secure adequate emergency services in remote and sparsely populated areas. Although the emergency services as far as transportation is concerned is not a specific subject of the HMP it is necessary to study the present transportation system and make adjustments based on the proposals regarding hospital structure.

1.2 Deliverables

Master Plan methodology shall according to the contract include proposed benchmarks or standards of health service planning based on the efficient practice of the world, in the context of what is needed and affordable in Estonia.

It is suggested that the report could give advice on the following issues:

- SWOT or similar analysis of the current situation on hospital network
- Benchmark of the population needs for secondary, tertiary care and long-term care over the next 10 – 15 years.
- Recommendations of the possible option(s) to restructure the hospital network in Estonia, including benchmarks for
 1. Minimum number of location of secondary and tertiary hospitals needed, assuring the availability of care
 2. Optimum number and location of nursing homes needed
 3. Optimum number and location of outpatient facilities needed
 4. The structure of hospitals per medical speciality
 5. Medical technology needed in connection with re-organisation of hospital network
 6. Bed – per – population recommendations for general / university hospitals

7. Bed – per – population recommendations for nursing homes
8. Specialist profile for secondary and tertiary care hospitals
9. Specialist per population for each speciality

The terms of reference also gives clear guidelines to build up government health sector investment programs for the next 10 – 15 years.

The terms of reference according to the consultants, gives clear guidelines that the consultant shall advice on steps to be taken to ensure enabling policy framework where restructuring of the hospital sector could be implemented. These frameworks are

- Authority on making decision (hospital ownership issue)
- Participation of the key players of the Master Plan development (Sickness funds are purchasers of the services based on the needs of insured population, local Governments)
- Investment, finance and cost-of capital issues
- Use of norms and standards
- Migration of social cost of closing down facilities

2. METHODOLOGY OF COLLECTING INFORMATION

The work was organised in three different sub-projects according to the following;

1. Project Hospital Management / Planning expertise
Responsibilities: To prepare questionnaires and review facts, and make hospital visits to collect information for the HMP.
2. Architect/Engineer/ Planner
Responsibilities: To prepare questionnaires and review facts, and make hospital visits to collect information for the HMP.
3. Demography / Epidemiology / Finance
Responsibilities: To collect relevant statistics for analysis, comparisons and benchmarks.

The project team consisted of Göran Hellers and Göran Lundegårdh (physicians), Stig Nyberg (hospital administrator), Aare Saks and Olle Sutinen (architects/planners) and Magnus Sundberg (health care economist/statistician). Göran Hellers functioned as project leader.

On the Estonian side Katrin Saluvere (co-ordinator at the Ministry of Social Affairs) assisted the project team. Regular meetings were held with a Steering Committee at the Ministry.

During the hospital visits representatives from both the medical/hospital side and the architect side of the project participated.

3. PREVIOUS CONSULTANT'S WORK IN ESTONIA

A number of previous studies have been carried out. Two of these are of particular interest.

3.1 Danish Health Consultant A/S

The Danish consultant company carried out the "Hospital Assessment Project". As a part of this study a questionnaire was sent to all hospitals, and the results were collected in a database. We have examined both the questionnaires and the whole database. There are some comments to be made regarding this survey and the quality of the information.

The database is not complete. All hospitals are included in the database but the input of data from the various hospitals differs. Some hospitals have just answered some, but not all of the questions in the questionnaire.

The data were never controlled with respect to quality (which was apparently not intended in the consultant agreement). Nevertheless we have found the information in this database to be useful during our hospital visits. We were able to do some quality controls during our hospital visits.

3.2 Solve

The report prepared by Solve on Tartu University hospital has a good structure. The factual information included in the report was useful during our review of the whole Tartu area. We do not however agree with Solve's conclusions. We believe that a future solution for Tartu included significantly fewer beds than proposed in the Solve study.

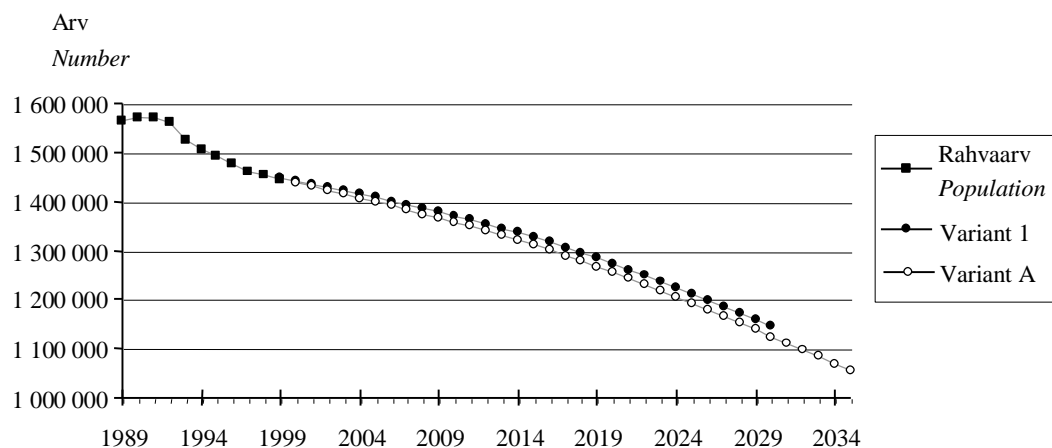
4. SITUATION ANALYSIS

In order to get access to relevant agencies in Estonia and to plan meetings and interviews in Estonia, the Client provided the Consultant with contact persons at the Ministry of Social Affairs. We had multiple meeting with all involved agencies in order to receive information and get an understanding of the Estonian health care system.

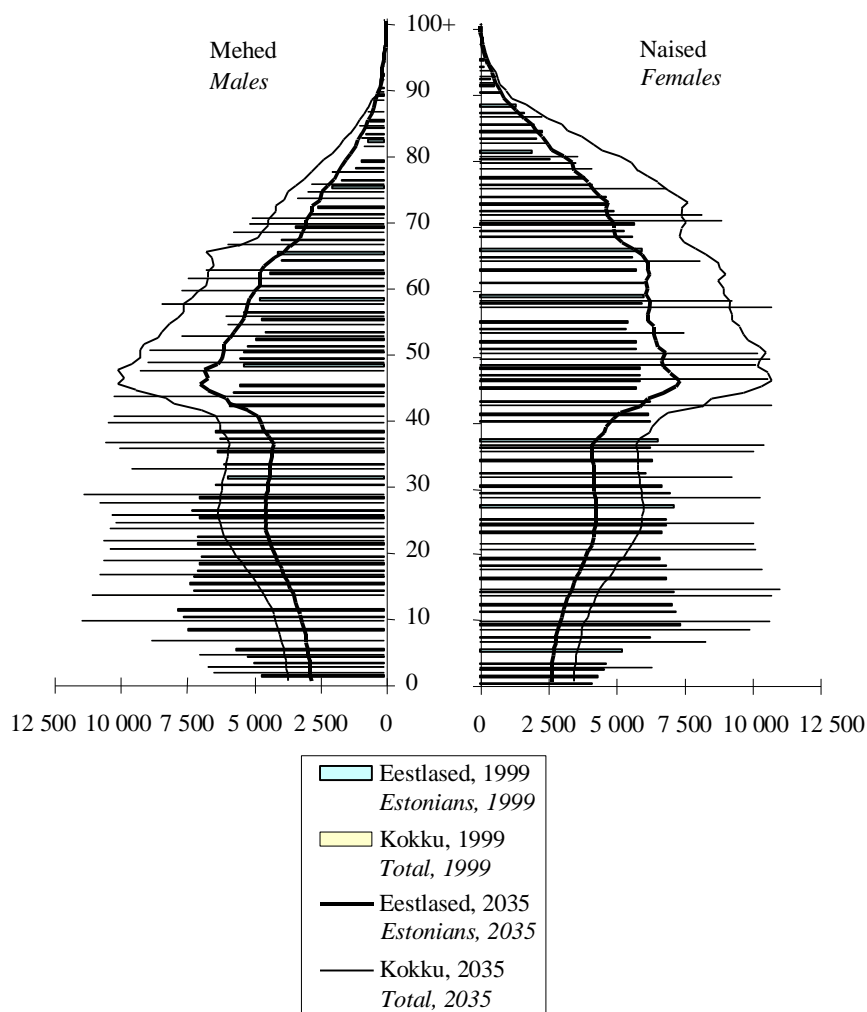
4.1 The Estonian population

According to the Statistical Office of Estonia, the number of inhabitants will decrease during the coming years. The expected number of inhabitants in the year 2015 will be a little over 1,3 million. The graph below shows the population projection in Estonia during the next 30 years.

An estimate like this is to a large extent depending on birth rate and immigration. Today there are 12.000 births per year in Estonia. We have in this study assumed that this will increase to 15.000 within the next 5-10 years. There are many things the government can do in order to stimulate an increase in the birth rate. So - an estimate such as this cannot be taken for granted. Estonia should definitely strive to increase the birth rate.



The Statistical office of Estonia has prepared a population pyramid until the year 2035. The pyramid clearly shows that Estonia has an ageing population. In terms of healthcare this means that more healthcare will be consumed as the proportion of elderly people increase.



4.2 Health care financing and organisation

Since the reconstruction of the Estonian Health care system started in 1992 many things have been done in order to orient the health care system towards a modern Western European model. Our general impressions of the changes so far is positive; in particular the total separation between provision and funding of health care.

Health care in Estonia is financed through health insurance to 90% and through budgets from the state and the municipalities. The patient has to pay for medical treatment under certain circumstances; the total sum of patient payment is however marginal.

The Estonian health care system has, as in many other countries, been hospital focused. With the implementation of the family doctor system starting in 1997 more emphasis will be put on primary care. At the same time specialists will still work outside the hospitals together with the family doctors in the health care centres. In many places the family doctors have their consultation rooms in the polyclinic/ambulatorium inside or near the hospital and the specialists work both in the hospital with in-patients and in the polyclinic with out-patients.

Of the total expenses for health care in Estonia 60% goes to hospital care, 20% to primary care/family doctors and 20% to specialised care according to special programmes.

There are 78 hospitals in Estonia. They have to be licensed to have in-patient wards. For funding they have to have contracts with the sickness fund. Some hospitals are owned and run by the state, others are owned by the city, by municipalities or by other different kinds of organisations.

There are also different kinds of hospitals; central and general hospitals, which offer acute and medical care in various specialities on secondary and/or tertiary level.

There are many monopile hospitals focused on care for special diseases, i.e. tuberculosis, psychiatry, oncology etc. These are part of the state organisation for health care.

There are many small, local hospitals all over the country. They mostly offer non-acute care and aftercare in internal medicine and surgery for patients living in the neighbourhood. "Pikaravi" is the most common speciality in local hospitals (about pikaravi see 8.10). In some small local hospitals there are also paediatric units where most of the children seem to be admitted because of "bronchitis".

4.3 The Central Sickness Fund

The following is a review of some of the issues related to the Central Sickness Fund.

4.3.1 *Number of sickness funds*

Previously Estonia was subdivided into many sickness funds. Some were very small such as Hiiuma with 10.000 people enrolled. This cannot be optimal in a country with just a 1,5 million population.

The system is now changing and the number of funds is going to be significantly reduced. Our opinion is that there should be very strong arguments for having more than one fund in a country with such a small population as in Estonia.

4.3.2 *Contract with providers*

Health insurance is administrated by the sickness funds that makes agreements/contracts with healthcare providers (hospitals, family doctors).

The quality of the content of the contracts between the sickness funds and the providers has improved since the first contracts were signed in 1992. The local sickness funds are the "planners" of health care provision. This means that the sickness funds must take responsibility for developing national standards and methods. In order to do this data must be collected.

It is obligatory to sign contracts between the local sickness fund and the providers. In the beginning the contracts included just a lump sum without any specific targets. The contracts are now beginning to be subdivided by speciality and with more specific objectives to be reached by the provider.

There are standard contracts prepared by the Central Sickness Fund. The local sickness funds are obliged to use the standard contract in contracting with local providers. The present contracts are detailed and can among other things include statements regarding priorities. The provider is obliged to take care of queues, and reach targets regarding number of admissions and visits by speciality, etc.

The level of maturity differs between the different local sickness funds. Some of the local sickness funds merely look at what was produced the previous year and prolong the contract for the forthcoming year. Other local sickness funds have started to work in a more professional way and try to base the contracts on what they perceive to be in the best interest of the population. The different customs seem to be related to staff competence and education at the individual fund.

The degree of maturity between different providers is also significant. Tartu University Hospital seems to have developed more sophisticated systems than other providers.

4.3.3 *Handling of providers deficits*

The responsibility for provider deficit is a central question in any health care system. The question is what happens if a provider produces more care than agreed on during a fiscal year, or if a provider experiences a loss during a fiscal year. Introducing expense limits in the contracts has solved this problem. So far a situation has not occurred where a sickness fund has covered the losses of a provider. If losses have occurred these seem to have been covered by the municipality on some occasions. On other occasions the hospital has just had to cut down on activities.

The Central Sickness Fund produced a deficit in the insurance system of 500 million EEK for the fiscal year of 1999. The major cause of this was the new collection system for the health insurance tax. The tax was earlier collected by the local sickness funds, but from the January 1, 1999 the tax authority collects the tax.

4.3.4 *Statistics*

The Central Sickness Fund collects data on admissions, visits etc. from all local sickness funds in Estonia. They therefore have a complete database with health care statistics.

The statistics have so far been in a relatively poor shape in particular in Tallinn. The main reason for this is that the funds have used different software systems when handling hospital bills in the system. From January 2000 everyone, including the Tallinn Sickness Fund, will use the same software. The quality of the statistics is therefore expected to improve significantly.

For the purpose of this study we were therefore provided with statistics for the whole of Estonia for the months of January 2000 (including Tallinn). The quality of that statistics was very good. We were able to use the January 2000 data for Estonia and do an extrapolation and get good whole-country data for analysis. The result of the analysis, which compares the average length of stay (ALOS) for main diagnoses by age structure and with the benchmark countries is shown in Appendix D.

4.4 Ministry of Social Affairs

Several meetings were held at the Ministry of Social Affairs to receive information about the Estonian health care system.

4.4.1 Hospital license bureau

The first licensing started in 1990 and was a doctor's licensing program. The reason for this was that very little was known about the educational background of the Russian doctors working in Estonia at the time. The hospital licensing bureau worked together with a Dutch consultant company during this phase.

With respect to hospitals there were no specific criteria to fulfil when the first licenses were given in 1990. Every hospital received a license for 3 years. A set of basic criteria was established for the second round of licenses 1994. The health care law does not yet stipulate an end of the new licenses issued in 1994. It is however expected that this rule will eventually change.

Licenses are also issued separately for each speciality. There are 46 different speciality licenses in Estonia. To receive a license, the hospital must fulfil different criteria such as having adequate equipment, do a minimum number of procedures and, in some specialities, to have adequately trained staff.

A hospital can add a new speciality as long as it fulfils the criteria and can get the license. There is no method for the Ministry of Social Affairs to decide that there is no need for this particular speciality in the particular town or county. It is possible to establish a new speciality as long as the criteria are fulfilled. Licences are in principle for 5 years but at present they are automatically prolonged without new application.

When the new licensing system started in 1994 this resulted in a reduction of number of hospitals from 120 to about 85. There were few objections from those hospitals that did not receive the new license because something else was often given to them; i.e. they received money for establishing a long-term care unit or a nursing home.

4.4.2 *Price list*

The current price list is basically a fee-for-service list. In a very limited number of cases a system similar to DRG (Diagnosis Related Groups) system is used.

Back in 1991 there was a Health Care Development Centre that handled prices. They prepared a questionnaire that was sent to all hospitals in Estonia. The aim was to calculate the bed day cost for different departments. At that time there were two persons working with the price list. Today nobody is specifically assigned to do that work.

Basically all procedures are reimbursed. In developing the system the German point system was used as a model, copied and applied for all tests (with prices in EEK). However, the fee-for-service price list for things such as radiology examinations and laboratory tests was never calculated.

During the years 1994-96 the price list was reviewed and improved. This review was not specifically based on calculation of cost per product. In some cases the doctors' specialist associations were asked about some costs (i.e. materials) and based on that changes were made in the price lists.

There is a continuing process through which hospitals and medical specialities want to make changes in the price list in order to achieve better compensation for certain procedures. In order to change a price the hospital, together with the specialist organisation, has to fill in an application and submit this to the pricing committee.

Usually the hospitals want to increase the revenue for a bed day. On other occasions, i.e. when they have purchased new equipment, the hospitals want to have the services covered by that particular equipment to be better compensated. The pricing committee never asks for salary costs.

Until now it has been quite easy to have prices changed. The sickness funds have since 1992 constantly increased their funds. For the fiscal year of 2000 the situation is however a bit more difficult.

So far there has not been any situation when better reimbursement for one type of service has been compensated by reduction for another in order to keep the budget constant. In the fiscal year 2000 however the sickness funds are for the first time signing contracts with a lower revenue framework than earlier years.

The price list used by hospitals for billing their services is mainly a fee-for-service list. In practice this means that the more tests and procedures that are carried out on each patient the more the hospital will receive in compensation.

The price list also separates procedures from bed days, and the current price list even compensates departments with a higher number of beds better than departments with a lower number of beds. Estonia therefore seems to be the only country in Europe that has increased

its number of hospital beds during 1999. The reason for this is probably that many departments are opening up more and more of their licensed number of beds. By doing this the will increase their revenues.

The overall pricing system has a certain level of maturity. There are fairly modern prospective payment systems, which use DRG's, or similar systems as basis for hospital reimbursement. For some treatments, in particular for chronic diseases, capitation fees are calculated annually.

The Estonian price list is generally on the right track. There is however very little cost analysis and this of course has to be improved

4.4.3 *Politics in the price list*

There is a pricing committee constantly working with the price list. That committee is an advisory board to the Ministry of Social Affairs. In the end, the Ministry decides on the price list. The price list for the year 2000 was decided in December 1999.

Since the Ministry of Social Affairs is the body deciding on the prices it is obvious that political objectives affect the level of the price list. The capitation fee for family doctors must be considered as rather high. Larger hospitals also seem to be better compensated than smaller hospitals. The compensation per day for a department of general medicine with 30 beds is as a rule higher than for a similar department with 20 beds.

