

The ICRP take-home message

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Introducing new technologies

- Evaluation of the **expected benefit**, rather than being driven by technology itself
- A **safe step-by-step approach** based on progressive consolidation

Staff training, availability and dedication

- Replacement of **proper training with a short briefing** or demonstration leads to insufficient understanding
- Safety-critical tasks, such as calibration, beam characterization, complex treatment planning and pretreatment verification, require a **substantial increase in staff time allocation**

Safety awareness of responsible persons for radiotherapy

- Independent verification of beam calibration remains essential.
- Investigating discrepancies in dose measurements. **Understanding and verification essential**
- Work environment that encourages working with **awareness**, facilitates **concentration and avoids distraction**

Manufacturers

- Responsibility for **delivering the correct** equipment with the correct calibration files and correct accompanying documents
- Responsibility for providing **correct information and advice to users**

Programme of purchasing, acceptance and commissioning

- The programme should not only address treatment machines but also **treatment planning systems, imaging equipment, software**, procedures and entire clinical processes.
- Re-commissioning after equipment modifications including **software upgrades and updates**

Need for new protocols for treatment prescription and dosimetry

- Protocols for treatment prescription, reporting and recording, such as found in ICRU reports, **should be revised to accommodate new technologies** and adopted nationally
- Similarly, **dosimetry** protocols should be developed for **small and non-standard radiation fields**

Dose escalation

- Dose escalation generally implies a **reduction of geometrical margins.**
- This is only possible with conformal therapy accompanied by **precise, image-guided patient positioning and effective immobilization** together with a clear understanding of the accuracy.
- **Without these features, target dose escalation could lead to severe patient complications**

Safety-critical communication and notifications

- Unambiguous, **well structured communication is essential,**
- In particular, procedures to notify physicists of **maintenance and repair activities**, identified as crucial in conventional technology, are even more necessary with new technologies.

Computers and data integrity

- **Procedures** should be in place to deal with situations created by **computer “crashes”**, which may cause **loss of data integrity** and lead to severe accidental exposures.

Updating of quality control tests

- When conventional tests and checks are not applicable or not effective for new technologies, **the required level of safety should be maintained.**
- This may require the design of **new tests** or the **modification and validation of the old ones**

Using lessons from experience

- **Lessons** learned past accidental exposure should be **incorporated into training**.
- Sharing experiences of actual and potential safety incidents through participation in databases

Overcoming the lack of experience when introducing new technologies

- Prior to the introduction of a new technologies, there is little or no experience to share. Two complementary approaches available
 - Prospective safety assessments
 - Moderated electronic networks and panels of experts to share experience at early phase

Thank you