

OECD A&D Experts' Consensus Conference

DO ADVANCES IN RADIOTHERAPY REQUIRE PARTICULAR STANDARDS?

Prof. Dr. Matthias Guckenberger

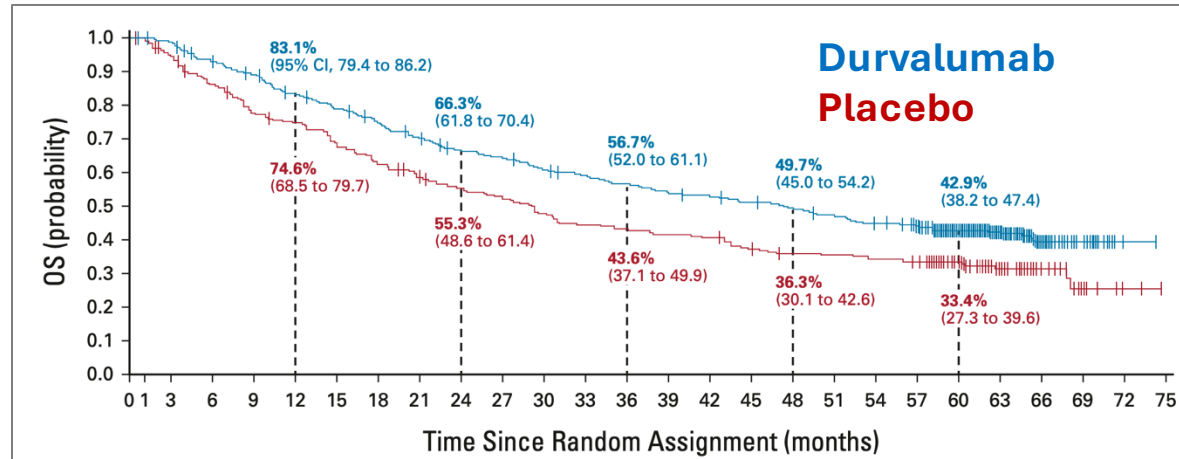


@matguc

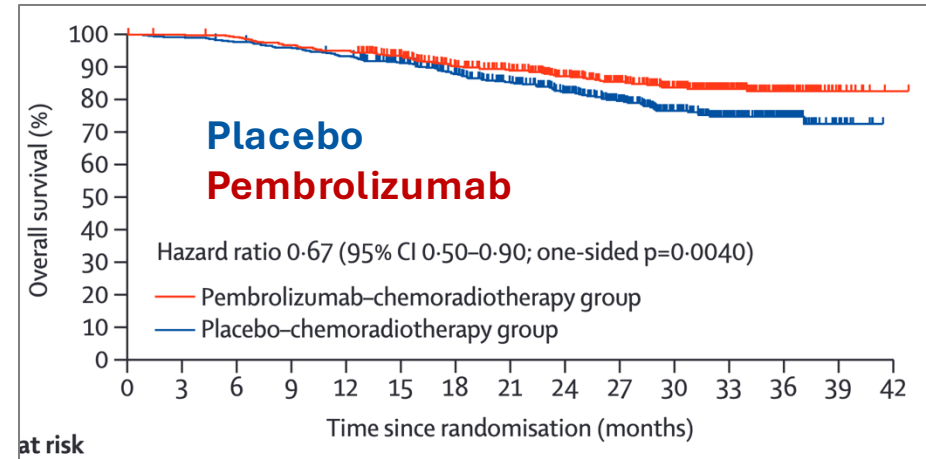


Advances in RT

Maintenance IO after RCT in NSCLC

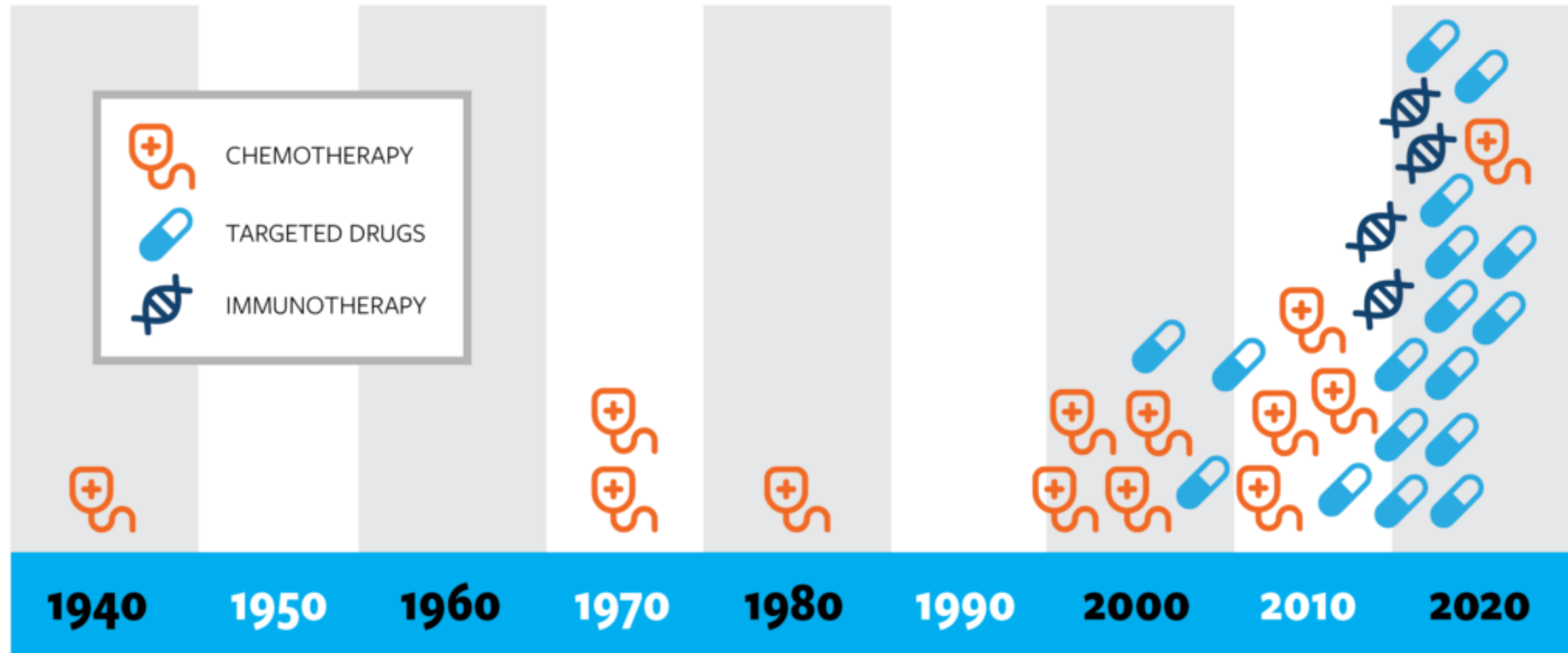