4.4.4 *Fraud and abuse*

There is a mechanism for control of hospital bills. The bills are reviewed by the doctors working at the Sickness Fund. It seems that very few instances of obvious abuse have occurred. On the other hand the inspection activities do not seem to have been very detailed so far. Basically the reviewers have just looked at the bills and have not made any hospital inspections. There is no official statistics available on fraud and abuse.

4.4.5 *The future*

There are discussions going on aiming at recalculating the price list, but there is no plan for this work. A decision is expected later this year. The question is who is going to construct the new price list.

Some hospitals have indicated that they want a prospective payment system based on DRG's. They believe that true changes in efficiency will not occur until a prospective payment system is introduced.

4.5 **The Medical Statistics Bureau**

The Medical Statistics Bureau (MSB) is a separate agency and a part of the Ministry of Social Affairs. The MSB is working with health care statistics primarily on the national level.

4.5.1 *Statistics collected by MSB*

MSB is responsible for several registers; i.e. the tumour, infectious disease and tuberculosis registries. Questionnaires are sent every year to all hospitals in Estonia. We examined these questionnaires and the statistics. The number of hospital discharges by main diagnosis group (MDC) was used for benchmark analysis, with the benchmark countries. The results are shown in Appendix C.

There is also a monthly statistics delivered from all hospitals in Estonia to the MSB. The monthly statistics deals with questions such as number of beds by profile, rate of occupancy etc.

4.5.2 *Population data*

MSB has supported us with population figures and prognoses until the year 2035. The Statistical office of Estonia prepares these data.

4.5.3 *Financial information from hospitals*

MSB has supported us with profit and loss accounts for some Estonian hospitals. The profit and loss accounts are collected annually by the county physicians and delivered to the MSB. We have had meetings with three county doctors and discussed the process of collecting financial information.

The county doctors collect data and deliver these to the MSB. By tradition they do this without any quality controls since they do not have budget responsibilities for the hospitals. From the fiscal year 2000 all hospitals are obliged to report their profit and loss accounts to the Ministry of Social affairs.

The hospitals themselves are the only body responsible for their profit and loss accounts. In practice this means that there is no cost control of the Estonian hospital system. Theoretically it is possible that the reimbursement from the sickness funds together with other sales generates substantial profits for the hospital sector.

There is, as far as we have been informed, no national targets for total health care expenditure increase in Estonia.

4.5.4 *Specification of statistics collected*

Appendix B is a list of all statistics collected by the consultant.

4.6 Hospital visits

We have visited about sixty of the Estonian hospitals in different parts of the country. The visits were planned in co-operation with the Ministry of Social Affairs. We prepared a questionnaire, which was translated, and sent to the hospitals before our arrival. This procedure worked out well. The questionnaire was in most instances thoroughly answered prior to our arrival.

We worked with two different groups, each with one representative from SC Scandinavian Care Consultants AB and one from SWECO AB. The groups were met at the hospitals by the "peaarst", the manager and others in managing positions of the hospitals. During the meetings the questionnaire was discussed and complementary questions were asked.

At the end of every visit there was also a tour to the most important parts of the hospital. On the average a visit lasted for 2,5-3 hours. The groups received very well prepared information and the discussions were open, informative and fruitful.

The secondary hospitals are in general too big. The physical standard of the hospitals are very different as is described in chapter 7. The occupational rate is low in most of the hospitals. But even if the occupational rate is low and there is much empty space in the hospitals the ward rooms are often overcrowded and the environmental conditions are not satisfactory for the patients or for the staff.

The average length of stay (ALOS) has decreased during the last years but is still in many specialities significantly higher than in hospitals in many other countries. Day surgery is practised in a few but not in most hospitals. We have the impression that price system is an obstacle. There is no incentive to change to day surgery when in-patient care gives much higher reimbursement.

The number of deliveries is in some hospitals 300 per year or even lower. This is much too low in order to guarantee high quality and staff competence.

The local hospitals we have visited are all situated in old buildings. The standard is mostly low or even very low. There are seldom lifts. The ward rooms are often small with 3 to 4 or even more patients in each room. In some hospitals there are stoves for heating in every room. The possibilities to give active rehabilitation are limited. However, it is always very clean and everything seems to be in good order and we are convinced that the patients are well treated relative to the given conditions.

Appendix A is a list of all hospitals visited by the Consultant

4.7 Building standard

The following is a summary of our impressions from auditing about 60 existing hospitals in Estonia with respect to site conditions, building construction, technical services and functions.

4.7.1 *General impressions*

The hospitals are very diversified in terms of age, size, condition, suitability, etc. All of these factors vary greatly. Most hospitals are more than 20 years old; many are much older. Some hospital buildings were built for other purposes but have been converted to hospitals. Many old buildings are solidly built, while hospitals built during the 60's, 70's and 80's are of very poor building quality. Nearly all buildings have been renovated to some extent. Very few hospitals are suited to be hospitals with respect to modern standard demands.

It was also obvious to us that many hospitals have overcapacity, not only in beds but also in the number of operating theatres, delivery rooms, radiology laboratories etc. In particular, the larger general hospitals that we visited are in most cases much too large.

4.7.2 *Site conditions*

Most countryside hospitals have poor or even very poor accessibility through public transportation. Some hospitals, in particular in the Tallinn area, are built on small pieces of land with limited expansion possibilities and totally inadequate parking facilities.

4.7.3 *Room and hygiene standard*

Since the ward departments are the major volume of a hospital, we paid special attention to their area requirements and room standards. Low standard will have a great impact on future needs of investments. The old Soviet space standard, 28 m² for a 4-patient room, is only 60% of modern Western standards.

Area standard of the wards is often low. The number of 1-2 patient rooms is rather small and many bedrooms are narrow. Doors are sometimes too narrow to allow bed transports. This causes difficulties for both patients and staff. Narrow working and care environment can cause various work related injuries to the staff.

Hygiene standard is poor both in terms of number of hygiene rooms and in space and equipment. Few toilets are connected to the bedrooms. Mostly they are collected in clusters with very narrow cabinets. The situation is similar concerning showers. As a result patients need more assistance from staff than would otherwise be necessary.

Public reception and waiting areas are often small and uncomfortable. A typical sight is people waiting in corridors and staircases. Day rooms for the patients are neglected. The consequence is that patients remain in bed resulting in negative effects on their medical condition.

4.7.4 *Handicap adaptation*

Handicap toilets and showers are rare and when they exist they rarely correspond to Western European standard. Adaptation to disabled patients must be considered in the future. Differences in floor level between corridor and rooms are rather common and create

difficulties in transports. Main entrances to hospitals are rarely adapted to disabled persons.

4.7.5 *Communications*

Elevators are old, too few and too small. There are few elevators in two- and three-storey buildings; patients sometimes have to be carried to the upper floors.

4.7.6 *Construction*

The most common structure is based on a column/beam system, bearing prefabricated floor-elements, in a framework of 6 x 6 m. This grid of bearing elements is the old Soviet system. This system is however too narrow for modern health care buildings. A suitable grid should be at least 7,2 x 7,2 m.

Furthermore, the distance between floor and ceiling is often low in buildings from the 60's, 70's and 80's. A height of 3,0 meters is common according to former Soviet standards. The modern standard is at least 3,6 m or preferably even 4,0 meters. The 3,0 m standard does not allow for installation of mechanical ventilation. Many buildings have narrow single corridors. Finally, worn-out floor coverings and other surfaces make cleaning difficult.

4.7.7 *Technical services*

Many buildings will face problems in the future with respect to old installations. Piping, sewage, electricity, elevators and other technical installations are often in poor shape and will require considerable investments and attention in the future. Modern mechanical ventilation is lacking in almost every hospital. This is a serious problem, in particular in wards with limited room heights and with many patients in the same room.

Some hospitals have installed new reserve power generators, while others lack reserve power or still depend on old Russian equipment. Heating is based on variety of energy sources, in most cases district heating. There are also some individual heating plants, in some cases with new equipment. We have also seen small hospitals in the countryside heated by fireplaces in every room. Radiators are rarely replaced with modern equipment.

Almost every hospital has its own catering and laundry facilities. The status of these facilities is highly varied; from perfect modern standard to very old totally inadequate standard.

Finally, and most importantly, very few hospitals seem to be subdivided into appropriate fire protection cells.

4.7.8 *Renovations undertaken*

Most hospitals have done some renovation or upgrading in different sections. Resources have mainly been spent on up-grading of hygiene and sanitary standard as well as on some essential treatment functions. In a few exceptional cases, i.e. Valga Hospital, investments have been in totally new constructions. A problem is that these investments seem to have been carried out without a long-term investment plan and without co-ordination with other hospitals.

Most laboratories are rebuilt and equipped to modern standard and are often certified. Radiology departments are undergoing a rapid modernisation. Many of them are adequate, both in terms of building standard and equipment. Several new central sterilisation units have been installed as part of a Swiss aid programme. Some ward departments have been remodelled. Surface layers, especially floor-coverings, have been changed. New windows and mechanical ventilation have been installed, in a small scale, in for instance operating theatres and intensive care wards.

Despite these ambitious renovations during the last decade, there is a need for extensive basic investments in the near future. Under the present circumstances the lack of co-ordination in investments carried out between different hospitals is natural. We have, however, observed only a few costly “wrong” investments, so far.

4.7.9 Area standard

Compared to Western Europe the area standard in Estonian hospitals is very low. Bedrooms are often very narrow, hygiene rooms are few and small and the waiting rooms in the out-patient departments are crowded with patients. However operating theatres and radiology laboratories often have good area standard.

Gross area per bed for the visited hospitals is shown in appendix I. There are considerable differences between hospitals. Only some new hospitals (i.e. Valga) or projects under planning (i.e. Pärnu) or construction (i.e. Haapsalu Neurological Rehabilitation Centre) are in level with modern Western European standard.

Gross area per bed varies from 18 sqm in Tartu Long-term Clinic to 113 sqm in Pärnu (under planning). The figures for Keila (124 sqm), Rakvere (95 sqm) and Jõgeva (127 sqm) are probably not correct. Compared with similar hospitals these hospitals probably have 70-80 sqm per bed.

The Tartu University Hospital has on the whole a very low area standard (50-70 sqm) in particular with respect to the hospital's status as a tertiary care centre.

The large hospitals in Tallinn (Mustamäe and Central Hospital) also have a low area standard (68 and 72 sqm respectively) as well as the large hospital in Narva (54 sqm).

Compared to Western Europe these figures are very low. In Sweden modern hospitals have 150 to 190 sqm gross area per bed. Denmark has about 150 sqm and Britain about 100 sqm, but British hospitals have very little out-patient care at the hospitals.

We strongly recommend that all future hospital building investments shall be preceded by a hospital master plan. The future building and equipment standard shall correspond to modern Western European standards. Some kind of central control over building investment is most likely necessary.

4.8 SWOT analysis

The present situation of the secondary and tertiary hospital system in Estonia can be summarised in a simple SWOT-analysis, which is a risk-analysis often used.

Our analysis (S= strength, W= weakness, O= opportunities, T= threats) is based on the facts we have received from central authorities. Our impressions from our visits of 60 hospitals and from discussions and interviews with people in different positions in Ministry, at hospitals and private companies working in the health care sector are;

S(trength)

The current system

- covers the whole country
- satisfies the principal of nearness
- promotes local initiatives
- is locally linked

W(eakness)

There is in the system

- inequality
- differences in medical quality
- to many "social patients"
- unclear relation to the social care system
- unclear definition of long-time care and geriatrics (pikaravi)
- lack of co-ordination
- duplication of resources
- economic inefficiency
- poor working environment
- unsuitable premises
- complex structure of ownership
- many monoprofile hospitals

O(pportunities)

- adaptation to local situation
- encourage entrepreneurship
- possibility to re-plan health care based on the needs of the population
- flexibility of the present system

T(hreats)

- lack of quality
- difficulties in maintaining professional skill
- lack of patients
- difficulties in employing skilled staff
- waste of money

5. ESTONIAN HEALTH CARE INDICATORS AND BENCHMARK ANALYSIS

5.1 Choice of benchmark countries

A benchmark is a comparison with another organisation or system. The car industry has used benchmark analysis for decades. The most used benchmark in the car industry is the number of minutes it takes to build a car.

Benchmark analysis has also become an instrument for health care analysis. The most common way of using this system is to compare situation with the best practice available.

We have found that Sweden and Norway for many reasons are two suitable countries for the benchmark study. One reason is the population structure in Estonia. The percentage of urban population is similar to the Norwegian situation, but the Tallinn area is more comparable to Stockholm in Sweden.

5.2 Sweden

In Sweden the county councils are responsible for the major part of public health services. The municipalities are responsible for care of the elderly and the mentally ill. During the first half of the 1990's the financial situation of the county councils was under pressure. This was caused by weak state finances leading to a reduction in state contribution to the counties and by weak local tax revenues. This situation made it necessary to reduce the cost of health care. Calculated in fixed prices and pay levels, the reduction in cost was an average of 1.3% per year during the period 1992-1996. The central government's aim now appears to be to try to avoid further cuts by increasing state contributions.

The effect on the health care providers has been a significant reduction in the number of hospitals and hospital beds. There has also been a major increase in the use of day surgery and an increase in the number of primary care visits. The supply of health care has been limited.

5.3 Norway

The Norwegian health care system is built on three tiers of government. The state has the overall responsibility for providing and financing health care. The counties are responsible for hospitals and specialist services. The municipalities are responsible for general practitioners.

The Norwegian state budget has constantly produced a surplus since the mid 1970's. The reason to this is that Norway is an oil producing country with great resources. The Norwegian economy has in particular during the 1990's been very inflationary with a need for high taxes to cover high social expenses. During the government election in 1996 the main debate was about health care spending. Health care costs in Norway have expanded every year but the output of the health care system has been constant or even decreasing.

After the 1996 election a health care reform program which included a prospective payment system was introduced. The Norwegian hospitals used to be financed by frame budgets and the most common argument to receive extra money for a new fiscal year was to refer to the queues.

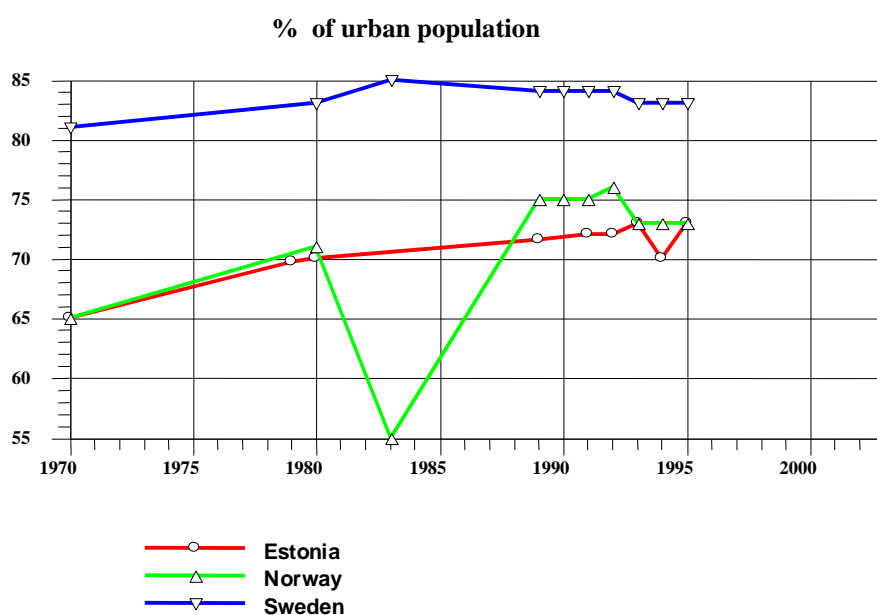
Since the prospective payment system for acute care hospitals was introduced in 1997, hospital queues have been reduced. Long term care that by tradition occupied acute hospital beds is undergoing a restructuring as well as geriatric care. There has also been a dramatic increase in day surgery and a decrease in hospital beds due to an incentive program that was started in January 1999. Some hospitals have increased their ratio of day surgery from 30% to 70% of all planned surgery during just one year. The Norwegian health care system differs from the Swedish in one important way. The number of general practitioners is very high compared to the number of specialist doctors. The situation is the opposite in Sweden.

Norway has many hospitals (84 general hospitals in 1998). The most important reason for this is that the country is sparsely populated, in particular in the northern parts of the country.

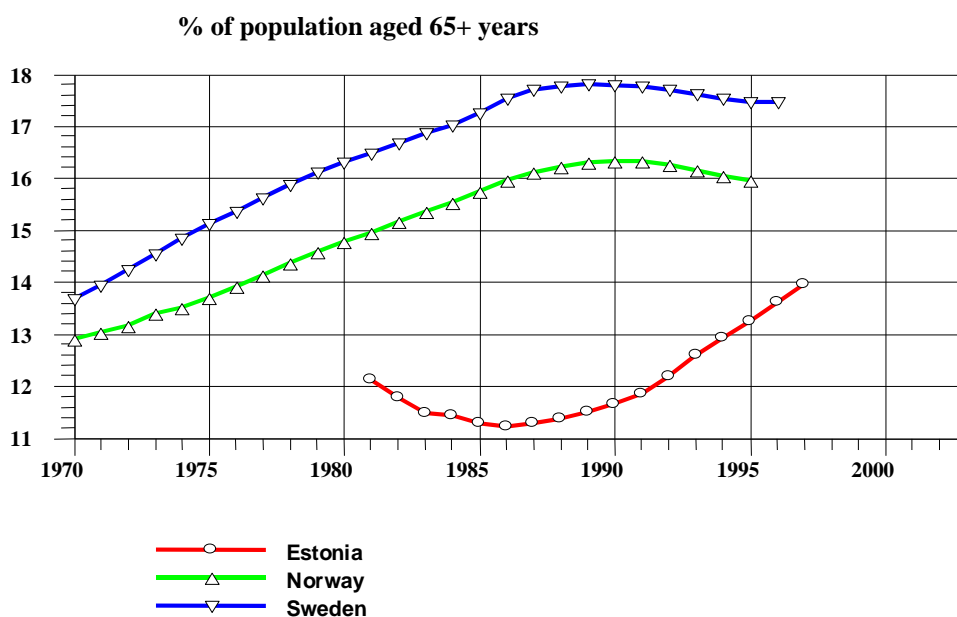
SINTEF UNIMED, who handles the collection of health care statistics from hospitals and polyclinics in Norway, supplied us with a computer file for benchmark analysis. We also received demographic statistics from the Official Statistics of Norway.

