

Programme of Action for Cancer Therapy (PACT)

Building Sustainable Cancer Control Capacity and Infrastructure in Developing Countries

Maria Stella de Sabata

AROME Meeting
Naples, 28-29 April 2007



IAEA

*Atoms for Peace: The First Half Century
1957-2007*

Programme of
Action for
Cancer
Therapy

PACT

International Atomic Energy Agency (IAEA)

The IAEA is the world's center of cooperation in the nuclear field. It was set up as the world's "**Atoms for Peace**" organization in 1957 within the United Nations family.

The Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful nuclear technologies.

Nuclear Applications in Health: a Unique Mandate of the UN System

Article II of the Statutes of IAEA

“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to **peace, health and prosperity** throughout the world”



IAEA – Areas of Work

- **Safety and Security**: Work is keyed to international conventions, standards and, guidance. The main aim is to protect people and the environment from harmful radiation exposure.
- **Safeguards and Verification** : Inspectors work to verify that safeguarded nuclear material and activities are not used for military purposes.
- **Science and Technology** : Work targets food, health, water, and environmental areas where nuclear and radiation technologies can make a difference.

ENHANCING AGRICULTURAL PRODUCTIVITY / FOOD SECURITY



- **Developing improved crop varieties**
- **Control of insect pests**
- **Food preservation and control**



RADIATION STERILIZATION

- The use of ionizing radiation for the **sterilization of medical disposables products** goes back over 20 years being today the sterilization process used by the majority of manufacturers

There are now estimated to be more than 200 industrial irradiation plants around the world, and close of 60% of all medical disposables devices are sterilized **by ionizing radiation**.



Estimated Cancer Worldwide Trends

- Incidence:

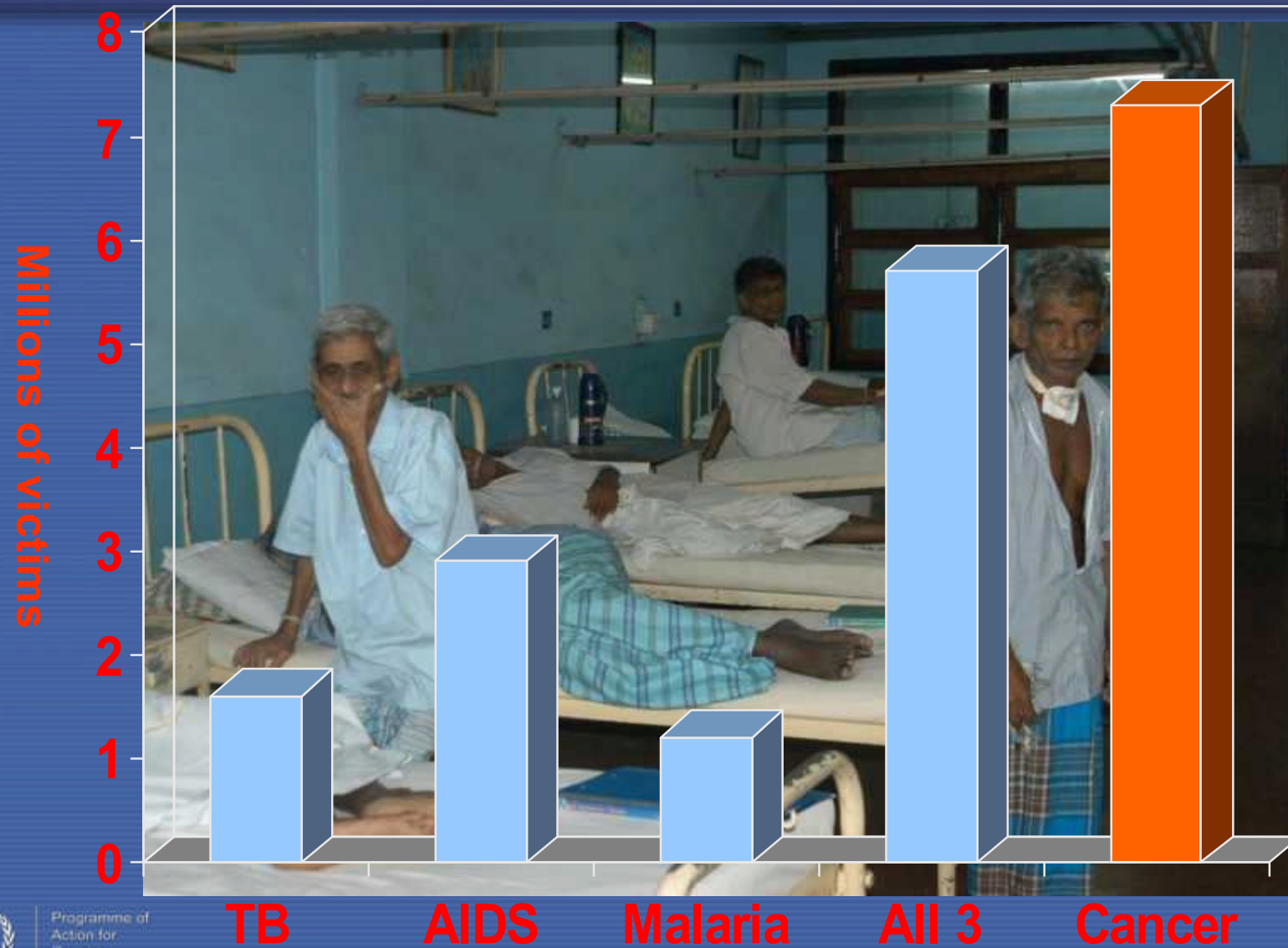
from 11 million in 2005 to 16 million in 2020