IO concurrent to RCT in cervical cancer



- Standards for each component individually
- New standards for combination and interaction

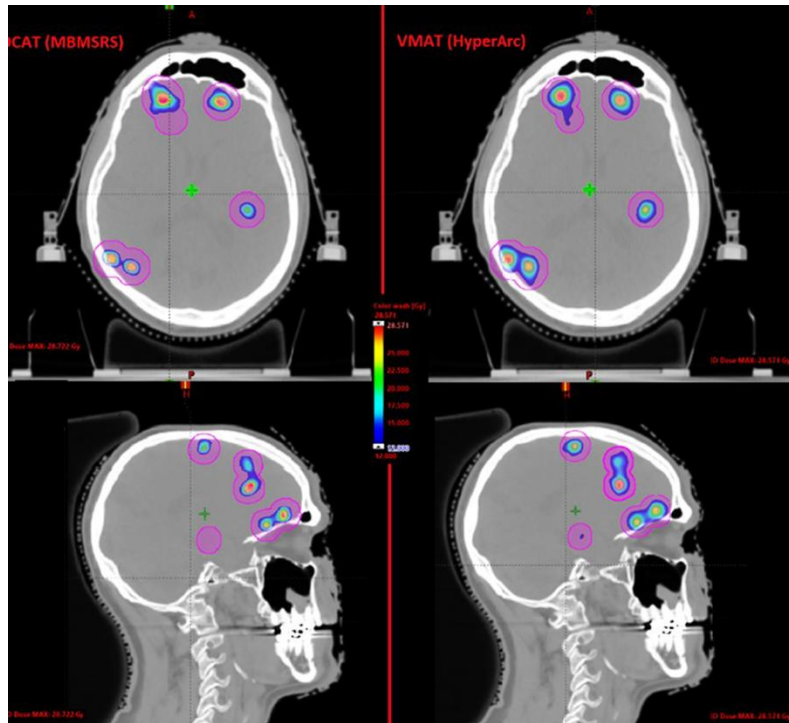
Advances „around“ RT



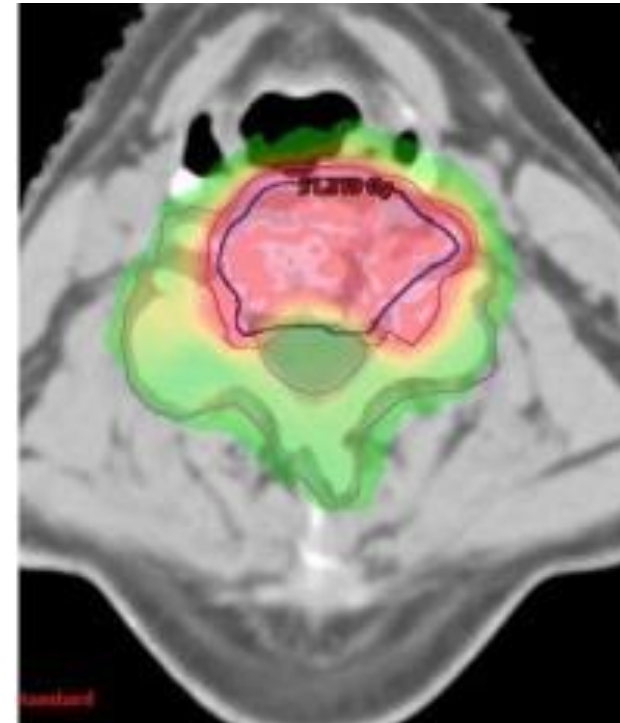
Rapid registration of new anti-cancer drugs

