Radiotherapy Physics Education in the Russian Federation Today

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Current Situation in the CIS countries

Population is about 300 million, common Russian language and common problems in radiation oncology:

- 30 years backwardness from developed countries
- staff shortage of radiation oncology team
- poor staff qualification
- outdated equipment - 90% of which is morally and physically obsolete, 75% of clinics have a poor level of equipment;
- lack of finance for the RT modernization
- only 30% of cancer patients receive radiotherapy instead of 70 % requiring it and only 3% at the highest quality level

Azerbaijan

Belarus

Kyrgyzstan

Russia

Ukraine

Armenia

Kazakhstan

Moldova

Tajikistan

Uzbekistan

Radiotherapy in Russia

	Availability	Number/1mln population	Estimated needs
Radiotherapy departments	141	0,99	500
Linear accelerators	139	0,97	650
Co-60 units	234	1,64	200
Simulators	42	0,29	141
TPS	162	1,13	425
Medical Physicists in RT	300	2,10	1800

Medical Physics Academic education

- Nominally, there are **12 Medical Physics Departments (Chairs)** in Russian Universities but only **3** of them (two in Moscow and one in Saint Petersburg) provide proper basic education and produce **only 30 medical physicists** per year.
- At present the **traditional educational system** does not provide **proper training of medical physicists** for radiotherapy mainly due to the lack of clinical bases in universities;
- Traditionally, there is one-level educational structure in Russia, thus instead of bachelor and master degrees there is only specialist degree which takes approximately 5 years and a half.
- Nowadays some universities are **in a transition stage to** deliver a system with **two educational levels** (Bachelor and Master of Medical Physics).

Medical Physics Academic education standards

- Common humanitarian and socio-economic disciplines (foreign language, history, economics, etc.) - **1800 hours**
- General mathematical and natural sciences (mathematics, general physics, chemistry, etc.) - **3440 hours**
- General professional disciplines (physics) - **1310 hours**
- Specialization subjects (biology, anatomy and physiology, biochemistry Medical Biophysics non-ionizing radiation. Basics imaging Radiation Physics. Medical electronics and transducers. -**1532 hours**
- Other disciplines - **1098 hours**
- The total duration of - **9180 hours**

Group of the Russian non-governmental and nonprofit organizations in radiation oncology and nuclear medicine

