EMERGING ISSUES WITH REGARD TO ORGAN DOSES

P SCALLIET – EU SCIENTIFIC SEMINAR MAY 2017

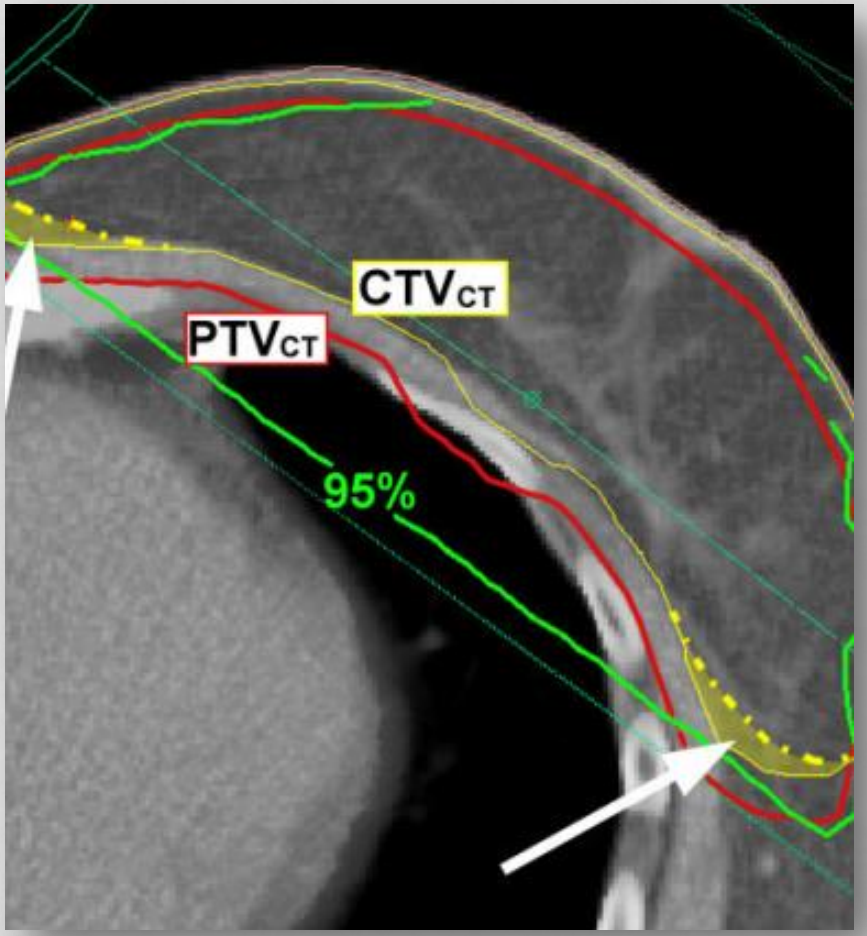
RADIOTHERAPY

- Dose levels close to tolerance.
- Organ failure is a remote but clear possibility.
- Cancer induction is a constant concern.
- But it is a life-saving treatment for a deadly disease

IDEAL TREATMENT

- 100% of curative dose in target.
- 0% of dose elsewhere.

- 100% efficacy.
- 0% toxicity.



BUT IT IS ALWAYS A COMPROMISE

- X-rays have a straight trajectory.
- Impossible to bend rays.
- Therefore necessarily an entrance and an exit.