- Mortality:

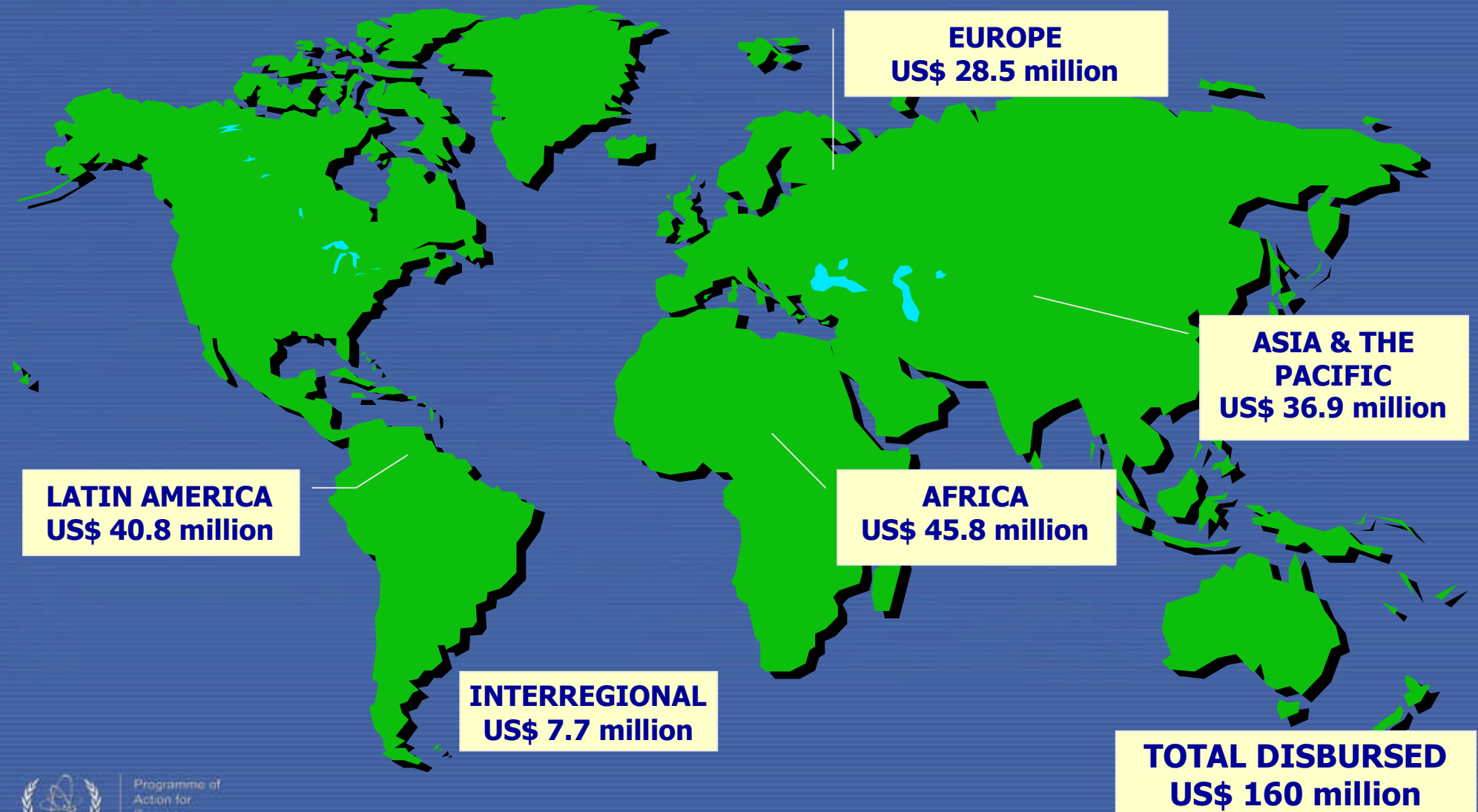
from 7.6 million in 2005 to 10.3 million in 2020

unless we act

Globally Cancer kills more than ATM combined!



