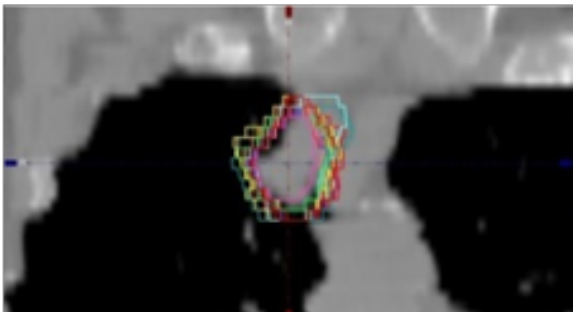
Graduation assignment:

A prediction model of the effect of delineation uncertainties on dose



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Introduction

Patients with cancer can be treated in various ways, usually with a combination of surgery, chemotherapy, immunotherapy and radiotherapy. With radiotherapy, a high radiation dose is given to the tumor while sparing the surrounding tissue as much as possible.
These treatment plans are based on, usually manual, delineations of the tumour and organs at risk. Variations in delineations will lead to variations in the dose delivered to the actual tumor and organs at risk. This will lead to a decrease in treatment efficacy.

Main research goal:
To determine the delineation variation in and its impact on the planned dose for patients treated in the European Organization of Research and Treatment of Cancer 1709 Glioblastoma clinical trial. Furthermore, to develop new methods/tools to incorporate delineation variations in the evaluation of the appropriateness of planned dose distributions.

Your contribution

You will:

- Use the benchmark plan data available within the EORTC 1709 trial to quantify delineation variations.
- Quantify the variation in dose resulting from these variations.
- Develop and test new methods to predict the influence of delineation variations on dose.
- Based on this new prediction model, suggest guidelines for QA in future clinical trials.
- Compare the results with similar results as reported in the literature and co-write a scientific publication of the results.

Your gain:

- You will get a general introduction into radiotherapy medical physics.
- You will be able to attend educational sessions at the department and see the whole process of patient treatment preparation and execution.
- You will acquire comprehensive knowledge on and experience in the work of a medical physicist in a radiation therapy department.
- You will be able to work in an international setting and if desired travel to the EORTC headquarters in Brussel and present your work at an international EORTC conference.
- You will acquire comprehensive knowledge on and experience in clinical trials QA.
- You will have the possibility to co-write a scientific paper.