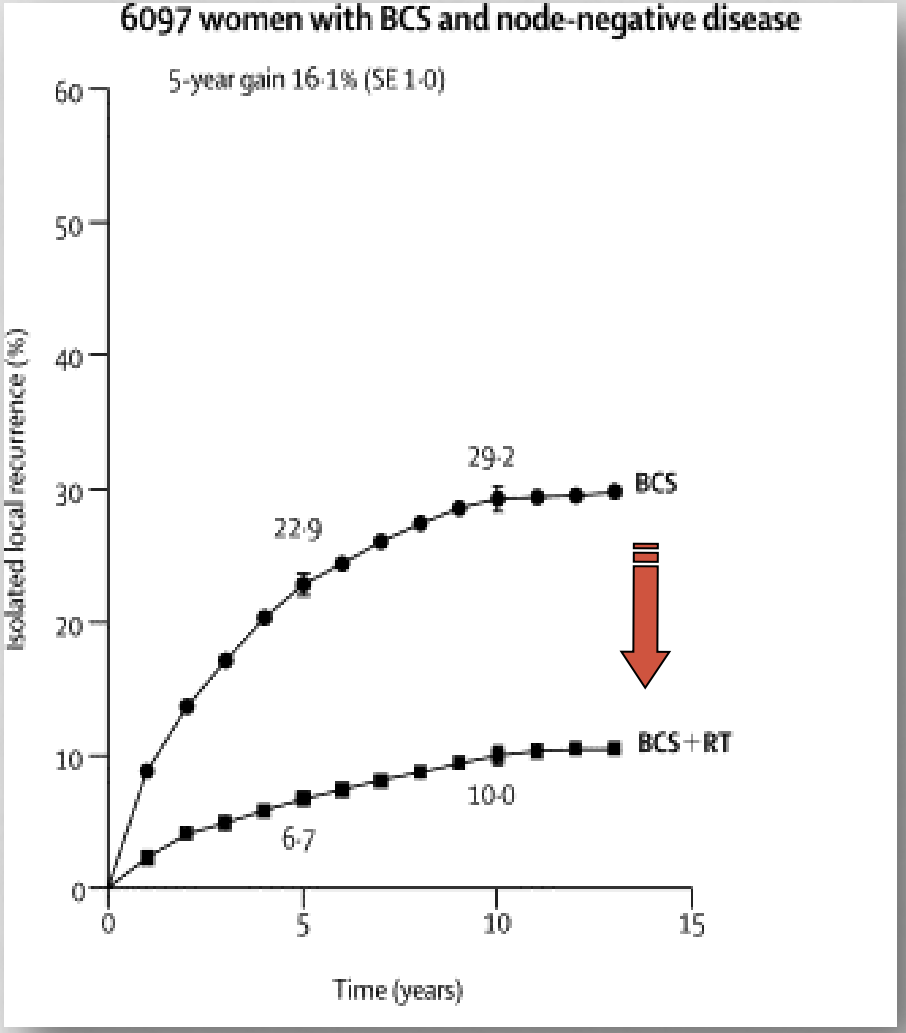
THE ESSENCE OF THE QUESTION

Benefit?

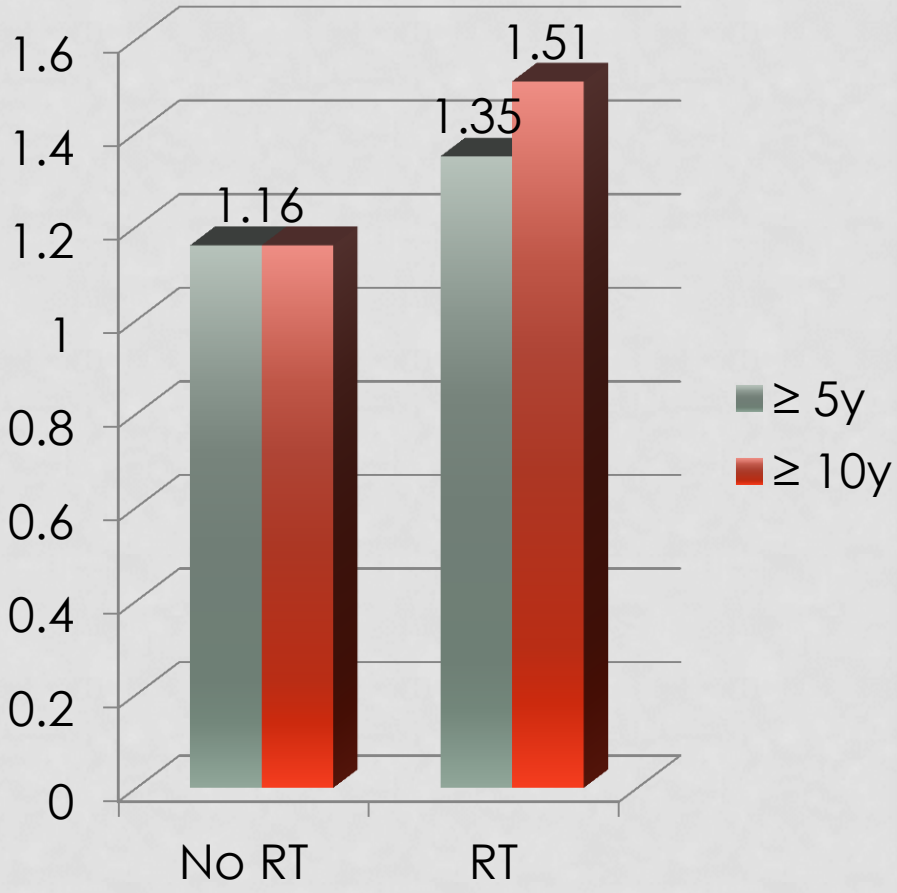
Detriment ?