Advances „around“ RT

Brain metastases



Bone metastases

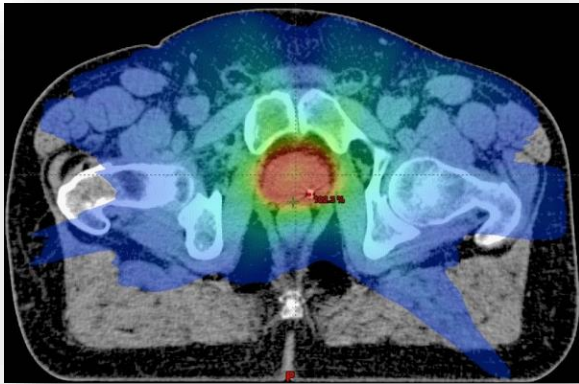


To SAFELY integrate palliative RT into systemic therapy with novel drugs?

Advances in RT

Localized prostate cancer

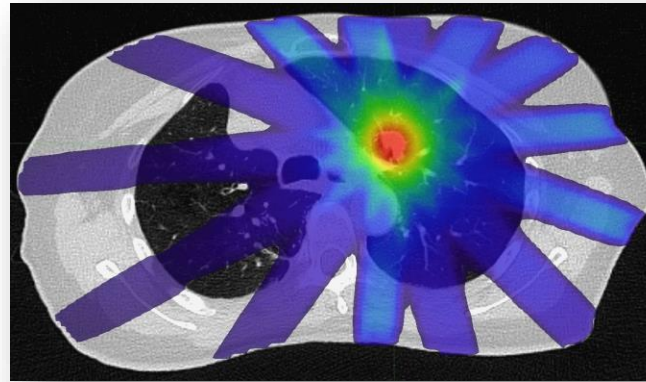
Stereotactic RT



5-years "cure"
>95%

Early-stage NSCLC

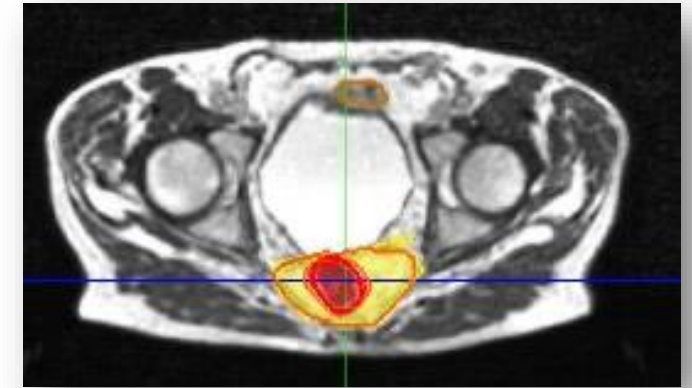
