Radiotherapy in Cancer Management

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WiN conference Wed, 26 August; 11:00-12:30; Session: Use of Radiation in Medicine
What is Cancer

- **Diagnosis:**
  - Biopsy
  - Laboratory
  - Radiologic

- **Staging:**
  - Depends on the type of cancer

[Image of cell cycle and cancerous cells]

[Table showing normal vs. cancer cells]

http://sphweb.bumc.bu.edu
Functional Imaging

Combined CT and PET offers the most benefit in interpretation
Radiation Therapy Techniques

• Radiotherapy has been used for curative or palliative treatment of cancer, alone or combined with chemotherapy or surgery.

Robotic Body Radiosurgery

Gamma-knife Radiosurgery

External Beam 3-D/IMRT

Brachytherapy
Comparison of Techniques
Intensity Modulated Radiation Therapy

Non-IMRT versus IMRT Port Films

CT-Simulation Structure Definition → Plan Optimization → QA and Delivery
Targeting & Motion Management

Onboard imaging (OBI)

Motion management

Motion tracking system
Stereotactic Body Radiation Therapy/Radiosurgery

SBRT to 37.5 Gy in 3 fx

Image-guided Robotic radiosurgery
THE IAEA HUMAN HEALTH PROGRAMME

- **Applied Radiobiology & Radiotherapy**
  Eduardo Rosenblatt, SH

- **Nuclear Medicine & Diagnostic Imaging Section**
  Diana Paez, SH

- **Dosimetry & Medical Radiation Physics**
  Ahmed Meghzifene SH

- **Nutrition & Health related Environmental Studies**
  Cornelia Loechl SH

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<th>Technical Cooperation (TC) Department</th>
<th>Manages projects in radiotherapy in LMIC countries; assistance in National Cancer Control Programmes through Programme of Action for Cancer Therapy</th>
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<td>Nuclear Safety (NS) Department</td>
<td>Establishes normative and codes of practice in radiation safety and promotes regulatory infrastructure in all countries</td>
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IAEA support in Radiotherapy, Medical Physics, & Nuclear Medicine

- Setting up new centres/Upgrade/QA
- National education programmes
- Fellowships for education and training
- Experts (equip. commissioning, on-site training, etc.)
- Procurement of equipment
- Regional training courses
- Dosimetry services
- Comprehensive audits

2015 QUATRO activities: 87 QUATRO missions to date: Africa – 7; Asia – 11 + 2 re-audits; Europe – 33 + 4 re-audits; Latin America – 12; Middle East - 10 + 8 re-audits

Radiation oncologist
Medical physicist
RTT
Safety specialist (local)

QUANUM, QUATRO, QUADRI missions
QA Calibration & Audit services

Calibration service for national dosimetry standards

IAEA-WHO SSDL Network
- 80 SSDL laboratories in 67 countries
- 6 SSDL organizations
- Five collaborating international organizations

Support to end-users in dosimetry:
Verification of clinical beam calibration

IAEA/WHO TLD postal service for external beam radiotherapy
- About 500 beams per year
- Includes Co-60 and High Energy X-ray beams
- Discrepancies are followed up, if necessary by an expert visit
Coordinated Research Projects (CRP)

- Post-mastectomy radiotherapy
- Pre-operative advanced rectal cancer
- Palliative oesophagus cancer
- Glioblastoma multiforme
- Lung cancer
- Painful bone metastasis
- Head and neck cancer (2)
- Cervical cancer (2)
Developed and managed **jointly** by the Member States and the IAEA Secretariat.

The IAEA Technical Departments are responsible for the technical integrity of the TC programme.

IAEA TC Department responsible for the management of the TC programme

Yearly budget of about €120 million

About €32 million (~26%) are spent on Human Health

**IAEA TC Activities**

125 countries/territories receive support from the IAEA

Per year

- ~3200 expert missions fielded
- ~1600 fellowships and scientific visits
- ~3200 participants in training courses
- ~190 training courses
- ~2500 Purchase Orders
Education & Training - Improving the learning experience

Development of interactive eLearning modules for Health Professionals:

- Introduce new interactive E-learning modules that enhance self-directed learning.
- Improve efficiency in education
- Expand educational opportunities in remote areas.

http://humanhealth.iaea.org