Association of Medical Physicists in Russia, 1993

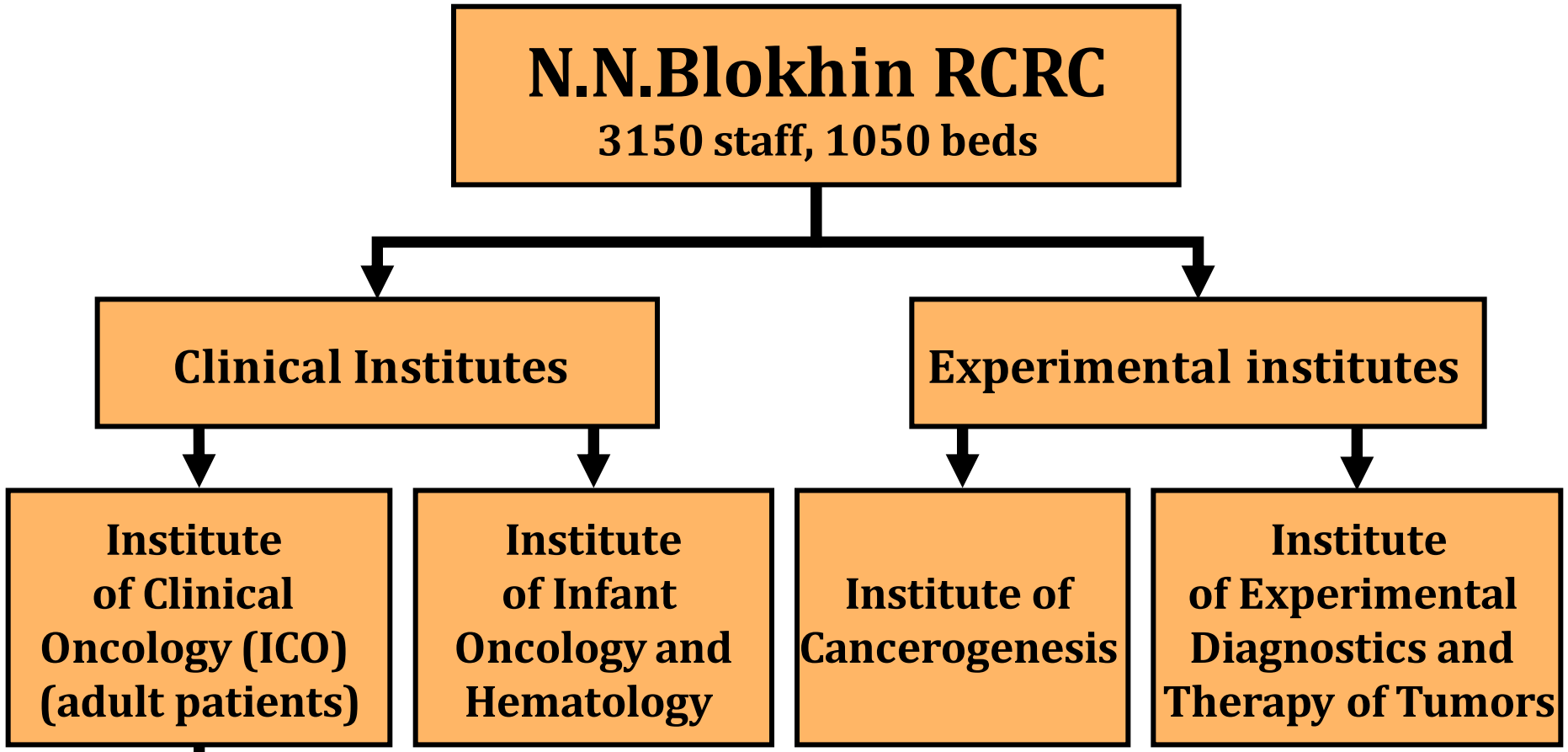
Journal “Meditsinskaya Fizika” (Medical Physics) Techniques, Biology, Clinic, 1995

Institute of Medical Physics & Engineering, 2004

Radiation Oncology Society, 2011

Journal “Radiation Oncology and Nuclear Medicine”, 2011

N.N.Blokhin RCRC



Radiation Oncology Division in RCRC

External beam radiotherapy department

Brachytherapy department

Medical Physics Department

STAFF:

- Radiation oncologists - 34 + 6 residents
- Medical physicists - 20
- RTTs (nurses) - 15
- Service engineers - 5

RCRC Equipment

- 4 high-energy Varian Clinac IX machines with Millennium 120 MLC, OBI, EPID, IMRT, RapidArc, Gating;
- 2 low-energy - Varian Clinac 600CD and 6EX machines with Millennium 120 MLC, EPID, IMRT, Gating;
- CyberKnife
- 1 Russian Co60 unit ROCUS;
- 1 Philips SL 75-5
- 2 Varian Acuity simulators;
- MRI 0.35 GE Signa Ovation;
- PET and SPECT are available in diagnostic departments

International Training Center on medical physics, radiation oncology and nuclear medicine

- Postgraduate training courses for medical physicists, radiation oncologists, radiation surgeons under the auspices of the International Atomic Energy Agency (IAEA), the State Atomic Energy Corporation ROSATOM (ROSATOM), Moscow Engineering Physics Institute (MEPHI) and Radiation Oncology Society (ROS)

- Got positive assessment from IAEA Quality Assurance Team for Radiation Oncology after their audit mission in October 2013.