Stereotactic RT & Immunotherapy



4-years local control
100%

Early-stage rectal cancer

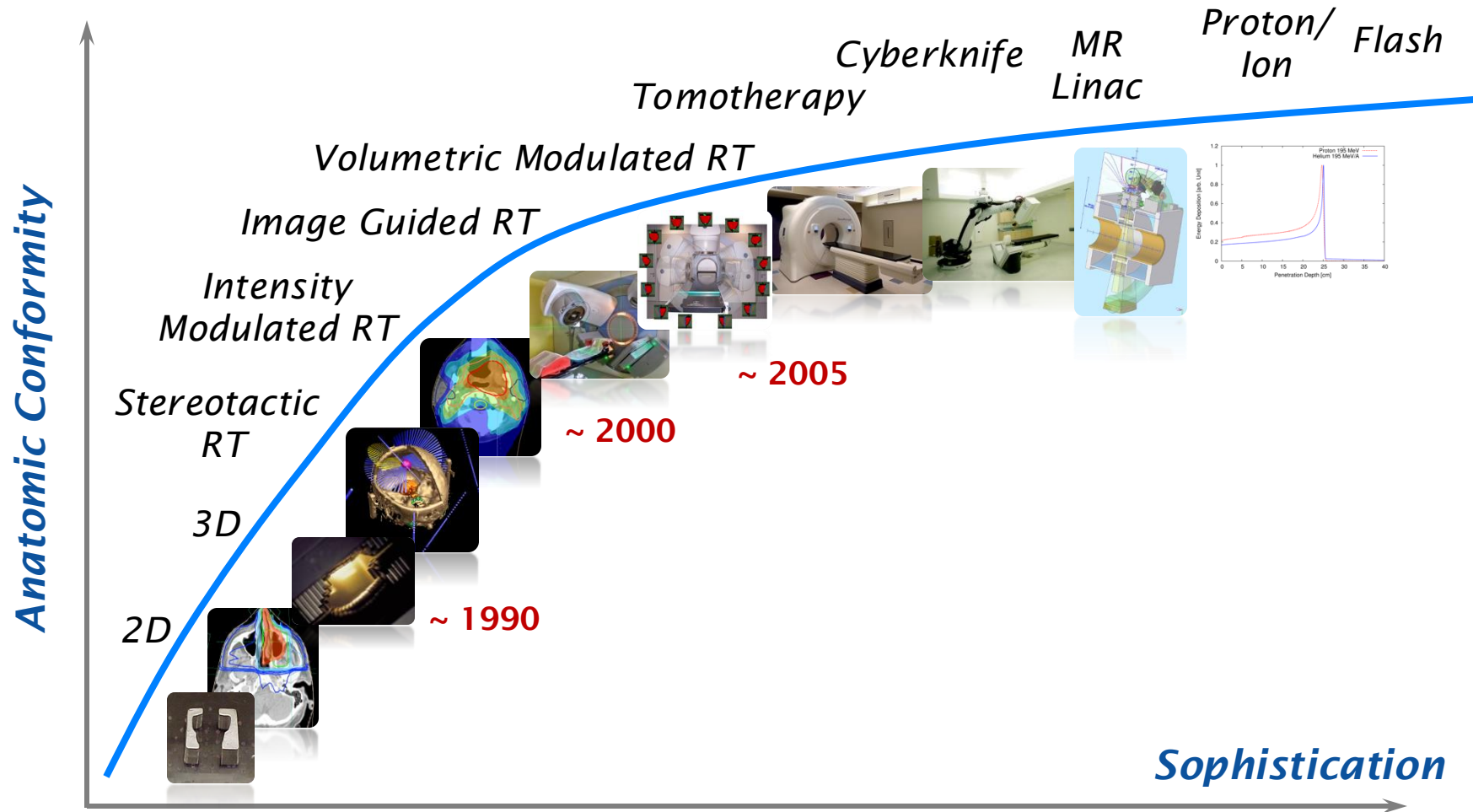
Radio-chemotherapy



3-years organ preservation
97%

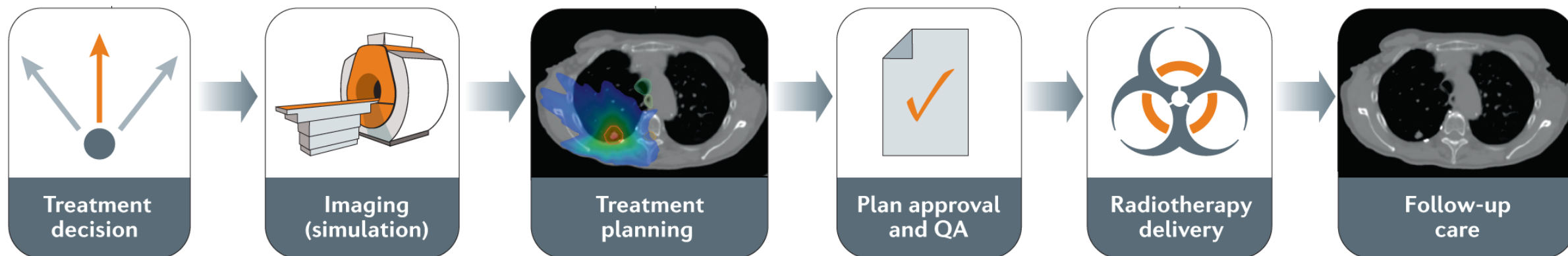
Technological progress translating into improved outcome of cancer patients
based on randomized controlled trials