5.4 Some benchmark examples

The WHO statistical database (Health for all, European region) is public and accessible through the internet. Using this database we have carried out some benchmark comparisons between on one hand Estonia and on the other hand Sweden and Norway. For the urban population we used primarily Norway. For the Tallinn area we used Sweden which has a higher urban population density. All graphs are from the WHO statistics database.

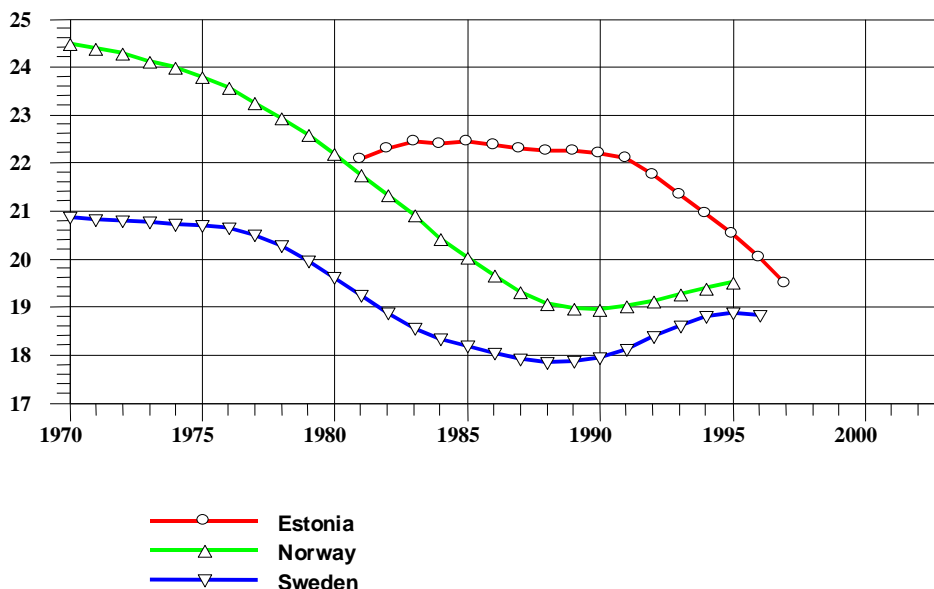


Another reason for choosing Sweden and Norway as benchmark countries is the demographic profile of the countries. Norway and Sweden have an ageing population and Estonia is going in the same direction. The dip in the Norwegian curve for 1983 is a technical error. For the fiscal year 1981 – 1989 Norway did not supply WHO with any information regarding the urban population.



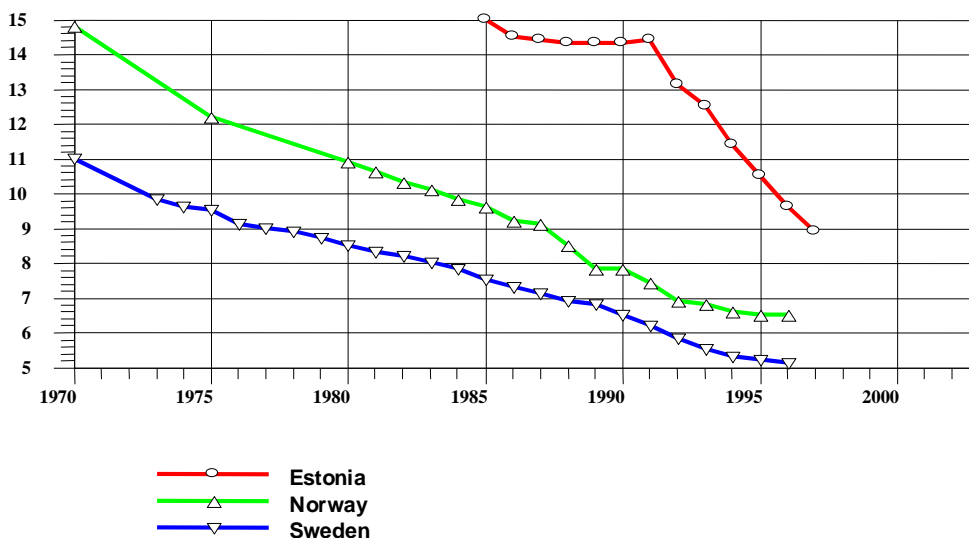
For the population younger than 14 years of age, the situation is similar. In 1995 the three countries had about the same percentage of the population younger than 14 years old.

% of population aged 0-14 years

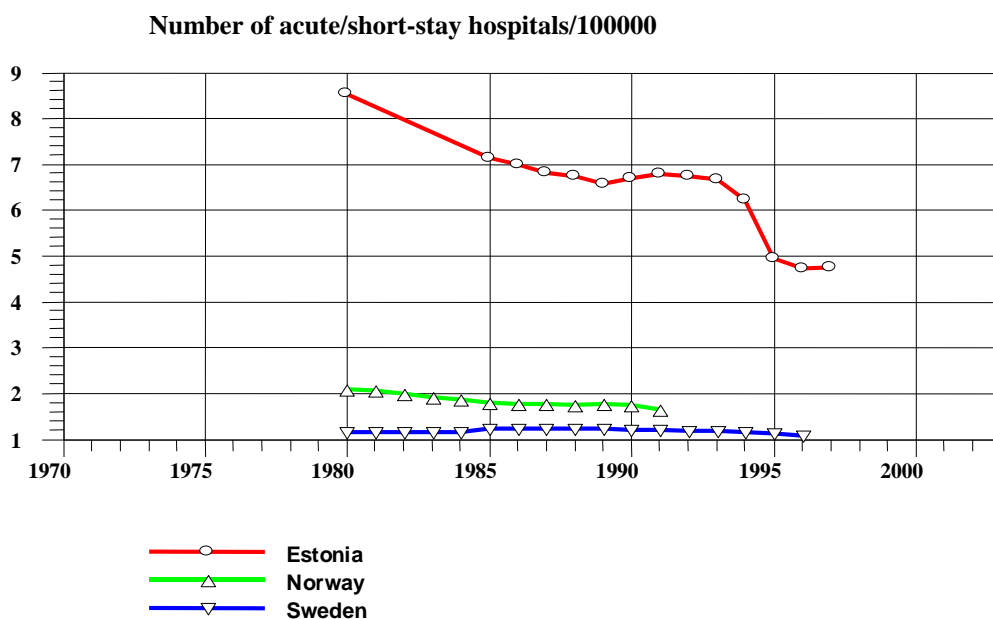


The average length of stay in acute care hospitals differs significantly between the three countries. The figures presented below are up to 1995. After 1995, first Sweden and in later years Norway have restructured in particular the surgical admissions and more and more planned surgery is carried out as day surgery.

Average length of stay, acute care hospitals



There is also a major difference in the number of acute/short stay admissions between the countries where Estonia has a very different position compared to Norway and Sweden.



5.5 Factors affecting the health status

Medicine is today in a state of very rapid change. The speed of development of medical technology increases year by year. There are no signs that the development will slow down in the coming years. On the contrary everything indicates that the speed will increase even further.

These changes in technology will, even in a fairly short perspective, have a profound impact on methods of health care delivery and on health care structure in the future.

Before setting standards and create benchmarks there are however some basic factors that must be taken under consideration. These factors can be seen as the underlying factors that must be considered before creating a HMP.

In Sweden and Norway, as in every West European health care delivery system, differences in health care consumption and death ratios hides important differences between social classes. Occupational status, income level and education define social classes.

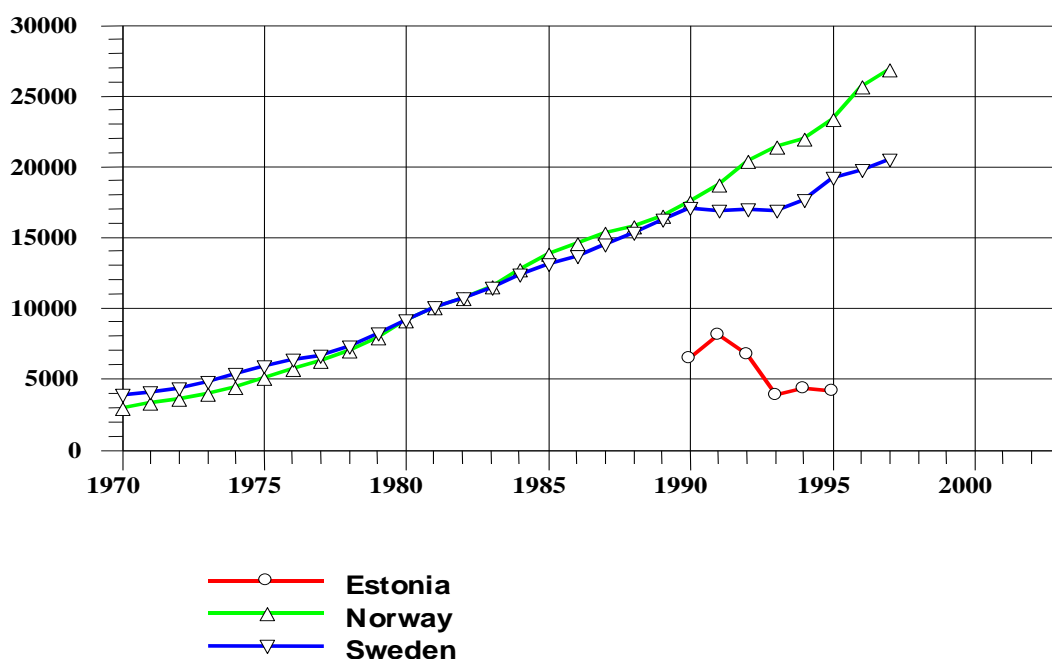
Estonia has in recent years worked with the development of various welfare programs. Two important examples are;

1. The Child welfare development programme. *Basis and guidelines (1998-2000)*. The objective of the programme is to analyse the current situation in child protection and child welfare, recognise specific problems in child welfare and determine future trends.
2. Special care development programme. *Basis and guidelines (1998-2000)*. One of the priorities of this programme was to improve housing and sanitary conditions in the welfare

establishments. Organising staff training, initial training of customers on independent coping in seven special welfare establishments, implementation of open care in Põlvamaa, Järvamaa, Läänemaa and Pärnumaa as well as transition of establishment-based funding to personalised funding.

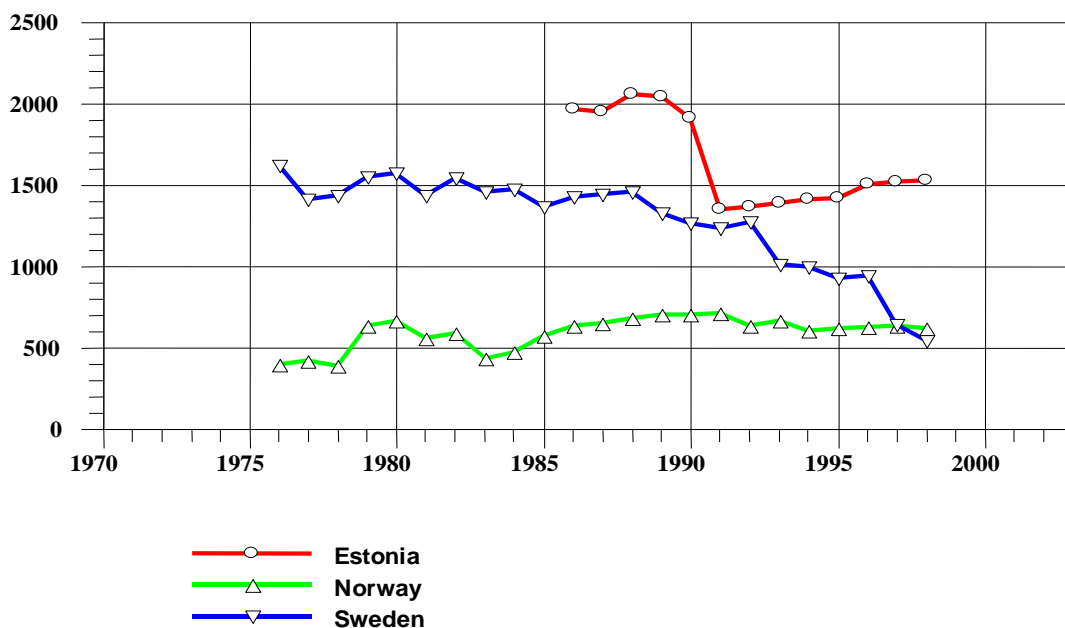
Social class is strongly related to a person's longevity and burden of diseases. When comparing Estonia with Sweden and Norway, the level of education is of minor importance because the GNP per capita so much different between the countries.

Real gross domestic product, PPP\$ per capita



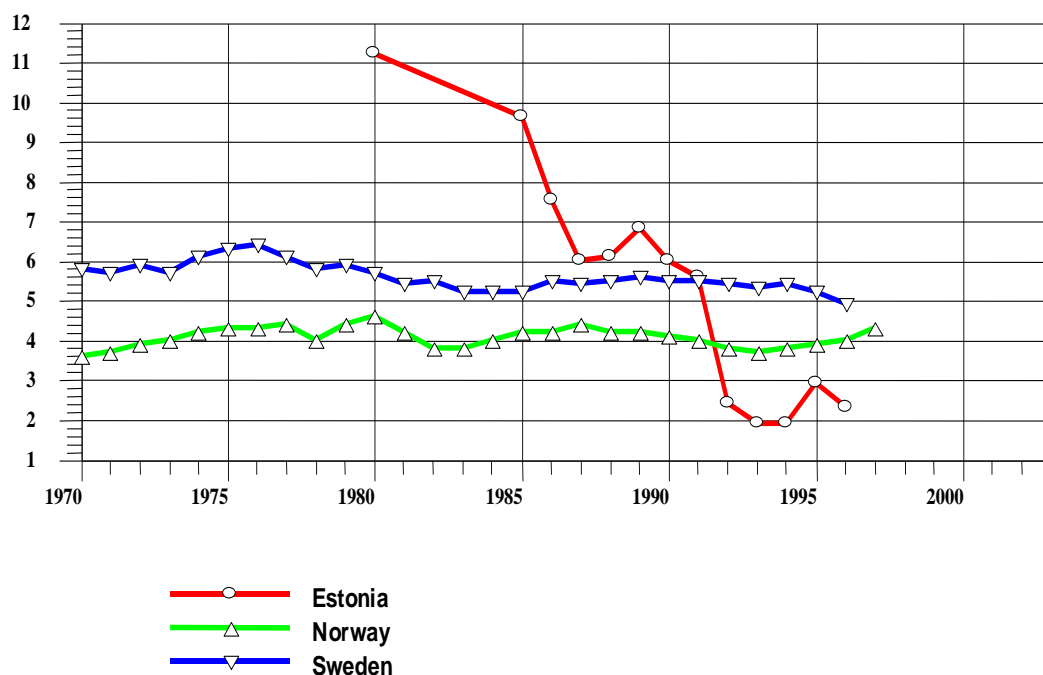
It is clear that Sweden and Norway have a greater gross real gross domestic (GNP) product per capita than Estonia.

Number of cigarettes consumed per person/yea



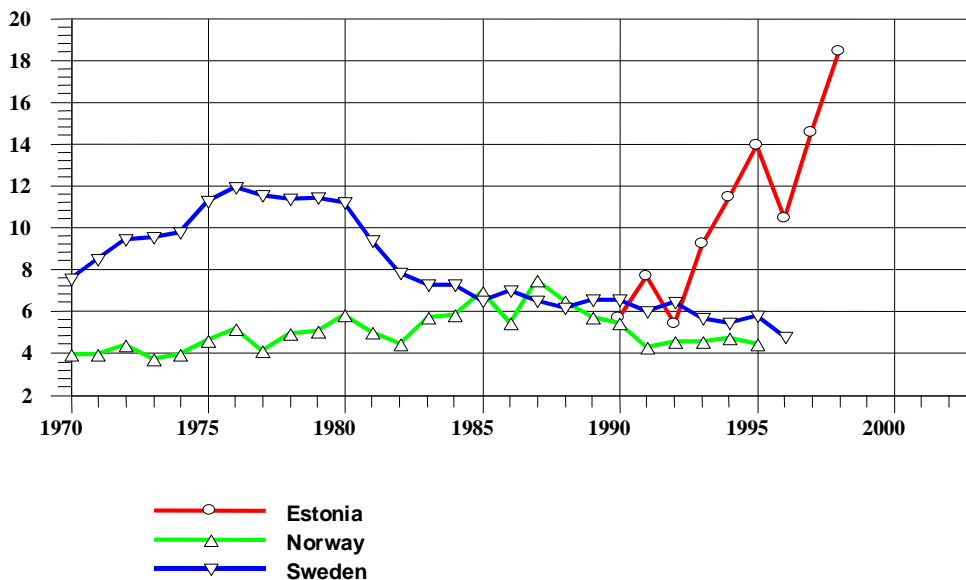
The WHO Statistics indicates that the smoking is more frequent in Estonia than in Sweden and Norway.

Annual pure alcohol consumed / person,litres



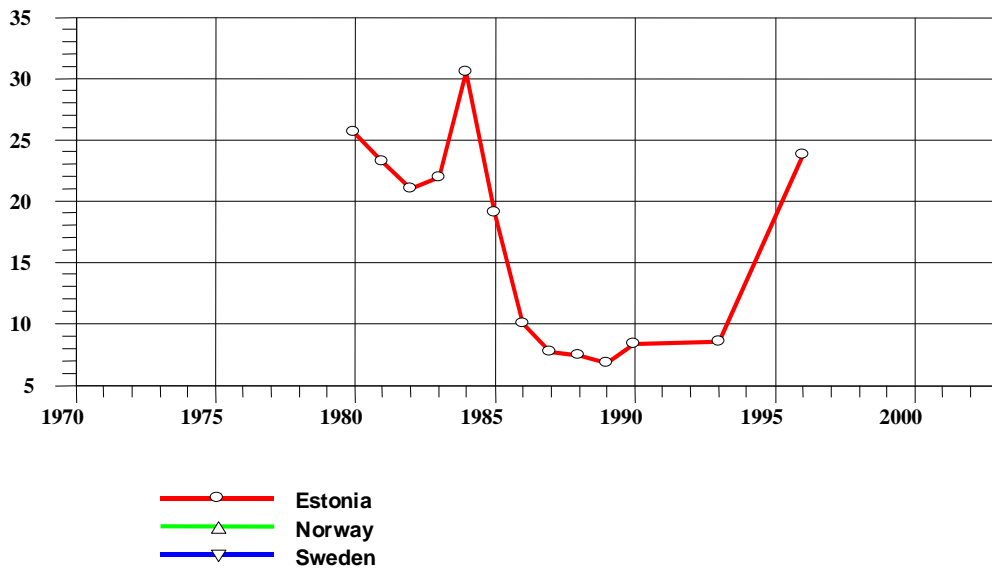
The figure above indicates that Estonia has had a dramatic decrease in the consumption of alcohol since 1980 and that the consumption per person should be lower in Estonia than in Sweden and Norway. These figures are however based on registered sales. In our opinion these figures are most likely totally wrong.

