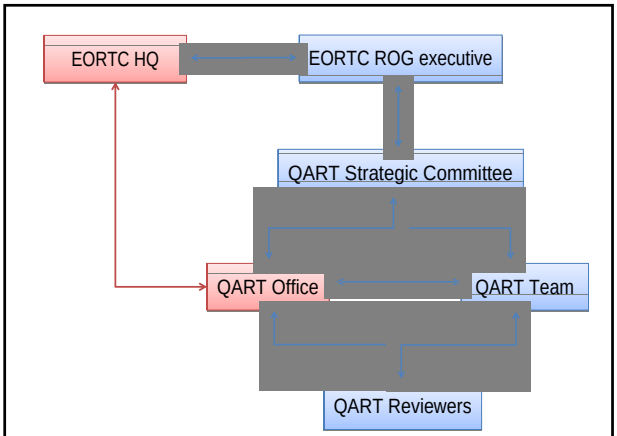
EORTC QART update



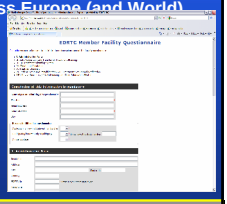
Final version, Sept. 8, 2009

EORTC Levels of QA RT

1. Facility Questionnaire (FQ) External Reference Dosimetry Audit (ERDA)
2. Dummy Run (DR)
3. Limited Individual Case Review (ICR)
4. Extensive Individual Case Review (ICR)
5. Complex Dosimetry Check

FQ + ERDA – minimum requirements 1

- **Why?**
  - Inadequate staffing and/or equipment → poor quality RT
  - ERDA → demonstrates basic ability to deliver a planned dose
  - Variation in national standards across Europe (and World)
- **How?**
  - Online questionnaire
  - Submission of ERDA certificate
- **When?**
  - ROG membership
  - Prior to trial-specific authorisation
  - Update every 2 years (active centre)



2010-06: ~ 200 FQ in the database

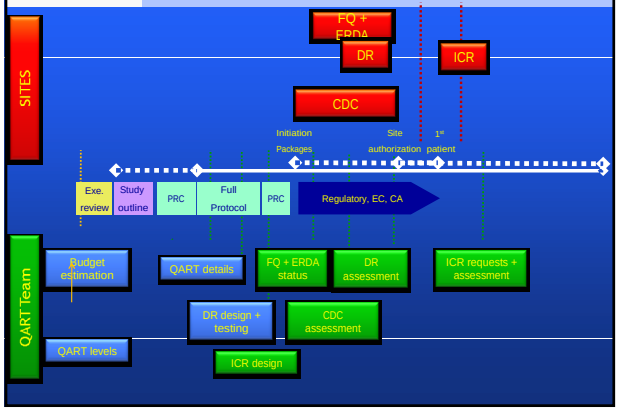
Dummy run – planning exercise 2

- **Why**
  - Tests application of protocol (and protocol itself)
  - Allows correction of technique for future (real) cases
- **How**
  - Planning of prepared case in accordance with protocol
- **When**
  - Mandatory as part of authorisation process (prior to patient entry)
  - [within first 6 months]

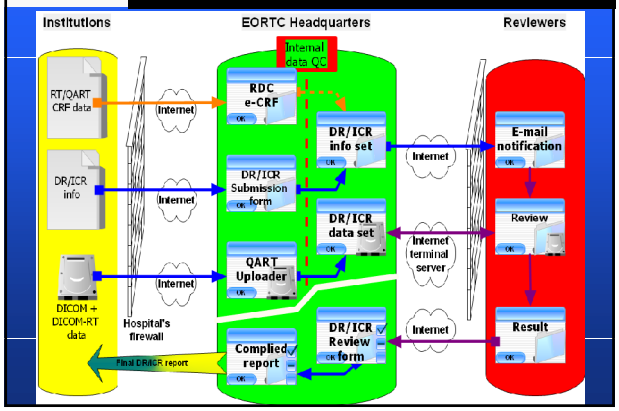
Individual Case Review 3 4

- **Why?**
  - Quality control check of actual cases (real-time now possible)
  - Potential feedback to sites / protocol amendment
  - Overall assessment of quality of RT in trial
- **How?**
  - Submission of RT data and ICR-specific questionnaire
- **When?**
  - Ideally starting early in accrual phase