Advances in RT



Radiotherapy process

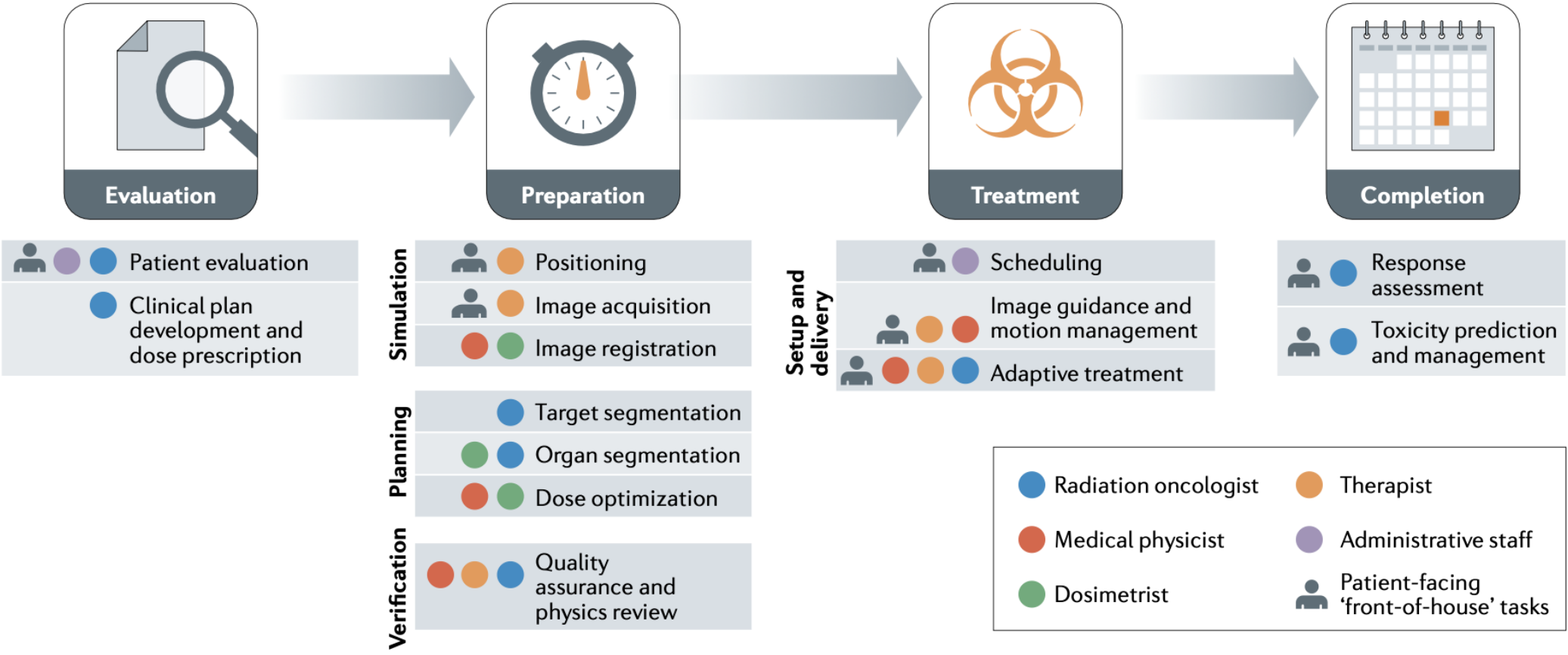
Process of Radiotherapy



- ... multistep process
- ... multidisciplinary and interdisciplinary
- ... almost completely digitalized
- ... mostly using dedicated infrastructure
- ... AI supported
- ... highly regulated by radiation protection

Unique in medicine

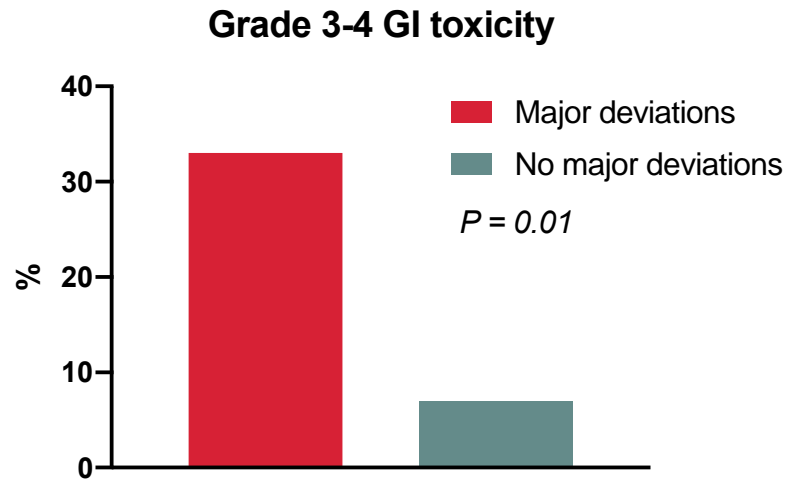
Radiotherapy process



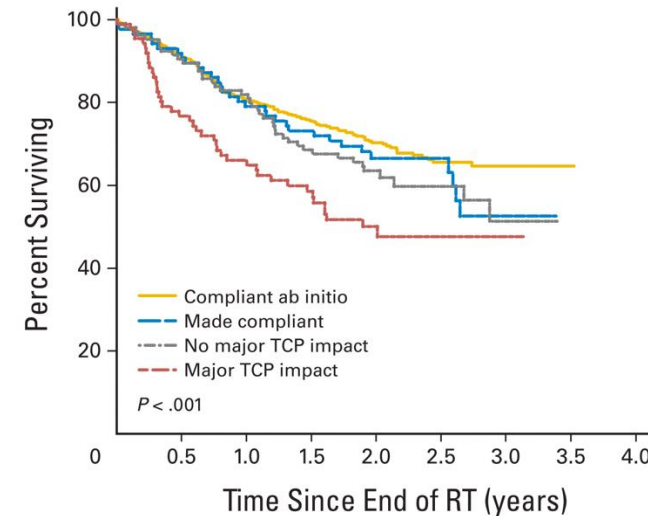
Quality (assurance) impossible w/o deep standardization