SDR chron.liver dis.&cirrhos.,all age/100000



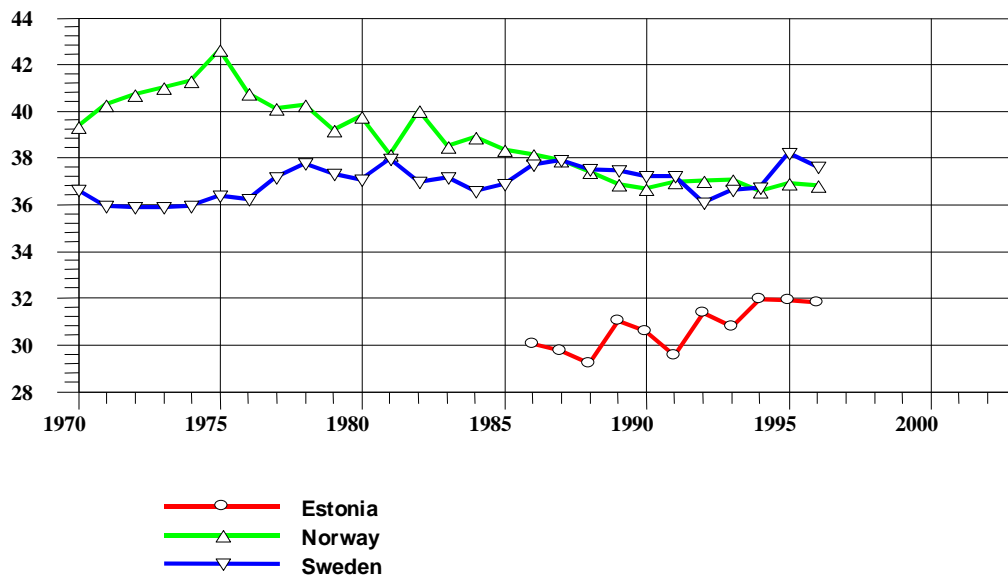
The figure above indicates that the incidence of liver cirrhosis has increased since 1990 (contradicting the alcohol sales data above). The other is the incidence of alcoholic psychosis, which has increased in Estonia since 1990.

Incidence of alcoholic psychosis per 100000



Based on the incidence of liver cirrhosis and alcohol cirrhosis it is our conclusion that the consumption of alcohol in Estonia has in fact increased (despite the sales figures given) and is greater than in Sweden and Norway.

% of total energy available from fat

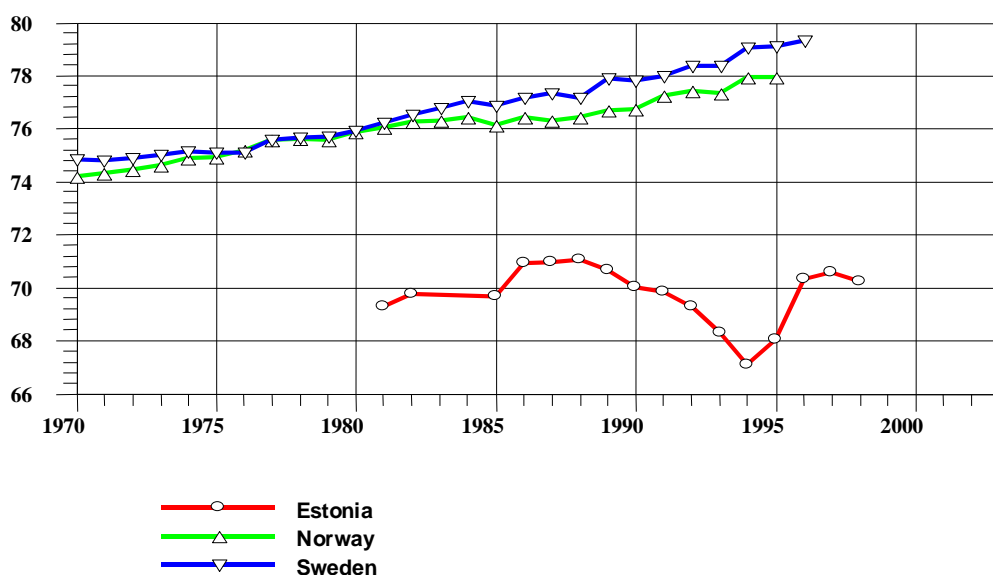


The figure above indicates that the percentage of total energy available from fat should be lower in Estonia than in Sweden and Norway. This might be true, although the difference between the three compared countries is probably too great.

Our conclusion about the underlying factors and their influence on the healthcare consumption is that Estonia has to improve on many fields concerning health care prevention. Individual and collective habits concerning smoking and alcohol consumption must change. It is not our job to make assumptions about Estonia's economic future, but our belief is that the Estonian economy will grow. As a result of that the overall social conditions will improve as well as the common welfare programs.

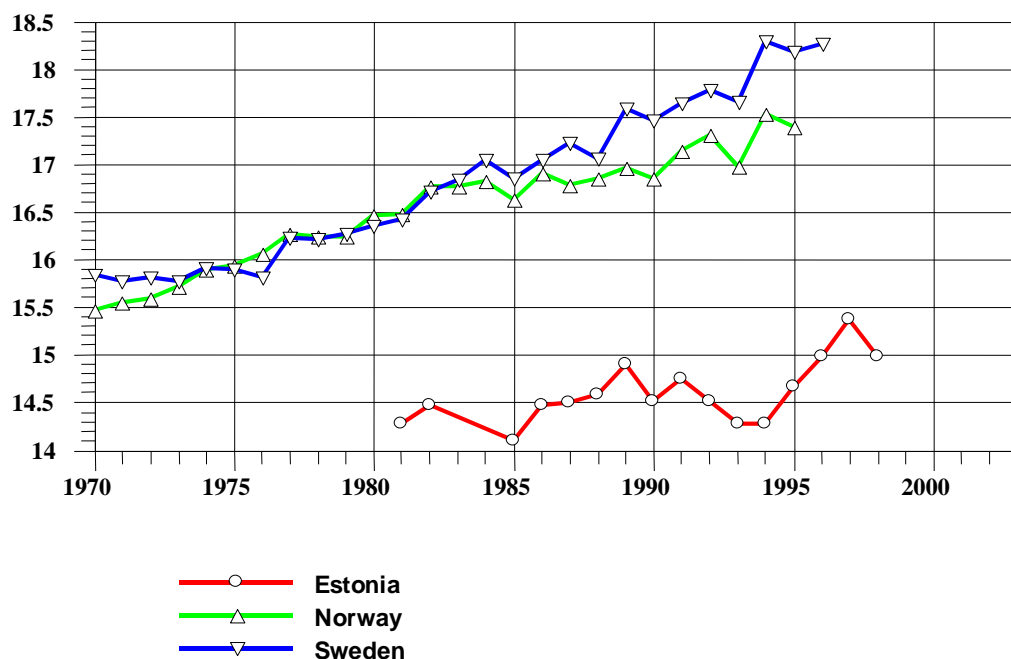
5.6 Life expectancy

Life expectancy at birth, in years



Life expectancy at birth indicates that Estonia is improving, but there is still quite a difference between Estonia and the benchmark countries.

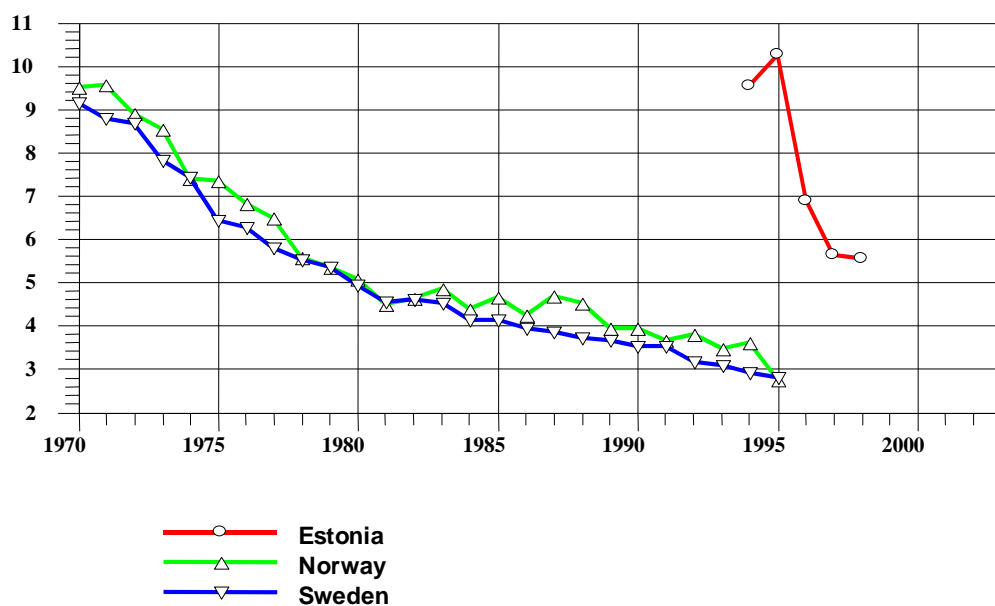
Life expectancy at age 65, in years



When comparing life expectancy at the age of 65, the difference is about the same in total years. Estonia has improved during the last years

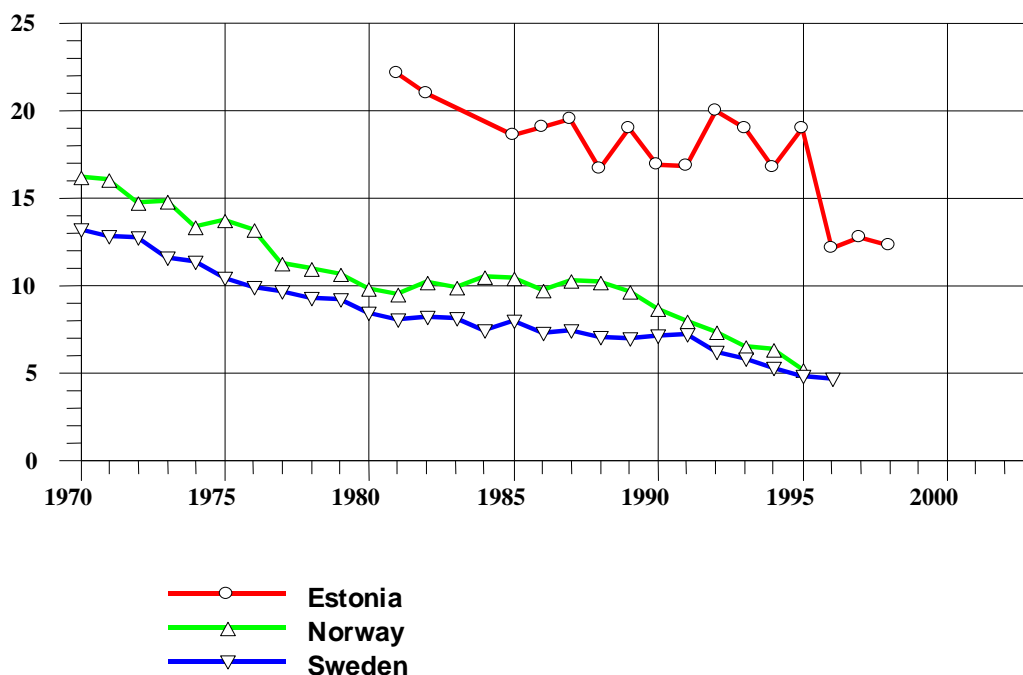
5.7 Neonatal and infant mortality

Neonatal mortality rate per 1000 live births



The neonatal mortality rate in Estonia has a clearly decreasing trend, which is most encouraging. The child welfare programme has probably had a significant impact on the decreasing trend.

Probability of dying before age 5 years/1000



The probability of dying before age 5 also shows a decreasing trend, but compared to ratios in Sweden and Norway, Estonia still has to improve. This particular indicator is often used as an indicator of the general health care status in the population.

An early registration of pregnant women combined with a process of monitoring of their health status before the delivery decreases the neonatal mortality rate. A continuing monitoring of the health status of the child will reduce the subsequent risk of dying.

Estonia has significantly improved the neonatal mortality rate as well as the probability of dying before 5 years. There are however further steps to be taken. One very important step is to concentrate deliveries. In Sweden 1500 deliveries per year is often used as a minimum level for a maternity unit. Protracted and slow deliveries at a unit with insufficient resources and experience are often associated with increased risk for both mother and child. Quick deliveries (even if they occur in an ambulance or a taxi) are as a rule associated with a very low risk to mother and child.

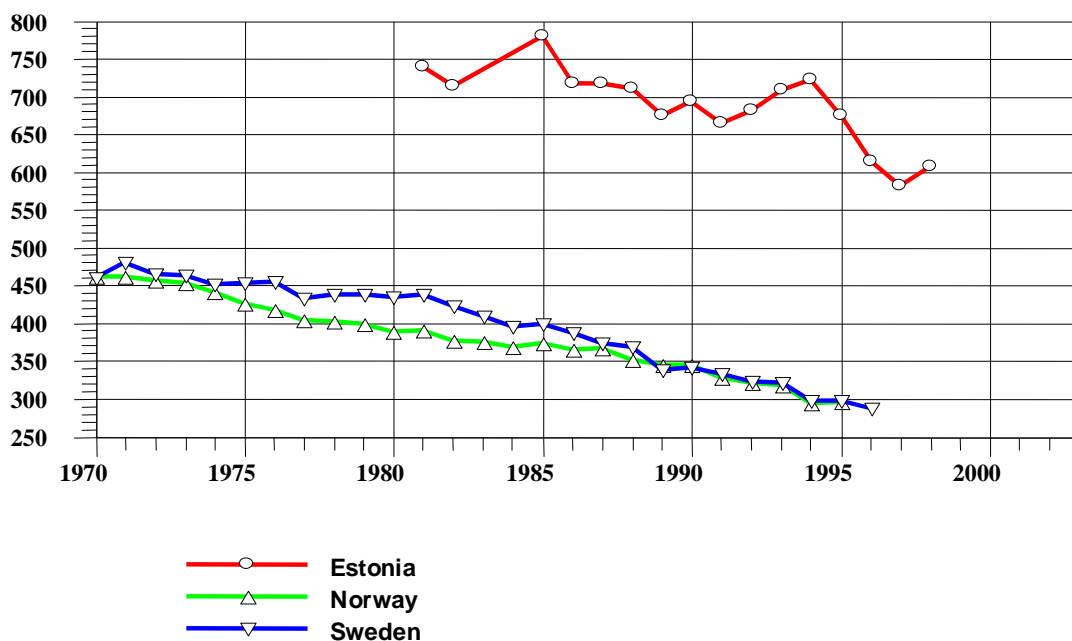
5.8 Main causes of death

The most frequent cause of death in Estonia during 1997-1998 was diseases of the circulatory system (63%) followed by cancers (16%). The following is a short summary of some of the

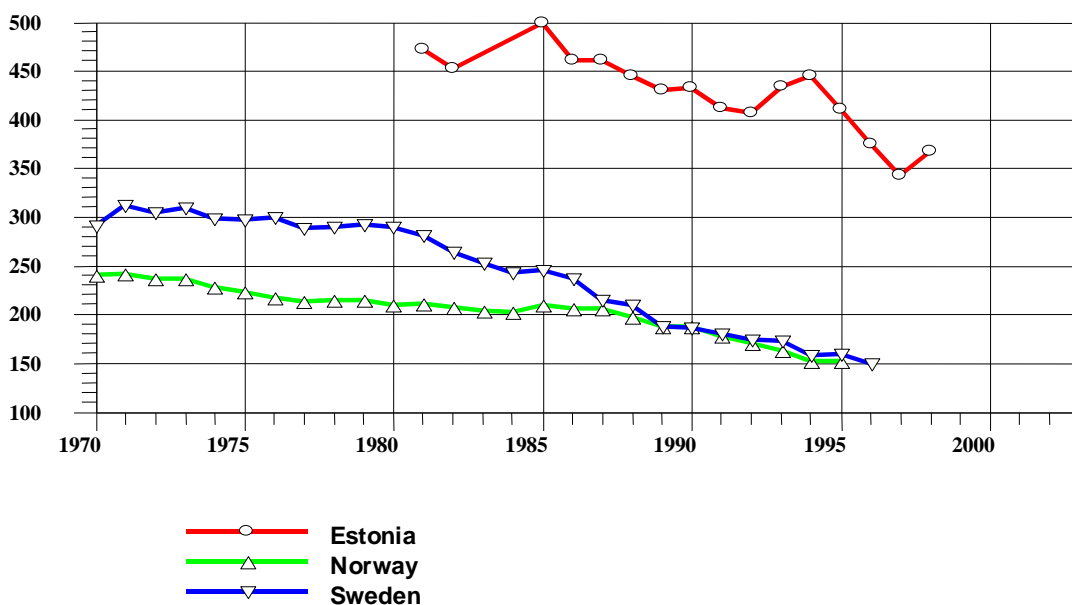
important differences between Estonia on one hand and Sweden and Norway on the other hand.

All three countries show a declining rate of cardiovascular diseases. Estonia has however a much higher standard deviation rate of cardiovascular diseases than Sweden and Norway.