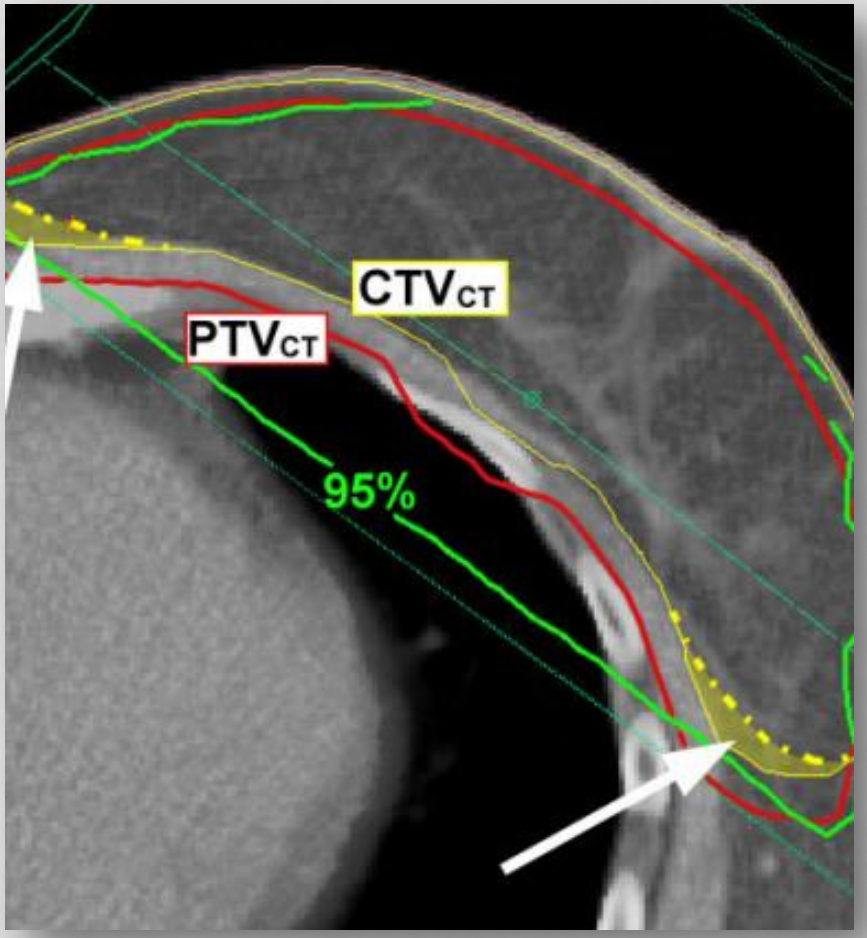
RADIOTHERAPY PREVENTS BREAST CANCER RECURRENCE

After breast conserving surgery (all age) Clarke, Lancet, 2006



RELATIVE RISK 2ND CANCER IN BREAST CANCER PATIENTS WITH AND WITHOUT RT.

