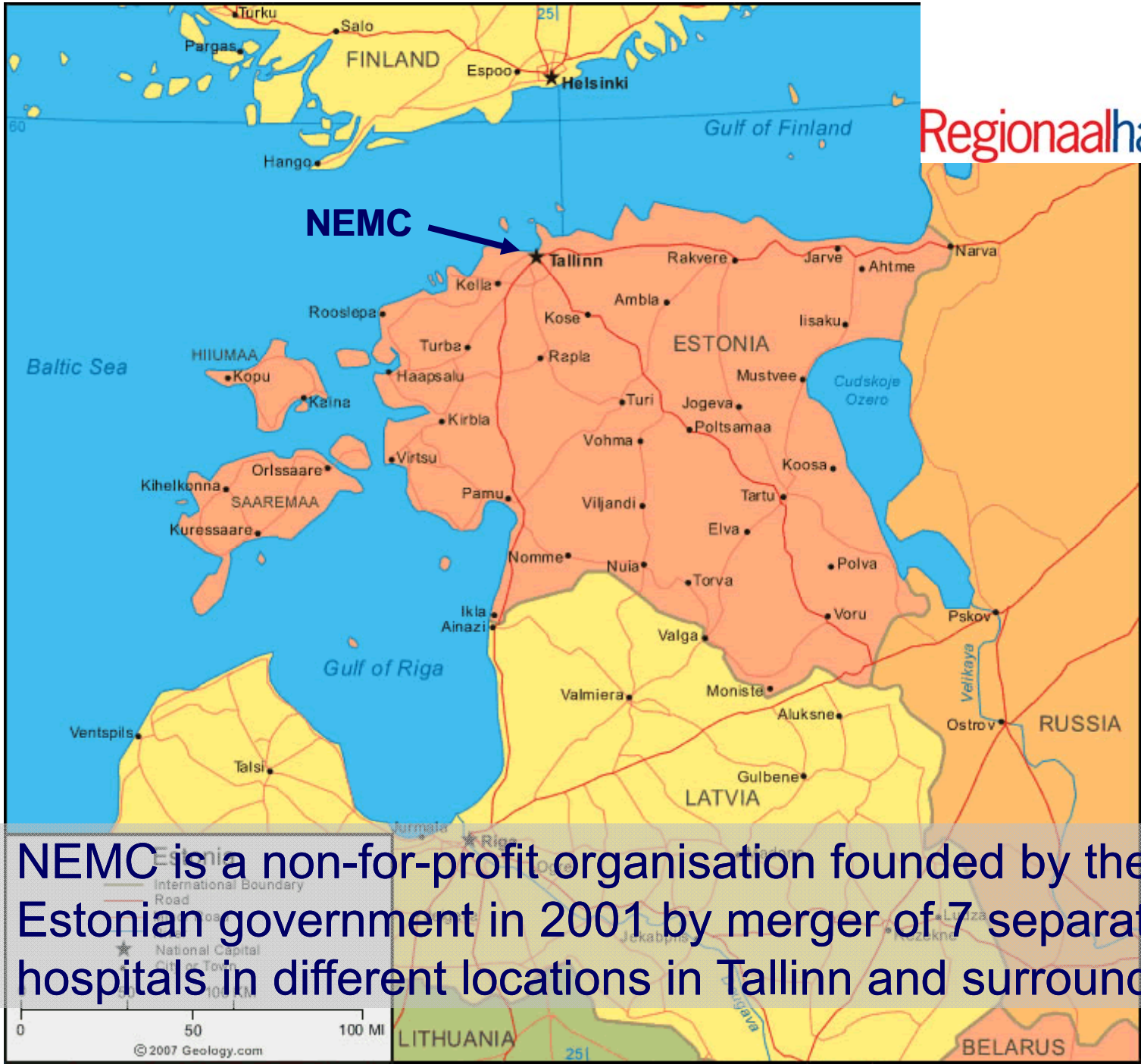


# North Estonia Medical Centre



***Andrus Arak, MD PhD - Clinical Coordinator on Oncology  
North Estonia Medical Centre - Tallinn, Estonia***

***OEI General Assembly - Genova, 24 May, 2008***



- NEMC is a non-for-profit organisation founded by the Estonian government in 2001 by merger of 7 separate hospitals in different locations in Tallinn and surround



**One of these was the Estonian Cancer Centre,  
the provider of all kind of medical services for  
cancer patients over six decades**



## NEMC

- is now the foremost and **biggest hospital in Estonia**  
operates as a tertiary care hospital
  - provides services in almost all medical specialties  
(*excl. paediatrics and obstetrics*)
  - catchment area approx 1 million inhabitants
  - 1 340 beds and 3 473 employees  
(incl. 544 doctors and 1282 qualified nurses)
  - 363,264 outpatient contacts
  - 38,796 hospital admissions
  - 61,153 surgical procedures (NCSP) in 2007



