Conclusion:

Rigid (PLA) and flexible (Ninjaflex) bolus materials provide build-up characteristics within 5% of Solid Water. When incorporated into treatment planning calculations, planned dose for 3D bolus agrees with OSLD measured dose to within 2% on average, and 3D printed bolus gives lower variability in the agreement of the delivered to planned dose. In summary, 3D printed chestwall bolus may be produced in an automated fashion and gives improved consistency of delivered dose accuracy compared to standard sheet bolus.

PO-0942

VMAT planning and treatment preparation process adapted for failure mode and effect analysis

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Purpose or Objective:

Mitigating risks in radiotherapy is paramount for patient safety. A volumetric modulated arc therapy (VMAT) adapted to failure mode and effect analysis (FMEA) and implemented through workflow-integrated checklists is presented. This work is in line with efforts done by organizations to integrate a culture of patient safety into radiotherapy processes.

Material and Methods:

VMAT is currently being offered to our patients using RapidArc®, Eclipse® 11, Aria-11®, and TrueBeamTM; all by Varian Medical Systems (Palo Alto, CA). All systems went clinical in February 2013. Three months into the VMAT program, we realized our operation may be optimized by using the new Workflow feature introduced in Aria® version 11. Consequently, a workgroup consisting of 2 physicists, 3 radiation oncologists, one radiation therapist and one IT was created to identify modes-of-failure in our VMAT planning and preparation process; and to implement a workflow that mitigates their risks. A process-centered risk analysis for VMAT employing FMEA was performed. Risk priority numbers (RPN) for occurrence, severity and detection, were assigned for identified modes of failure based on a simplified model of the AAPM TG100 scoring. FMEA for one task in our VMAT process (Figure 1) is presented as example in Table1. Mitigation actions were implemented into Aria-11® Workflow via integrated checklists where e-signatures are enforced. Risk mitigation strategies employing redundancy, implementation of related policies-and-procedures, documentation, and peer-review were hardwired into the VMAT process.

Results:

A VMAT workflow (Figure 1) was designed and included 114 potential-modes-of-failure distributed into 4 groups: (1) 59 modes recurring redundantly, (2) 3 decision-type modes forcing re-planning, (3) 33 recurring modes aimed for enhancing communication, and (4)19 modes occurring only once; some with residual RPN’s necessitating implementation of policies-and-procedures. In the 18 months period leading up to this study, more than 600 VMAT planning and preparation processes were delivered conforming to the workflow in Figure 1. No aberrations in treatments occurred. Shortcomings in e-chart preparations were virtually eliminated.

Conclusion:

An adaptation of the VMAT planning and preparation process to FMEA using the Aria-11® workflow was presented. Risk analysis was performed, and risk mitigation was achieved through hardwiring appropriate checklists into the VMAT planning tasks. The adaptation to FMEA resulted in marked improvements in patient safety, process control and process documentation. The presented workflow adaptation to FMEA could serve as a reference or model for clinics offering VMAT.

PO-0943

Dutch national head and neck plan comparison significantly improved treatment planning quality

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Purpose or Objective:

The National Platform RT Head and Neck Cancer (HNC, Landelijk Platform Radiotherapie Hoofdhals Tumoren, LPRHHT) is a working party of the Dutch Society of Radiation Oncology, and is engaged in regulating and improving RT for HNC. One of the objectives of the LPRHHT is to evaluate the variation in treatment plan (TP) objectives and possibly improve treatment planning by increased organ at risk (OAR) sparing and reduction of variation between institutes.

PO-0942

VMAT planning and treatment preparation process adapted for failure mode and effect analysis

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Purpose or Objective:

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Material and Methods:

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