IAEA Expenditure on Cancer Projects 1980-2005



Role of Radiotherapy (RT)

RT is an essential part of the treatment of cancer
and one of the most cost-effective forms of
cancer treatment

ACCESS TO RADIOTHERAPY

pact@iaea.org



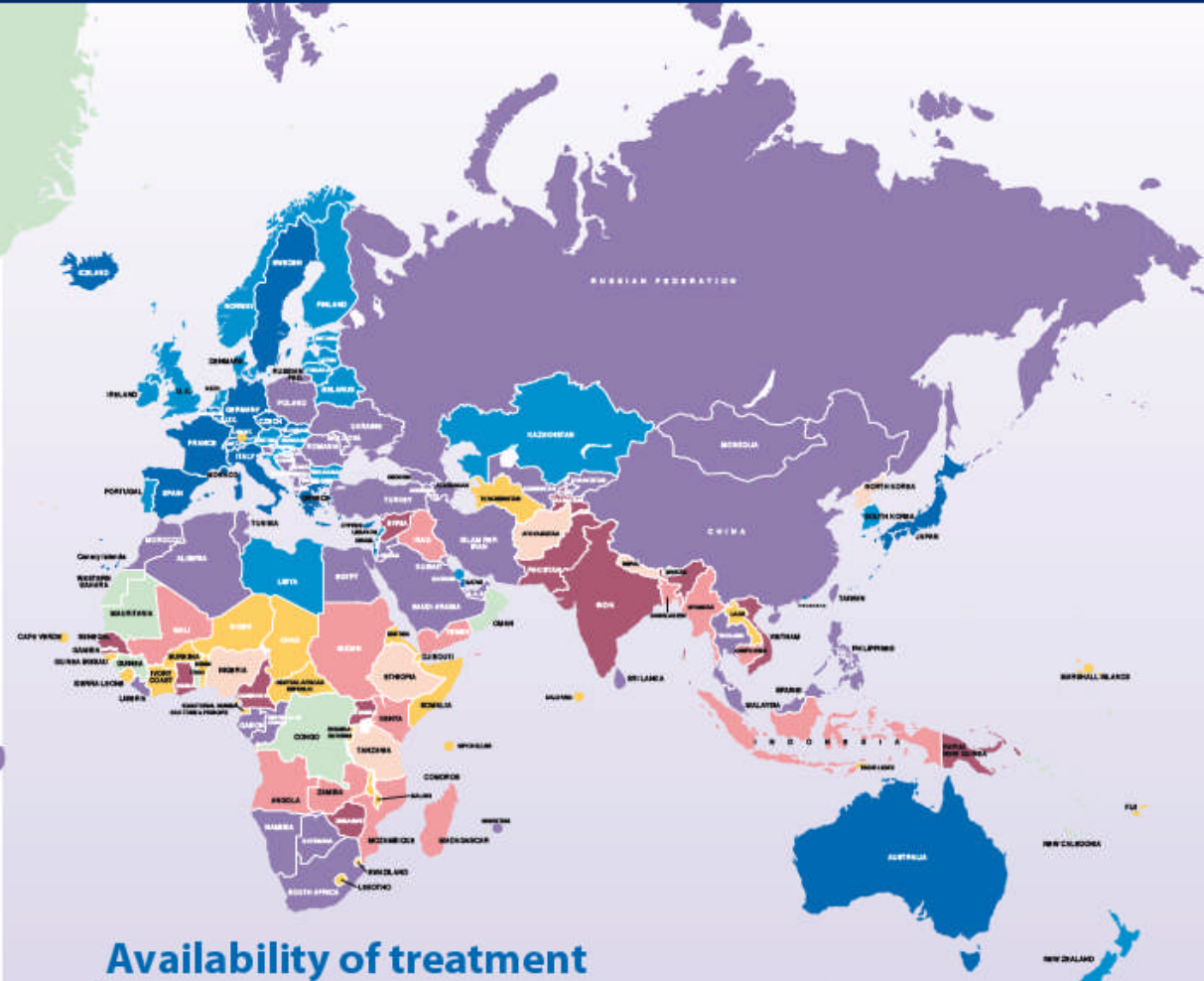
Radiotherapy is an essential part of the treatment of cancer