## Education

- NEMC operates as teaching hospital for students in medical and related specialties (medical physicists, biomedical engineers, social sciences, etc.) from
  - Tallinn University, Tallinn University of Technology, University of Tartu
  - Tallinn Health College and Tartu School of Health Care
- NEMC is a training center for approx 100 residents per year
- NEMC offers opportunities for continuing medical education in most medical specialities

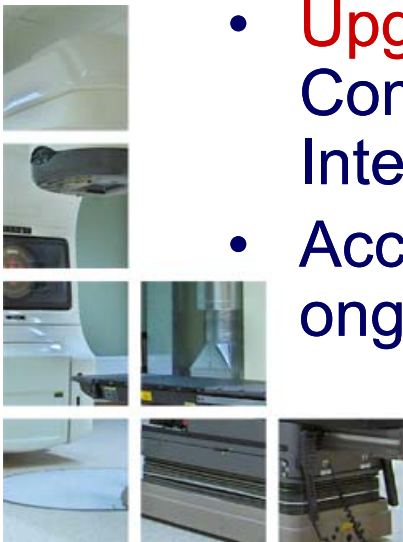


## Research and Development

Regionaalhaigla



- **Estonian Cancer Registry** is evolved from the registry of the Estonian Cancer Centre
- NEMC is one of the founders of the **Competence Centre for Cancer Research** in Tallinn
  - created to develop new diagnostic and treatment methods
- **Project of transplantation of stem cells** separated from peripheral blood in collaboration with the Göteborg University Hospital
- **Upgrading the radiotherapy unit** to a National Competence Centre in collaboration with the International Atomic Energy Agency
- Accepted experience in **clinical trials**, there are 21 ongoing clinical trials in oncology at present



# Oncology

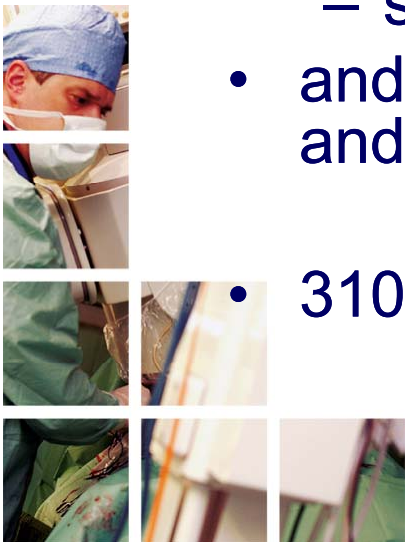


- NEMC provides > 60% of all oncological services in Estonia
- For some rare cancer sites it is the only treatment centre in Estonia
- Approach in principle for cancer care - decision-making and treatment of patients by organ-based multidisciplinary teams following the evidence based guidelines (*NCCN guidelines for most sites*)



## Oncology

- **Cancer surgery** is performed in specialised departments for
  - gastro-intestinal
  - thoracic
  - head-and-neck
  - gynecological
  - breast
  - skin/soft tissue tumors
- and in the departments of orthopedics, neurosurgery and urology
- 3100 cancer patients were operated on in 2007



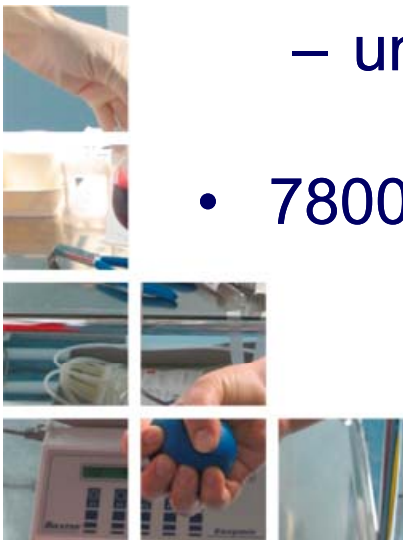


# Oncology



- **Medical oncology** in NEMC is a complex of services including
  - centralized preparation unit in pharmacy
  - the department of medical oncology for patients with solid tumours
  - the department of hematology, for patients with leukemias/ lymphomas and for stem cell transplantation
  - units for supportive care

