



# The EORTC Radiotherapy Quality Assurance platform

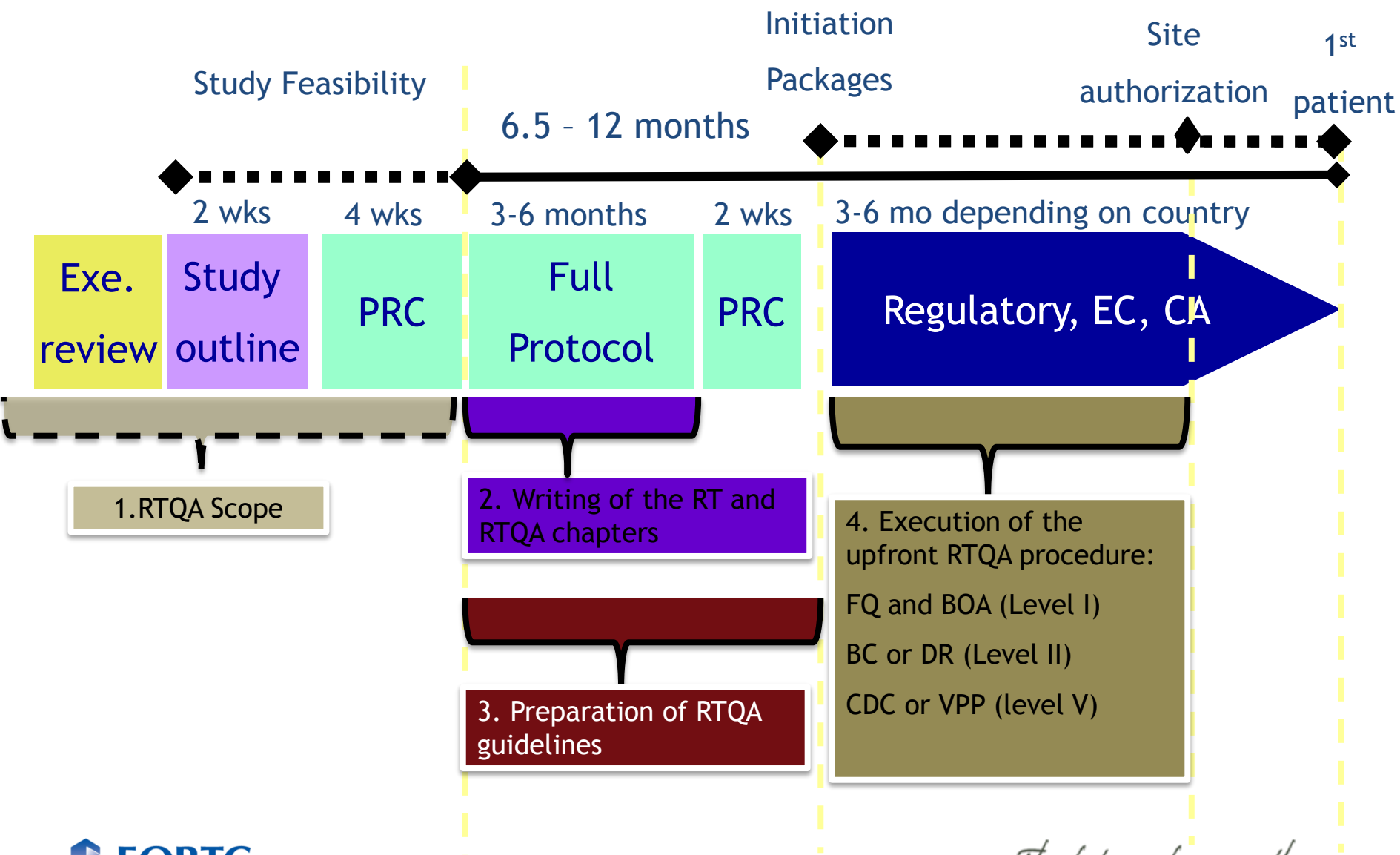
André Branquinho, MD  
EvdS fellow, EORTC HQ

