Quality control and safety for radiation therapy in Hungary

Csilla Pesznyák¹,³, Tibor Major¹, Géza Varjas¹, Richárd Elek², Katalin Lumnicky², Géza Sáfrány², Csaba Polgár¹

¹National Institute of Oncology
²"Frédéric Joliot-Curie" National Research Institute for Radiobiology and Radiohygiene
³Budapest University of Technology and Economics Institute of Nuclear Techniques
Capital: Budapest
Area: 93030 km²
Inhabitants: ~10 million (108 people/km²)
Radiation Therapy Centres (12)
How we can prevent accidents

- Organization
- Education and training
- Acceptance test for equipment
- Communication
- Quality control and quality assurance protocol
- Documentation
- Independent audit
- Database for “incidents and near miss events”
Legislation and competency problems in Hungary

- 97/43/EURATOM implemented as order (31/2001) of Ministry of Health
- „Minimum criteria” is regulated in the field of radiation therapy

For safety work it is necessary:

- to organize graduate education ✔
- to organize post-graduate education ✔
- to organize continuous education ✔
- to organize radiation protection education ✔
- to operate QA/QC system ✔
- to ensure professional and financial career for all professions in radiation therapy (physician, medical physicist, RTTs)
Education system in Hungary

Physicians

- 6 year gradual education (4 Medical University)
- 4 year specialization (Radiation Therapist)
- 3 year PhD studies
- continuing education

Medical Physicist

- 5 year gradual education:
  - 3 year BSc
  - 2 year MSc Medical Physics (1 university (BME NTI))
- 4 year specialization (Clinical Radiation Physicists)
- 3 year PhD studies
- continuing education

RTTs

- Not regulated
Short term priorities:

- Encourage legislation bodies (ministries and other governmental organisations) to recognise the importance of the field and provide at least partial funding.

- Encourage legislation bodies to reformulate regulations according to current needs and available training.

- Encourage legislation bodies to open expert centres for independent QA/QC control for raising standards in practice to assure need for high level expertise.
Priorities in education/training in the country

Long term priorities:

- Building up educational resources: competence, assets, financial support.
- Increasing the awareness of the profession amongst medical personnel, educational bodies, and legislation authorities.
- Improving cooperation with radiation therapy equipment vendors, health organisations and regulators to establish up-to-date education and training while considering both educational needs and expertise to share.
- Ensuring a closer connection between education and R&D to maintain high level technical competence.
Different levels of E&T for radiation protection in medicine

- Basic level education
  - For workers who can access sources of ionizing radiation, but do not operate them
- Extended (advanced) level education
  - For workers who operate sources
- Comprehensive level education
  - For workers who supervise other workers
Certifications in radiation protection

- At the end of every training there is a written exam – if successful, a certificate is issued
- Gaining a certificate for a given worker is a must after a year of employment
- There are specialties above the level of basic trainings; these are marked in the certificates
- Under supervision one can work for one year before getting a certificate

First Course → 5 year validity → Refresher Course
Statistical evaluation

No. of Individuals

<table>
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<tr>
<th>Year</th>
<th>Refresher course</th>
<th>First course</th>
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<tr>
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QA/QC programs are organised by the National Institute of Oncology, Hungarian Society of Medical Physicists and Hungarian Society for Radiation Oncology.
Independent audit for TPS

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In 2011 we bought the IMRT CIRS Thorax phantom and made new measurements in University of Szeged and repeated the audit in several centers.
LINAC, TPS and algorithms

TPS younger than 10 years:
Philips ADAC Pinnacle - adaption convolution model
CMS XIO TPS - Multi grid superposition
- Fast Fourier Transform Convolution
Oncentra MasterPlan TPS - Collapsed Cone algorithm
- Pencil Beam model
Varian Eclipse TPS - AAA

TPS older than 10 years:
Varian CadPlan TPS - pencil beam with Mod. Batho Power Law
- pencil beam with non correction
PrecisePLAN TPS - adaption convolution model
Nucletron Helax TPS - pencil beam convolution algorithm
Nucletron Plato TPS - pencil beam convolution algorithm

Equipment
Varian LINAC – 6, 18 MV
Elekta LINAC – 6, 18 MV
Siemens LINAC– 6, 15 , 18 MV
Theratron 780C cobalt unit
The National Institute of Oncology established a database for “incidents and near miss events” on the basis of ROSIS system which is currently in pilot phase.

- The forms are put in all treatment rooms
- The reporting system is anonymous
- Less than 20 events in one year, all near miss events
High level of competence, knowledge and skill of medical workers is necessary to identify incidents as early as possible in the radiotherapy process with less serious consequences.

Stakeholders and radiation therapy centres shall take responsibility for the safety and welfare of every single patient.
Egry József: Rainbow

Thank you for your attention