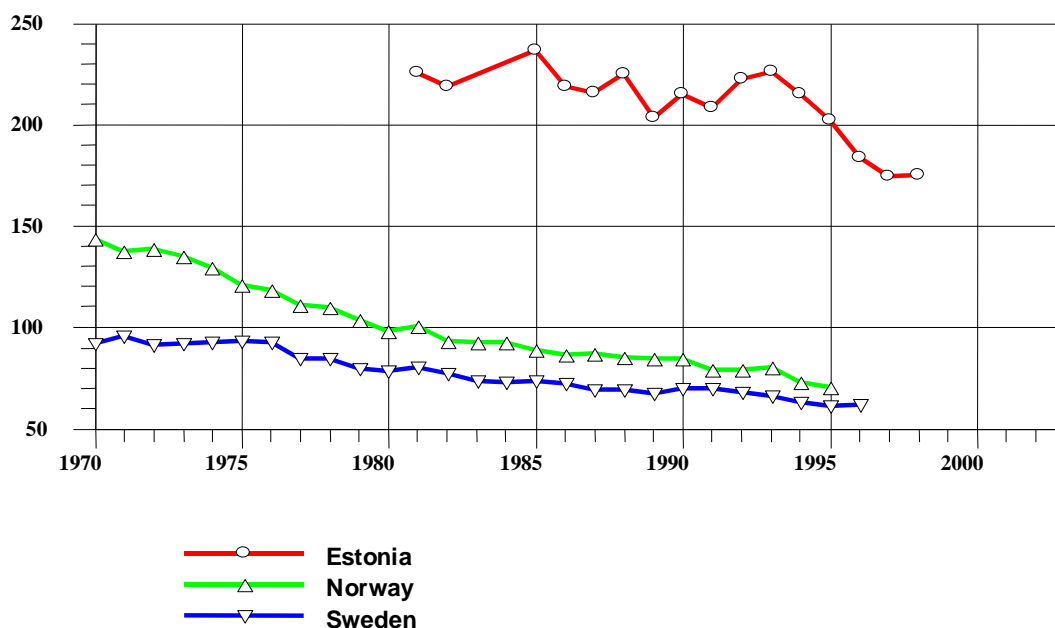
SDR, circ. system diseases, all ages/100000



SDR, ischaemic heart disease, all ages/10000



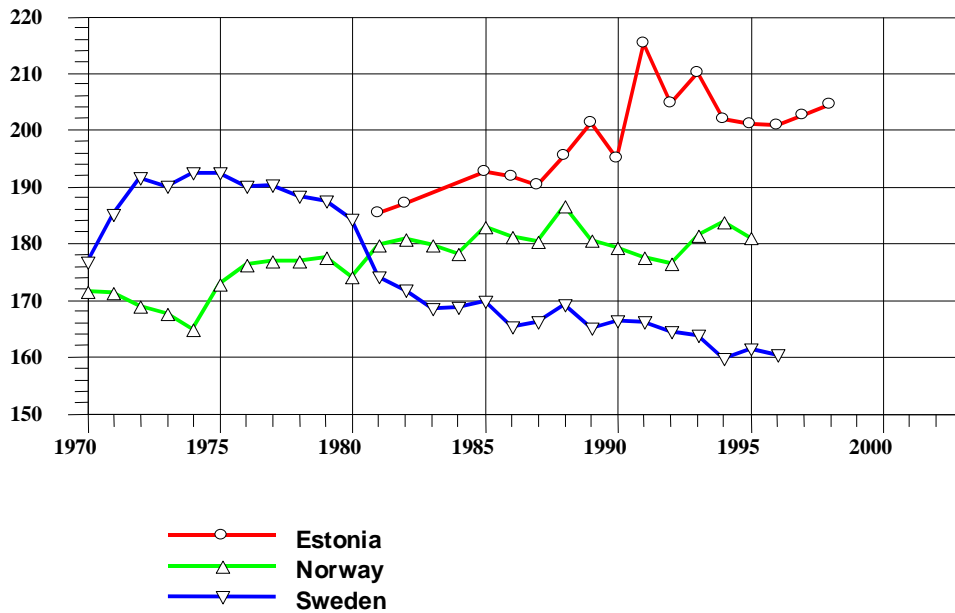
SDR,cerebrovascular diseases, all ages/10000



In the opinion of WHO almost all cardiovascular deaths are influenced by individual or collective habits. A wide variety of health promotion and prevention can influence these deaths. WHO has also made the conclusion that there is empirical evidence that there is a direct relationship between cardiovascular death and socio-economic status. A lower socio-economic status gives a higher rate of cardiovascular death.

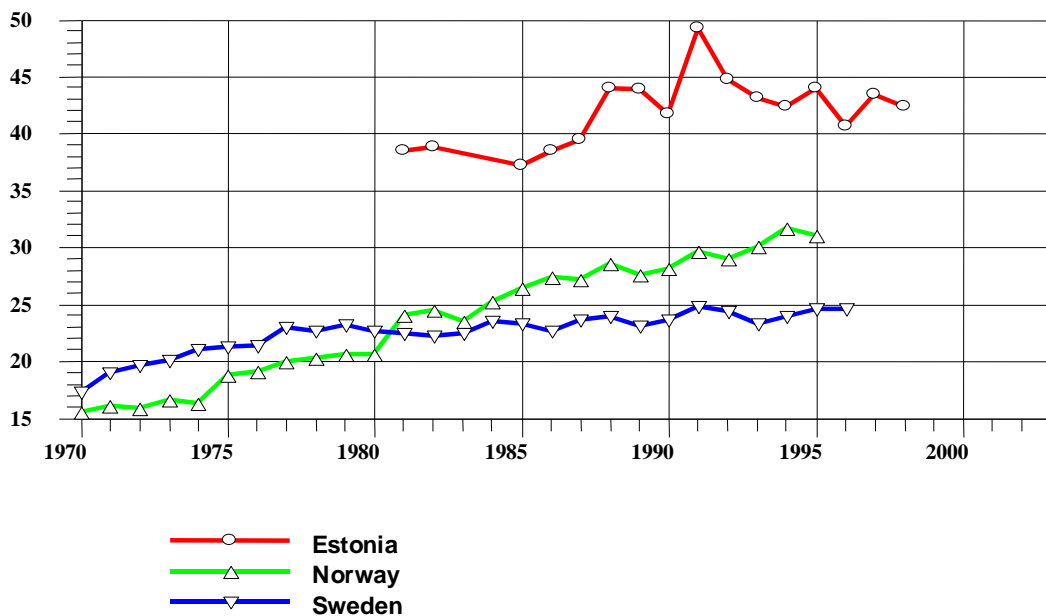
An additional factor for cardiovascular death is also the technological level of diagnosis and the treatment methods used. Better facilities reduce the risks.

SDR, malignant neoplasms, all ages/100000



The overall cancer rate shows that Estonia is higher than Sweden and Norway. The higher proportion of cancers in Norway is explained by a higher frequency of lung cancer.

SDR, trachea/bronch/lung cancer, all age/10000



5.9 Benchmark analysis

The benchmark in this report is built on actual demographic situation in Estonia compared to the situation in Sweden and Norway. The Benchmark data from Estonia was received from the Medical Statistics Bureau at the Ministry of Social Affairs. The Swedish data was received from the Centre of Epidemiology at the National Board of Health and Welfare. The Norwegian data was received from the Norwegian Patient Registry, a department at the Norwegian Ministry of Social Affairs. The Norwegian and Swedish physician associations also delivered information for the benchmark analysis. There are some important notes to take into consideration.

All the countries in the benchmark study use ICD10 for medical coding. Our experience from detailed surveys of medical coding is that about 20% of all medical coding at hospitals are wrong in the sense that the main diagnosis is not the same as the diagnosis registered in the case record. It is a bit unclear to what extent this will affect the general conclusions in the individual case.

In Appendix C the number of discharges by main diagnostic category is compared between Estonia, Norway and Sweden. The number of discharges is divided with the number of inhabitants in the actual age range. The figures give an indication of which patient categories that are in fact undergoing treatment.

One major difference between Estonia and Sweden and Norway is that the elderly population in Estonia, who are those who usually consume most healthcare, have a much lower consumption of healthcare than in the comparison countries. This indicates that the level of ambition in treating the elderly is low in Estonia. This must be regarded as a significant ethical issue. It is our opinion that Estonia has to improve significantly in this field if Estonia wants to reach a Western standard health delivery system.

Appendix D compares the average length of stay (ALOS) for the main diagnostic categories. The ALOS is presented in age ranges. Estonia has in general a much higher ALOS than Sweden and Norway. This is probably to some extent due to differences in technology available as well as treatment methods. The strongest factor in explaining the difference is however most likely differences in tradition. Cost (necessitating short ALOS) has never been a factor of great importance in the Estonian system, while in Sweden this factor is of major importance.

5.10 Bed-per-population rate for regional/university hospitals

The table below illustrates the present situation in Estonia compared to Sweden and Norway. As can be seen from the table the Estonian number is low. If, however, Mustamäe Hospital is considered as a regional hospital the Estonian number will double and in fact be more than adequate.

	Sweden	Norway	Estonia
Number of University/Regional Hospitals	8	5	1
Number per 1,000,000 inhabitants	1,1	0,9	0,7

Today Estonia only has one hospital with university/regional hospital status. The number in this category is thus low but not in comparison with Sweden and Norway extremely low. It is consequently our opinion that Estonia should have two hospitals in this category – and the overall frequency will then increase to 1,4 such hospitals per million inhabitants.

Appendix E gives a benchmark for bed–per–population for regional/university hospitals.

5.11 Bed–per–population rate for nursing homes

Bed–per–population for nursing homes is also given in Appendix E. The benchmark given for nursing homes is 6000 in the year 2015. It has been extremely difficult to find exact benchmarks for nursing homes. That is because most official statistics include not just nursing homes, but also senior living, home care etc. It is not even clear that a person staying at a nursing home has had an initial visit at a secondary care hospital. In chapter 8.11 an example built on experience is given where the ratio 5,1 nursing home beds per 1000 inhabitants is presented. For Estonia that would translate into a total of 7400 nursing home beds. If one looks into WHO: s official statistics for long term care, the statistics given by different countries reflects the difficulties in giving exact definition on nursing homes.

Some examples of numbers given to the official statistics explain the difficulties in giving exact statistics. For the year 1998 the following number of beds in nursing homes and elderly homes divided with 100 000 inhabitants, are presented in the WHO statistics.

France	970
Estonia	404
Germany	443
Norway	985
Sweden	42
UK	333
Switzerland	861

As can be seen there are major differences. The low figure for Sweden is because Sweden has only reported geriatric care beds, while Norway on the other hand has included all types of elderly care, including home care and senior houses.

5.12 Specialist profile for secondary care hospital.

In modern health care specialist profiles have nothing or very little to do with the organisation of hospital beds. Specialities are organised in groups and beds and resources are not earmarked for one particular speciality.

A hospital department can consist of physicians with different profiles. A department such as surgery can include urology, but there not necessarily any need for specific urology beds. Instead of looking at specialities as such in a secondary care hospital it is more important to look at the diagnostic facilities and treatments that shall be available.

Surgery

Includes upper and lower abdominal surgery, basic vascular and endocrine surgery and urology. There is also a need orthopaedic specialists for emergency care (fractures).

Internal medicine

Includes cardiology, haematology and gastroenterology, neurology, nephrology and infectious diseases.

Orthopaedic surgery

Planned orthopaedic surgery handles replacement surgery, basic ligament, foot and hand surgery as well as back surgery.

Other specialities present at a basic secondary hospital (based on the size of the catchment area) may be *paediatrics, gynaecology and obstetrics, ophthalmology* and *ENT*. In smaller secondary hospital these specialist may be present in the form of out-patient service including day surgery.

5.13 Specialist-to-population rate for each speciality

Appendix F gives a benchmark on specialist to population rate for each speciality. Appendix G gives the population rate for each type of specialist.

The benchmark is based on comparable data for Sweden and Norway for the year 1998. One of the problems with the data received from the Swedish and Norwegian physician associations is that there are physicians with double specialist competence. The data is corrected and shows the number of physical persons. The Estonian data were given to us by the MSB.

Surgeons, orthopaedic surgeons and internal medicine are responsible for emergency care. Geriatrics or long-term care physicians are new profiles.

5.14 Hospital structure per category

This benchmark has been carried out by comparing the actual situation in Sweden and Norway and Estonia in 1998 with the proposed situation in Estonia in 2015.

Number of hospitals				
Hospital type	1998			2015
	Norway	Sweden	Estonia	Estonia
Univ/regional hospitals	5	8		2
Central hospitals	23	30		4
Secondary hospital	30	54		7
Sum	58	92	27	13

Hospital/1,000,000 inhabitants				
Hospital type	1998			2015
	Norway	Sweden	Estonia	Estonia
Region hospitals	1,1	0,9		1,4
Central hospitals	5,2	3,4		2,8
Secondary hospital	6,7	6,1		4,8
Sum	13,0	10,4	18,6	9,0

These two tables requires some comments. In Estonia there are a total of 78 hospitals. Of these 27 are classified as central/general hospitals. We have tried to get a further classification of these but it has not been possible. It seems as if there is no clear hospital classification system. It should in this context be noted that in Norway there is, in addition to the 58 hospitals in the table, another three monoprofile hospitals and 14 hospitals that are not classified. In Sweden all hospitals are clearly classified.

In the table we have given the proposed number of 13 hospitals in Estonia in 2015. How this number has been reached is explained in the following chapters. We have in this number not included monoprofile hospitals in Estonia (i.e. tuberculosis) that will probably still be in function in the year 2015.

The somewhat lower total number in Estonia in 2015 is explained by the fact that there are relatively more tertiary institutions in Estonia. The secondary hospitals are on the other hand smaller.

6. DEFINITIONS

6.1 Primary care / health care centres

The terms primary, secondary and tertiary care are used for describing the different levels of health care. In to understand the conclusions of this study it is important to define these terms.

Primary care is the practice of basic general medicine. It is according to WHO defined as the first point of entry into the health care system for all patients of all ages with all diseases. It is further population based and preventive in nature. Physicians who have special training in general practice shall practice it.

The old Soviet system was based on very large multi-speciality polyclinics. This is not an adequate system because it detaches in-patient care from out-patient care. In Western countries most of the specialist care is carried out at out-patient departments localised at the hospital. There are however also in Western countries **health care centres**, which are local facilities with primarily family practice physicians but also with some selected specialists; the most common specialities being gynaecology, orthopaedic surgery and paediatrics. It is our opinion that the old Soviet-style polyclinics should gradually be closed. The health care centres may have daytime emergency service but no 24-hr service. Health care centres are often localised together with nursing homes.

6.2 Secondary care

Secondary care is basic specialist care. It may be practised in an out-patient setting (i.e. at a health care centre or local hospital) but is usually carried out at a general hospital. The 24-hour emergency services are also the responsibility of the secondary care facilities. Physicians who have special training in recognised specialities shall practice it.

6.3 Tertiary care

Tertiary care is special care of low frequency requiring specially trained staff, special equipment and/or other special physical facilities. It includes a need for a teamwork approach and is dependent on sophisticated in-house medical support such as clinical chemistry, physiology, pathology, clinical pharmacology etc. In addition tertiary care has a strong relationship to research.

It is in this context worth noting that true tertiary care in most Western countries no more than 3-4% of the total health care expenditure. At any university hospital (where virtually all-tertiary care is located in Western countries) true tertiary care patients rarely comprise more than 10% of the cost structure. The rest is even at university institutions basic secondary care for the population in the local catchment area.

6.4 Nursing homes/geriatrics

The definition of **nursing home** is not entirely clear. The most common definition is a place where a patient can be taken care of after he or she has been in an acute care hospital; somatic or psychiatric. It seems that nursing home for many planners and politicians is a generic term for various forms of long-term care, elderly home, rehabilitation units and other forms of aftercare.

In this plan we use nursing home as a term for care of the elderly in an organisation separated from the acute care hospital administrative structure. It is for patients who need care for a long period; sometimes for the rest of their life. The word “nursing” means that there is a need for regular medical supervision. Nursing home does not include home for elderly, social homes etc, where there is no regular need for medical supervision. In such facilities the social aspect of care is the most important.

Geriatrics and *rehabilitation* are two other important types of care. Geriatrics was previously synonymous with long-term care but has today developed into a short-term form of care (ALOS often less than a week). The aim of geriatrics is today to get an appropriate diagnosis and to determine which form of long-term aftercare that is the most appropriate in the individual case. The patient is after the evaluation transferred to such an institution.

Rehabilitation is an active form of care aiming at optimising the patient’s functional status before discharge to another form of care or, most commonly, to the patient’s home. The typical patient is a patient with a hip fracture. This patient is first operated in an acute care hospital and stays there for 2-3 days. The patient thereafter spends 10-14 days at a rehabilitation unit. The patient can thereafter usually go home.

6.5 Definition of medical specialities

The definition of medical specialities differs in various countries. There is even on an international level, uncertain what shall be defined as main specialities and what shall be considered as subspecialties. In a small country such as Estonia it is not practical to have too many specialities. The reason is that in such a case many specialities would just have a small number of specialists. It is then difficult to uphold an adequate training program for new specialists. It is therefore better for Estonia to have fewer main specialities and to rely on education and training outside of Estonia for those who want special training in smaller subspecialties.

For the purpose of this study we have therefore considered a smaller number of specialities according to the following;

Surgical specialities

Surgery

Orthopaedic surgery (including hand surgery)

Urology

Plastic and reconstructive surgery

Neurosurgery

Thoracic surgery

Anaesthesiology

Obstetrics and gynaecology

Oto-rhino-laryngology (including maxillo-facial)

Ophthalmology

Vascular surgery

Internal medicine specialities

Internal medicine
Allergology
Cardiology
Dermatology and venerology
Endocrinology
Gastroenterology
Infectious diseases
Neurology (including neurophysiology)
Nephrology
Pulmonology
Rheumatology
Oncology (including radiotherapy)

Paediatrics

Paediatric medicine
Paediatric surgery

Psychiatry

Adult psychiatry
Child and adolescent psychiatry

Other specialities

Diagnostic radiology
Laboratory medicine
Pathology
Family medicine
Occupational health
Geriatrics
Rehabilitation

In the European Union the official Council directive 93/16/EEC lists 52 different specialities. Hand surgery is the only speciality in the list above, which is not yet listed by the European Union. Maxillo-facial surgery is in some countries a dental speciality; in other a medical speciality. It is up to the Estonian government to make a decision; both choices are equally correct. We listed it here so that the speciality is not forgotten. It is an important speciality.