- 7800 cycles of chemotherapy were performed in 2007



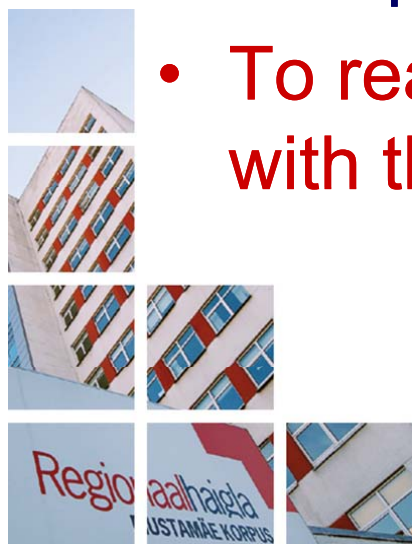
## Oncology

- The department of **radiation oncology** is equipped with
  - CT-simulator for treatment planning
  - Varian brachytherapy machine (*Gammamed Plus*)
  - 2 modern linear accelerators (Varian, 2<sup>nd</sup> Linac is installed in May, 2008) → 4 accelerators in 2012
- 18 000 external radiotherapy fractions and 500 brachytherapy sessions were performed in 2007



# In conclusion

- As a successor of Estonian Cancer Centre NEMC's aim remains to be a National Cancer Centre
- Vision of NEMC is to become a recognised accredited, integrated and harmonised Comprehensive Cancer Centre in Europe
- To realise this NEMC applies for membership with the OECD-EEIG as Full Member



Thank you for your attention





# Healthcare System in Estonia

The current healthcare system was created by the Hospitals Master Plan 2015 in 2000.

The territory of Estonia is divided into four major catchment areas, namely:

- North-west
- North-east
- South-west
- South-east

Each major area has to have a hospital network, which provides medical services carried out by a regional/ university hospital and/ or central hospital.

A hospital should be situated max. 70 km (1 hour) from a potential patient.

# The Levels of Hospitals

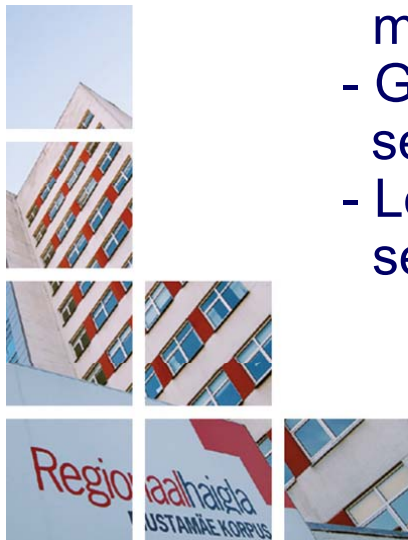
## Tertiary care providers

- North Estonia Medical Centre (NEMC)
- Tartu University Hospital
- Tallinn Children's Hospital

(Population area of medical services 0.5-1 mln people)

