

Stockholm University
Centre for Radiation Protection Research



SWEDISH NATIONAL COMMITTEE FOR
RADIATION PROTECTION RESEARCH
THE ROYAL SWEDISH ACADEMY OF SCIENCES

Current challenges of patient re-irradiation



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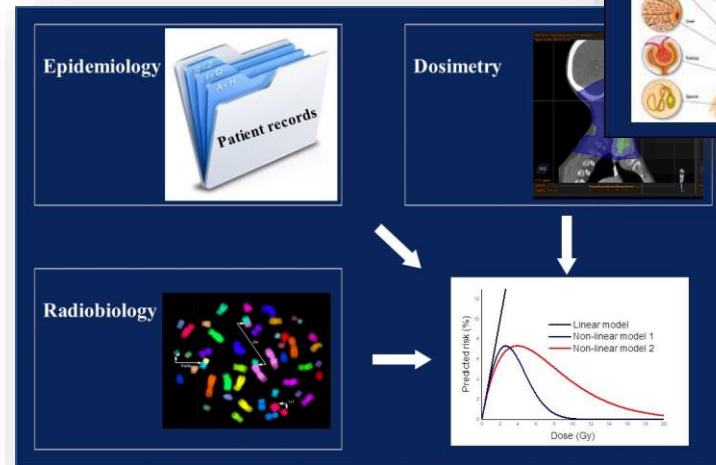


Stockholm workshops series

2014 *Biological basis of radiotherapy:
where do we stand?*



2016 *Risk of secondary
cancer following
radiotherapy*

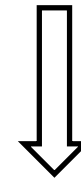
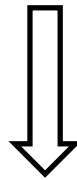
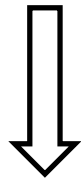


2018 *Current challenges of patient re-irradiation*



Current challenges of patient re-irradiation

Patient re-irradiation = challenging task



Radiobiology

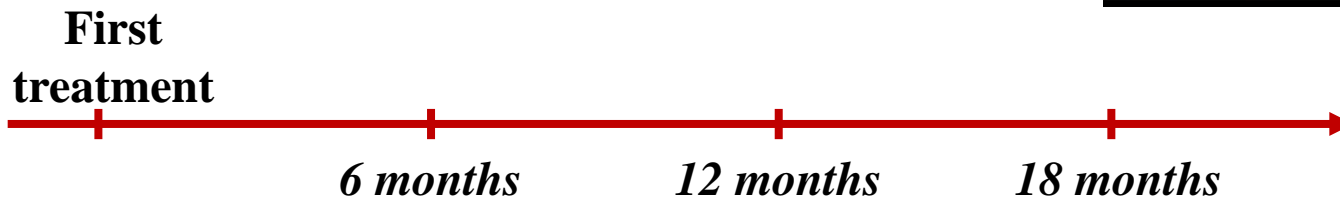
Physics

Clinical



Current challenges of patient re-irradiation

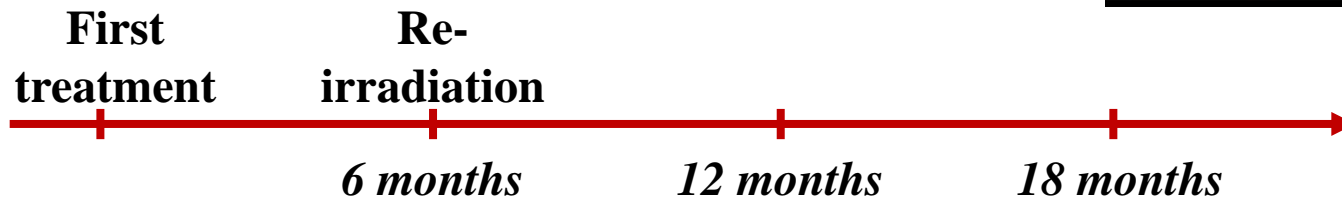
- Toxicity of the OARs / tolerance of the NT
 - What dose constraints should be used in case if re-irradiation?