We have excluded the Estonian speciality traumatology from this list. Emergency services are in Western Europe covered by surgery, orthopaedic surgery, internal medicine and neurology.

There are of course many opinions about what is the “correct” choice of specialities. We do not want to insist that Estonia should use the above list. We merely want to point out that there is a need for revision of the Estonian speciality list – and that there should be fewer specialities than it is now.

7. THE FUTURE HEALTH CARE SYSTEM

7.1 Institutional structures and resources

We propose that health care be organised in three separate levels.

The Ministry of Social Affairs shall deal with policy matters and legislation concerning the social insurance system. The Ministry shall also have the overall responsibility for health care provision and health care policy in the country.

The regional level is the sickness funds, the payer of the healthcare provided. We propose that the Central Sickness Fund shall remain and that the Central Sickness Funds position shall be strengthened. The Central Sickness Fund shall work with guidelines and methods and prepare contracts that are obligatory to use for the regional sickness funds. The sickness fund must be responsible for all types of institutional care, i.e. secondary and tertiary care as well as rehabilitation, nursing homes and health care centres. More about the functions of the Central Sickness Fund can be found in Chapter 8.2.

On the local level the municipalities, or when necessary a group of municipalities (as in Finland), can cooperate and take responsibility for the care of the elderly and for social care. Health care is paid by a 13% flat tax. Part of this must then be transferred to the municipalities to cover funding of their obligations.

For the steering of the system it is important to have detailed information about costs. Some kind of mechanism for collection of cost information must be established (see chapter 7.6). The outcome of this work will show that emergency hospitals are quite expensive, while rehabilitation and nursing homes in comparison are much cheaper. Ultimately the cost information must be used to introduce incentives in the system to reduce the length of stay at the emergency hospitals.

7.2 Hospital ownership

As a part of the decentralisation of the Estonian society the state has handed over the hospitals to others. The state still owns and runs the monoprofile hospitals for tuberculosis, oncology and psychiatry but also some of the central hospitals, e.g. Mustamäe Hospital in Tallinn. Some hospitals are owned by a town, a municipality or by a group of municipalities. Often the municipality owns the hospital building but the hospital services are managed by others; i.e. by foundations or private or public companies. The ownership issue is from a theoretical point of view not very important. Any financially strong body could own and/or manage a hospital.

From a practical point of view the issue is however a bit more complicated. Estonia is in a state of transition. Financial resources are scarce. The transition efforts must be co-ordinated on a national level. In this situation it is important that the state can have a decisive influence on the transition process. There must, at least for a period of time, be a system in which ownership issues are not allowed to disturb the transition process.

7.3 Hospital licensing

The hospital licensing system must be improved. There must be some norms for existing hospitals, such as a target number of inhabitants in the catchment areas, population per family doctor etc. The hospital licensing system should also specify the type of hospital, not license individual specialities. The legislation may be improved by giving the Ministry of Social Affairs the right not to license new departments or hospitals even if they fulfil the criteria. If the Ministry of Social Affairs determines that there already exists an appropriate supply of a specific type of service in a particular catchment area they must have the possibility to deny licensing.

7.4 Quality assurance and accreditation

There is a need for an independent regulatory authority in the Estonian health care sector with respect to quality assurance matters. This authority shall work directly under the government, and support the financier (the Central Sickness Fund) and the legislator (the Ministry of Social Affairs). Future contracts between the sickness funds and the providers must include quality standards for care. The independent authority shall be responsible for medical audit. The independent authority shall consist of rather few people (five or six). If necessary, external competence from the hospital sector can be hired for special purposes. The work with quality standards for treatment should be built on the best practice in the world.

If a hospital does not comply with the quality criteria, they must be censured. This can be done either by refusing to pay or by revoking the licence (temporarily or permanently). A penalty fee is another possible choice. Quality criteria are best developed diagnosis by diagnosis. The following are some areas suitable for quality audit.

- Stroke
- Lung cancer
- Breast cancer
- Pneumonia
- Diabetes
- Heart attack
- Heart failure

In order to determine if the provider operates with accredited quality standards the independent authority shall make regular hospital audits (see chapter 7.7).

7.5 Fraud and abuse

The Central Sickness Fund has to build up a system in order to avoid fraud and abuse. This is best done through collecting statistics on a national level.

7.6 Principles for reimbursement

The current price list is basically a fee-for-service list. In a very limited number of cases a system similar to DRG system is used. The prices are however not recalculated annually. Instead, a review of the price list is made every year. This means that by principle the price lists are not cost based.

Since the beginning of the 1980's many countries have started to use other principles for reimbursement for health care services than fee-for-service systems. DRG (Diagnosis Related Groups) were introduced in 1994. The system uses diagnoses and procedures to separate all admission episodes into groups. These groups are thereafter used as a base for prospective payment.

In the initial system there was 494 groups. With time other systems have been developed with up to 1200 groups. The advantage of using DRG's instead of fee-for-service is that not all costs nor hospital days are necessarily covered by the insurer. The advantage of the system is that it normally increases the turnover of patients since the hospitals are trying to increase their revenues. DRG also gives a good measure of the output and can be used for productivity calculations.

For ambulatory care APC (Ambulatory Care Patients) was introduced in USA in the year 2000. The system is similar to DRG and is just for visits, day surgery and day medicine. The principle is basically the same as in the DRG system. A grouper is used which gives an APC code and a weight.

For psychiatry and geriatric care there are other types of prospective payment systems. These are not based on diagnosis and procedure but on the functional status of the patient. The functional status of the patient is a better measure of resource consumption than diagnoses and procedures. One example is geriatric care where the patient's behaviour and symptoms, i.e. eating behaviour and social status, are scored every day.

The Nordic countries have a close co-operation regarding the development of prospective payment systems. It would be of great benefit to Estonia to become an active participant in this co-operation. The work is lead by the WHO centre in Uppsala in Sweden.

7.7 Cost calculation

The reimbursement system must be built on actual costs. In most countries hospitals deliver cost information to the insurer, who calculates the cost and decides the price lists. The cost information must be calculated on a patient level.

In Estonia today, where most prices are fee-for-service prices, the process of adding new prices for new tests or treatment methods, is not appropriate. An application is filled in when a new treatment method or laboratory test shall be priced. Off course, all costs have to be included when calculating new prices. Fixed salary costs, real estate costs and overhead costs are costs types that have to be calculated for all types of services and treatments. If one new

test or treatment is added, this means that all other prices will have to be recalculated.

In the US there is an independent authority (MedPac), reporting directly to Congress, working with analysis and calculation of price lists. MedPac collects financial information from all hospitals, independently of how they are owned. Hospitals that cannot deliver cost information will not have the right to sign contracts with HCFA (the Health Care Financing Administration). HCFA insures individuals younger than 18 years of age, those older than 65 years and those who are disabled.

It would be of benefit to the system if such an authority could be established in Estonia. The authority must be quite small (with 3-5 economists employed) and shall collect financial data from all providers in order to calculate the price lists. In principle, it is an advantage if this authority can work directly under the government and be separated from the authority proposed to deal with quality and accreditation.

It is our experience that it is optimal if neither the insurer nor the legislator is involved in the calculation of price lists. A totally independent authority can be much more resistant to the influence of various special interest groups trying to influence the price list to their benefit.

7.8 Decision on price lists

Once the price lists have been calculated there are some issues that have to be taken into consideration. It is not necessary to give exactly the same compensation for the same DRG to every hospital. University hospitals should have a higher compensation because they have more complex cases and higher basic costs. For example, in the US urban hospitals are given higher compensation than rural hospitals because salaries and rents are higher in urban areas. This situation will have to be reviewed in Estonia before deciding on individual compensation.

When the authority should present its proposal regarding the price lists to the Central Sickness Fund and the Ministry of Social Affairs. These bodies should then be responsible for deciding on the price list for the next year. At this stage a certain element of politics can be introduced, i.e. the decision could slightly overcompensate day surgery and undercompensate in-patient surgery in order to create an incentive to use more cost-efficient types of care.

7.9 Equipment investments

Medical technology is advancing at an increasing speed. Changes in technology will have a major impact on medical care structure as well as on management system in the future.

In laboratory medicine there are two in a way contradictory tendencies. The ongoing automation will make it easier to have routine tests analysed promptly and safely even in the individual doctor's examination room. On the other hand there is a tendency to centralise the analysing of large amounts of tests and also to centralise very complicated and unusual analysis. It is possible to embrace both tendencies. A decision must be taken regarding the

principle layout of the laboratory services. The bulk of services should be taken care of in four or five laboratories in the country. The remaining needs can be taken care of in a very decentralised fashion. A plan for this should be worked out.

There has been a rapid development in radiology during the last decades. Digital techniques will dominate radiology within just a few years. The CT and MR technology will further reduce the use of invasive radiology. Progress in telemedicine will soon create possibilities for distant evaluation of pictures between different facilities.

With respect to need for radiology services there are some key indicators to observe. It is today generally determined that there should be one sophisticated ultrasound unit in 50.000 population, one CT or MR per 100.000 population and an angiography laboratory per 200.000.

Estonia is today far from these numbers. The future target for Estonia may in fact be even higher. In the West there are today many indications that these numbers will be cut in half within a short period of time, maybe only 5 years. In Stockholm for instance there are 24 MRI laboratories in a population of 1,85 million. In addition to this there are a number of CT's as well. The target numbers according to above must be taken as a minimum level in Estonia even in such a short perspective as 2005.

Modern medicine is totally dependent on appropriate imaging. In practice this means that every hospital, even Kuressaare, must have at least a CT scanner. Patients with head trauma or stroke cannot be treated properly without at least CT facilities. A national plan for heavy diagnostic equipment must be worked out urgently.

We recommend that a special central authority at the Ministry of Social Affairs shall be appointed, and be consulted, when hospitals have intentions to buy expensive medical equipment. That authority will have to approve the purchase from a strategic point of view and if it is in accordance with the overall plan for hospital structure in the country.

7.10 Building investments

We strongly recommend that all future building investments shall be preceded by a hospital master plan. The future building and equipment standards shall correspond to modern Western European standards. There must be some central control over building investments. If not – the risk of wasting money is great.

7.11 Health care prevention

Estonia has to improve in many fields regarding health care prevention. Individual and collective habits concerning smoking and alcohol consumption must change. Welfare programs must be established to reduce the effects of these habits and behaviour. Estonia must continue to work with health protection programmes. These programs are of major importance in order to increase the overall health status, the quality of life and the longevity.

7.12 Health care for the elderly

A major difference between Estonia and Sweden and Norway is that the elderly population in Estonia, who are those who usually consume most health care, have a much lower consumption than in the comparison countries. This indicates that the level of ambition in the treatment of elderly is low. This is an ethical dilemma. It is important to give the oldest, and most needing part of the population, the care level they deserve.

7.13 Preparation of targets for health care expenditures

The development of the health care system and a new hospital structure, which is equal to Western standards, will cost a significant amount of money. It is therefore of great importance with strict fiscal control.

To finance the implementation, we suggest that Estonia set targets for healthcare costs. The targets shall be broken down on low levels within the system.

There are several methods to set targets for healthcare expenditure. One model is to allow health care spending to increase by the same amount as the increase of funding to the sickness funds. Another model is to relate health care spending to the growth of the GNP.

A combination of the above mentioned methods can also be used. That is preferable in situations where salary costs increase less than the GNP growth. This situation occurs in many western economies from time to time.

We suggest that the Ministry of Social Affairs shall have the responsibility to follow up of the health care targets. It is of great importance that this is done in a proper way during a transition period when the health care sector develops. Budget discipline, combined with cost targets on a centralised level, is of great importance for Estonia's financial credibility since many improvements will have to be financed by international development programs.

8. THE FUTURE HOSPITAL STRUCTURE

The intention for the HMP is according to the Ministry of Social Affairs "to obtain savings and increased efficiency of hospital care by easing constraints effecting the hospital system in Estonia including unused capacity, long length of stay, deficiencies in management, budget, accounting and facility design". The aim is to find out "how to reconstruct secondary and tertiary care hospitals and out-patient clinics taking into account that the physical reconstructing of hospital buildings involves also the reallocation of medical services and medical specialists". A network of nursing homes is also an integral part of the future hospital network.

In Estonia there are too many hospital beds in relation to the number of inhabitants and

compared to other countries. There are not only too many hospitals; they are too big and often in an unsatisfactory condition. The patient's often stay for a long time in hospital, although the ALOS has become shorter during the last few years.

The structure of health care systems with hospitals and out-patient facilities are in many countries often related to traditional behaviour by the patients and also by the professionals. In Estonia there are historical reasons for building small hospitals in the rural areas. At a time when the rural population was greater and the communications not as good small hospitals were an essential part of the health care system. Today, with a decreasing population in particular in the rural areas, but with better roads, the distance to qualified care is not as important as before.

The average duration of life will increase. More and more persons will get older and older. Sooner or later they will demand medical treatment, not only good long-term care but also acute secondary care. Today there is a significant difference in consumption of hospital care for those over 65 between the Nordic countries and Estonia. There will also be an increasing demand from the patients to get the benefit of new methods of treatments not readily available today, i.e. hip and knee replacements, by-pass surgery and cataract surgery. These methods are mainly improving the quality of life especially for elderly. All this will put great demands on the organisation for health care. Resources must continuously be re-allocated in order to satisfy the demand for new and better methods of care.

Acute care and specialist treatment is today dependent on medical technology and knowledge. There must also be a sufficient number of patients for every speciality in order to maintain staff experience, high quality and cost effectiveness.

Even if there in most hospitals nowadays are few "social beds" and most patients have a medical diagnosis, it is obvious that there are many patients in the hospitals who are medically ready for discharge. These patients can of course not be thrown out from the hospital. These patients should instead be taken care of in departments of long-term care and others in nursing homes. Some may need day care and rehabilitation. Finally, some patients could probably go home if there was an organisation for assisting and caring for them at home.

The situation of today is both a medical and social problem. The hospital care system is on the whole fairly insufficient. The system of social care is still under development. Finally, there is, as in many other countries, a conflict between medical care and social care regarding payment responsibilities. The overall solution must be found in closer co-operation between hospitals, primary care and social care organised by the municipality.

8.1 Hospital definitions

In order to achieve the appropriate quality level of care various types of hospitals have to have a catchment area, which is suited to the medical content of that particular hospital. The following is a short summary of the content and approximate catchment areas needed for each particular type of hospital.

The “ *health care centre*” or local hospital is a concept that has developed quickly in Western countries during the last few years and is without any doubt in the future going to be a very important part of any health care system. Hospitals with only day care or (in some instances) with Monday through Friday elective in-patient care are very efficient. The bottom line is that 80-90% of the production can often be done for 50-60% of the cost. The small/local hospital model includes,

- primary care
- selected specialist care
- day-time out-patient emergency services
- medical day care and day surgery
- basic diagnostic services (laboratory and radiology)
- in-patient care for the elderly (nursing homes, rehabilitation etc.)
- a few beds that can be used for observation of patients for a short time

The catchment area for a health care centre or local hospital can be anything between 35.000 up to 75.000 inhabitants. Units with smaller catchment areas will have fewer specialities and more primary care physicians as part of the concept.

The basic *secondary care* hospital usually has a catchment area of around 100.000 inhabitants. That size is adequate in order to ascertain enough competence and patient number in order to have a 24-hour emergency room. In special cases it is possible to have lower numbers. A good example in Estonia would be Kuressaare. The population on Saaremaa is 40.000, which will generate a fair number of emergency cases. It is however geographically difficult to travel to another hospital. On Hiiuma, on the other hand, there are only 10.000 inhabitants. This is too small to sustain a secondary care hospital or any type of adequate emergency service. It is much cheaper; more cost effective and medically sound to arrange for an ambulance helicopter service for the few cases that will need urgent transportation.

The medical content of a basic secondary care hospital is internal medicine and general surgery. Medical sub-specialities are covered under the common heading of internal medicine. Surgical specialities such as orthopaedic surgery and urology are part of general surgery. As a general rule there would only be outpatient gynaecology and no deliveries and in general only outpatient paediatrics.

The *central hospital* is the next level of the hospital system. This hospital is larger and will as a rule have separate departments for other specialities such as orthopaedics, gynaecology incl. obstetrics, and often ENT and ophthalmology as well as some medical subspecialties. The catchment area is generally in the interval 100-200.000 inhabitants depending on geographic conditions.

Finally, the highest level of care is provided by a tertiary care institution such as a *university hospital* or a *regional hospital*. The difference between these two is that the regional hospital is not a university with pre-clinical institutions. It may however, in terms of level of care, have the same resources as a university hospital. For these types of institutions it is important that the catchment area is enough for the tertiary care institutions to receive a large enough number of patients in the tertiary care specialities. It is in Western Europe today estimated that a tertiary care institution shall have a catchment area of 0,5 to 1 million inhabitants. In the case

of Estonia it is obvious that there shall be two such institutions – one in Tartu and one in Tallinn.

8.2. General conditions for catchment areas

The old Soviet health care system is a vertical system. This means that the system is based on hospitals for special purposes (monoprofile hospitals) and category hospitals (special hospitals for police, military, railroad workers etc.). Such a system is inefficient and wasteful because of duplication of resources and lack of co-ordination within the system. The modern Western systems are population based and organised based on catchment areas. In addition to this there are well defined levels of care for defined levels of needs.

The first step in the planning of the future Estonian hospital structure is therefore to define suitable catchment areas. In order to do this we have compiled a set of criteria on which we have based our proposal regarding catchment areas. These criteria are,

1. The demographic structure.
2. The catchment area can not be too small in order to guarantee best quality in medical treatment and to justify the cost for 24 hrs services.
3. The geographic distance to an acute/secondary hospital must be reasonable for most patients. This means a transportation time of 60 minutes or less which usually into a distance of 60-70 km.
4. A good organisation for transportation of patients who need acute care as well as for those who must be transported during their illness.
5. Communications, primarily roads, but also public transport must be sufficient.
6. The secondary/acute hospital should be located in a place or in a direction that coincides with travelling for other purposes, e.g. public service or shopping.
7. There must be decentralised resources for taking care of patients who need acute care for small injuries.

