Protection of quality and innovation in radiation oncology: the prospective multicenter trial the German Society of Radiation Oncology (DEGRO-QUIRO study). Evaluation of time, attendance of medical staff, and resources during radiotherapy with IMRT.

Abstract:
A number of national and international societies published recommendations regarding the required equipment and manpower assumed to be necessary to treat a number of patients with radiotherapy. None of these recommendations were based on actual time measurements needed for specific radiotherapy procedures. The German Society of Radiation Oncology (DEGRO) was interested in substantiating these recommendations by prospective evaluations of all important core procedures of radiotherapy in the most frequent cancers treated by radiotherapy. The results of the examinations of radiotherapy with intensity-modulated radiation therapy (IMRT) in patients with different tumor entities are presented in this manuscript.

Four radiotherapy centers [University Hospital of Marburg, University Hospital of Giessen, University Hospital of Berlin (Charité), Klinikum rechts der Isar der Technischen Universität München] participated in this prospective study. The workload of the different occupational groups and room occupancies for the core procedures of radiotherapy were prospectively documented during a 2-month period per center and subsequently statistically analyzed.

The time needed per patient
varied considerably between individual patients and between centers for all the evaluated procedures. The technical preparation (contouring of target volume and organs at risk, treatment planning, and approval of treatment plan) was the most time-consuming process taking 3 h 54 min on average. The time taken by the medical physicists for this procedure amounted to about 57%. The training part of the preparation time was 87% of the measured time for the senior physician and resident. The total workload for all involved personnel comprised 74.9 min of manpower for the first treatment, 39.7 min for a routine treatment with image guidance, and 22.8 min without image guidance. The mean room occupancy varied between 10.6 min (routine treatment without image guidance) and 23.7 min (first treatment with image guidance). The prospective data presented here allow for an estimate of the required machine time and manpower needed for the core procedures of radiotherapy in an average radiation treatment with IMRT. However, one should be aware that a number of necessary and time-consuming activities were not evaluated in the present study.