HACKETTSTOWN REGIONAL MEDICAL CENTER
JOAN KNECHEL CANCER CENTER
CHART CHECK - PHYSICS

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Effective Date: August 2005	**Policy No: ROC TECH 10**
Cross Referenced:	**Origin: Radiation Oncology**
Reviewed Date: 5/09, 12/11	**Authority: Executive Director**
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SCOPE

Department of Radiation Oncology

DEFINITIONS

Qualified Medical physicist - A board certified medical physicist who is qualified to perform QA procedures for linear accelerators and treatment simulators and is registered as such in New Jersey State.

Treatment Plan – a computer generated or table based calculation of treatment fields' arrangement, field modifiers and monitor units.

Monitor Unit (MU) – a unit of measurement of machine output of a linear accelerator.

Isodose Distribution – treatment dose representation by the same dose curves drawn on axial, coronal, sagittal or 3D views of a patient plan

PURPOSE

To ensure a high standard of patient safety, quality, efficiency and documentation. The chart checking system shall verify that all parameters are consistent from prescription to treatment plan to simulator sheet to MU calculation and to the daily treatment record.

POLICY

To have all department charts conform to the components outlined on the attached procedures.

PROCEDURE

The Physician, Nurse, Qualified Medical Physicist, Dosimetrist, Therapist, Medical Secretary are responsible for providing all documents required in a patient's chart.

1. Review of New or Modified Treatment Plan

1. Treatment Prescription

Procedure:
The prescription and any prescription changes shall be signed and dated by a physician. Field number(s) energy, modality (e.g. photons or electrons), field arrangement, prescription point/ isodose level, dose per fraction, number of fractions daily, weekly, and total, planned total dose, and any beam modifiers shall be indicated for each treatment site.
Any previously-treated fields that may overlap the current fields shall be indicated; the treatment

record, isodose distributors, beam parameters, and films should be obtained. A "reasonability" check shall be performed by the reviewer to ascertain that dose, technique, treatment parameters, etc are typical for area to be treated.
Any *in vivo* measurements to be performed shall be requested shall be requested in writing by the physician.

Tolerance: N/A

Corrective Action: Documentation must be with the patient's treatment chart within 2 working days.

2. Patient Setup and Treatment Parameters

Procedure:
All parameters used at patient simulation shall be transferred to the setup sheet. Patient position, separations, SSD's, shifts, tattoos and/or marks, and any immobilization devices (and their corresponding settings) shall be included on the setup sheet. Photographs of the treatment field and patient position shall also be included on the setup sheet.
All parameters used for Monitor Unit Calculations for each treatment field shall be included on the setup sheet. These shall include: Field number, treatment room, energy and modality, SSD and/or SAD, calculation depth (e.g. specific depth, isodose line, or 'per plan'), asymmetric jaw settings, field size, cone size (for electron fields), gantry/couch/collimator angles, block and/or MLC indication (and blocking tray code if applicable) cutout indication (electron fields), arc definition, and monitor units. Each field is signed by the therapist, dosimetrist and the physicist that reviewed the chart.

Tolerance: N/A

Corrective Action: All pertinent parameters must be clearly defined and documented within the treatment chart.

3. Dosimetry

Procedure: All parameters used for treatment planning calculations shall match the prescription and those recorded at simulation. When films and/or Digitally Reconstructed Radiogrpahs (DRR's) are available, they shall also be compared to the parameters and blocking used in the treatment plan. Special situations such as gap calculations, partial transmission blocking, custom bolus, etc shall be carefully reviewed; each special situation shall be accompanied by a notion clearly defining the situation.

Tolerance: N/A

Corrective Action: Discrepancies between data sets shall be resolved and documented in the chart. Special situations shall be properly annotated.

4. Monitor Unit Calculation

Procedure:
The total daily dose per fraction and the number of fractions shall be as stated in the prescription. Machine, energy, wedge orientation, SSD, gantry/collimator/couch angle, jaw settings, tray factors, bolus thickness, and MLC configurations shall be checked for each field. Any immobilization device that is in the path of the beam shall have corrections applied as necessary.