Influence of quality on outcome

Safety



Efficacy



Proven influence digital, quantitative and patient-individual RT parameters on outcome

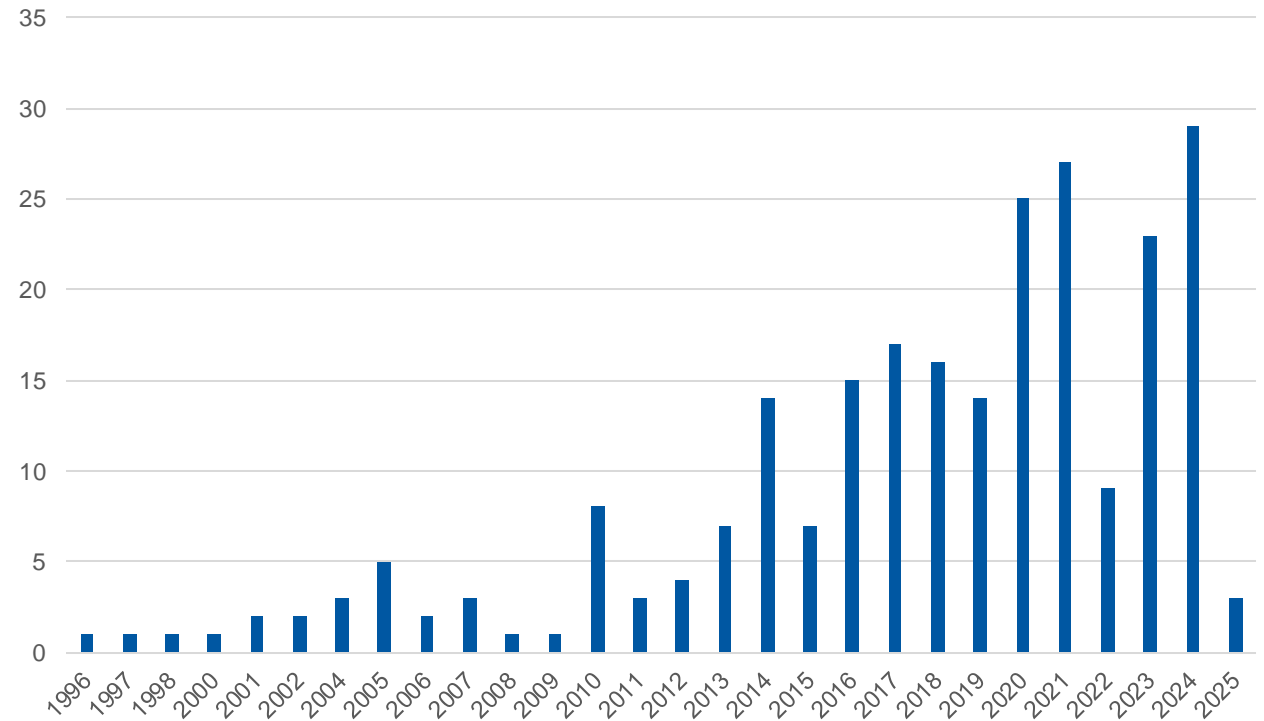
**Radiation Oncology.
Optimal Health
for All,
*Together***

Developing quality standards within ESTRO

> Guidelines Committee

- > Guidelines Sub-Groups
- > Guidelines Sub-Group on Head and Neck
- > Guidelines Sub-Group on RTT
- > Guidelines Sub-Group on CNS
- > Guidelines Sub-Group on Lung
- > Guidelines Sub-Group on Upper GI
- > Guidelines Sub-Group on Lower GI
- > Guidelines Sub-Group on Breast
- > Guidelines Sub-Group on Physics
- > Guidelines Sub-Group on Urology

"ESTRO guideline" in pubmed

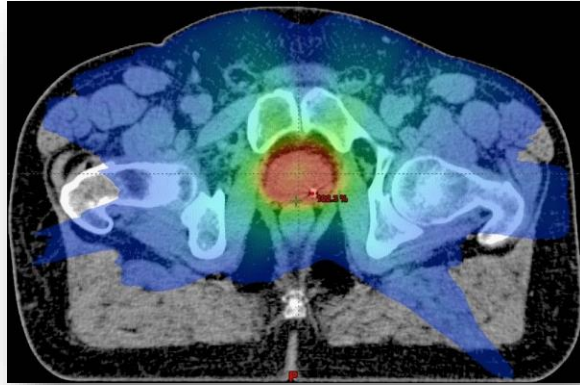


ESTRO guidelines

Progress & innovation in RT

Localized prostate cancer

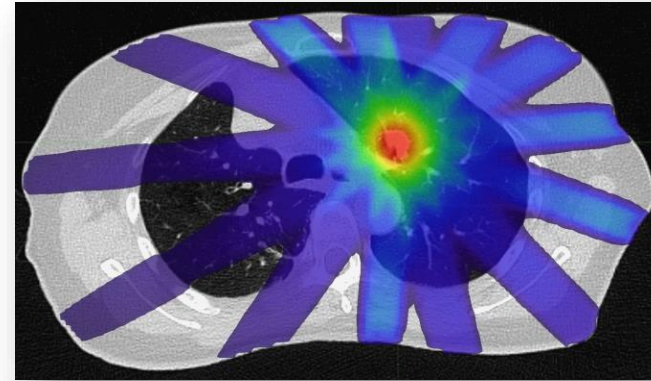
Stereotactic RT



5-years "cure"
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Early-stage NSCLC