Current challenges of patient re-irradiation

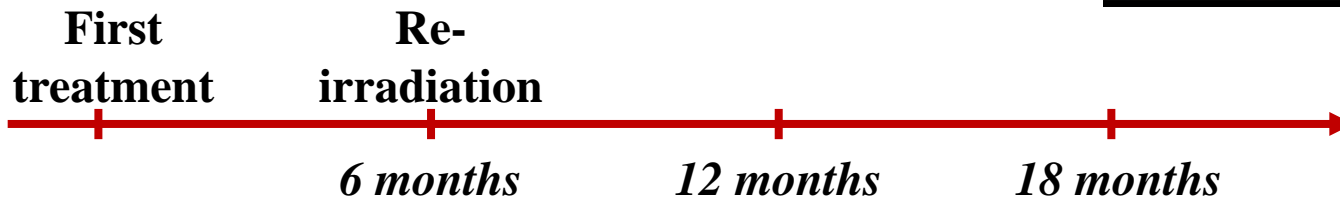
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Current challenges of patient re-irradiation

- Toxicity of the OARs / tolerance of the NT
 - What dose constraints should be used in case if re-irradiation?



- How do the dose constraints depend on time?



Current challenges of patient re-irradiation

- Toxicity of the OARs / tolerance of the NT
 - What dose constraints should be used in case if re-irradiation?
- Radiosensitivity of the recurrent tumours
 - Are recurrences as radiosensitive as the primary tumours?
 - Are the new malignancies as radiosensitive as the primary tumours?

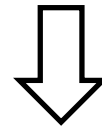
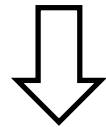




Radiobiological challenges

- Translate the current knowledge from animal experiments to clinical dose prescriptions and constraints

Normal tissue tolerance



At cellular level:

- Clonogenic cell survival
- Role of the stem cells

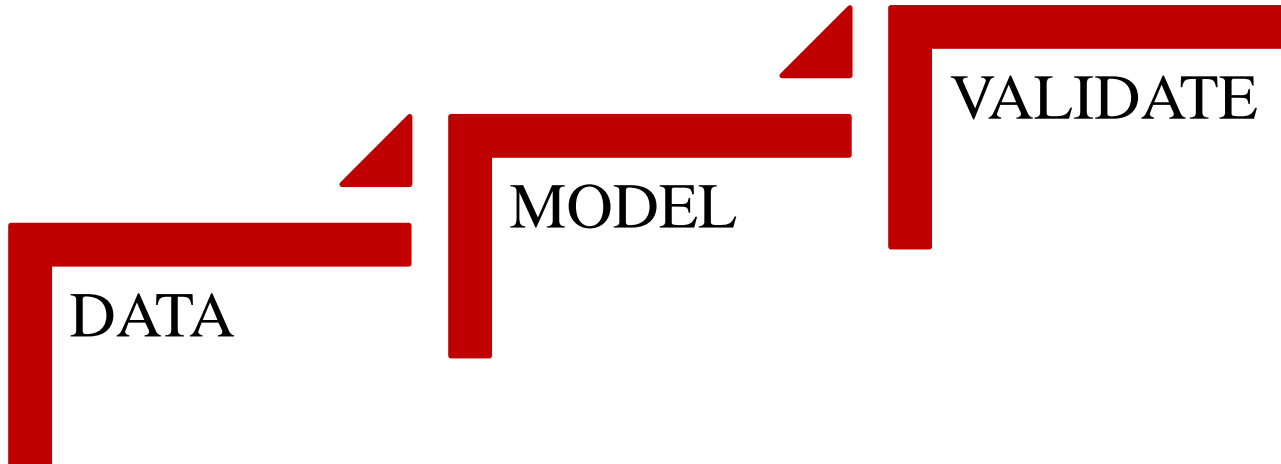
At organ level:

- Type of the tissue
 - late or early responding
- Volume effect
 - size and location



Radiobiological challenges

- Why are the experimental data on irradiation not yet adopted by the clinic and included in the re-irradiation protocols?