Geneva, February 2016

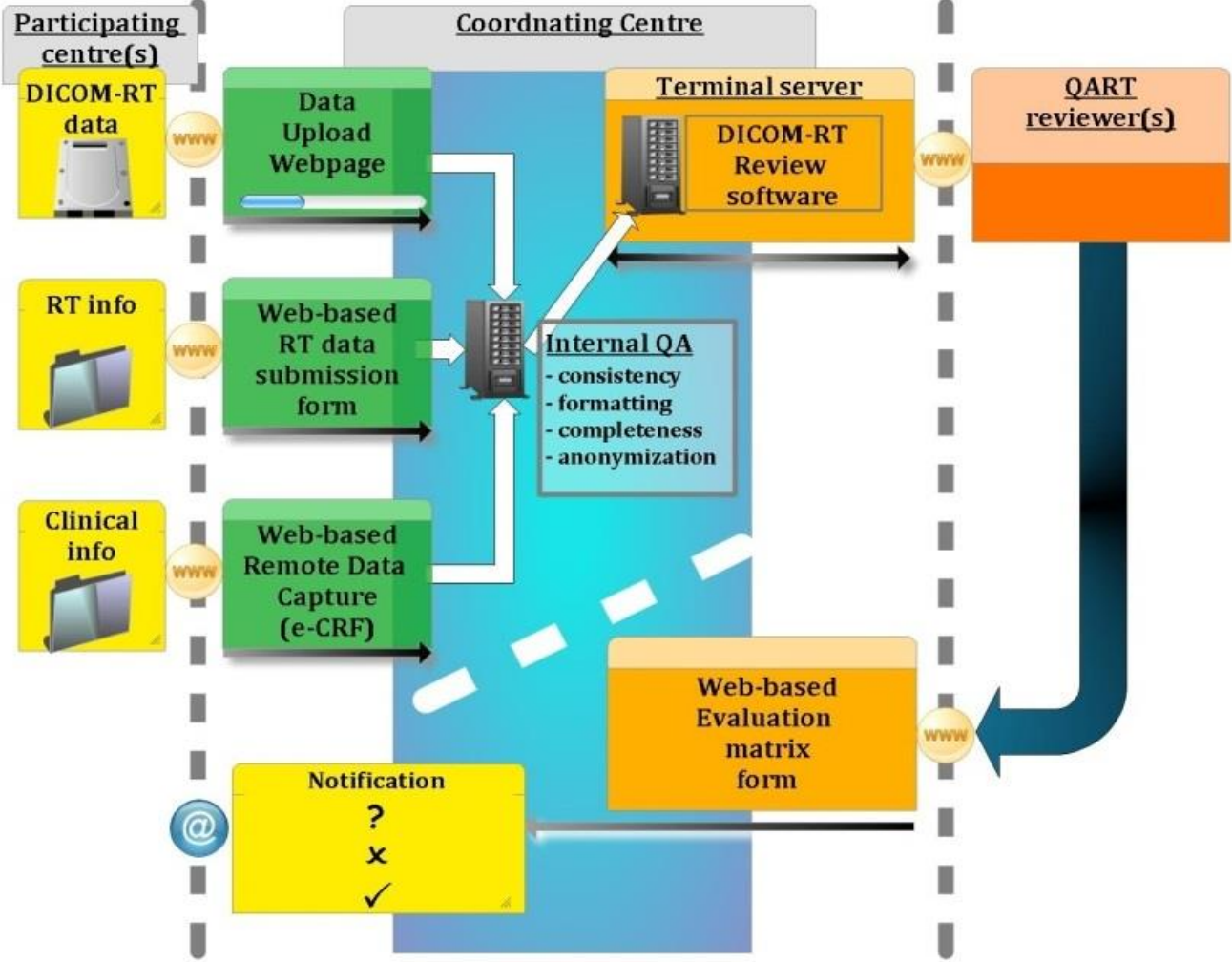
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# Study Development: RTQA involvement