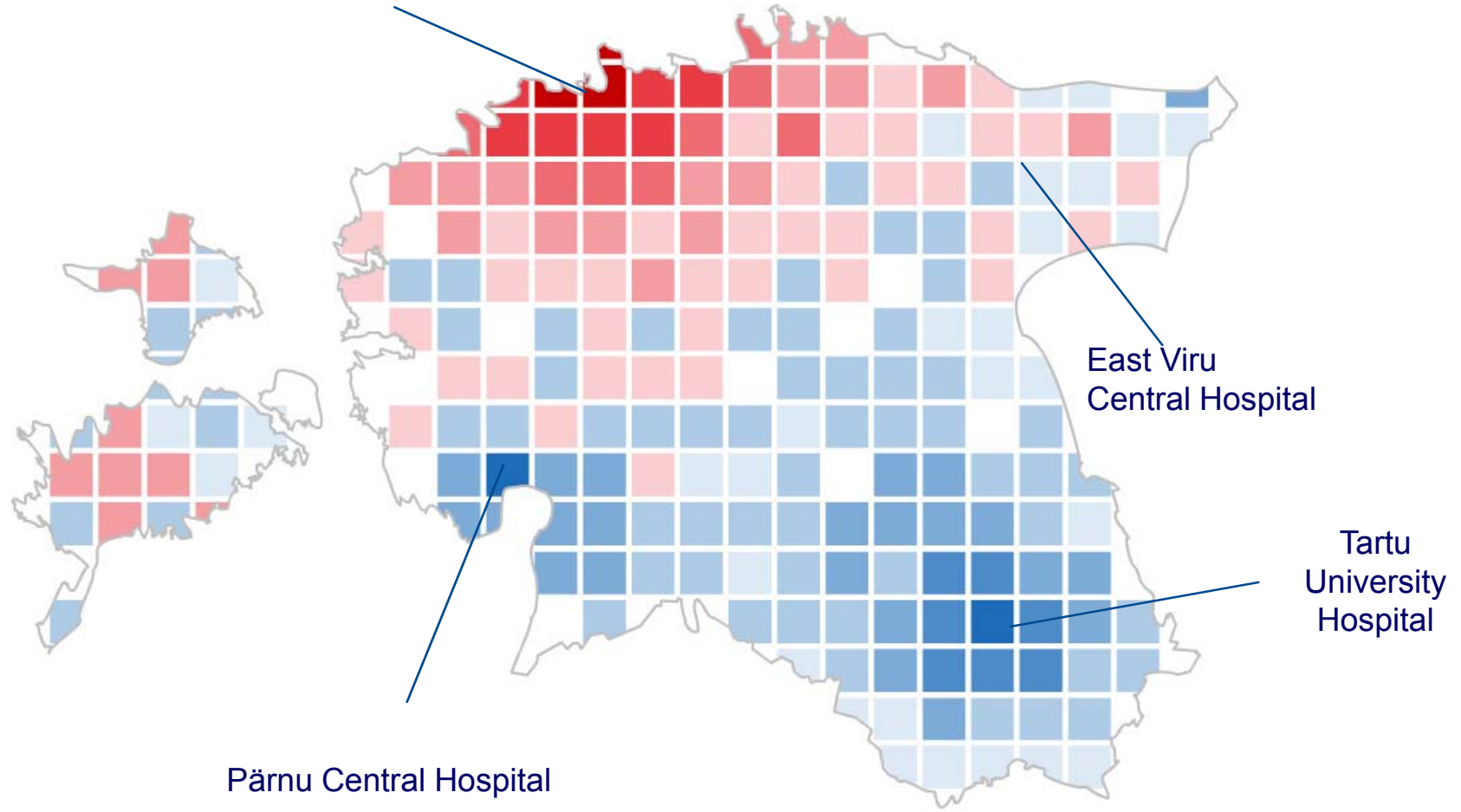
## Secondary care providers

- Central Hospital Level (Population area of medical services 100,000-200,000 people) – 4 hospitals
- General Hospital Level (Population area of medical services approx. 100,000 people) – 11 hospitals
- Local Hospital Level (Population area of medical services approx. 35,000-75,000 people) – 3 hospitals



**North Estonia Medical Centre**

- Tallinn Children's Hospital
- East Tallinn Central Hospital
- West Tallinn Central Hospital



Additionally 11 General Hospitals and 3 Local Hospitals.



# Health Care Financing in Estonia

Mandatory health insurance after the restoration of independence (1991) starting January 1992

- Each employer pays 13% of the total payroll to the Health Insurance Fund.
- Health Insurance Fund reimburses healthcare services 50% on a fee-for-service basis and 50% on DRG basis by contracting of health care institutions.
- All health care institutions shall be licensed companies or foundations.

# North Estonia Medical Centre

Foundation established by the government act on July 25, 2001 by the merger of 6 different hospitals in Tallinn.

These were: Mustamäe Hospital (emergency), Estonian Cancer Centre, Psychiatric Hospital, Kivimäe Hospital (pulmonology), Hospital of Dermatological Diseases, Clinic of Occupational Diseases

Later two more institutions were merged.

In 2003 Hospital of Keila (incl. Ambulance) and in 2006 North Estonian Blood Centre, were merged to the North Estonia Medical Centre (NEMC).

The main buildings are situated in Mustamäe, Hiiu, on Paldiski Road, Ädala Street, Kose and Keila.



## Merged Hospitals

Hospital name	Beds		Personnel	
	Before merger	01.01. 2007	Before merger	01.01. 2007
Cancer Centre (1946-2001)	214	173	418	408
Dermatologic Hospital (1944-2001) *	85	30	94	62
Keila Hospital (1940-2003)	324	185	577	374
Mustamäe Hospital (1979–2001)	520	622	1 531	2 011
Psychiatric Hospital (1903-2001)	350	230	446	362
TBC & Pulmonology Hospitals (1940-2001)	309	100	279	74
North Estonian Blood Centre (1941-2006)	0	0	112	78

\* Including personnel of centres of occupational and dermatological diseases

# Vision and Mission

To be a recognised medical centre in Europe.