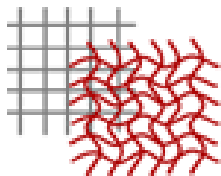
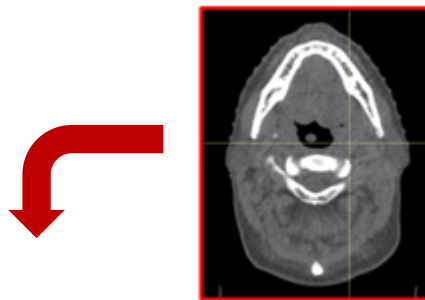


- What is the role of radiobiological models for NTCP / BED?
 - Evaluation of the plans and patient selection

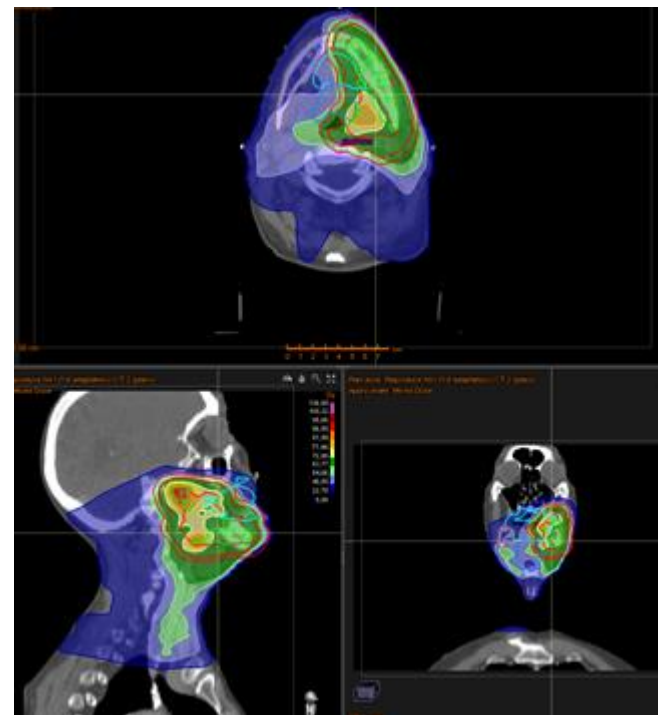
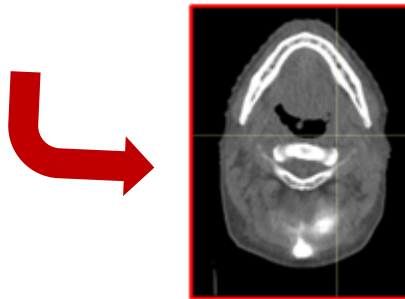


Physics challenges

- What is the accumulated dose in the pre-irradiated tissue?



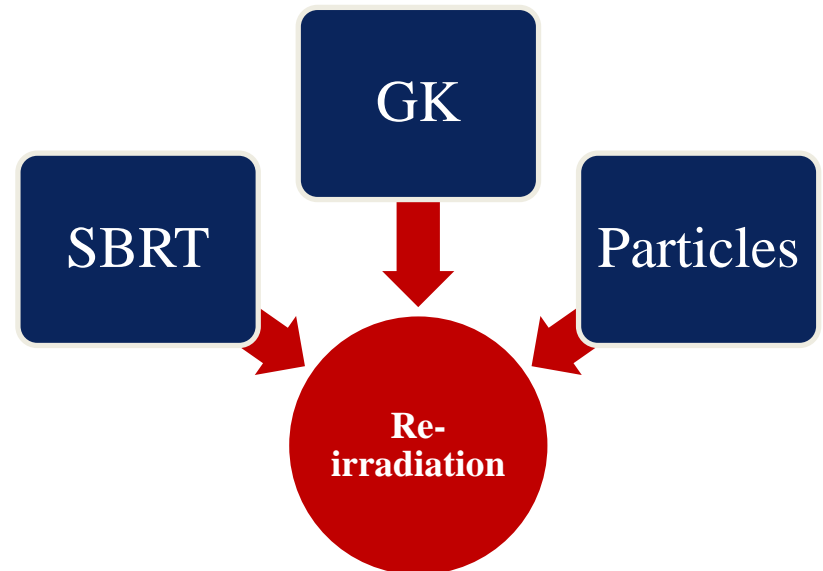
- How should the dose reconstruction be performed?





