IAEA Quality Audits in Radiotherapy

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IAEA audits in radiotherapy

- **SINCE 1969:** IAEA/WHO TLD postal dose audits of radiotherapy beam calibration (>40 years of operation):
  126 countries, ~1850 hospitals, >9000 beams
- **SINCE 1981:**
  TLD audits for ~70 SSDLs
- **SINCE 2005:**
  Quality Assurance Team for Radiation Oncology (QUATRO)
- **NEW:** TPS audit
Dose audit networks for radiotherapy

- Country participating in the IAEA/WHO TLD service
- National QA network or participant in international network other than IAEA QA network co-operating with IAEA
- QA network co-operating with IAEA
- Country not having radiotherapy or not participating in an audit network
IAEA/WHO TLD results for Co-60 and high energy X rays
1969-2011

1969-2011: N = 9096, m = 1.009, SD = 0.080, 85% res. within 5% after follow-up

2010-2011: N = 1071, m = 1.009, SD = 0.083, 95% res. within 5% after follow-up

D(TLD)/D(stat)
Follow-up of poor TLD results

The IAEA dosimetry travel kit used for QA missions to radiotherapy hospitals
TLD results within the 5% limit (1)
In 2000-2011, 5491 beams were checked with 538 TLD results followed-up (EU ~ 47%, AM ~ 25%, WP ~ 14%)
TLD results for SSDLs: 2000-2011

N = 833, m = 1.006, SD = 0.016, 98% results within 3.5%

All deviations outside 3.5% have been explained and corrected
Comprehensive RT audit: QUATRO
On-site audit procedures

• Typically 5 days per RT department
• Entrance briefing
• Assessment: complete tour of facility, staff interviews, review & evaluation of procedures and documentation, measurements, tests of procedures, observation of practical work
• Exit briefing: feedback to the department, preliminary recommendations, questions, discussion.
QUATRO audits: summary

- Regional workshops have been organised to train auditors
- So far more than 70 missions have been conducted and more are planned
- Most audits have been in Europe
- QUATRO Audit assessed adequacies in:
  - Infrastructure
  - Patient related procedures
  - Equipment related procedures
  - Training programmes
  - Staffing
Recommendations by QUATRO

- Support staff continuous education
- Strengthen QA programmes and procedures
- Equipment: get more, use better
- Increase staffing level: MP, RO, RTT
- Better trained staff: RTT, RO, MP
- Improve treatment protocols
- Improve structure and organization of cancer centres
New IAEA procedures: TPS audit

Set of practical tests for dosimetry calculations reflecting typical treatment techniques in a radiotherapy department
Implementation of TPS audit

Steps in implementation of TPS audits:
1. IAEA multicentre pilot study
2. TPS test audit runs in Baltic countries and Hungary
3. National TPS audit exercises supported by IAEA (Europe)

TPS audit package is available from IAEA on request.
Conclusion

• The IAEA/WHO TLD audits contribute to the improvement of the status of radiotherapy dosimetry worldwide.

• QUATRO is a useful tool for peer reviewing radiotherapy practices; it documents weak links in hospital operations and procedures, and offers recommendations to address them.

• TPS audits help the physicist appreciate limitations of treatment planning systems and the importance of independent verification of plans before treatment.

RESULT: QUALITY IMPROVEMENT → SAFETY FOR PATIENTS