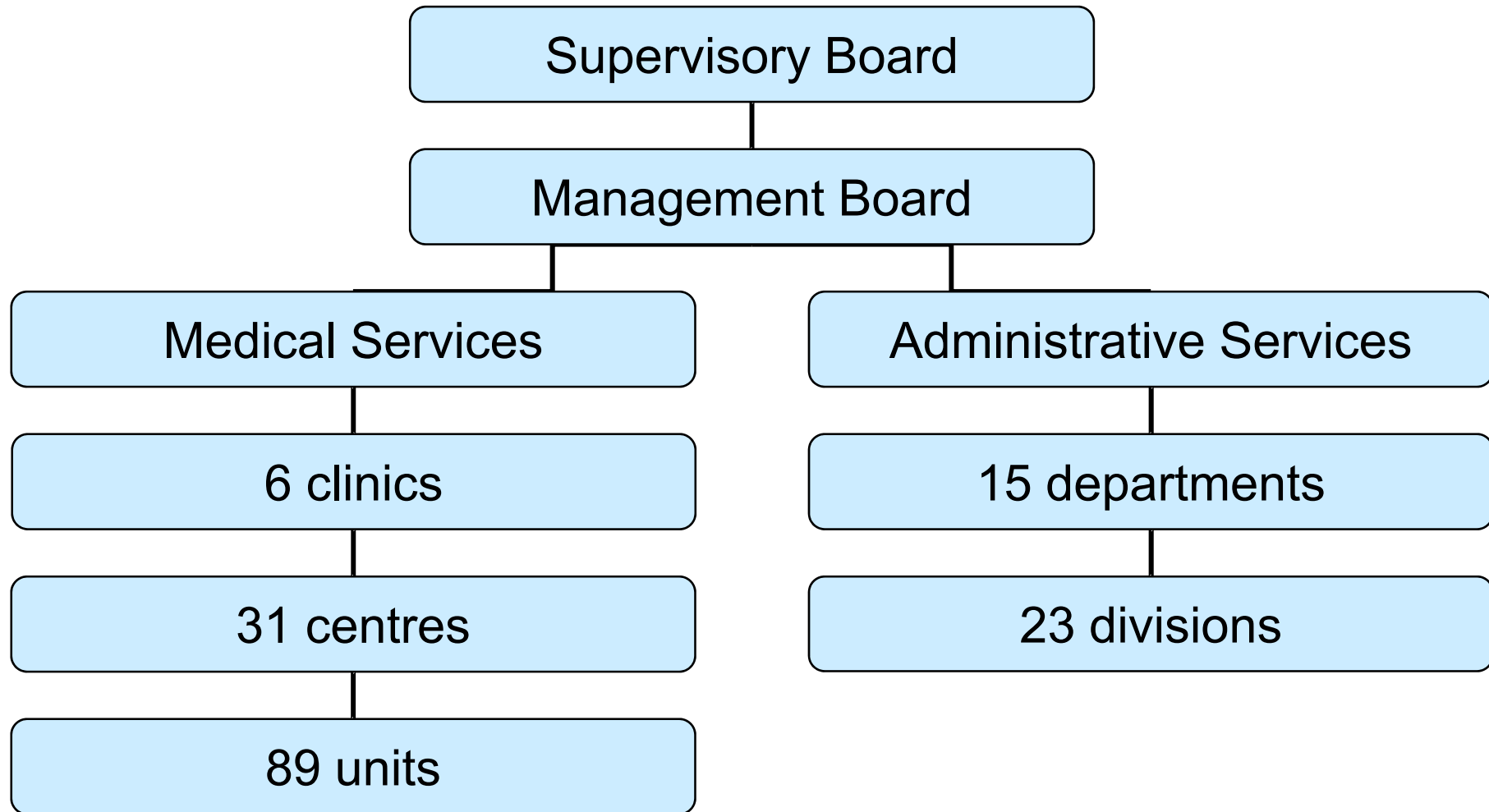
*(Vision)*

To assure medical security to the Estonian population and health care system as a multi-profiled hospital providing acute care. To be in the forefront in teaching, scientific and developmental work in medicine and health care.

*(Mission)*



# Management Structure



Medical operations are managed through five clinical divisions – Anaesthesiology Clinic, Diagnostics Division, Surgery Clinic, Psychiatry Clinic and Internal Medicine Clinic – and Keila Hospital

# Personnel

<b>Position</b>	<b>2002</b>	<b>2005</b>	<b>2007</b>
Physicians	429	426	480
Residents	37	76	111
Provisors	6	7	8
Qualified nurses	1,057	1,207	1,282
Other nursing personnel	611	799	810
Laboratory assistants	8	79	99
Support services personnel	641	654	683
<b>TOTAL</b>	<b>2,752</b>	<b>3,248</b>	<b>3,473</b>

\* 31.12

## Health Services and Health Indicators

<b>Indicator</b>	<b>2002</b>	<b>2006</b>	<b>2007</b>
Number of outpatient contacts	330,805	342,476	363,264
<i>incl. emergency</i>	61,206	59,511	61,466
Number of hospital admissions	34,353	36,484	38,796
<i>incl. emergency</i>	15,216	17,394	17,359
Number of bed days	355,342	366,786	373,824
Average length of stay	10.3	10.1	9.6
<i>incl. acute care</i>	7.6	7.2	7.0
Number of surgical procedures (NCSP)	...	57,624	61,153
<i>incl. number of surgical operations (WHO)</i>	21,574	23,369	24,765

# Surgical Operations

<b>Operation</b>	<b>2002</b>	<b>2006</b>	<b>2007</b>
Total surgical operations	21,574	23,369	24,765
Outpatient surgery operations	5,641	4,939	5,098
Inpatient surgery operations	15,933	18,430	19,667
<i>incl. hip replacement</i>	229	370	360
<i>incl. coronary bypass</i>	360	509	526
Coronary angioplasty	372	816	903