International Training Center on medical physics, radiation oncology and nuclear medicine

- The faculty consists of 50 professors with clinical experience and technical expertise.
- 29 Doctors of Sciences, 9 Ph.D. (29 professors are from the RCRC)
- More then 1000 specialists have been trained during last 15 years
- More then 200 specialists have been trained during last 2 years
- More then 100 specialists will be annually trained there
- The training program is structured in 4 modules of 1-4 week duration.

- 3 new programs will be started in 2014 (2 of them as a part of Project RER/6/030, and 1 was developed with focus on current needs of Russian oncology departments).
- 1 new fellowship program will be started in 2014 as a part of Project RER/6/030

Train the trainers

Train-the-trainers events in 2013-2014

- Participation in training courses and conferences in 2013-2014:
  - IMRT and other conformal techniques in practice, Stockholm
  - ESTRO 32, Barcelona
  - Advanced treatment planning, Utrecht
  - ESTRO33, Vienna
  - ICMP 2013
  - ESTRO Forum 2014, Geneva
  - Dose Modelling and Verification for external beam radiotherapy, Prague
  - Basic Clinical Radiobiology, Istanbul
  - Imaging Courses for Physicists, Porto
  - PTQOG, Shanghai

Overall over 30 participations in international educational curses and conferences were fully supported during last 2 years.

Cooperation with the IAEA

- Continuously – the IAEA/WHO TLD postal audit operator on the territory of Russia

- 2012-2013 – RER/6/025, Building Capacity for Medical Physics in Radiation Oncology at the International Training Center (EARTH) for the Commonwealth of Independent States (CIS) Region

  US$ 840 000 ROSATOM cash contribution

  US$ 373 000 ROSATOM in-kind contribution

- 2014-2015 – RER/6/030, Building Capacity for Medical Physics in Radiation Oncology in the Commonwealth of Independent States

  US$ 880 000 ROSATOM cash contribution

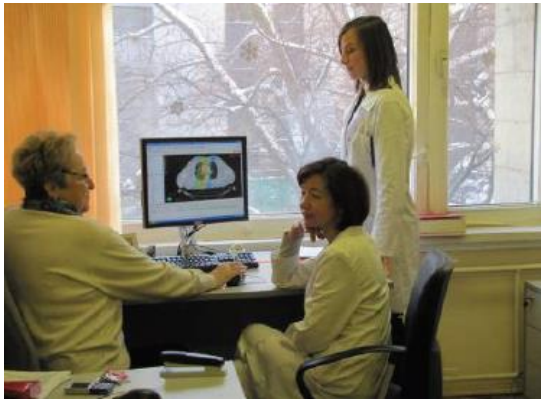
  US$ 575 000 ROSATOM in-kind contribution

International Training Center on medical physics, radiation oncology and nuclear medicine

Postgraduate education in medical physics for the Russian speaking specialists under the IAEA Technical Cooperation Projects RER/6/025 and RER/6/030 – Building Capacity for Medical Physics in Radiation Oncology at the International Training Center (EARTH) for the Commonwealth of Independent States (CIS) Region.

Schedule of the AMPR/IAEA courses in **2012-2013 within RER/6/025** :

- **December 3-14, 2012**
  Regional Training Course on Dosimetry and Quality Assurance of External Beam Radiotherapy
- **March 18–29, 2013**
  Regional Training Course on Commissioning and Quality Assurance of Treatment Planning Systems
- **April 1–12, 2013**
  Regional Training Course on Dosimetry and Quality Assurance of External Beam Radiotherapy
- **September 16–28, 2013**
  Regional Training Course on Commissioning and Quality Assurance of Treatment Planning Systems
- **November 11–29, 2013**
  Regional Training Course on Physics for Clinical Radiotherapy
- **December 2–6, 2013**
  Regional Training Course on Strategy for Radiotherapy Modernization and Development: Equipment and Staffing



Equipment used for practical sessions

Thank You for Your Attention !