Stereotactic RT & Immunotherapy



4-years local control
100%

Stereotactic body radiotherapy

A SoC not only in highly-specialized or academic centers

Progress & innovation in RT

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ESTRO-ACROP consensus guideline

ESTRO ACROP consensus guideline on implementation and practice of stereotactic body radiotherapy for peripherally located early stage non-small cell lung cancer



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Only 8/57 technologies and techniques were identified as mandatory for SBRT while 32/57 were considered as optional.

Progress & innovation in RT

Equipment	C-arm linear accelerator with volumetric in-room image guidance
Staff teaching, training and credentialing	Respiration correlated 4D-CT Written departmental protocols Multi-disciplinary project team for SBRT implementation and application Structured follow-up for clinical outcome assessment
Patient selection for SBRT	Discussion in interdisciplinary tumor board Minimum ECOG 3 Minimum life expectancy of 1 year
Treatment planning	3D conformal treatment planning Type B algorithms Respiration correlated 4D-CT imaging ITV based motion management strategy
Dose and fractionation	Risk adapted fractionation schemes for peripheral and central tumors, and for tumors with broad chest wall contact
Inter- and intra-fraction image guidance	Daily pre-treatment volumetric image-guidance
Follow-up	Follow-up according to published guidelines FDG-PET imaging in case of suspected local recurrence
Quality assurance	Intensified quality assurance (mechanical accuracy of 1.25 mm and a dosimetric accuracy of 3% in a lung phantom inside the treatment field) Small field dosimetry detectors for commissioning End-to-end testing in a lung phantom Quality assurance of in-room image-guidance systems and of the 4D-CT scanner Weekly checks of the mechanical accuracy of the delivery system Daily quality checks of the alignment of the IGRT system with the MV treatment beam

In contrast, quality-assurance related elements were considered as mandatory in 12/24 items.

Developing quality standards within ESTRO

ESTRO



Radiation Oncology Safety and Quality Committee (ROSQC)

Aims

- The ROSQC activities are aimed at improving safety and quality in the preparation and delivery of radiotherapy and raising compliance of member states with the legal requirements defined in the European Directives in the area of radiation safety and quality.
- The ROSQC will strive to support ESTRO in leading education, research, and development in the quality and safe delivery of radiotherapy and help to strengthen ESTRO position in defining and participating in EU research projects.