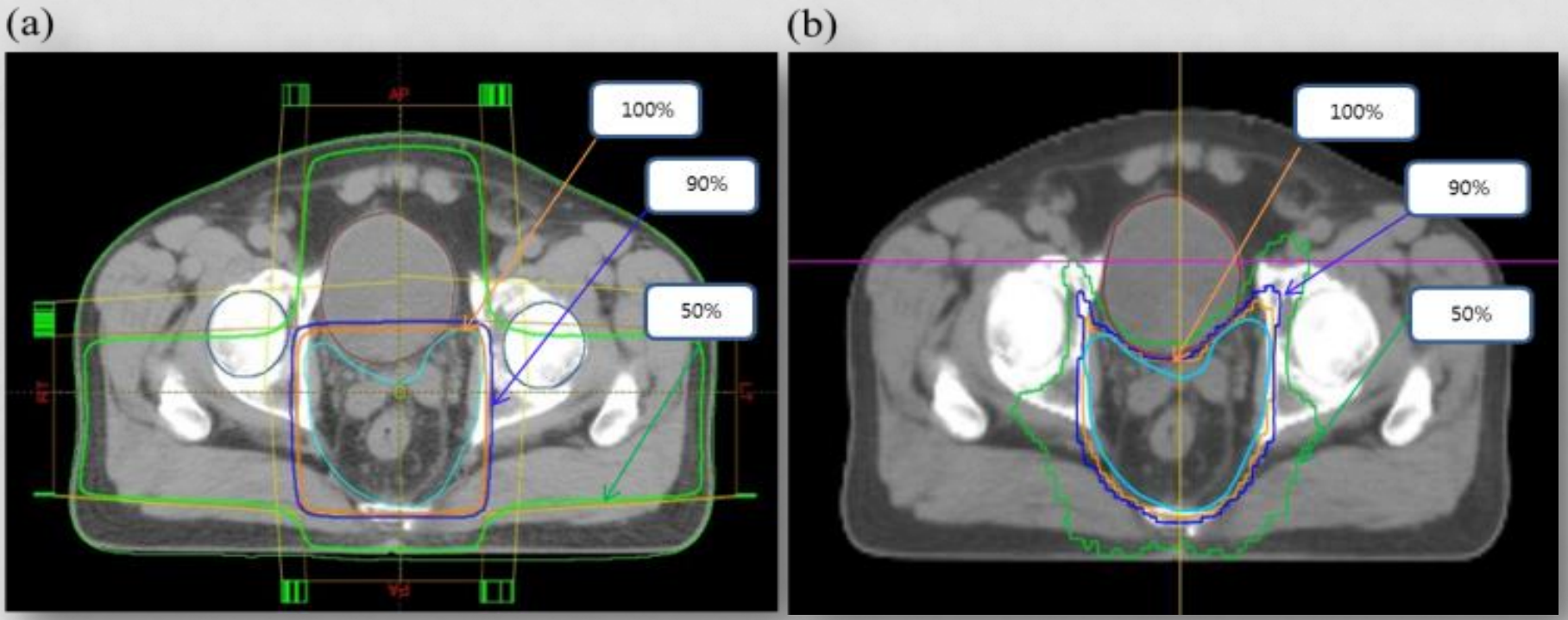




Grantzau T, R&O, 2016. 121 : 402-13.