QART timelines



QART platform – version 2009/2010



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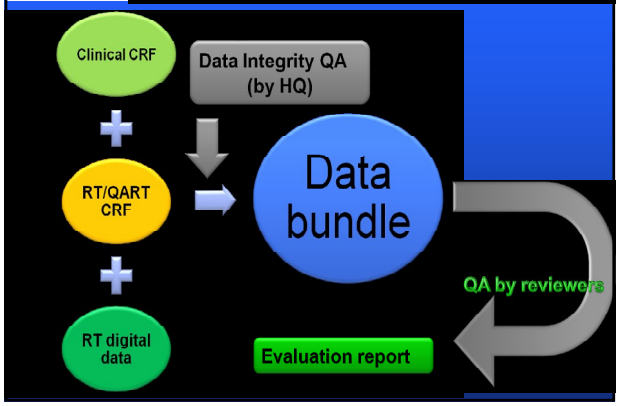


Current EORTC initiatives/involvement

- Comparison of RPC physical H&N phantom to digital phantom credentialing
- ERDA comparison US style and EORTC style
- Adaptive trial and QART design. NCI workshop 7-8 sept 2010 with representatives from USA and EORTC. White paper is being prepared.

NCI workshop recommendations

1: Develop a tiered system of clinical trial QA (Purdy)

2: Tailor extent of clinical trial QA to trial objectives (Bruner, Michalski, Timmerman)

3: Establish a case quality assurance repository (Michalski)
- Aim to achieve seamless electronic submission

4: Develop an evidence base for clinical trial QA (Bentzen, Purdy, Michalski, Bekelman)
- Review of QA-outcome relationship
  - QA credentialing-outcome studies
    - RTOG 0126: analyze benefits of credentialing with phantom versus those who were not
  - Deviation-outcome studies
    - Is the treatment being given as intended? (Actual versus intended delivery)
  - Volume-outcome studies
  - Learning curve studies
  - Recalculation of patient, target, or OAR doses
- Add specific questions, e.g., can anthropomorphic phantom measurements be replaced by calculations and TLDs? EPID? IGRT? (Deye)

5: Introduce innovative prospective trial designs to evaluate quality assurance as part of radiotherapy clinical trials (Bekelman, Dignam, Simon, Lee, Efstathiou, Bentzen)

6: Explore feasibility of consolidating quality assurance functions (Deye, Merchant, Purdy)

NCI workshop recommendations

Recommendation 1: Develop a tiered system of clinical trial QA (Purdy)
- Table X: Proposed Tiered System of clinical trial QA

Recommendation 2: Tailor extent of clinical trial QA to trial objectives (Bruner, Michalski, Timmerman)
- Figure X: Spectrum of Clinical Trials and Appropriate QA (a graphic that shows research questions that range from technology specific to non-specific with decreasing levels of QA)

Recommendation 3: Establish a case quality assurance repository (Michalski)
- Aim to achieve seamless electronic submission
- Voluntary versus mandatory participation

Recommendation 4: Develop an evidence base for clinical trial QA (Bentzen, Purdy, Michalski, Bekelman)
- Review of QA-outcome relationship
  - QA credentialing-outcome studies
    - RTOG 0126: analyze benefits of credentialing with phantom versus those who were not
  - Deviation-outcome studies
    - Is the treatment being given as intended? (Actual versus intended delivery)
  - Volume-outcome studies
  - Learning curve studies
  - Recalculation of patient, target, or OAR doses
- Short discussion of QUANTEC and normal tissue toxicity (Ten Haken)
- Short discussion of clinical outcomes versus NTCP/TCP modeling (Bentzen)
- Add specific questions, e.g., can anthropomorphic phantom measurements be replaced by calculations and TLDs? EPID? IGRT? (Deye)

Recommendation 5: Introduce innovative prospective trial designs to evaluate quality assurance as part of radiotherapy clinical trials (Bekelman, Dignam, Simon, Lee, Efstathiou, Bentzen)
- Trial designs to examine different QA programs (Dignam)
  - Opt in trial
  - Cluster randomization
  - Phase II-III
    - Start trial with intensive inst, at interim analysis we will investigate QA, determine whether QA can be limited following interim analysis, then open trial to more patients
- Trial designs to adjust power or sample size based on case-based quality assurance (Lee, Simon, Bentzen)
  - Adaptive design (Bayesian) to re-power study based on case QA
- Statistical methods in secondary analysis of clinical trials (Dignam)
- Trial designs to develop a repository of case-based QA (Bekelman, Efstathiou)
  - Registry
  - Large, simple trial (pragmatic trial)

Recommendation 6: Explore feasibility of consolidating quality assurance functions (Deye, Merchant, Purdy)

Uniform structure names

Problems:

Database problem:

Analysis of databases with radiotherapy patient data from multiple institutions hampered by non-uniformity of structure names.