Over 30 African and Asian countries have no access to radiotherapy

There is a shortfall of over 5000 radiotherapy machines in the developing world









IAEA has initiated PACT to comprehensively address this urgent problem

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Availability of treatment

Number of people served by a single radiotherapy centre (latest available data 1995-2003)

- | | |
|--|--|
|  below 500 000 |  10-19.9 million |
|  500 000-999 999 |  20 million and above |
|  1-4.9 million |  no centre |
|  5-9.9 million |  no data |



Radiotherapy: not only an equipment issue

- **Shortages** of RT services can only be overcome with **investments** in staff, appropriate equipment, maintenance, access to knowledge, QA/QC, advocacy, safety, and high standards
- **Maximising** RT efficiency and effectiveness needs **complementary capacity building** in other areas of cancer control such as prevention and early detection (e.g. present palliative role of RT because of late-stage presentation)

Improving access to Radiotherapy (RT)

- **National strategies** to integrate the various components of the cancer continuum are needed: IAEA, WHO and other organisations are ready to assist Member States develop a national cancer control plan

PACT's Overall Goal

PACT was initiated in 2004 as a special programme of the IAEA to:

- Introduce or expand existing **infrastructure and capacity in radiotherapy** in a sustainable manner
- Improve or accelerate widespread access to **effective radiotherapy services** as an essential part of multidisciplinary cancer care

This doesn't mean machines alone!

There's more emphasis on trained professionals

PACT's Basic Strategy

- Move the IAEA's cancer-related programmes to a **public health model**
- Integrate radiotherapy intervention into a **broad cancer capacity building** effort
- Exploit prevention and early detection synergies to **maximise the public health impact of treatment investments**

Maximising the impact of interventions through balanced investments

PACT's Integrated System for Comprehensive Cancer Control

Maximize the Impact of Interventions including Radiotherapy through Balanced Investments across the System

*Population Based Cancer Control Programme
(WHO Guidelines on Planning, Management and Evaluation)*

Cancer Knowledge Transfer and Technology Evaluations

Cancer Epidemiology and Surveillance System

Multidisciplinary Education, Training and Research in Cancer

*Multisectoral Partnerships including Cancer Society Building
(Advocacy, Public Education, Policy, Legislation and Resource Mobilization)*

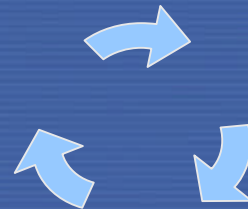
*Cancer Prevention
(Controlling Cancer Risk Factors)*

Screening and Early Detection

*Diagnosis, Treatment, Follow-up and Rehabilitation
(Pathology, Surgery, Imaging, Radiotherapy/ Nuclear Medicine, Chemotherapy, Other)*

*Palliative Care and Support for Patients and Families
(Symptom Control, especially Opiates and Radiotherapy, Psychological Interventions, Other)*

Need for Global Alliances – PACT does not work alone!