After considering the above criteria we propose that Estonia is subdivided into four basic catchment areas. In rough terms these areas follow the main transportation routes so that people can reach their closest hospital fairly easy. The catchment areas are the north-west (with Tallinn as a centre), the north-east (Kohtla-Järve/Jõhvi), the south-east (Tartu) and the south-west (Pärnu).

The following table shows the population in each of the four catchment areas.

Age intervals	North-east	South-west	North-west	South-east	Total
0-4	15 572	6 513	25 625	16 902	64 612
5-9	22 442	9 998	36 889	23 346	92 675
10-14	28 331	11 143	46 683	25 390	111 547
15-19	27 159	10 368	44 282	24 424	106 233
20-24	25 449	9 747	43 168	24 531	102 895
25-29	24 707	10 461	46 645	24 952	106 765
30-34	22 441	9 428	43 521	22 030	97 420
35-39	26 563	10 153	47 189	22 248	106 153
40-44	26 845	9 048	48 046	21 656	105 595
45-49	25 756	8 450	45 000	20 046	99 252
50-54	18 948	7 787	37 846	17 130	81 711
55-59	18 930	8 441	36 524	18 726	82 621
60-64	20 889	7 804	34 853	17 740	81 286
65-69	19 696	7 198	28 968	16 675	72 537
70-74	15 469	5 827	24 556	14 522	60 374
75-79	8 483	3 799	14 358	9 772	36 412
80-84	4 358	2 108	7 976	5 373	19 815
85+	3 762	1 938	6 787	5 190	17 677
TOTAL	355 800	140 211	618 916	330 653	1 445 580

Appendix L is a map showing the borderlines between these catchment areas. The borderlines do not mean that patients cannot cross the borderlines and seek care in another areas. The lines are mainly for planning purposes. The experience is however that patient rarely cross the borderlines. If the care is well developed and reliable at their closest hospital patients will as a rule go there.

8.3 Selection of acute care hospitals

There are in Estonia many monoprofile hospitals. From both a medical quality and cost-efficiency point of view monoprofile hospitals should be avoided. As has been previously stated monoprofile hospitals suffer from lack of co-ordination with other specialities and there is also unnecessary duplication of resources. In principle only some parts of psychiatry should be practised in monoprofile hospitals. In Estonia there is in addition to this a special situation regarding tuberculosis. The separate tuberculosis institutions will probably have to remain within the foreseeable future. (For further discussion on psychiatry and tuberculosis see chapters 8.8 and 8.9). For special forms of rehabilitation there can also be separate hospitals.

The separate hospitals for oncology, infectious diseases, dermatology and venerology and for children should be parts of general and/or regional/university hospitals.

8.4 Hospitals for secondary and tertiary care

Based on the presented facts for the four catchment areas; demography, communications etc we propose the following number and locations of secondary and tertiary hospitals. One of the prerequisites has been that nearly every citizen in Estonia should live within 70 km from an acute care hospital. In each of the proposed catchment areas there will be at least one central or regional hospital.

In the *north-east* there are some obvious locations; Rakvere, Kohtla-Järve/Jöhvi and Narva. Rakvere has approximately 75.000 inhabitants, Kohtla-Järve/Jöhvi 120.000 and Narva 75.000. It is obvious that Rakvere and Narva shall remain as basic secondary care hospitals. The present buildings may be used at least partly and be up-grade to a modern standard. In Kohtla-Järve/Jöhvi there should be a central hospital. There are several hospitals in the Kohtla-Järve/Jöhvi area. These should over a period of time be closed and a completely new modern facility built. A separate plan should be established for this to be implemented within a fairly short time span, i.e. 5 years. Smaller hospitals, such as Sillamäe, should be closed or used for other purposes.

In the *south-east* area a completely new hospital has been built in Valga. The Valga area is however too small to sustain a secondary care hospital. Some other use of this new facility must be found, i.e. a rehabilitation centre including a centre for home care and occupational therapy with home visits. The hospital can also be used as a health care centre with Monday through Friday care including basic day surgery and if possible elective surgery e.g. orthopaedic operations now done at the hospital in Elva.

The region of Põlva/Võru is large enough to sustain one secondary care hospital and so is Viljandi (even if this is borderline). Jõgeva is too small for a hospital and the distance to Tartu is short. The solution is thus to have a university hospital in Tartu, secondary hospitals in Võru and Viljandi, and a health care centre in Valga. The other hospitals should be closed or used for other purposes.

The situation regarding the university hospital in Tartu is complicated. The present hospital is spread out over 13 different locations in town. It is very urgent to produce a plan for a new university hospital with all specialities in one location. The university in Tartu is the only medical school in Estonia and thus the engine for the whole Estonian medical system. A new and up-graded facility in Tartu will have a profound impact on the whole development of health care in the country. This situation must be solved fairly quickly.

In the *south-west* area the situation is very straightforward. There should be a central hospital in Pärnu (with 100.000 inhabitants in the area) and a secondary hospital in Kuressaare (with 40.000 inhabitants on the island of Saaremaa).

Pärnu hospital is today located in different places in the city in buildings of different age and some of them in a very bad condition. There is in Pärnu already a skeleton for a new hospital. The plan for this hospital should be urgently up-dated and a new hospital then finished as quickly as possible.

The situation in the *north-west* region is also complex. In the city of Tallinn there are too many hospitals. There should without any doubt be one regional hospital with a catchment area of a little over 300.000 inhabitants. The need for the remaining part of Tallinn can be covered by two central hospitals, each with 100-150.000 inhabitants in the catchment area.

Hiiuma is too small to have its own facility. It must rely on a small secondary care hospital in Haapsalu. This must be combined with a helicopter service for urgent cases. There is also a need for a secondary care facility in Paide. The present facilities in Keila and in Rapla can be closed as secondary hospitals.

8.5 The hospital structure of the city of Tallinn

The centre of Tallinn is situated between the Baltic Sea and Lake Ülemiste. The centre is narrow and despite its relatively small size Tallinn has many problems of communications and traffic congestion.

The population of Tallinn is roughly subdivided into three regions; the southwest, the west and the east. All hospitals are located on the south-western and western side, none in the eastern part.

We have in proposed that there should be three hospitals in Tallinn; one regional and two central hospitals. The best way to achieve this goal is to group the hospitals in three groups. The aim of such a grouping is to merge the hospitals within each group into one unit and eventually reach the ideal situation. A merger is best carried out if a new joint management is appointed for all the hospitals within each group. The three groups are:

8.5.1 *The south-west.*

Mustamäe hospital should be given the role of a regional hospital (essentially the second hospital in Estonia after Tartu). The Children's Hospital should be merged with Mustamäe. It is from a medical point of view not satisfactory to have a children's hospital without an obstetrics unit or an obstetrics unit without a children's hospital. Mustamäe as a regional hospital must therefore be complemented with obstetrics and gynaecology.

The Dermatology Hospital should be closed and moved to Mustamäe as well as the Oncology Hospital in due course. The Tallinn-Järve Hospital is administratively integrated into Mustamäe as a rehabilitation facility.

The Mustamäe Hospital must be re-planned and extended with a new building. The best is probably to build this building between Mustamäe and the Children's Hospital so that these two facilities are physically connected into one structure. At the same time the old building should be renovated and up-graded.

8.5.2 *The west.*

The centre of this area should be the Merimeste Hospital and Pelgulinna Hospital. To this group should also be added Keila hospital. The catchment area of Keila is too small to maintain a separate secondary hospital. Further, there is only a 25 km straight drive on the same road to the two other hospitals. These hospitals together with the Tallinn Psychiatric Hospital should be merged under one management into a central hospital.

Either Pelgulinna or Merimeste could serve as the centre. Merimeste and the Psychiatric Hospital are located close to each other and there is plenty of land around the Psychiatric Hospital, which gives possibilities for expansion. We therefore believe that Merimeste after re-planning and rebuilding is best suited to become the main structure in the future West Hospital.

8.5.3 *The centre*

The Central Hospital and the Magdalena Hospital should be joined under one management and serve as a central hospital responsible for secondary care for central and eastern Tallinn. Magdalena hospital should gradually be merged into the Central Hospital. The Magdalena Hospital building can then be used for other purposes, i.e. a nursing home.

8.5.4 *Long-term considerations*

The immediate plan according to above can be implemented within a fairly short period of time, i.e. two or three years, in order to get a more suitable structure of Tallinn's hospital system. There is no question that there are too many beds and that there is a need for considerable consolidation of the system.

The method of putting several hospitals under one management and merging them into one facility from the inside is in our experiences a good method. If the merger is done from the outside (by the city authorities or by the state) it is more likely that there will be problems.

The condition is however that the ownership status of the hospitals is very clear. This is a political decision that must be taken first and then be followed by the appointment of a new management which is given free hands to carry out the merger.

In the long-term perspective there will also be a need to completely rebuild the Central Hospital. The present building structure can, after renovation and up-grading, be used for maybe another 10-15 years. Eventually a new structure is however needed. At that time the consequences of a new location should be evaluated. The whole hospital structure in Tallinn is not balanced. Every institution is today on the western side of town. There are no facilities at all in the east. From this point of view it would probably be better to relocate the Central Hospital to the eastern part of town when a new hospital building is going to be constructed

8.6 Obstetrics

Today there are obstetrics departments at 18 hospitals with 65 deliveries per year in Hiiuma and up to 2664 deliveries at the Central Hospital in Tallinn. In 12 hospitals there were only 500 deliveries or less. In a number of the hospitals there were not even one delivery per day. That is definitely not enough to maintain professional skills for the obstetricians and the midwives.

Ten years ago there were around 20.000 deliveries in Estonia. 1999 there were 12.000. We expect the birth rate to increase in the future; maybe up to 15.000 per years in a 5-10 year perspective. It is doubtful if it can climb back to 20.000.

In our proposal we have therefore calculated with 15.000 and propose that deliveries be centralised to fewer hospitals in the future.

8.7 Psychiatric care

Psychiatric care has changed considerably during the last decades in many countries. Many of the old big mental hospitals have been closed. Psychiatric clinics are often placed in somatic hospitals and more patients are treated as out-patients. Day care, often in groups, with patients and with specially trained nurses, physiotherapists and others professionals is more and more common. A multitude of therapies of are practised.

In Estonia there are mental hospitals in Tallinn, Tartu, Jämejala and Ahtme. In some of the somatic hospitals there are psychiatric departments. Finally, in some places patients treated outside hospitals in small groups.

The psychiatric hospitals are as a rule old; they are big and generally in a poor condition even if some reconstruction and rebuilding has been done.

We share the opinion that psychiatry care must be given in different ways and in different locations. The transfer from patient care from mainly in-patient to more out-patient care should be speeded up and day care centres ought to be established in a decentralised model, i.e. small local units in the towns and municipalities.

We further propose that there shall be small psychiatric departments for both in-patients as well as out-patients in the somatic hospitals. These should be used for treatment during the acute phase and as a base for out-patient care.

Despite these changes there is no doubt that in the future there will also be a need for separate mental hospitals for the treatment of chronic diseases and for forensic psychiatry. There must also be institutions for patients who have somatic diseases, i.e. tuberculosis, in addition to their psychiatric condition. The mental hospitals do need so many beds as today. They must also be profoundly rebuilt to suit modern psychiatric care.

Child and adolescent psychiatry is today not common as a speciality in Estonia. A classical question is if child and adolescent psychiatry is part of paediatrics or psychiatry. Our opinion is that child and adolescent psychiatry probably should be looked upon as a speciality in its own right. For treatment of this patient category it is essential with close contacts with social care. We propose that there shall be clinics for child and adolescent psychiatry, including a few beds, at the regional/university hospitals in Tallinn and in Tartu. Specialists for out-patient care should be located in the hospitals, at the health care centres and in polyclinics according to the number of children in the catchment area.

8.8 Hospitals for tuberculosis

If this plan had been done some ten years ago we would probably had proposed that treatment for lung diseases should take place only in general hospitals and that the sanatoriums should be closed. The unfortunate development of tuberculosis in Eastern Europe has radically changed the situation and it is obvious that special tuberculosis hospitals are needed.

We are familiar with the programme on tuberculosis of Estonia and have visited the hospitals and the departments for tuberculosis. We are convinced that there is a need for a special hospital for MRI patients in Estonia. It has been suggested that Kose hospital should be that hospital. We have studied the planning document for a radical rebuilding of the hospital and we have no objections to that plan.

If the Hospital Master Plan is implemented some hospitals must be closed. This opens up for alternative use of some hospitals. One possible such option is to find alternative locations to the planned rebuilding of the Kohtla-Järve Kopsuhaigla.

Regarding Kivimäe Hospital in Tallinn we seriously question the need for exclusive resources for operation of patients with tuberculosis and for special surgery departments for them. We propose that a special analysis be carried out.

8.9 Pikaravi

In the official list of specialities "pikaravi" is to be found. The speciality, which seems to be unique for Estonia, has been translated to us as primarily long-term care for the elderly. We have noticed is that under the term "pikaravi" is included recovery for up to 60 days for some diseases. It also seems to include convalescence, aftercare, rehabilitation and sometimes semi-acute care but not geriatric care.

Some of the patients seem to be in "pikaravi" beds more for social reasons than for pure medical reasons. Many of these patients would in other countries have been taken care of in other ways and in other places than in hospitals. It is essential in a new hospital structure to differentiate care for patients in clinics for "pikaravi" and also to increase the physical as well as the therapeutic resources. For good care of many of these patients it is necessary with close co-operation between acute care, long-term care, family doctors and social care.

For us it is obvious that "pikaravi" is more of a fiscal speciality rather than a medical. The real reason for classifying a patient to a "pikaravi" bed is that the compensation from the sickness fund changes after 9, 31 and 60 days.

8.10 Health care centres

In Chapter 8.1 a health care centre is described as a local health facility which can include primary care, specialist care, day surgery, day care, in-patient care for the elderly, sometimes a few observation beds but no 24 hrs secondary care. A health care centre can be adapted to local conditions and even to existing facilities.

Many of the general hospitals, which no longer will be hospitals for secondary in-patient care, can be converted to health care centres. They have all out-patient departments and if the polyclinic is not located to the hospital building it ought to be so. Day-surgery and day-care can easily start, as there are operation room, radiology facilities, clinical chemistry, physiotherapy etc. The ward departments can step by step be rebuilt to long-term care units or to nursing homes.

Some of the small local hospitals can be converted to health care centres if they are connected to a polyclinic or a family doctor's office. But some of them are very small and in a poor condition. Even after some renovation they can hardly serve as hospital/nursing home in the long run.

Today there are in some of the local hospitals also departments for children. We can not see any reason to keep these departments in local hospitals. Children should be treated in out-patient care or in paediatric clinics in the secondary hospitals.

In planning of care for elderly there are some fundamental principles among others; nearness, quality and dignified care.

For an elderly sick person the best thing is often to be treated at home. But since this is not always possible the patient must come to an institution which for some will be their home. That institution should be as close to the home as possible. Nursing homes can however not be established everywhere so sometimes the must be a compromise as to the principle of proximity.

For the years to come it is of utmost importance to find solutions so that patients who need medical care for a long time can get it close to their homes. Care should be of high quality, be administered in a dignified way and in institutions suitable for that kind of care.

8.11 Need for nursing homes/geriatrics/rehabilitation

The need for nursing home beds in Estonia is difficult to estimate.

Before 1992 Sweden had separate statistics for nursing homes but after that year the nursing

homes are integrated in “special living” for elderly.

In 1991 Sweden had 44.000 nursing home beds for 8,6 million inhabitants. This gives a number of 5,1 beds per 1.000 inhabitant. Calculated in the same manner Estonia should have about 7.400 nursing home beds.

At the same time Sweden had a much older population than Estonia which indicates a lower number for Estonia. On the other hand, at that time Sweden had 35.000 beds in old age homes, 53.000 apartments in service houses (for elderly people) and a well developed medical home care.

Considering these circumstances the number of 7.400 nursing home beds is rather low. The development of medical home care, primary care and construction of other premises of living will be of great importance if the need of future nursing home beds shall not exceed the number 7.400 beds. The need for long-term care and rehabilitation is also discussed in 8.13.

8.12 Calculation of hospital sizes

The number of discharges and visits to the hospitals are based on the actual health care consumption in Sweden and Norway. We have looked into the official data for the two countries and then scrutinised two patient administrative systems at two large hospitals in order to be sure that there are no double registrations by transfers between departments or between hospitals. The future health care provision is built on the assumption that Estonia will produce the same treatments and services as the benchmark countries. This means that adequate care for the elderly is included in the analysis.

For the purpose of benchmarking we have in this particular calculation used Stockholm County for comparison. The reason is the following; most of the statistics in Sweden and Norway is not “clean” since it includes transferrals of patients between hospitals. This means that many patients have two admissions registered for one care episode. Stockholm (with 1.8 million inhabitants) has only 5 major hospitals, which means that there are very few transfers between hospitals. For benchmark purposes Stockholm is therefore ideal in order to get a clean situation.

In order to get good conditions for comparison we have done a few corrections of the statistics according to the following;

- In Norway there has been a national study of the number of patients on waiting lists. There is no similar study in Sweden. We however have the general impression that the situation in Norway and Sweden is very similar. The Stockholm estimates are increased with 3% to account for patients on waiting lists.
- The future average length of stay in Estonia has been calculated as 30% longer than the present average length of stay in Stockholm. The benchmark average length of stay in Estonia has thus been set as 4,5 days.
- A number of day surgery frequency targets have been set. These are general surgery 30%, orthopaedics 65%, hand surgery 60%, plastic 30%, urology 15%, gynaecology 65%, eyes

85%, ENT 50%. These targets are in general lower than the present Stockholm actual frequencies.

The results of these calculations are given in Appendix K. The tables contain information on the selected specialities at the various hospitals, the projected number of admissions, number of bed days and finally the estimated need for beds (based on an average rate of occupancy of 85%). The total number of beds in acute care hospitals will be 3.120.

In the calculations the benchmark for average length of stay is set to 4,5 days. In practice this means that other care levels must be established to take care of the patient after the acute care episode. Rehabilitation and long-term care is calculated by the outflow from Western hospitals with average length of stay nearly 4,5 days.

