(GUI) as a table and graph. The entire program suite was developed using Netbeans.

**Results:** A robust and maintainable solution has been put in place through a web application without interfering with any software medical devices. The table of values that have been compared against tolerances can be attached as a PDF document to the patient records in the OMS. The graphical user aspects of the application have been tested with the automated testing package, Selenium. This enables future modifications in the program to have the vast majority of its user interface checked without user intervention. The developed application had its business logic tested using JUnit with 23 representative datasets. This program has the capability of reducing the time it takes to carry out patient specific QA by removing the need to deliver the transfer plan on the second machine, which takes 40 minutes for the first patient and 20 minutes for subsequent patients.

**Conclusions:** An application has been developed that meet the overarching requirements of such medical software. It is a reliable independent check on transfer plans. It has reduced the need to carry out transfer plan checks on the second TomoTherapy machine. It will be running in parallel with the QA procedure of checking patient transfer plans and then eventually integrated into the QA workflow.

**EP-1647**

Re-planning of field-in-field tangential treatment based on misalignment during the delivery


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**Purpose/Objective:** Field-in-field (FIF) technique ameliorates the conventional planning with tangential fields (TANG) for adjuvant treatments of breast cancers. It applies additional fields to improve different parameters. Ideally, each additional field should be delivered with perfect alignment to the main one. Treating more complex plan solutions for such patients affects the daily work of the RTT and implies more demanding practicalities. Define the stability of the dosimetric gain for the FIF plan when data errors due to the misalignment of conventional main fields to each field-in-field is incorporated, could improve the awareness of clinicians, physics and RTTs about such an issue.

**Materials and Methods:** We compared FIF technique to the corresponding TANG. Endpoints evaluated were: V95, V105, Maximum Dose within PTV, Maximum Dose. Separately, the misalignment of each specific field-in-field with the corresponding conventional main field was acquired directly during the treatment delivery (details reported in separately submitted abstract). First, the baseline FIF was compared to the TANG plan. Then, the FIF was recalculated incorporating the misalignment data and the new plan (FIFErrors) was compared to the TANG to check the stability of the dosimetric gain. A statistical analysis of the significance of differences reported on treatment plans between TANG and FIF, and between TANG and FIFErrors was separately addressed by Wilcoxon.

**Results:** We analyzed 33 patients. Mean values for FIF and TANG plans, were respectively: V95=98.92 vs 98.25%; Maximum Dose= 109.0 vs 110.01%; Maximum Dose within PTV= 108.32 vs 109.01; V105=4.01 vs 4.42. The FIF was significantly superior to the TANG plan for V95 (p=0.003), Maximum Dose (p=0.002), Maximum Dose within PTV (p=0.033); it was not significantly superior for V105 (p=0.201) although the mean V105 value was overall inferior for the FIF (4.01%FIF vs 4.42% TANG).

**Mean values for FIFErrors and TANG respectively were:** V95=98.90 vs 98.25%; Maximum Dose= 109.8 vs 110.01%; Maximum Dose within PTV= 108.39 vs 109.01; V105=4.11 vs 4.42. The FIFErrors was significantly superior to the TANG for V95 (p=0.005), Maximum Dose (p=0.003); it was not significantly superior for V105 (p=0.326) and for the Maximum Dose within PTV (p=0.071) although the mean V105 and Maximum Dose within PTV values were overall inferior for the FIFPlan. The mean gain by the adoption of FIF over the TANG accounted for: V95=0.67%; Maximum Dose= 1.01%; Maximum Dose within PTV= 0.69%; V105=0.41%. Once recalculated considering the misalignment it was reduced by a percentage of 2.98% for V95, 10.14% for Maximum Dose; 7.93% for Maximum Dose within PTV; 24.39 % for V105, respectively.

**Conclusions:** FIF technique optimizes the planning, without major drawbacks for the RTT practice. Although it presents a good geometrical stability during the delivery, it is more demanding for the daily practice of the RTT. The risk of waist of a rate of the planned gain should be taken into account when clinicians and physics select the planning. Close inter-professional collaboration could improve the whole process of planning and daily delivery.

**EP-1648**

A robust automated approach to clinical data integrity management

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**Purpose/Objective:** As part of Treatment Planning System (TPS) QA, the Institute of Physics and Engineering in Medicine (Report 61) recommends performing frequent, independent integrity checks of all executable, configuration and data files. Checksum calculations provide a rapid, automated method to verify file integrity. They can be performed at a high frequency, to minimise delays between change and detection. Verifying program integrity via checksums requires no knowledge of program function and is operating system independent; requiring only a baseline calculation in a known working state (commissioning/post-update).

In a multi-vendor department, a single, unified approach to manage file integrity across platforms is desirable, to minimise maintenance and management overheads. Whilst various systems exist to perform this, they normally require the installation of clients, which is undesirable on certified Medical Devices.

**Materials and Methods:** The Open Source Security (OSSEC) Host Intrusion Detection System (Trend Micro, UK) has been implemented to perform File Integrity Management (FIM) on two TPS (Monaco and XiO, Elekta, Sweden). Natively, OSSEC performs integrity checks on Unix/Linux systems without components being installed onto target devices, via the Secure Shell (SSH) protocol. A parallel system, utilising the...