Stages of PACT Implementation

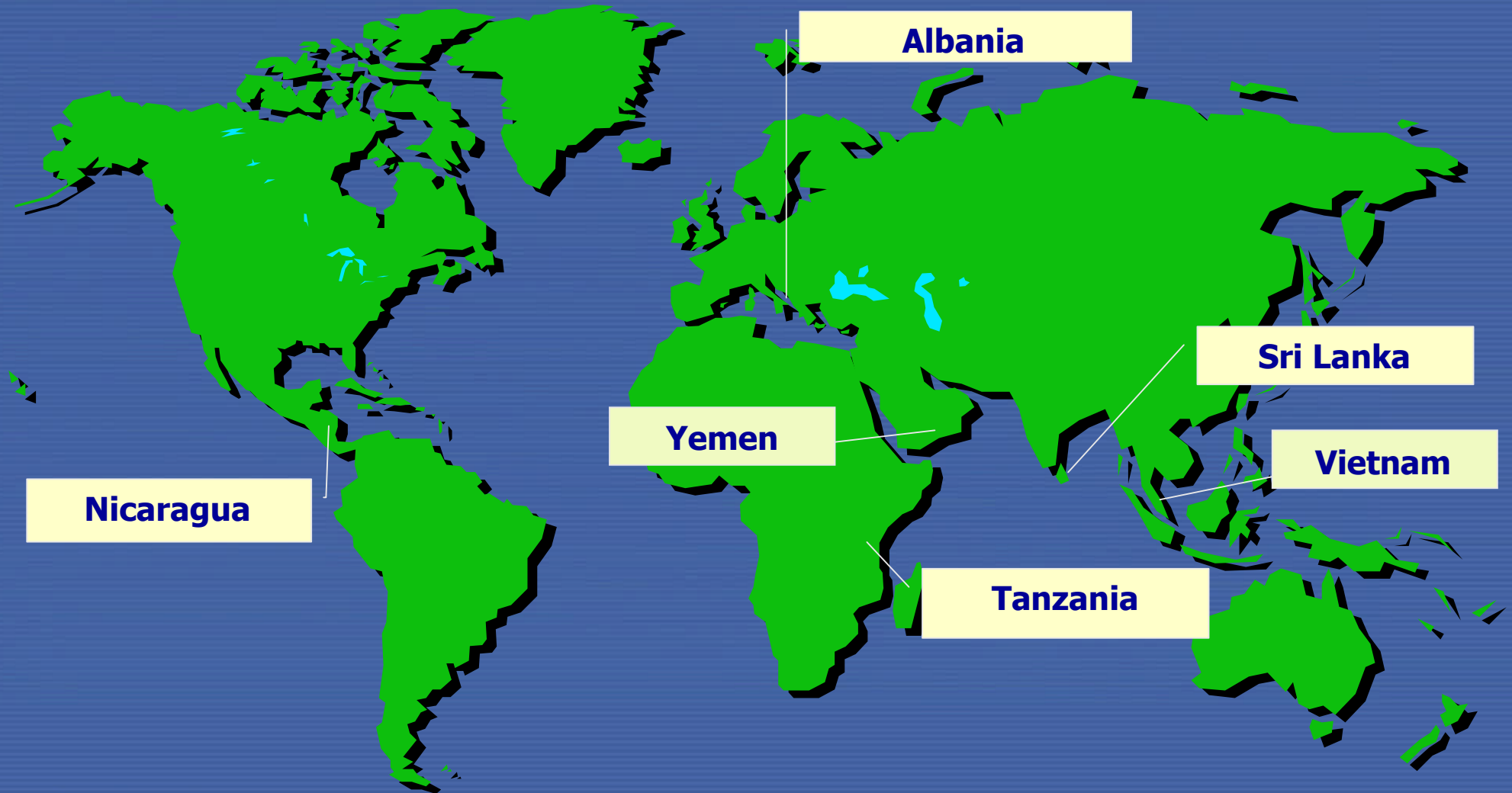
- Comprehensive cancer control needs assessment with partners (**imPACT reviews**)
- Establish **PACT Model Demonstration Sites** and use them for incremental fundraising
- **Regional cancer training networks** for capacity building
- Move towards a **global alliance and fund**

Stage 1: imPACT Review

- **imPACT** (*integrated missions of PACT*) is a multi-disciplinary **national needs assessment** of all aspects related to cancer control
- imPACT is **multi-stakeholder**, involving national authorities and public-private partnerships

Outcome: National Cancer Strategy and Action Plan

Stage 2: Project Model Demonstration Sites (PMDS)



PMDS: Goals

- Develop multidisciplinary cancer capacity building projects in **each of the six WHO regions**
- Build **interagency collaboration** and partnerships
- Create **public health synergies** that advance cancer control

PMDS: Goals

- Complement RT expansion with investments in the whole cancer continuum including civil society, demonstrating to donors the value of **multi-disciplinary cancer capacity building**
- Help Member States establish **centres of competence and excellence**
- Use above as a basis for **raising funds for larger scale efforts** (regional/global)

PMDS: PACT Partners Working Groups

- Core Group
- Cancer Control Planning
- Fundraising
- Programme Evaluation
- Society Building
- Cancer Knowledge transfer
- Cancer Registration
- Prevention
- Early Detection and Diagnosis
- Treatment
- Palliative Care

Stage 3: Regional Capacity Building

Lack of adequate human resources is a **critical bottleneck**

- Deploy **modern IT tools** and rely on existing recognised centres
- Develop new facilities and tools for RT and other cancer training **as needed**
- Create **national and regional self-sufficiency** (Centres of Competence/ Excellence) through South-South and North-South mentoring
- Serve as **regional hubs** or **centres of excellence** for multidisciplinary cancer training among neighbours
- Train **multidisciplinary personnel** for replacement personnel as well as creation/expansion of facilities
- Use as a basis for **regional/global fundraising initiatives**

Stage 3: Regional Capacity Building

Using *IAEA Nobel Prize Fund* and other support, PACT proposes to:

- Establish a *Cancer Control International Mentorship Network*
- Establish a *Virtual Cancer Control University*

PACT by Region

Africa (AFRO & EMRO)

Potential Centres of Excellence or Mentors: Morocco, Egypt, Ghana, South Africa, Algeria, Tunisia, Tanzania

imPACT and First Executions: Tanzania, Ghana

Assistance Requests Received: Cameroon, Niger, Senegal, Kenya, Eritrea

Donors: Canada, India, Monaco, Norway, United States

Asia (WPRO, SEARO & EMRO)