## Diagnostic Procedures

Diagnostic procedure	2002	2006	2007
Functional diagnostics	79,983	80,530	87,829
Endoscopy	8,861	9,479	10,619
Ultrasonography	32,591	48,477	63,544
X-ray examinations	134,530	189,266	213,964
<i>incl. coronarography</i>	<i>1,075</i>	<i>1,922</i>	<i>1,990</i>
<i>incl. CT</i>	<i>14,686</i>	<i>46,072</i>	<i>61,202</i>
<i>inc MRI</i>	<i>2,751</i>	<i>555</i>	<i>5,346</i>
Laboratory tests	1,126,739	1,772,319	1,970,574

# Hospital Discharges by Disease Groups

Disease group	2002		2006		2007	
	Patients	%	Patients	%	Patients	%
Neoplasms	6,957	21.2	8,597	23.6	9,955	25.7
Diseases of the circulatory system	6,064	18.4	8,151	22.4	8,496	21.9
Injury, poisoning	3,377	10.3	3,721	10.2	3,858	9.9
Mental and behaviour disorders	3,679	11.2	3,269	9.0	3,399	8.8
Diseases of the digestive system	2,754	8.4	2,788	7.6	2,811	7.2
Diseases of the musculoskeletal system	2,750	8.4	2,675	7.3	2,743	7.1
Diseases of the respiratory system	2,636	8.0	2,374	6.5	2,535	6.5

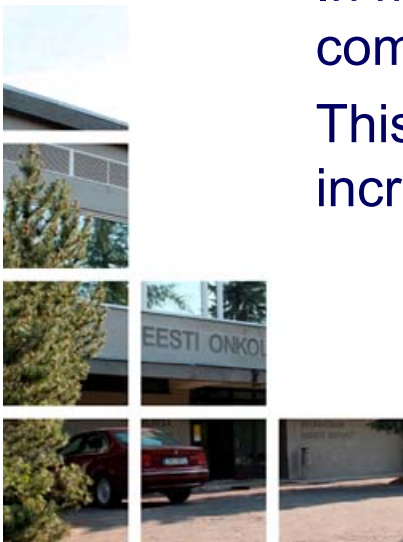
# International Collaboration

In 2006 in Northern Estonia the project of transplantation of stem cells separated from peripheral blood was initiated in collaboration with the Department of Haematology of the Göteborg University Hospital. Before this a stem cell laboratory for processing and conserving the separated stem cells was created.

In 2006 stem cells were collected and after intensive chemotherapy retransfused in 12 patients with multiple myeloma and malignant lymphoma.

In most patients a positive clinical response was achieved, and complications were reversible.

This year the number of treated patients is planned to be increased and the indications of treatment to be expanded.



# IAEA Assistance Through the National TCP in the Field of Radiotherapy

Upgrading the radiotherapy unit to a national competence centre with collaboration of the International Atomic Energy Agency (IAEA) has been carried out now for 10 years.

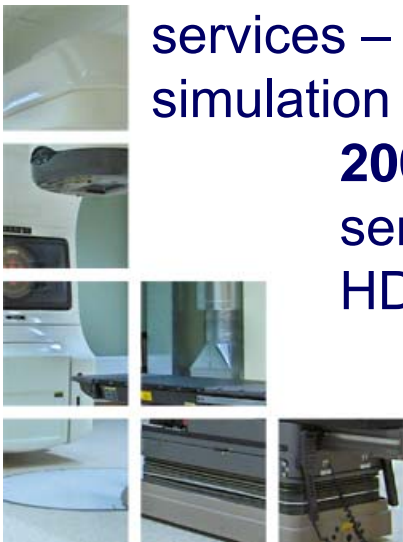
**1997-2000** – QA System in Radiotherapy – upgrading the tools for absolute dosimetry in radiotherapy services

**2001-2002** - Upgrading the dosimetry practices in oncology services – implementation of in vivo dosimetry

**2003-2004** – Upgrading the efficiency of radiotherapy services – upgrading treatment planning systems and simulation process

**2005-2006** – Increasing the efficiency of radiotherapy services – upgrading radiotherapy equipment (new Linac, HDR brachytherapy unit)