Patients transferred to other care levels from acute hospitals

	>60 years	<60 years	ALOS	Beds
Gynaecology	25	20	20	2
Heart diseases	1 870	350	20	111
Surgical diseases	910	300	20	61
Lung diseases	230	100	20	17
Internal Medicine	35	30	20	3
Neurology	720	380	20	55
Neurosurgery	360	380	20	37
Nephrology	70	15	20	4
Oncology	300	100	20	20
Orthopaedics	1 330	262	20	80
Plastic surgery	20	25	20	2
Dermatology	170	50	20	11
Thoracic surgery	920	5	20	46
Transplantation	10	15	20	1
Urology	185	20	20	10
Eye	15	10	20	1
ENT	45	20	20	3
Rehabilitation	287	110	20	20
Total	7502	2192	20	485
To long-term care	1425	166	30	119

This table means that if there is going to be 3120 acute care beds (which is our proposal) there is a need for additional beds according to above in order to take care of the outflow of patients from the acute care institutions.

8.13 Out-patient visits

The number of outpatient visits in Estonia was 5,6 per inhabitant in 1998. At the same time the number of home visits was 0,4 per inhabitant in 1998. This means that the total need for visits with a population of 1,45 million inhabitants is 8,120,000 out-patient and 580,000 home visits; a total of 8,7 million visits.

The proposed hospital structure will take care of about 1,2 million visits. If radiotherapy, chemotherapy, dialysis, day care and day surgery is included this will increase to about 1,3 million per year. The remaining visits will have to be taken care of by family doctors and at health care centres.

8.14 Special treatments

The following tables are examples of the need for some special services that are presently given in low numbers in Estonia. The tables illustrate the Estonian needs if it was to be the same as in Sweden and Norway.

Diagnosis (by DRG)	No of cases
105 Cardiac valve prosthesis without catherization	355
106 Coronary bypass with catherization	305
107 Coronary bypass without catherization	1 120
112 PTCA	1 050
209 Major joint & limb reattachm proc low extr	3 000
215 Back & neck proc wo cc	1 100
481 Bone marrow transplantation	100
302 Kidney Transplant	65

The figures are ratios of the consumption pattern in Norway and Sweden, compared to the population in Estonia. The number of cases in the two last groups is low. It is however our opinion that these therapies can be carried out in Estonia. In such a case it should only be done in one institution and with close collaboration with another recognised international centre, i.e. Helsinki.

Liver transplantation is excluded from the list above. The annual need in Estonia can be estimated to be about 15 cases. It should definitely not be done in Estonia. The population is too small. It is better to collaborate with another unit such as the unit in Helsinki.

9. AREA STANDARDS AND BUILDING COSTS

9.1 General remarks

As have been mentioned in 7.9 the area standard in Estonian hospitals is very low compared with the standard in Western Europe. Bedrooms are often very narrow, hygiene rooms are few and small and waiting rooms in the out-patient departments are crowded with patients. However operating theatres and radiology laboratories often have good area standard.

Gross area per bed varies from 18 sqm in Tartu long-term clinic (23 sqm in Tallinn Long-term Hospital and Kallavere Hospital) to 113 sqm in Pärnu (under planning).

Tartu University hospital has on the whole a very low area standard (50-70 sqm) especially

considering the advanced treatment given there.

The large hospitals in Tallinn (Mustamäe and Central hospital) have also low area standard (67,5 and 71,5 sqm respectively) as well as the large hospital in Narva (54 sqm).

In Sweden modern hospitals have 150 – 190 sqm gross area per bed. Denmark has about 150 sqm and Britain about 100 sqm, although British hospitals have very little out-patient care.

The advantage of raising the area standard is that it will facilitate the work of the staff. It increases the possibility of using technical equipment, for example hoisters and the patients can to a greater extent visit hygiene rooms without assistance.

Considering the present Estonian area standard and comparing it to Western European standards we suggest the following standard for *gross area per bed* for different types of hospitals:

Type of hospital (equivalent)	New construction	Reconstruction
University hospital	130 sqm	120 sqm
Regional hospital	130	120
Central hospital	120	110
General hospital	100	90
Long term, rehabilitation	90	80
Psychiatry		
Nursing home	80	70

In reconstruction it is difficult to obtain optimal area standard and therefore it can be reasonable to accept a little lower area standard in those cases.

9.2 Cost indicators

Our estimate of investment cost is based on three different factors,

- area standard (square meter gross area per bed)
- construction cost (EEK per square meter gross area)
- technical standard of the hospitals

Building costs (new construction) per sq. gross area are estimated as follows:

Type of hospital	Building costs EEK per sqm gross area
University hospital	15 000
Regional hospital	14 000
Central hospital	11 000

General hospital	8 000
Long term, rehab, psychiatry	7 000
Nursing home, health care centre	6 000

The costs do not include medical equipment.

The building costs are based on prices and information from the Solve report on Tartu University Hospital, cost-estimation of Pärnu central hospital (under planning), costs for Valga general hospital, cost for Tartu Biomedical and reports on major building investments in Estonian hospitals during recent years and experience of Swedish building costs during recent years.

For reconstruction a reduction of building costs will be calculated depending on the technical and functional standard of the hospitals. Since the technical and functional standard is low compared with Western European standard (lack of mechanical ventilation, old elevators, few and narrow hygiene rooms) the reconstruction costs will be rather high.

Estimated building investments are based on Estonian building costs in EEK per square meter gross area for new construction and corrected for existing technical and functional standard in three alternatives (80%, 60% and 35% of new construction) for reconstruction. Raised area standard will increase the investments and lower area standard will reduce investments.

Despite raised area standard most hospitals that we suggest shall remain will have a considerable surplus of building area.

9.3 Cost estimation for hospitals

The following is an estimate of the total investment costs (in million EEK) for university, regional, central and secondary care hospitals:

Northwest area	1,844
Northeast area	710
Southeast area	1,468
Southwest area	380
Total	4,402

For details, see appendix H

We suggest that the remaining hospitals not used for acute care will be converted for long term care, rehabilitation, nursing home care or into health care centres. This will be a good

way to use existing facilities since reconstruction is a bit cheaper than new construction.

The following is an estimate of the total investment costs for converting hospitals not used for acute care:

Estimated costs for new construction	6000 EEK per sqm gross area
Cost for reconstruction (80% of new construction)	4800 EEK per sqm gross area
Gross area	223 000 sqm
<hr/>	
Total conversion costs	1070 million EEK

The following is a summary of investment costs;

New construction and reconstruction of existing hospitals	4.402 million EEK
Conversion of remaining hospitals	1.070 million EEK
<hr/>	
Total investment costs	5.470 million EEK

10. NEED FOR CHANGES IN BUILDINGS

10.1 General need for reconstruction

The need for reconstruction will very much depend upon the future size and capacity of the individual hospital. Hospitals with low area standard in ward-departments may need an enlargement if the calculated cut in bed capacity does not compensate for the need of improved area standard. Another reasons for enlarging a hospital is expanded or additional functions. This will occur in areas where specialities will have to be moved between hospitals in order to reach the proposed concentration of units.

The availability of free space on a hospital site will be an important factor in the restructuring process.

Another reason for a major rebuilding is the need of improved logistics. For instance, in modern hospitals a close connection is needed between the emergency ward and intensive care ward, but also supporting units, such as radiology department, laboratory department and operation theatres.

In addition hereto, large investments have to be made concerning the infrastructure of the buildings. A new mechanical ventilation system means extensive construction works in canalisation ducts, shafts and fan rooms.

In order to reach prescribed fire protection, all buildings have to be completed with approved fire doors and other necessary fire protection systems. Improvement for handicapped people means new handicap toilets, new elevators, ramps to main entrances, levelling out differences in floor levels etc. All old windows must be replaced or renovated in order to save energy and eliminate unhealthy draft. Finally most facades are in a poor condition and have to be restored. In the long run the outdoor environment needs a face-lift.

When visiting Estonian hospitals we noticed that almost no hospital had an outdoor sign system.

10.2 Reconstruction of major hospitals and future use

10.2.1 Northeast catchment area

New Central Hospital

In Kohtla-Järve there should be a completely new central. We suggest immediate start of planning and construction.

Kohtla-Järve Haigla and Puru Haigla

Conversion and reconstruction into nursing homes when the new central hospital is completed.

MTÜ Rakvere Haigla and Narva Haigla

The two hospitals shall be used as secondary hospitals but with fewer acute beds and with some beds for long-term care and for nursing homes. The present hospital buildings should be up-graded to modern standard.

Sillamäe Haigla

The hospital should be closed as a secondary hospital and the patients moved to Narva. Conversion into a nursing home or tuberculosis hospital could be an alternative.

10.2.2 Northwest catchment area

Mustamäe Hospital

Mustamäe Hospital should be up-graded to become a regional hospital with multiple specialities and expanded with new capacity for additional beds and specialities. The site offers several possibilities for additional buildings. After reconstruction and extension, oncology, dermatology and infectious diseases should be moved to Mustamäe. The Children's Hospital adjacent to Mustamäe Hospital will be integrated with Mustamäe Hospital and complemented with obstetrics and gynaecology. This means rebuilding of the present children's building. Tallinn-Järve Hospital will be administratively integrated into Mustamäe as a rehabilitation clinic.

Tallinna Keskhaigla

We believe that Tallinna Keskhaigla and Magdalena Hospital will remain for a period of 10-15 years. During this period necessary upgrading must be done, but major investments should be avoided. Central Hospital together with Magdalena Hospital may in the future form the new East Hospital. These two units will form a completely new hospital and serve the eastern parts of Tallinn. The two present hospitals can be sold and converted/rebuilt for other purposes. They both have favourable localisations in the city. Magdalena Hospital could also be converted/rebuilt to a nursing home.

Western Hospital

Another central hospital can be created with Merimeeste, Merimetsa and Pelgulinna Hospitals as a core. Merimeeste Hospital is the best alternative for becoming the centre of this merger because it has free capacity and extension possibilities. There is also space on the hospital site for additional new buildings. Another advantage is the short distance to the Psychiatric Hospital. The latter has a large site also suitable for a new hospital building. Pelgulinna Hospital is split on two sides of a major street and the extension possibilities are not favourable.

Läänemaa Haigla (Haapsalu)

Reconstruction for secondary care hospital use. The number of hospital beds should be reduced and the surplus area converted into a nursing home.

AS Järvamaa Haigla

The hospital shall remain as a secondary care hospital but with fewer beds for secondary care. The surplus area can after rebuilding be used for long-term care or nursing homes.

Rapla Haigla and Keila Haigla

The two hospitals shall not remain as secondary care hospitals. They may be used as health care centres with day care, day surgery, specialist out-patient care and with departments for long-term care, rehabilitation and as nursing homes.

Hiiuma Haigla

The number of inhabitants on Hiiumaa is too small to justify a secondary care hospital with 24 hour service. The Hiiuma Haigla will be converted into a health care centre with specialists and a few observation beds. For secondary care the inhabitants must rely on Läänemaa Haigla or the hospitals in Tallinn. For urgent cases a helicopter service must be used. Some of the ward department beds can be converted to a nursing home.

Kallavere Haigla

The hospital shall be converted into a nursing home.

10.2.3 Southeast catchment area

AS Tartu Ülikooli Kliinikum

Planning and construction of a new university hospital is urgent. Since the present 1280 beds are estimated to decrease to about 620 (excluding psychiatric beds) our main alternative for the Tartu University Hospital is to construct a completely new building complex and only use

the Maarjamoisa polyclinic of the existing buildings. From functional and logistic point of view this should be the most favourable alternative.

A less favourable but cheaper alternative is to use the Maarjamoisa Hospital as an integrated part of the new university hospital. If the present Maarjamoisa Hospital is kept it could after reconstruction house about 300 beds. The gross area is 35800 sqm and the reconstruction cost can be estimated to approximately 429 million EEK. A new construction will add another 320 beds. The added area will be about 41 860 sqm gross with an estimated construction cost of about 628 million EEK.

This alternative will thus cost approximately 1057 million EEK to compare with our main alternative with an estimated cost of 1209 million EEK. The difference between the two alternatives will be approximately 152 million.

AS Võrumaa Haigla

Reconstruction for secondary care hospital uses in collaboration with AS Põlva Haigla. The number of hospital beds should be reduced and the surplus area converted into a nursing home.

Viljandi Maakonnahaigla

Reconstruction for secondary care hospital uses. The number of acute beds should be reduced and the surplus area converted into nursing home beds. A possible option is to integrate a new psychiatric clinic with the hospital.

AS Valga Haigla

Valga hospital should be converted into a rehabilitation centre including a centre for home care. The hospital can also be used as a health care centre including basic day surgery. It could also for some time be used for elective surgery, e.g. orthopaedic operations now done at the hospital in Elva, until the new hospital in Tartu is finished.

Põlva Haigla

The hospital shall no longer have secondary care beds. It can be used as a health care centre with specialists and with day care, day surgery etc. Some rebuilding must be done. The ward departments can after rebuilding be used for long-term care, rehabilitation and as a nursing home.

Elva Haigla

The hospital can be used as a health care centre with long-term care and nursing home facilities. The orthopaedic department should in principle be moved to Tartu. At the present time there may be space constraints in Tartu. Valga can in such a case for some time be used as a relief facility.

Jõgeva Hospital

The hospital shall no longer be used as a secondary care hospital. It may be used as a health care centre.

10.2.4 South-west catchment area

Pärnu Haigla

There is in Pärnu already a skeleton for a new central hospital. The plan for this hospital should be urgently up-dated and a new hospital then finished as quickly as possible.

Kuressaare Haigla Sihtasutus

The hospital should be reconstructed for secondary hospital use. The number of hospital beds should be reduced and the surplus area converted into a nursing home.

10.2.5 Monoprofile hospitals

The monoprofile hospitals shall in principle be closed and integrated into the secondary and tertiary care organisation. There are however some exceptions.

Psychiatric care

We propose that the psychiatric hospitals in Tallinn, Jämejala and Tartu should be totally reconstructed. The number of hospital beds should be radically reduced. Clinics for child and adolescent psychiatry should be connected to the regional hospitals in Tallinn and in Tartu.

Hospitals for tuberculosis

There is a need for a special hospital for MRI-patients. A reconstruction of Kose has been proposed and is a suitable option.

Kohtla-Järve Kopsuhaigla must be completely renovated or moved to another facility, i.e. Sillamäe Hospital.

Kivimäe Haigla must be completely renovated. The future medical profile is unclear.

10.2.6 Small country-side hospitals

Several small hospitals in the countryside such as Lihula, Sindi, Võnnu and Rõngu should be closed since the buildings are unsuitable for health care activities and/or too expensive to rebuild. Some may be used as health care centres but the need for this is questionable.

11. PRIORITIES AND IMPLEMENTATION

11.1 Priorities

The implementation of this plan can be subdivided into immediate measures and long-term planning activities.

Among the immediate measures we suggest are the phase-out and substitution of the long-term hospitals in Tallinn and Tartu, the completion of Pärnu new hospital building, the

establishment of a special hospital for tuberculosis and the concentration of all hospital beds in Valga to the new building.

Simultaneously the planning for a new Tartu University Hospital, a reconstruction and expansion of Mustamäe Regional Hospital and a new central hospital in Kohtla-Järve/Jöhvi should start.

The priorities are based on the following:

The long-term care hospitals in Tallinn and in Tartu are in an extremely bad condition with insufficient possibilities to give adequate care to the patients.

Pärnu Hospital is under planning and with some adjustments it can easily be completed within a couple of years. However, the number of beds must be reduced. For a period of time the old hospital may serve with buffer beds before the average length of stay has decreased to the estimated 4,5 days.

As previously mentioned there is an urgent need for a special hospital for patients with multiresistant infections (MRI). After the necessary planning Kose Hospital can in a short time be rebuilt and adapted for this purpose.

In Valga one of the old buildings is still used while there is free space in the new building. This is not acceptable from an economic point of view. All services should immediately be concentrated in the new building.

Tartu University hospital is spread over many different buildings. These are often very narrow and in poor condition. With respect to the advanced medical treatment carried out in these facilities and the education of medical staff it is of high priority to improve the situation with a new hospital complex. The planning, building and equipment period is estimated to approximately 5 years.

We propose Mustamäe Hospital to be the regional hospital for northern Estonia. To fulfil this mission there is a need to add some specialities, i.e. paediatrics, obstetrics and gynaecology, dermatology, oncology, infectious diseases and psychiatry. The planning for Mustamäe must be carried out before planning for the central hospitals in western and eastern Tallinn.

The situation in the Kohtla-Järve area is almost chaotic with many different hospitals in rather poor condition. A new central hospital will significantly improve the situation and allow for the elimination of buildings, or to convert them for other use.

11.2 Implementation

Depending on the future financial situation in Estonia we suggest three alternative scenarios for the rebuilding process:

1. *The bold scenario.*

All major hospitals, one in each catchment area, will be planned and constructed simultaneously as soon as possible. All necessary steps for evacuation and re-organisation in accordance with this will start as soon as possible.

Secondary hospitals will be rebuilt later. Hospitals that shall no longer house secondary in-patient care will be rebuilt one after another during the whole implementation period.

This alternative implies that most of the investment volume will be made during the first 5 years or so of the implementation period.

2. *The middle course scenario*

The four major hospitals and the secondary hospitals will be rebuilt one after another during the coming 10-15 years.

Secondary hospitals will be rebuilt later. Hospitals that shall no longer house secondary in-patient care will be rebuilt in the same way during the whole implementation period.

This alternative leads to a fairly even investment level during the whole implementation period.

3. *The cautious alternative*

An economical alternative based on re-use of many existing buildings and/or postponing some building phases.

In this alternative Pärnu, Mustamäe and Tartu start their process immediately, but relocation of some units to these hospitals will have to wait; i.e. the oncology department to Mustamäe. In Tallinn the future East Hospital will also have to wait.

The concept in Tartu will not include a completely new facility but will be based on a renovation of the present Maarjamoisa Hospital and an addition of a new annex building.

The hospital in Kohtla-Järve will be used for the time being and will be rebuilt later.

Hospitals that shall no longer house secondary in-patient care will be rebuilt one after another during the whole implementation period.

Although this alternative is slower it still includes a significant investment being made during the first five years of the implementation period. The pace of investments will however be slower and the total volume of investment a bit smaller than in the other alternatives.

12. APPENDICES

Appendix A	Hospital visits
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