Potential Centres of Excellence or Mentors: India, Thailand, Jordan, Iran, Syria, Philippines, Singapore, Israel, New Zealand

imPACT and First Executions: Sri Lanka, Vietnam

Preliminary imPACT: Yemen

Assistance Requests Received: Afghanistan, Syria

Donors: Australia, India, Japan, Norway, Rep Korea

PACT by Region

Europe

Potential Centres of Excellence or Mentors: Czech Republic, Greece, Poland, Hungary, Monaco, Germany, Russia, Spain, Sweden, France, UK

imPACT and First Executions: Albania

Preliminary imPACT: Georgia, Montenegro

Assistance Requests Received: Moldova, Uzbekistan, Kyrgyzstan, Romania

Donors: Canada, Monaco, Norway, United States

Latin America (PAHO)

Potential Centres of Excellence or Mentors: Brazil, Colombia, Mexico, Argentina, Cuba, Peru, Uruguay, Chile, Canada, United States

imPACT and First Executions: Nicaragua

Preliminary imPACT: Peru

Assistance Requests Received: Bolivia, El Salvador, Colombia, Costa Rica, Panama, Dominican Republic, Haiti, Venezuela

Donors: Canada, Norway, United States

PACT 2007-2009 Plans

- Consolidate partnerships
- Execution of 3 PMDS (Albania, Nicaragua, Tanzania)
- Initiate another 3 PMDS (Sri Lanka, Vietnam and Yemen)
- Solicit equipment, products and services donations
- Fundraising campaign for PMDS
- Proposals on cervical cancer and breast cancer
- African regional capacity building proposal UK
- Cancer Therapy for Africa EU
- Individual country and donor matching

Summary of Donations and Pledges Received

- Over \$2.4 million by IAEA Member States
- US NCI \$200,000 pledged
- OPEC Fund \$500,000 Grant approved
- Up to 3 new Theratron cobalt machines MDS Nordion
- One new Bhabhatron cobalt from India
- Pledge for 13Mev cyclotron from KIRAMS Korea
- Assignment of cost-free experts to PACT
- Many professional volunteers to work on PACT projects

PACT Expected Outcomes

- Placing cancer on the **global agenda**
- Moving towards a **global alliance** to fight cancer
- Building effective strategic **public-private partnerships**
- Raising **new funding** for cancer care programmes including radiotherapy services
- Developing **Centres of excellence** and regional cancer **training networks**
- Making **cancer therapy affordable** for patients
- Introducing **national cancer control programs** and plans so that investments in the cancer continuum have an impact on public health

Programme of Action for Cancer Therapy (PACT)

Requesting support from the International Atomic Energy Agency (IAEA) for radiotherapy equipment

AROME Meeting
Naples, 28-29 April 2007

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www.iaea.org/pact



IAEA

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Member State requests to IAEA

- IAEA's Member States counterparts are **National Atomic Energy Commissions**
- Member State (MS) decides on its **priorities**