ESTRO ROSQC committee

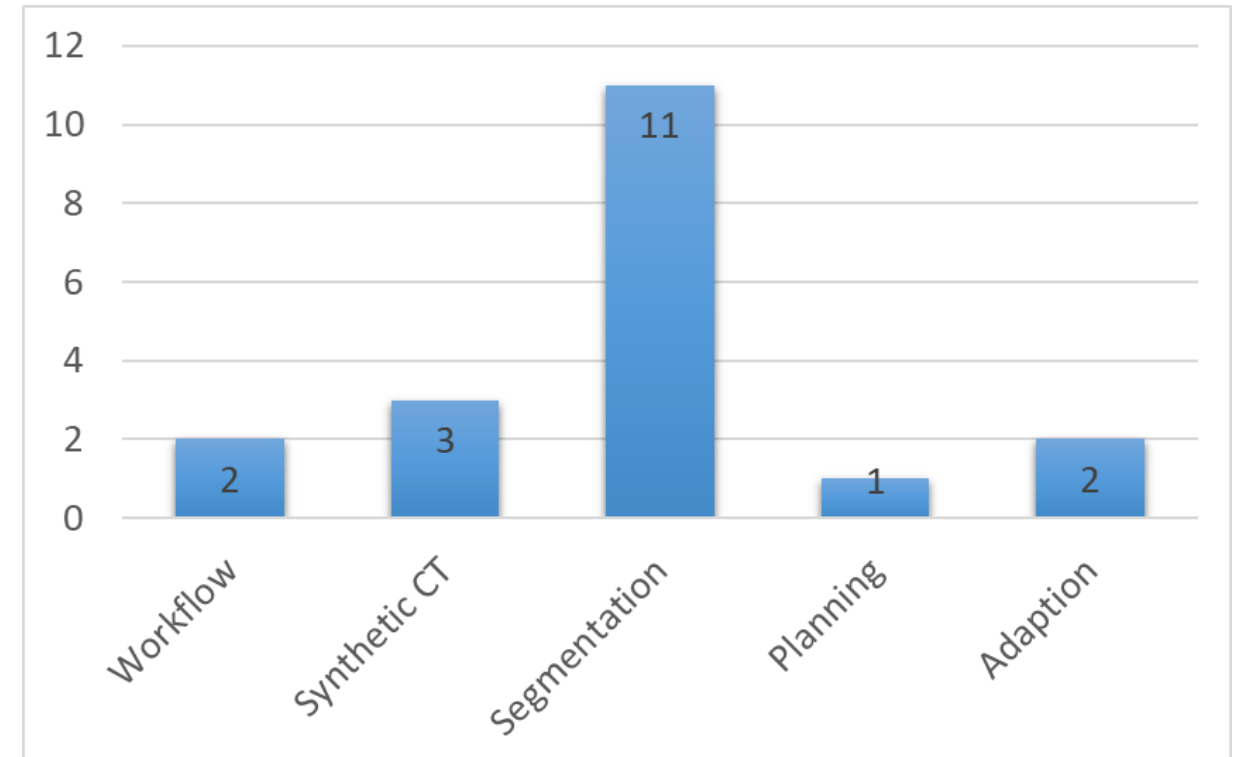
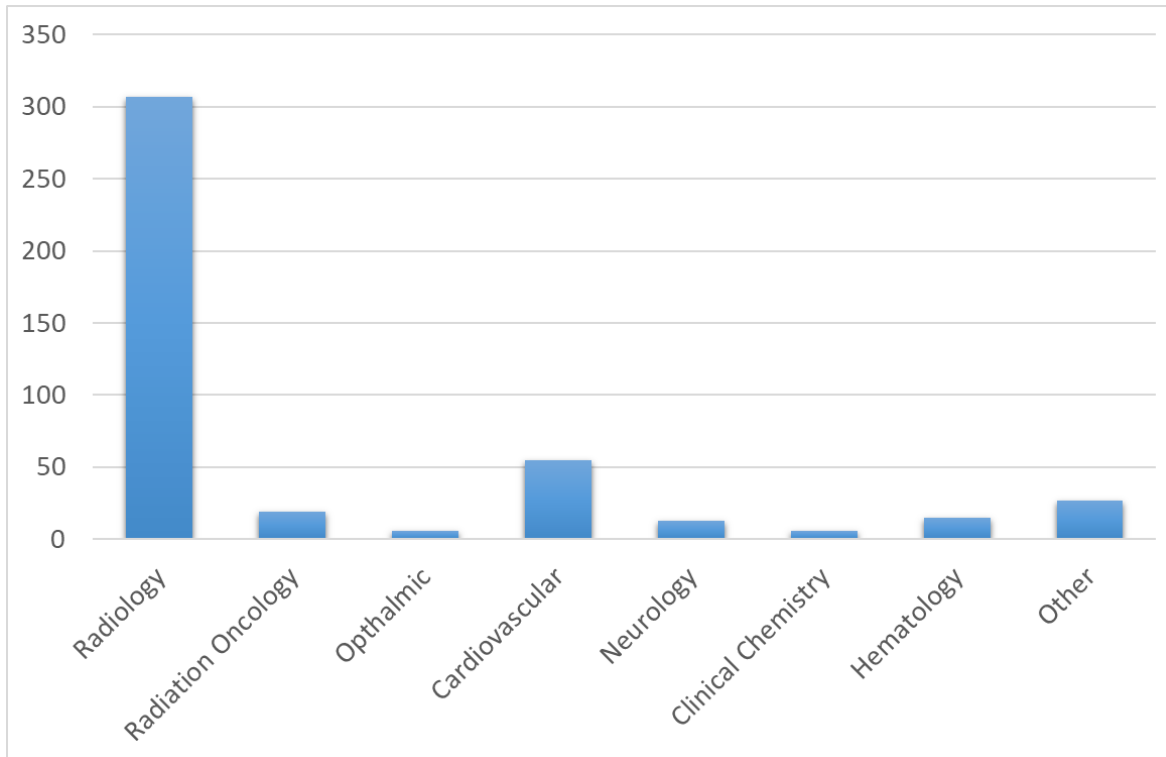
Quality Assurance Team for Radiation Oncology (QUATRO)

1. **Planning the introduction** of new technology (needs analysis, multidisciplinary team, budgeting, tendering, specifications, consideration of need for associated services)
2. Roles of the professions and training associated with the **introduction** of new technology
3. **Acceptance and commissioning** of new technology
4. **Operation** of new technology and its **integration** within the department
5. **Quality Assurance Program** for new technology
6. Consideration of **service and maintenance** for new technology
7. **Radiation Protection** Considerations for new technology
8. **Clinical program** and evaluation of new technology
9. **Long term planning** and consideration of sustainability for new technology

Comprehensive multidisciplinary framework

Future of QA and standardisation - AI

FDA approved AI products in medicine



AI has arrived in today`s practice

DO ADVANCES IN RADIOTHERAPY REQUIRE PARTICULAR STANDARDS?

- Advances in Radiotherapy: continuous and iterative process
- Multi-disciplinary and interprofessional nature of radiotherapy mandating rigidly defined standards
- Fully digital process with opportunity for definition of quantitative standards
- AI to allow for advanced standardization