All monitor unit calculations shall have a secondary calculation also performed. This can be performed either manually or with the aid of a second computer program or spreadsheet. The agreement between primary and secondary monitor unit calculations shall be ≤5% averaged over all fields. Initial physics checks must be performed within 3 fractions of start of treatment.
Tolerance: < 5% averaged over all fields.
Corrective Action: Secondary monitor unit calculations outside of the 5% tolerance level shall be investigated; the results of the investigation shall be noted in the chart. For IMRT cases outside the tolerance level, the film dosimetry & chamber measurement results shall be assessed.

5. *in vivo* Measurements

Procedure: When in vivo measurements or point dose calculations have been requested by a physician a report shall be filed in the chart which has been signed by both the physician and the medical physicist.
Tolerance: N/A
Corrective Action: Documentation mandated.

6. Record & Verify Data

Procedure: The reviewer shall assure that all pertinent data, including treatment parameters and prescription, have been entered properly into the Record & Verify system. The reviewer shall then approve the fields for treatment.
Tolerance: N/A
Corrective Action: All treatment fields must be within the "record and Verify System" unless otherwise instructed by the physician or supervisor.

2. Weekly Chart Review

Weekly Chart Review

Procedure: Charts are reviewed by a medical physicist weekly. A rotating system has been set up such that the same medical physicist does not perform weekly chart checks on the same machine on consecutive weeks. The daily treatment record shall be checked for monitor unit setting, beam modifier indication, daily and cumulative dose, date, elapsed days, and session number. The Record & Verify system record shall also be checked for monitor unit setting and cumulative dose.
Tolerance: Mandatory every 5 fractions.
Corrective Action: Any discrepancies shall be noted and addressed. Once addressed and corrected, a note shall be made.

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3. Treatment Completion Chart Review

Treatment Completion Chart Review

Procedure: Charts are reviewed by a physicist following completion of treatment. The daily treatment record shall be checked for monitor unit setting, beam modifier indication, daily and final dose, and session number. The Record & Verify system shall record also be checked for total number of sessions treated and cumulative dose. Appropriate areas of the chart shall be checked for necessary signatures.
Tolerance: Within 3 working days of patient completing treatment.
Corrective Action: Any missing data shall be added; discrepancies shall be discussed with physician.

4. Brachytherapy Chart Review

1. Initial chart Review

Procedure: Charts are reviewed by a physicist before treatment can commence. A second medical physicist shall also check an HDR chart before treatment. The following shall be checked for consistency with the written directive on a brachytherapy chart: Isotope: prescription dose; applicator type (and size, if applicable); films and/or CT images; number of catheters or needles; number of dwell positions or seeds; source strength. An independent calculation check shall be performed. For seed cases, the seed strength shall be assayed.
Tolerance: Independent check $\leq$10% Assay $\leq$5%
Corrective Action: For a seed assay > 5%, the manufacturer shall be contacted and the plan re-run for the assayed activity. For a seed assay $\geq$ 10%, treatment shall not proceed. For a **calculation second check** >5%, a second physicist shall check calculations. For a check >10%, an investigation shall be initiated and resolution arrived at before treatment.

2. Final Chart Review

Procedure: Charts are reviewed by a physicist once the brachytherapy treatment course completed. Chart check shall include a full review of all treatments; all appropriate second checks and signatures shall be present. Seed cases shall include a review of post-implant dosimetry. Seed type strength, number, and DVH data shall be reviewed. The total dose shall be within 15% of the prescribed dose.
Tolerance: Final Dose $\leq$15% of prescribed
Corrective Action: Physician shall be notified of a difference in dose. Any missing data shall be completed before the chart is filed.

REFERENCES:

AAPM TG40 – American Association of Physicists in Medicine Task Group 40 “Comprehensive QA for Radiation Oncology”, 1994.