**2007-2008** – Increasing Radiotherapy Capacities in Estonia (new Linac with stereotactic capabilities)



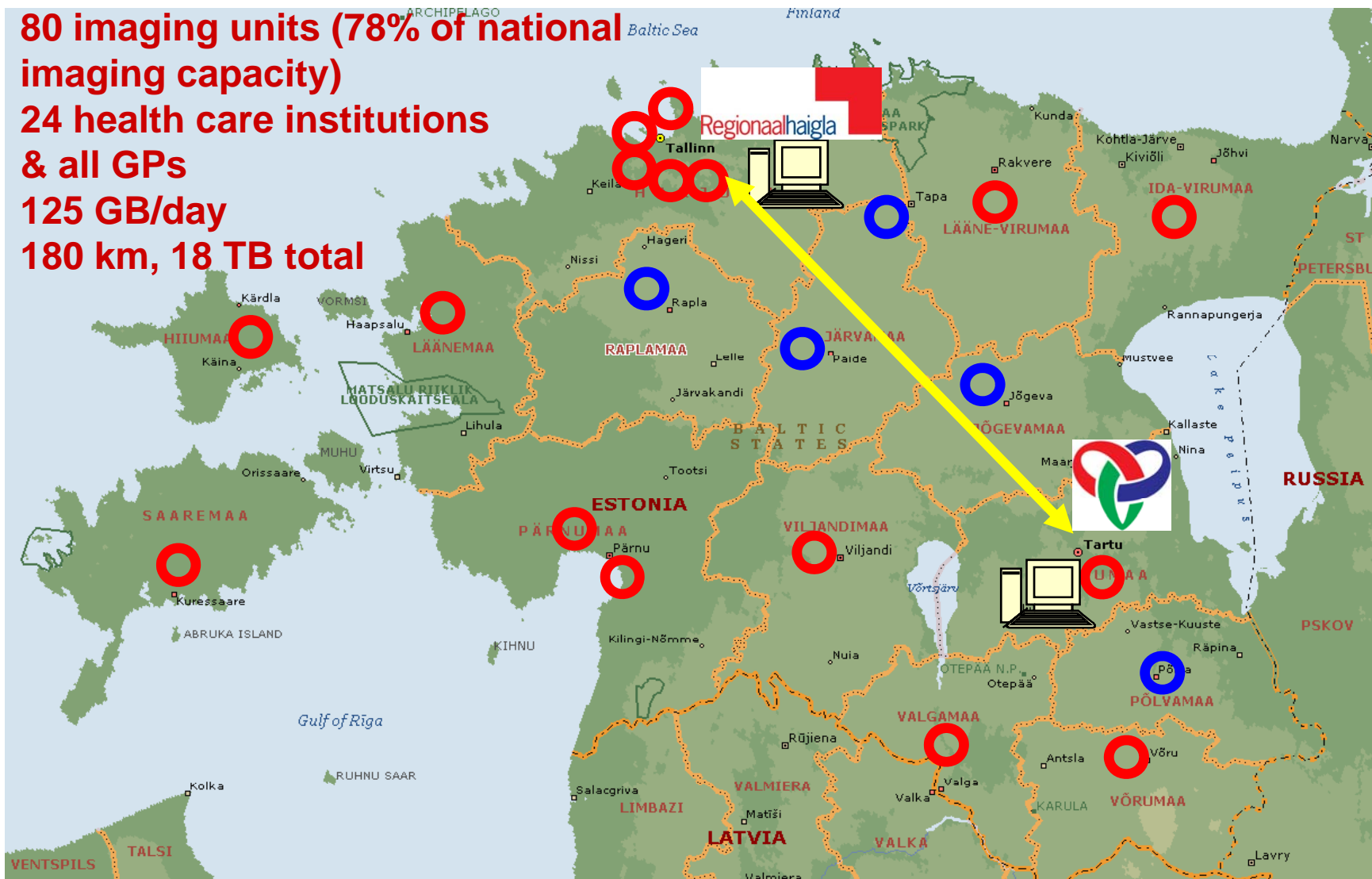
# Estonian PACS

In collaboration with the Tartu University Hospital a set up of nationwide PACS (Picture Archiving and Communication System), which is one of the initials for implementing the Estonian E-medicine project, was initiated. This is the first nationwide PACS in the world.



# Estonian PACS

**80 imaging units (78% of national imaging capacity)**  
**24 health care institutions & all GPs**  
**125 GB/day**  
**180 km, 18 TB total**



# Estonian E-health

In 2005 the Ministry of Social Affairs initiated four e-health projects with support from the European Union structural funds: digital medical history, digipictures, digital registry office and digiprescription. When these are applied a unique health care information system comprising the whole country will be created.

In 2007 the pilot project for transition to digital medical history was initiated. During the project technical solutions will be tested. 3 hospitals participate in this pilot project: North Estonia Medical Centre, Tartu University Hospital and East Tallinn Central Hospital.



