Task Group 158
Measurement and Calculation of Doses Outside the Treatment Volume from External-beam Radiation Therapy Treatment

Scope of Report
This report aims to address the following charges as they pertain to non-target radiation:
- Highlight major concerns
- Provide a rough estimate of doses associated with different treatment approaches in clinical practice
- Discuss the uses of dosimeters and phantoms for measuring photon, electron, and neutron exposures
- Discuss the use of calculation techniques (including Monte Carlo) for dosimetric evaluations
- Highlight techniques that may be considered for reducing non-target doses
- Discuss dose reporting
- Make recommendations for clinical and research practice

Task Group Members
- Stephen F. Kry, co-chair MD Anderson Cancer Center, Houston, TX
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Status of Report

- Reviewed by TPC
- Responses pending
- Submitted to Medical Physics
- Published ~end of the year/early 2016

Goal of this session

- Listen to this talk now so you don't have to read the TG report later!

Session Outline

- Overview of Non-Target Doses
  Stephen Kry (10 min)
- Dosimeters and Phantoms for Measuring Non-Target Doses
  Rebecca Howell (12 min)
- Calculation Techniques for Determining Non-Target Doses
  Bryan Bednarz (12 min)
- Summary of Recommendations
  Stephen Kry (10 min)
Introduction to TG-158

- Non-target dose?
  - Dose outside the PTV (no benefit to patient)
- Out-of-field dose?
  - Dose outside any primary field border
- TG-158 addresses non-target dose, but primarily in a low-dose context

Why do we care?

Low doses of radiation can be bad
- Second cancers
- Cardiac toxicity
- Fetal damage
- Implantable electronic devices
- Cataracts
- Skin dose (unique considerations not addressed in this report – see TG-176)

Where does the dose come from?

- Patient scatter
- Collimator Scatter
- Head leakage
- Neutrons
- Different properties than in-field radiation
So how much dose is there?

- Simple square fields
  - Use TG-36
  - 1995

- What about newer techniques?

Chapter 3 of report

- IMRT; similar for Tomo, VMAT, FFF, SBRT, electron, proton, brachytherapy, imaging.

Caution

- These doses provide a range that is likely to be encountered
- There can be a lot of variability between individual treatments
- These are just rough guidelines

- You need to determine the dose for your own case
- Measurements and calculations
Let's get into some details!