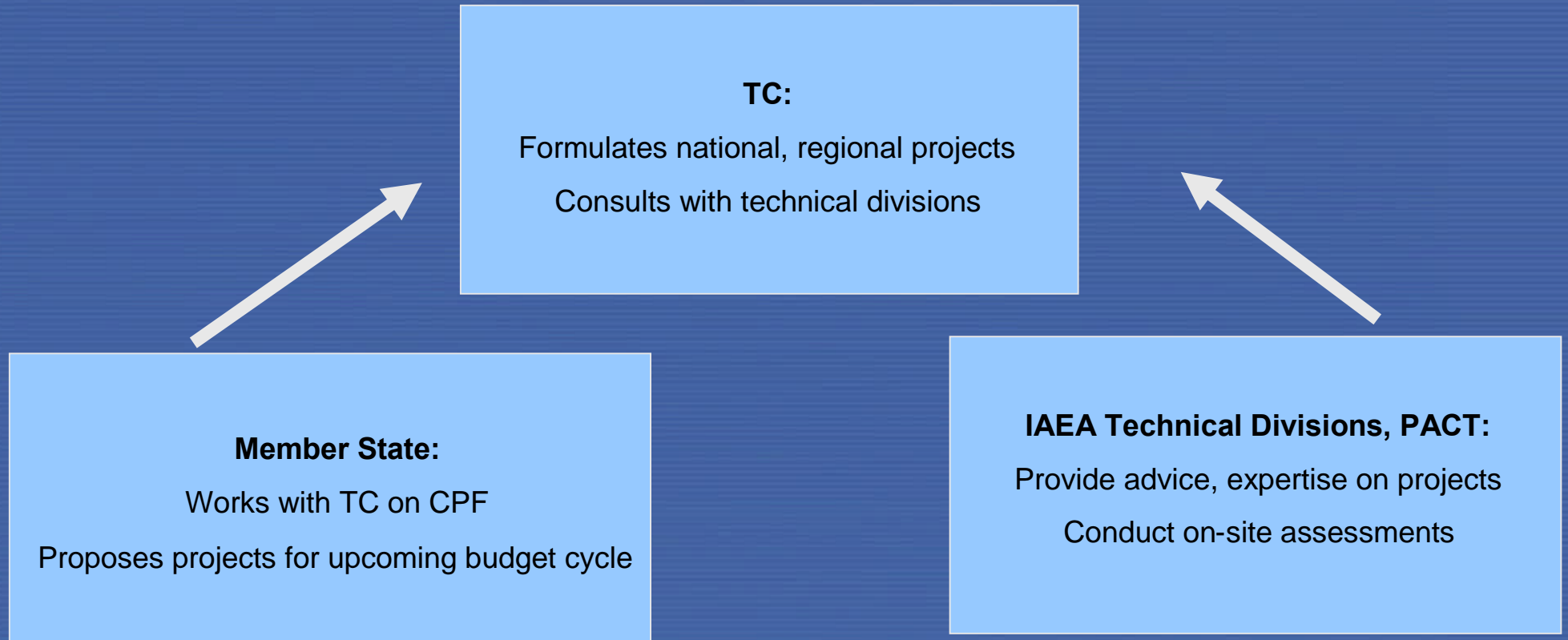
Member State requests to IAEA

- A Member State works through its National Atomic Energy Commission and **National Liaison Officer** with IAEA's **Technical Cooperation (TC)** division
- Together they formulate a **Country Programme Framework (CPF)**. This document is updated every 5 years

Member State requests to the IAEA

- The **National Liaison Officer** (NLO) communicates *country individual requests* to **TC Programme Management Officer** to be included in upcoming budget cycle
- TC formulates **Projects** – both national and regional – which include procurement of equipment and human resource training
- TC works closely with **Agency technical divisions and PACT** to coordinate activities

Flow Chart



Concerns of the IAEA

- TC works with Agency technical experts, and sometimes outside experts, to determine **appropriate, sustainable level** of technical assistance – e.g. Cobalt-60 vs. linear accelerator
- TC strongly encourages Member States to **cost-share** in the procurement of equipment

Useful IAEA resources

- **TECDOC 1040** “Design and implementation of a radiotherapy programme: Clinical, medical physics, radiation protection and safety aspects”
- **Content** covers: Programme design and implementation flow, Staff requirements, Facility design, Equipment, Quality assurance, Radiotherapy protection and safety of sources
- Its **updated version** will be published this year