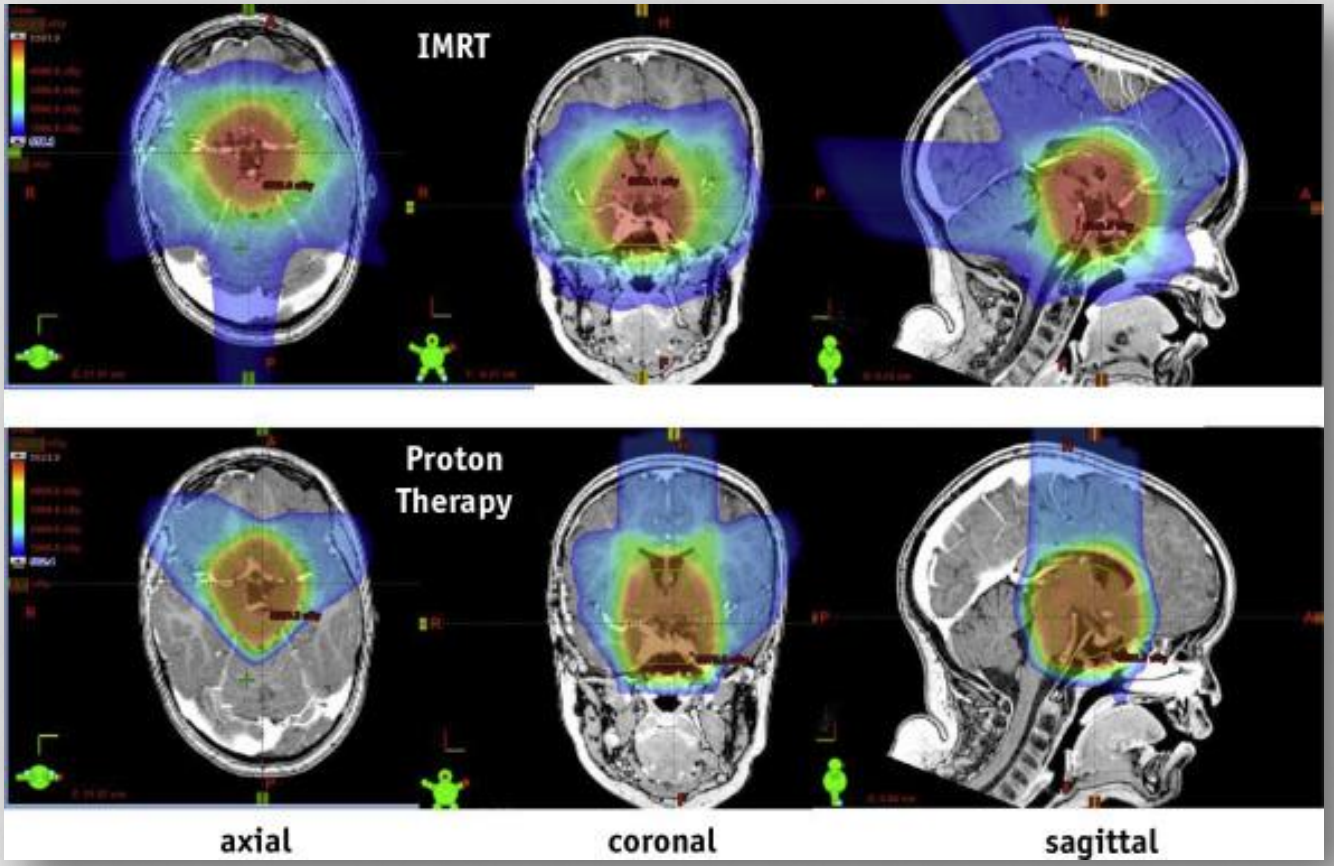
IF A NON-IRRADIATING TREATMENT EXISTS IT SHOULD BE PREFERRED

REDUCING DOSE TO NORMAL TISSUE



2D vs. 3D dose distribution for rectum cancer

DOSE DISTRIBUTION IMPT VS. IMRT IN CHILDREN CRANIOPHARYGIOMA



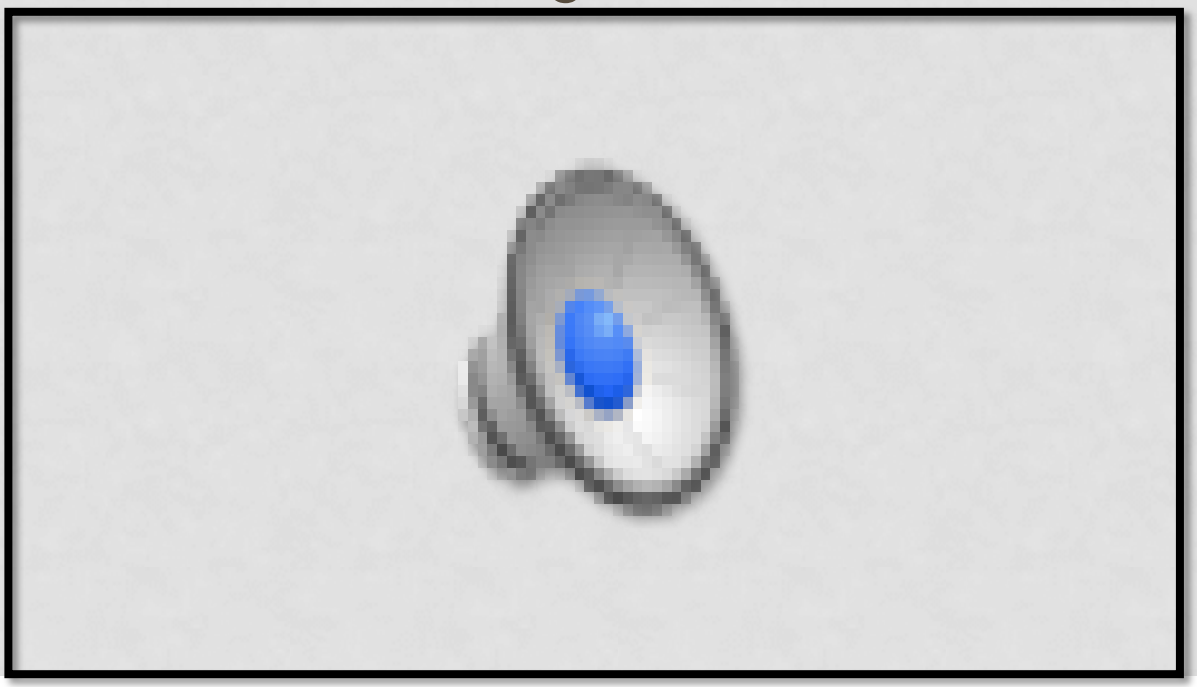
Lower integral dose, does it matter ?

Daniel J. Indelicato, IJROBP 2016, 96:387

MULTIPLE FACTORS…

ALARA PRINCIPLE

- The devil is in « reasonable ».
- Few long term clinical data in survivors.
- High cost of RT installation.
- Absence of cost-benefit data in economical terms.
- Absence of clear data linking DVH with cancer risk.



RESEARCH NEEDS

- Clinical validation of organ dose reduction techniques (ch arged particles).
- Understand survivors physiology (how do minute dose effects translate in megadose survivors).
- Understand second cancer risk (risk even or group at risk).