# Radiotherapy planning assessment



Weber DC, Radiother Oncol. 2011 Jul;100(1):150-6

# DICOM-RT Review software

## Visualisation and Organisation of Data for Cancer Analysis

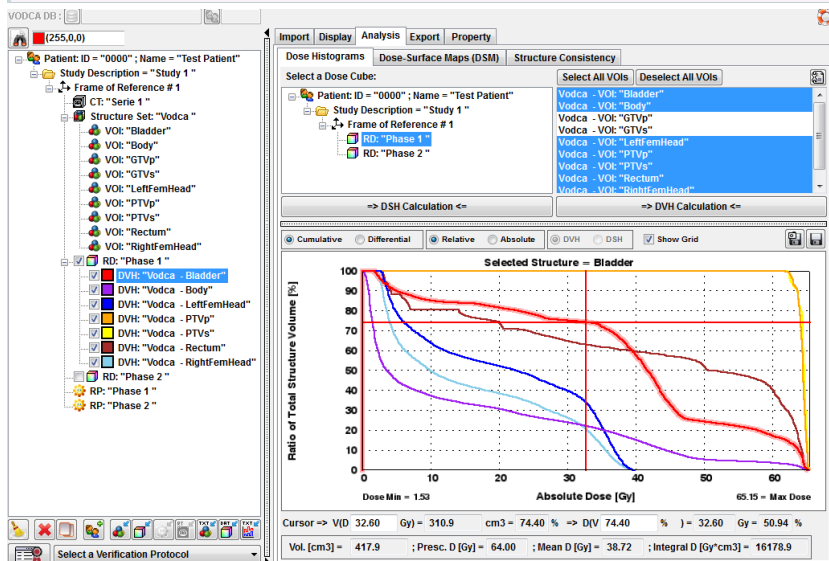
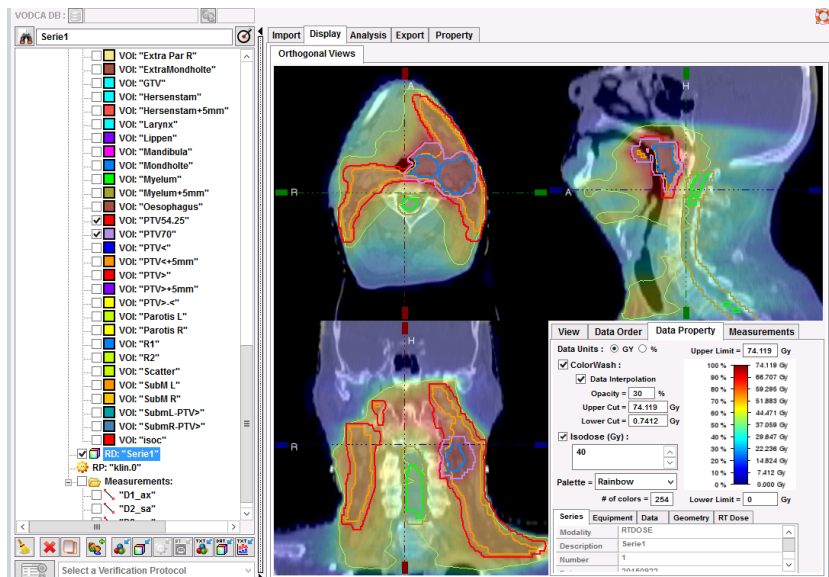
MSS Medical Software Solutions GmbH

VODCA can read a wide variety TPS

- Delineations
- Dose distribution

EORTC VODCA specialized for RTQA activities (remote access)

- Benchmarks
- Individual Case Reviews

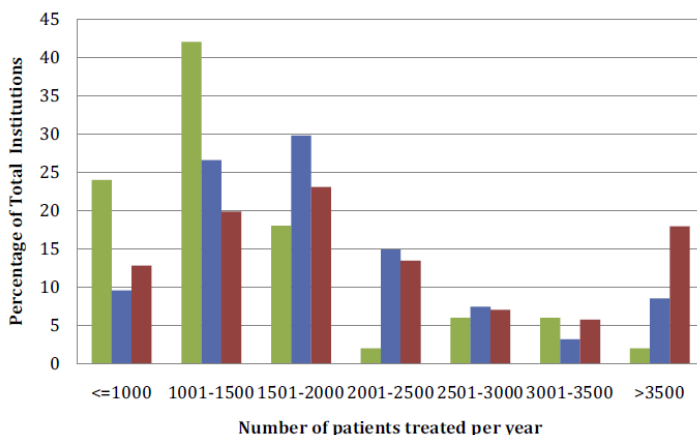


# EORTC RTQA Examples

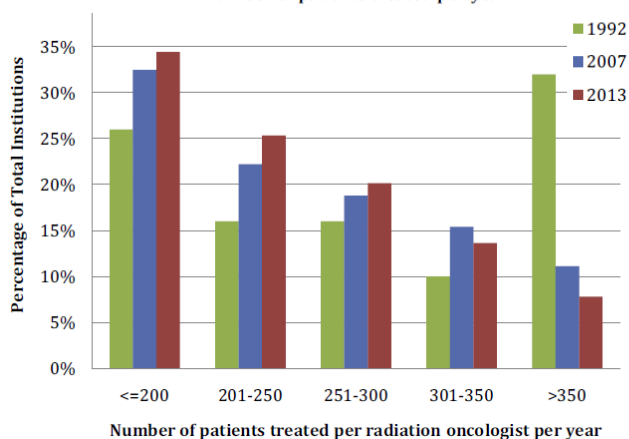
# RT departments' improvement



Quality assurance standards drive improvements in the profile of radiation therapy departments participating in trials of the EORTC Radiation Oncology Group