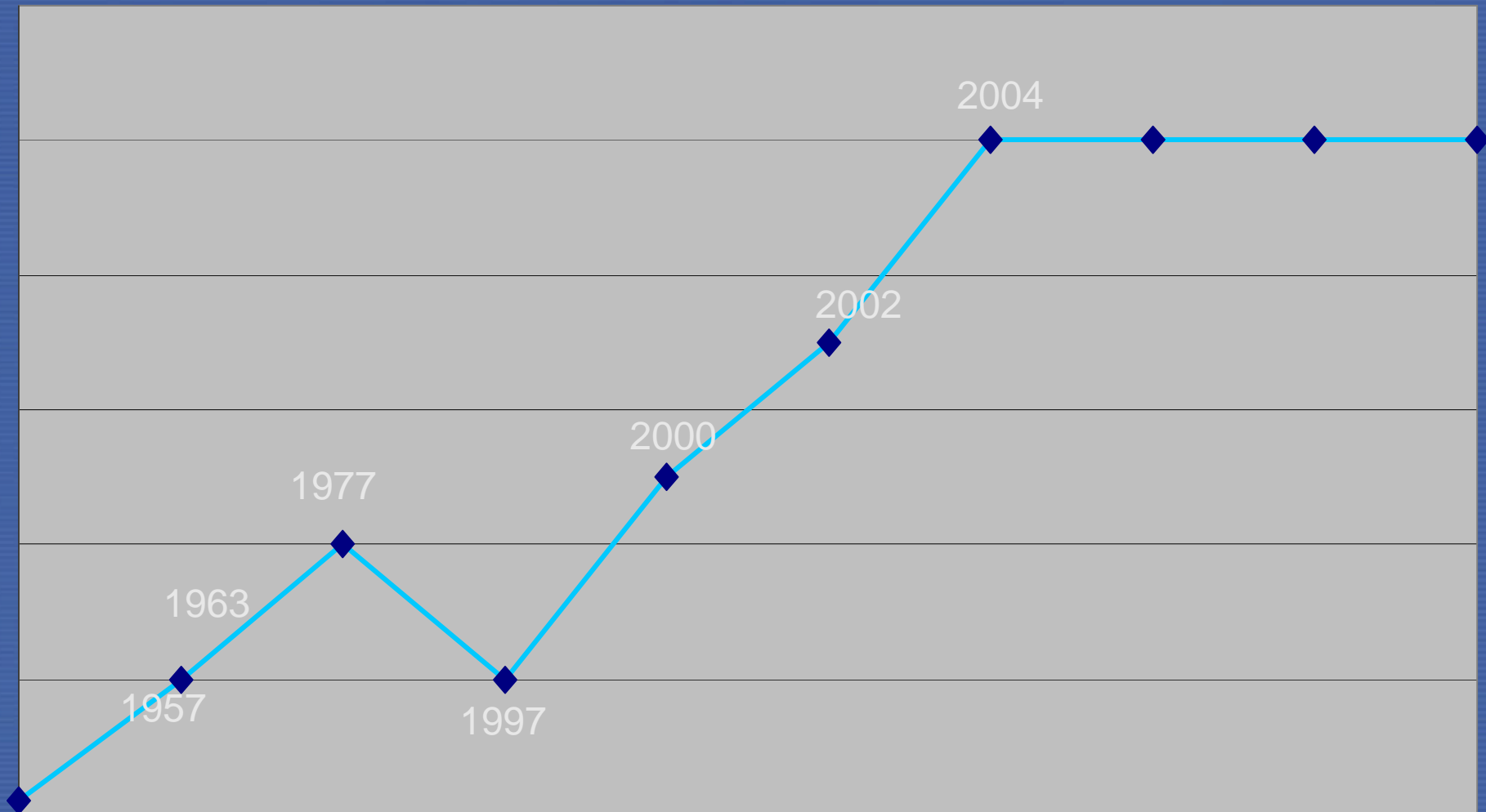
A success story – Republic of Macedonia

- Landlocked country, 2 million inhabitants
- One radiotherapy center: **Institute of Radiotherapy and Oncology, founded 1947**. Covers Republic of Macedonia and Province of Kosovo (private patients). In the SFR Yugoslavia population from southern Serbia (additional 1,5 million) also covered by IRO.
Radium sources
 - 1957, 1958: Ortovoltage units
 - 1963 Cobalt 60 machine
 - 1977 MEL Philips Linear Accelerator – 1st in former Yugoslavia
 - 1977 Currientron for brachytherapy
- Years of inertia, lack of financial support, political situation and indifference of people in charge lead to destroying radiotherapy in Republic of Macedonia

A success story – Republic of Macedonia

- The collaboration between the Republic of Macedonia and IAEA began in **November 1995**: Ministry of science and IRO proposed the project “Modernization of brachytherapy”
- **April 1996** – **expert visit** from IAEA concluded: exceedingly bad condition of all radiotherapy equipment; good clinical experience and potential for developing the Institute.
- Suggestion to significantly expand the proposed project: **September 1996** the regional project “**MODERNIZATION AND IMPROVEMENT OF RADIOTHERAPY (RER/6/009)**” started.

Institute of Radiotherapy and Oncology timeline of development



A success story – Republic of Macedonia

- **1997–2004 numerous fellowships:** 3 and 4 months fellowships for 8 doctors - radiation oncologists; 4 and 6 months fellowships for 4 physicists; 3 months fellowships for 4 radiation technologists; Numerous IAEA/ESTRO courses
- **New equipment** at IRO (**NB:** IAEA provides expert advice on most suitable and affordable teletherapy option):
 - 1997 – 2D TPS (ROCS)+basic dosimetry equipment
 - 1999 – Cobalt 60
 - 2000 – LDR brachytherapy machine
 - 2002 – Simulator
 - 2004 – LINACs, CT simulator, 3D TPS
 - 2005 – HDR brachytherapy unit

A success story – Republic of Macedonia

- **Staff** presently include:
 - 36 doctors including 6 pathologists and 27 radiation oncologists
 - 6 physicists
 - 1 hospital engineer
 - 1 engineer, network administrator
 - 4 other highly qualified personnel
 - 20 radiation technologists
 - 44 nurses
 - 12 lab personnel
- Notwithstanding 10 difficult years, Institute of Radiotherapy and Oncology made a huge leap in a very short time and achieved status of **Center of competence for radiotherapy**, through QUATRO audit performed by IAEA in October 2005