Physics challenges and opportunities

- What is the most suitable technique for the irradiation of a particular site?
- What is the role of particle therapy?
 - Think not only about the conformity of the dose but also about the radiobiological effectiveness and the possibility to use hypofractionation

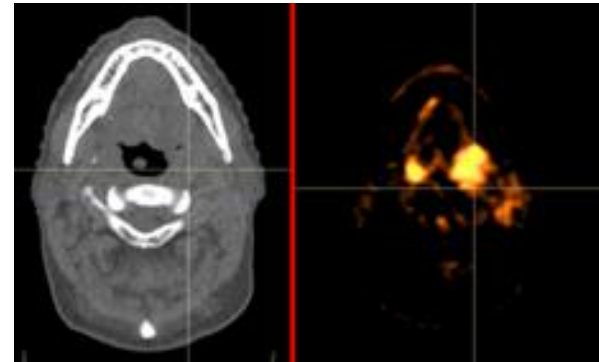




Physics challenges and opportunities

- What is the role of functional imaging in addition to morphological imaging?

- Better definition of the target



- Better assessment of the functionality of the OAR

- Earlier assessment of the radiation damage



Clinical experience

- Few key examples:

- Head and neck
- Lung
- Vertebral bodies
- Brain

- Re-re-irradiation

- Clinical considerations
- Evidence



Current challenges of patient re-irradiation

- Patient re-irradiation is not an easy task
- Today we have more questions than answers...

...but I trust that many of these questions will find their answers
by the end of our workshop



Current challenges of patient re-irradiation

September 6, 2018

Introductory lecture

09:00-09:30 Patient re-irradiation – a multifaceted challenge Iuliana Toma-Dasu

Session 1 – Radiobiology

Chairperson: Andrzej Wojcik

09:30-10:10 Normal tissue tolerance to re-irradiation – from pre-clinical experiments to clinical applicability Klaus Trott

10:10-10:50 Normal tissue tolerance to re-irradiation – current knowledge based on preclinical studies Albert van der Kogel

Coffee break

11:20-12:00 Normal tissue tolerance to re-irradiation – role of the stem cells and partial volume irradiation Rob Coppes

12:00-12:40 Radiobiological modelling of NTCP – particular challenges of re-irradiation Alexandru Dasu

Lunch break

Session 2 - Physics

Chairperson: Marta Lazzeroni

14:00-14:40 Image guidance and registration – particular challenges in case of re-irradiation Martin Fast

14:40-15:20 Re-irradiation techniques – SBRT Ricardo Palanco-Zamora

Coffee break

15:40-16:20 Re-irradiation techniques – GammaKnife David Schlesinger

16:20-17:00 Re-irradiation techniques – Light ions therapy Nobuyuki Kanematsu

Conference dinner at 18:30

Restaurang Q - KTH Royal Institute of Technology on Malvinas väg 4, 114 28 Stockholm





Current challenges of patient re-irradiation

September 7, 2018

Session 3 – Clinic 1

Chairperson: Peter Wersäll

09:00-09:30	Re-irradiation of head and neck targets	Claes Mercke
09:30-10:10	Re-irradiation of lung tumours	Judith van Loon

Coffee break

10:30-11:10	Re-irradiation of vertebral bodies	Dorota Gabryś
11:10-11:50	Re-irradiation of brain targets	Caroline Chang

Lunch break

Session 4 – Clinic 2

Chairperson: Mattias Hedman

13:00-13:40	Re-irradiation - Clinical results and patient selection	Michael Gubanski
13:40-14:20	Clinical experience on re-irradiation using particle therapy	Stephanie Combs

Coffee break

14:40-15:20	Re-irradiation is now a real option – but how do we take it forward?	Bleddyn Jones
15:20-16:00	Re-re-irradiation – what do we know about it?	Carsten Nieder

Coffee break

16:30-17:00	General discussion and concluding remarks	Moderator: Iuliana Toma-Dasu
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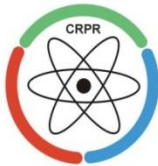
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Focus Issue of

*Physica Medica - European Journal of
Medical Physics*

- The FI will include three sections:
Radiobiology, Physics and the Clinic
- Submission deadline 31st December 2018
- Estimated to be published in June 2019





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