- Increasing number of patients and professionals
- Reduction number of patients per professional/machine per year



	Mean	Median
<i>2013 (156 institutions)</i>		
No. megavoltage units	5.3	4
No. patients per unit per year	468.6	450
No. patients per simulator/year	1622.9	1542
% inst. with dedicated CT	92	
% inst. with IMRT capability	94	
% inst. with SBRT capability	65	
<i>2007 (98 institutions)</i>		
No. megavoltage units	3.9	3
No. patients per unit per year	488.0	456
No. patients per simulator/year	1117.0	1038
% inst. with dedicated CT	86	
% inst. with IMRT capability	79	
% inst. with SBRT capability	54	

Grant W, Radiother Oncol. 2014; 112(3):376-380

*The future of cancer therapy*

# Benchmarks detect protocol incompliances

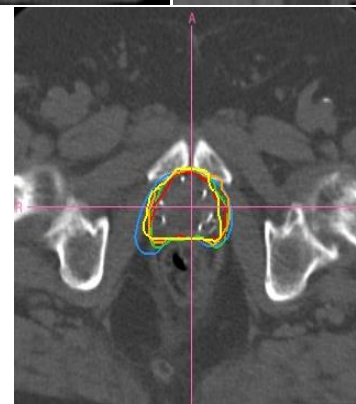
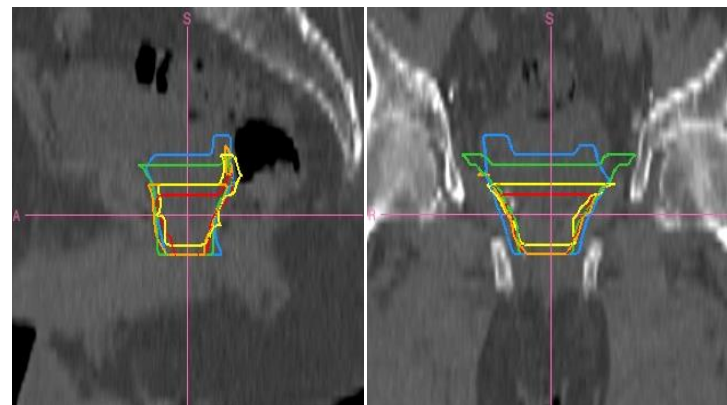
Radiotherapy  
& Oncology

European Society of Radiotherapy  
and Oncology

Quality assurance of the EORTC 22043-30041 trial in post-operative radiotherapy in prostate cancer: results of the Dummy Run procedure.

38 submissions from 31 institutions

- 6 per protocol.
- 23 acceptable variations
- 9 unacceptable variations
  - 7 of 9 submission due to target volume





# RTQA retrospective Individual case review



Quality assurance in the EORTC 22033-26033/CE5 phase III randomized trial for low grade glioma: the digital individual case review

1<sup>st</sup> fully digital ICR

- 57 of 72 requested datasets from 48 institutions were technically usable.

Volumes (N = 57)	GTV	CTV	PTV	OAR
Protocol compliant	41/57	30/57	35/57	5/57
Minor deviation	10/57 Crosses anatomic boundaries – 5/10 Cannot be judged without MRI – 4/10 Incorrect – 1/10	19/57 Crosses anatomic boundaries – 15/19 Margin incorrect – 3/19 Both – 1/19	18/57 Margin incorrect – 16/18 Cannot be judged without CTV – 2/18	5/57 OAR contours missing and/or incorrect – 5/5
Major deviation	6/57 No GTV – 3/6 2 GTVs – 3/6	8/57 No CTV – 4/8 Incorrect – 3/8 2 CTVs – 1/8	4/57 2 PTVs – 3/4 Incorrect – 1/4	47/57 OAR contours missing and/or incorrect – 47/47

