Results: Key improvements included two of nine initial process steps being eliminated, decreased time between planning and treatment (average nine days down to six days), implementing visual management and accountability for wait times at each step/role/individual, remote plan approvals by ROs, daily and weekly huddles in dosimetry, and weekly posting of results. In the seventh month, the 90% RTT-to-RTx interval was 2.6 weeks. Managing change required and benefited from engagement of multiple stakeholders including patients, radiation therapists, treatment planners, booking clerks, radiation oncologists (ROs), medical physicists, management, and data analysts. The process improvement was sustained. Active reinforcement of ownership, measurement and continuous improvement are ongoing as are wait time improvement projects among the lung and GU patient groups.
Conclusions: Formal process improvement using LEAN and Six Sigma principles resulted in a significant and sustained improvement in RTT-to-RTx timeliness and a cultural change in accountability, the use of visual monitoring, and staff engagement to sustain the process improvement.

191
MARGIN DETERMINATION FOR HYPOFRACTIONATED PARTIAL BREAST IRRADIATION
Caryn Geady[1], Brian Keller[2], Mark Ruschin[2], Ezra Hahn[2], Nadiya Makhani[3], Sandi Bosnic[3], Danny Vesprini[2], Hany Soliman[2], Justin Lee[2], Claire McCann[2]
[1]Ryerson University, Toronto, ON
[2]University of Toronto, Toronto, ON
[3]Odette Cancer Centre, Toronto, ON

Purpose: To determine the Planning Target Volume (PTV) margin for Hypofractionated Partial Breast Irradiation (HPBI), a novel technique intended to provide local control in breast cancer patients not eligible for surgical resection using 40 Gy in 5 fractions prescribed to the gross disease.
Methods and Materials: The van Herk formalism, a widely accepted PTV margin recipe, is $M = 2.5\Sigma + 0.7\sigma$, with Σ and σ standard deviations (SDs) representing systematic and random uncertainties, respectively, which were quantified through retrospective analysis of cone-beam computed tomography (CBCT) data sets for ten patients. During simulation and treatment, patients were immobilized using a wing board and an evacuated bag. CBCT was acquired prior to treatment delivery (prefraction) for setup verification. The prefraction CBCT was rigidly registered to planning four-dimensional computed tomography (4DCT) using the chest wall and tumour and translational couch shifts were applied as needed. CBCT was also acquired following treatment delivery (post-fraction) for intrafractional verification. This clinical workflow was faithfully reproduced in Pinnacle (Philips Medical Systems) to yield residual setup and intrafractional error through translational shifts and rigid registrations (ribs and sternum) of prefraction CBCT to 4DCT and post-fraction CBCT to pre-fraction CBCT, respectively. All ten patients included in this investigation were medically inoperable; the median age was 84 (range, 52-100) years; one patient was male and nine patients were female.
Results: The image quality of the CBCT was sufficient for required registrations. Systematic (and random) setup uncertainties detected for the left-right, craniocaudal and anteroposterior directions were 2.1 (2.5) mm, 1.6 (3.6) mm and 1.7 (2.8) mm. Net systematic (and random) uncertainty was determined to be 2.2 (3.2) mm. Rotations > 2º in any axis occurred on 11/72 (15.3%) registrations.
Conclusions: Preliminary results suggest a non-uniform setup margin of 7.1 mm, 6.6 mm and 6.3 mm for the left-right, craniocaudal and anteroposterior directions is required. This investigation is ongoing, though published results from similar studies are consistent with the above findings. Determination of margins in breast radiotherapy is a paradigm shift, but a necessary step in moving towards hypofractionated regiments, which may ultimately redefine the standard of care for this select patient population.

192
EMPOWERING PATIENTS THROUGH EDUCATION – DEVELOPMENT AND EVALUATION OF A MULTIMEDIA PATIENT EDUCATION TOOL TO ENSURE PATIENT PREPAREDNESS FOR PLANNING CT SCAN FOR PROSTATE CANCER (RANDOMIZED STUDY)
Krista Dawdy[1], Katija Bonin[2], Steve Russell[1], Tamara Harth[1], Christopher Townsend[2], Stanley Liu[1], William Chu[1], Patrick Cheung[1], Hans Chung[1], Gerard Morton[1], Danny Vesprini[1], Andrew Loblaw[1], Xingshan Cao[2], Ewa Szumacher[1]
[1]Odette Cancer Centre, Toronto, ON
[2]Sunnybrook Health Sciences Centre, Toronto, ON

Purpose: A review of patient preparedness for prostate radiotherapy (RT) showed that thirteen out of 55 patients were prepared and 42/55 (76%) needed to be re-scanned due to inadequate bladder or rectum filling. To decrease additional scans, associated costs and patient satisfaction, a video outlining proper preparation for prostate RT was created. The purpose of this study was to determine the effectiveness of a video versus an educational handout to improve CT planning preparation for prostate RT.
Methods and Materials: A video outlining the importance of rectal and bladder preparation was created and revised based on clinical feedback from an interprofessional team consisting of patients, radiation oncologists, nurses and radiation therapists. Patients were accrued by the research assistant (RA) in new patient clinics or over the phone and were randomly assigned to either the control group (received handout) or the experimental group (watched video and received handout). At the CT planning appointment, planning therapists collected bladder and rectal volume based on departmental guidelines. The rectal volume was measured at the maximum point within the prostate volume. These measurements were used to determine if patients were prepared or needed to be rescanned. At the CT simulation appointment, the RA collected this data as well as patient satisfaction with the preparation materials (handout or video). A Likert scale was used to determine patient satisfaction outcomes.
Results: Fifty-eight out of 65 patients completed the study, with 29 patients in each arm. The mean age in the control group was 71 and 68 in the experimental group. In the control group, 23/29 were prepared for planning CT scan and 6/29 needed to be rescanned due to full rectum (5/28), empty bladder (0/28) or both (2/28), with one person needing to be rescanned twice. In the experimental group, 22/29 were prepared and 7/29 needed to be rescanned due to full rectum (4/28) or empty bladder (5/28), with two people needing to be rescanned twice. There was no statistical difference between groups in re-scanning rate. Most patients were planned within 11 days after consenting to the study. Patients in the experimental group watched the video 1.4 times on average and expressed feeling more prepared for their appointment than the control group. Patients indicated that they liked the length of the video and would recommend the video to other patients with prostate cancer.
Conclusions: The CT re-simulation rate was 55% lower in the control group and 52% lower in the experimental group compared to the initial review. Despite no statistical difference in re-simulation rates between the groups, patient satisfaction in the experimental group was higher.

193
PRE-OPERATIVE VERSUS POST-OPERATIVE RADIOSURGERY FOR BRAIN METASTASIS: VOLUMETRIC AND DOSIMETRIC COMPARISON
Janice Doody, Balamurugan Vellayappan, Shawn Malone, Jean-Michel Caudrelier, Eric Vandervoort, Janos Szanto, John Sinclair
University of Ottawa, Ottawa, ON

Purpose: Cavity radiosurgery has largely supplanted whole-brain radiotherapy for patients, with solitary brain metastasis, who require surgical excision. However, coverage of the operative tract, in addition to tumour bed, may lead to large treatment volumes and inter-observer variability. We hypothesized that pre-operative radiosurgery may reduce target volume size and