Information exchange problem:

Description of ROIs in work instructions, guidelines and educational/scientific documents (e.g., trial protocols) often ambiguous.

Uniform structure names: NVRO/EORTC draft proposal

- Based on RTOG-ATIC convention

However:

ATIC convention to include suffix for margin used for **generation** of structure ROI (e.g. PRV5= 5 mm margin around the OAR) differs from clinical practice where suffix determines the margin used to **expand** the ROI (e.g. PTV7= PTV expanded by 7 mm)

Further expansion:

- **Possibility to abbreviate (complex) structure names**
- Two structure type subtypes are newly defined:
- **Optimisation:** Volumes used in optimisation of the treatment plan. This is distinguished by **the suffix "op"** directly following the structure type, e.g. Breast_PTVop. These volumes contain (part of) the source volume (in this example the Breast_PTV).
- **Evaluation:** Volumes used in evaluation of the treatment plan. This is distinguished by **the suffix "ev"** directly following the structure type, e.g. Breast_PTVev.

Uniform structure names: NVRO/EORTC draft proposal

Further expansion:

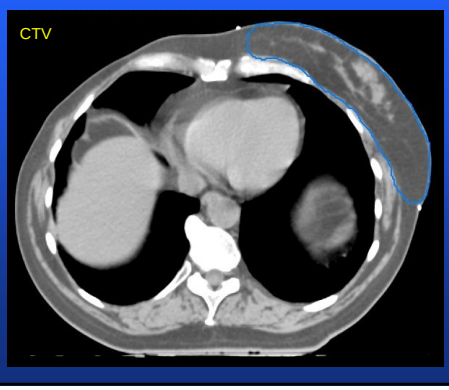
- **Operators for common, encompassing and avoidance structures**

- **Minor additions (eg use of minus sign)**

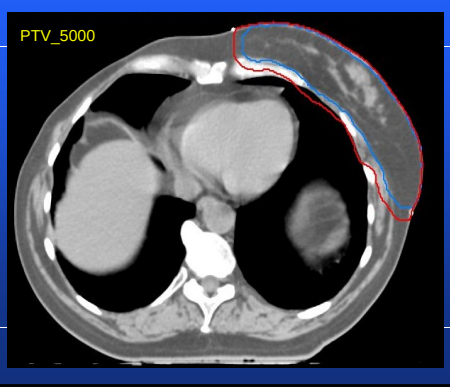
Next steps:

- **Input from / adoption by The Harmonisation Group?**

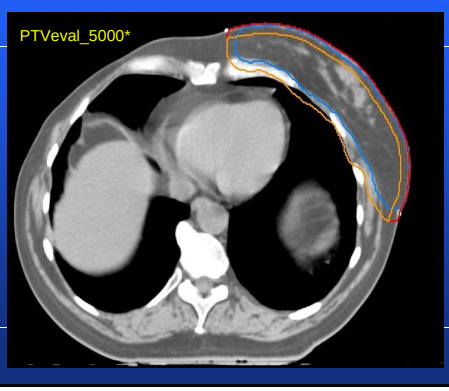
Uniform structure names: Example 1: Breast_CTV



Uniform structure names: Example 1: Breast_5PTV_5000

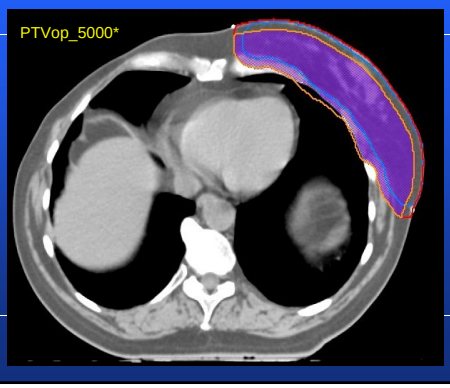


Uniform structure names: Example 1:Breast_5PTV_5000_A_external-7



Uniform structure names:

Example 1: Breast_5PTVop_5000_A_external-7_A_ Lung



Uniform structure names: NVRO/EORTC draft proposal

Example 2:

Brain_3PTV15_A_Brain_3PTV10

OR abbreviated:

RING10_5