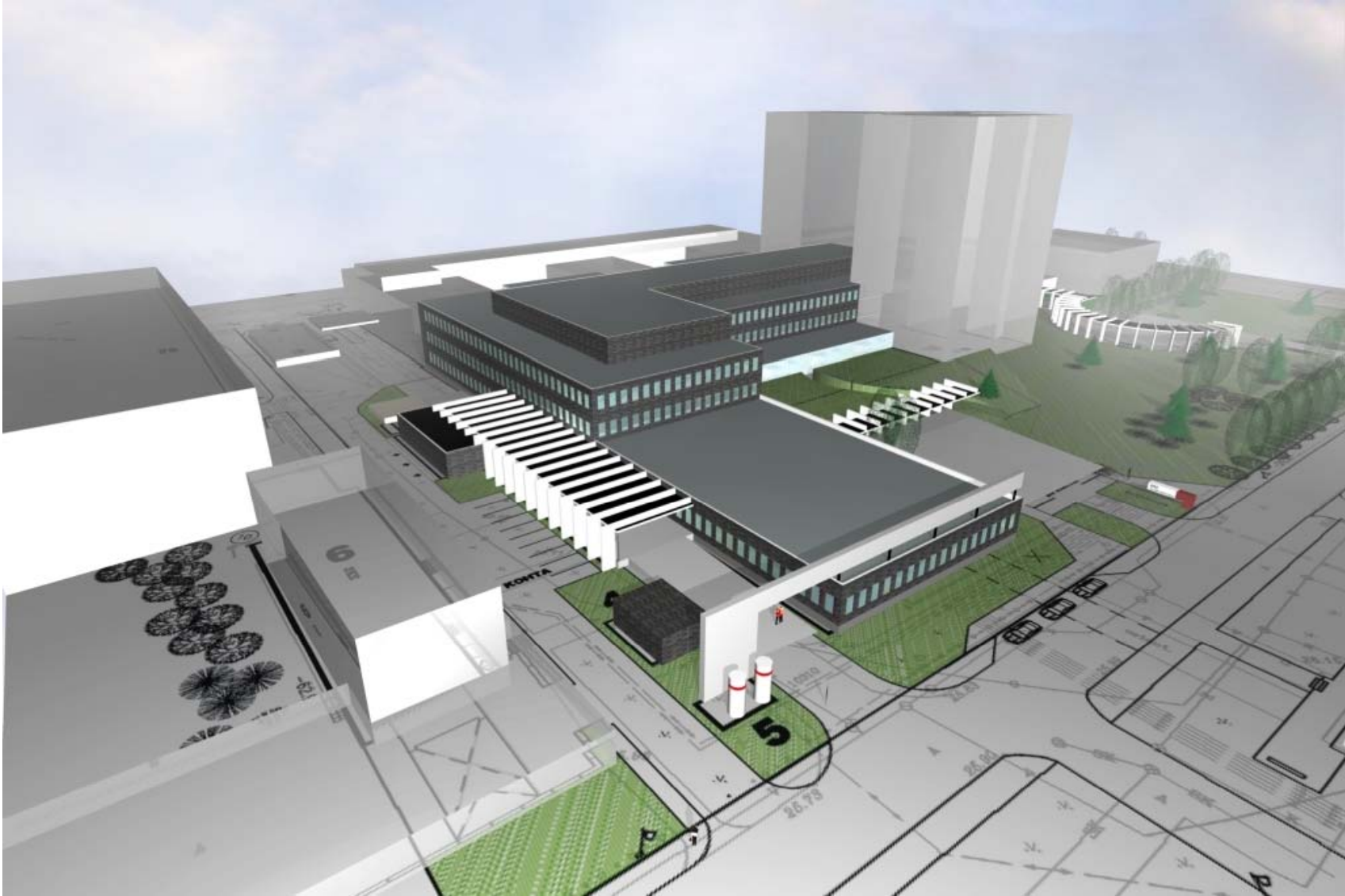
# Strategic Developments

- to concentrate high-tech acute care and to enhance the **Mustamäe Medical Campus**;
- to focus on defined medical problems;
- to achieve readiness for accreditation;
- to optimise business processes by development of medical and IT technology and partnership with other care providers;
- to develop scientific and educational relationships with local and European universities and institutions;
- to motivate and train personnel to go through change and development;
- to enhance the publicity of the hospital.





# Infrastructure Developments



# New Treatment and High Technology Building

It has been designed to create a high-tech treatment and diagnostics centre for the Mustamäe complex.

The new block will be a five-storey building with 26,900 m<sup>2</sup> of floor space (incl. underground and technical floor).

New building (X-building) will contain:

- centres of anaesthesiology, intensive care and emergency care of the Clinic of Anaesthesiology;
- operation centre with 17 operation theatres of the Clinic of Surgery;
- central sterilisation;
- radiology centre and unit of isotope diagnostics of the Clinic of Diagnostics;
- Department of Radiotherapy with 4 radiotherapy canyons and a treatment planning unit of the Clinic of Internal Diseases;
- hospital chemist for managing and preparing medications, incl. cytostatic drugs