Fairchild A, Radiother Oncol. 2012 Jun;103(3):287-92

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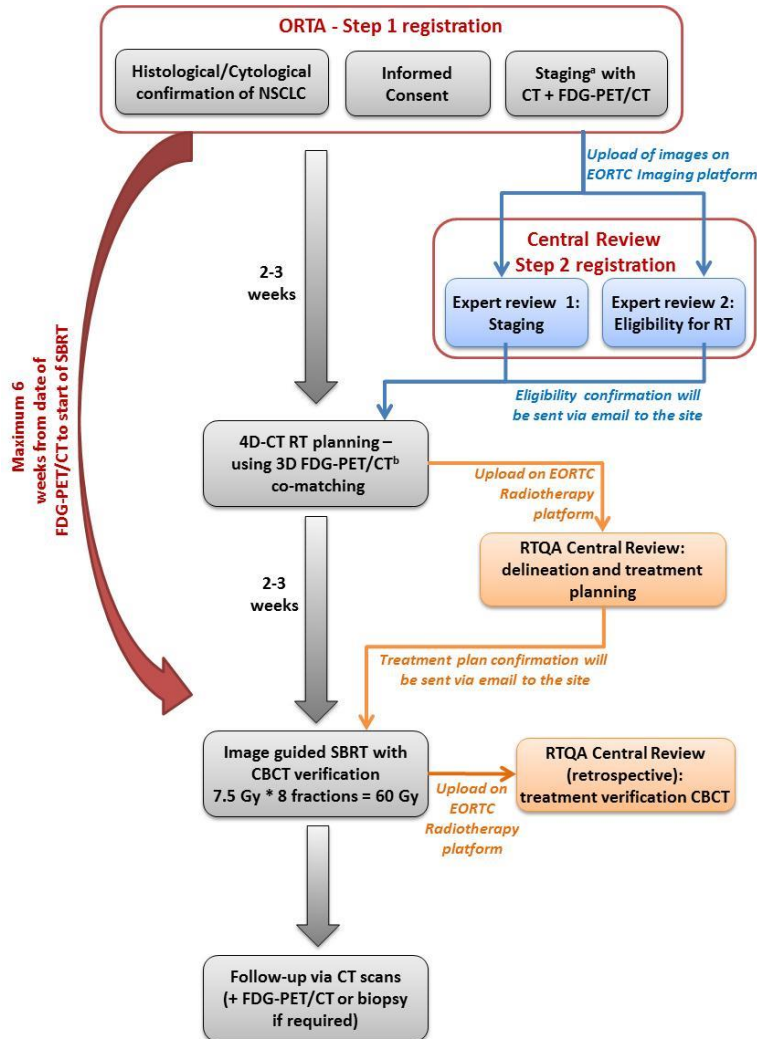
- 57 of 72 requested datasets from 48 institutions were technically usable.

Plans (N = 57)	Beam arrangement	Dose distribution	Total dose	Overall treatment time (OTT)
Protocol compliant	48/57	32/57	54/57	54/57
Minor deviation	3/57 Suboptimal use of vertex field – 2/3 Unequally weighted POP – 1/3	7/57 Minimum coverage <95% in proximity to OARs – 7/7	1/57 50 Gy prescribed – 1/1	2/57 OTT 44–45 days – 2/2
Major deviation	6/57 Two phase plan – 4/6 WBRT – 1/6 Suboptimal use of posterior field – 1/6	18/57 Maximum dose within ± outside PTV > 107% – 11/18 Minimum coverage <95% not in proximity to OARs – 2/18 Minimum coverage <95% and maximum >107% – 5/18	2/57 >50.4 Gy prescribed – 2/2	1/57 OTT ≥ 46 days – 1/1

Abbreviations: OAR – organs at risk; POP – parallel opposed pair; WBRT – whole brain radiotherapy.

Fairchild A, Radiother Oncol. 2012 Jun;103(3):287-92

# Prospective ICR: EORTC 22113-08113



- Stereotactic ablative radiotherapy (SABR) of inoperable centrally located NSCLC
- Phase II, non-randomized, single arm, multicenter trial
- Prospective ICR review (delineation and planning) for all accrued patients
- Time between submissions and review: 3 days
- Time for corrections: 3 days

# Conclusions

- Poor RT quality may lead to trial failure.
- Dedicated RTQA online platform allows smooth interaction among sites, coordinators and reviewers.
- EORTC RTQA programme is trial specific
- Proper RTQA leads to better trial results

# Acknowledgement

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Thank you