"A Review of the TG-201 Rapid Communication: QA of Data Transfer"
AAPM- 2011 Annual Meeting

Part 2: Treatment Data

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Outline

A. Patient Specific QA
B. Manually Handled Data
C. Historical Treatment Record

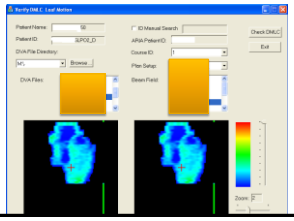
A. Patient Specific QA

1. Whenever possible, patient specific QA should be implemented on the actual data that will be used for treatment, rather than a copy of the data

- Testing the copy only gives you confidence that the copy is correct.
- Earlier versions of ARIA could create "QA fields", i.e. copies of the original treatment fields that were used for QA purposes
- Later versions of ARIA, MOSAIQ and ACCESS provide QA mode which delivers the actual treatment fields but does not carry dose.

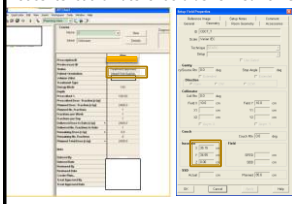
2. Clinics should perform patient specific verification of treatment parameters in the treatment database to ensure that they match those in the treatment plan, prior to delivery for treatment. This includes all control points in a delivery sequence.

- Patient specific measurements will catch gross errors
- A control point by control point comparison will catch subtle variations
- Control point comparison must be done with software- either in house or commercial. This should be done prior to treatment since DMLC errors can cause a lethal overdose.
- Manufacturers should provide and incorporate tools to ensure database integrity and perform exact comparisons of data on both sides of the transfer.



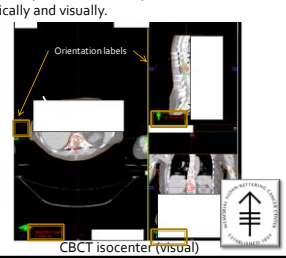
3. The transfer of coordinate system dependent data (images, dose, and treatmebnt parameters) should be verified for proper orientation and registration.

•Orientation- affects orientation labels on 2D and 3D images for image guidance as well as coordinate system
•Examine functionality for non-standard treatment geometries (FFP, FFS, etc) prior to first use
•To avoid L/R confusion, consider methods such as asymmetric fiducial placement.
•Isocenter coordinate- should be verified numerically and visually.



orientation

CBCT isocenter (numerical)



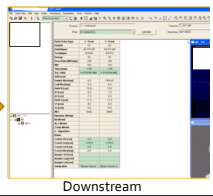
CBCT isocenter (visual)

4. Independent MU checks should be performed on the data that gets downloaded to the treatment unit.

- Performing an MU check on data that is in the TMS reduces the chance of an MU data transfer error downstream of the TPS
- Alternatively, MU's should be verified as part of SOP downstream of where the independent MU check is done.

Upstream

RTPlan



Downstream

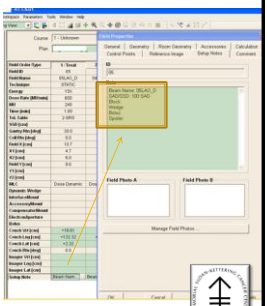
5. For RT systems that involve the transfer of treatment planning data directly to the treatment delivery unit (automatically or manually), procedures should be in place to verify that the delivery data match the planning data.

- Some models of some systems require data to be programmed directly to the treatment unit. An independent check should verify that the programmed data were correctly entered or transferred

B. Manually Handled Data

1. Items that are manually entered into TMS or imaging systems should be checked to ensure they match the corresponding items in the treatment plan or in the patient's records (e.g. physician prescriptions).

- Manual entry introduces the potential for transcription errors.
- Manual entries should be checked by someone other than the person who entered the data.
- Many manual entries into the treatment management system are for non-planned patients, therefore they may need to be checked against different parts of the patient chart to verify everything.



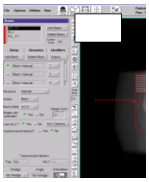
2. Items that are manually positioned for treatment delivery should be checked to ensure they match the correct patient, site, and field.

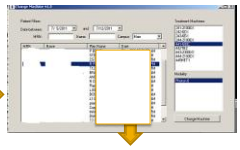
- Some parameters cannot be verified by the TMS (blocks, bolus, wedges in some systems, etc)
- Some type of interlock or tagging system (e.g. barcodes) should be considered if available
- If that is not possible, placement and verification of placement should be performed by different people.

3. For radiotherapy systems that are not directly tied into an electronic medical record or TMS, procedures should be in place to ensure that the appropriate information is recorded in the patient's chart.

- Gamma Knife systems, for example, have minimal support for TMS.
- A check of the treatment information entered into the patient chart (plan or txt record) is recommended

4. Mechanisms that transfer clinical set-up data (e.g. simulator, virtual simulation) to the TMS should be checked.





•Ex. Some simulators capture plan data and transfer directly to TMS
•When the TPS is not used to generate the plan, other methods to export plan data should be verified.
•Be careful of dummy values for quantities not known in sim!

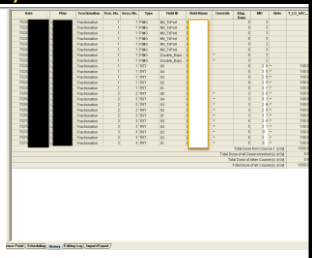
5. Amendments to a treatment plan should be recorded in the TMS or TPS and be independently verified.

- Ex. Modifications to MU done outside the system due to couch attenuation, etc.
- Amendment record can be used to record these changes and their checks. (Record amendments in one place)
- A physicist or dosimetrist other than the one who entered the data should be used to verify the amendment.

C. Historical Treatment Record

1. Dose tracking problems should be resolved prior to the next treatment delivery to ensure the proper operation of dose-based system functions.

- Dose for a partially treated fraction may not be recorded correctly by the TMS. This should be resolved prior to the next treatment lest more dose delivery than is prescribed be allowed by the system.
- Procedure in place such that dose related information (reference point doses, breakpoints, etc) are corrected.

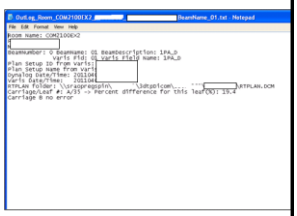


2. TMS users should devise procedures to correctly track dose for situations that the TMS cannot handle.

- Ex.
  - "Day 1/Day 2"
  - Not treating all fields each fraction (proton, TSEB)
- Treatment calendars should be reviewed for such cases to avoid dose tracking errors

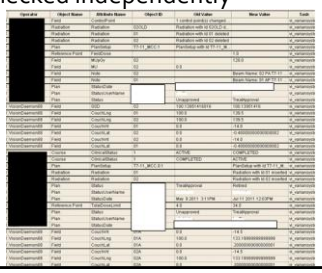
3. Delivered treatments should be compared against the intended plan to ensure complete accuracy.

- Portal dosimetry during treatment
- Weekly chart check- search for delivery parameters that are out of tolerance
- Tolerance tables should be tailored to different types of treatments
- Dynalog file/trajectory log analysis after treatment



4. All treatment plans, including modified versions of existing plans, should be checked prior to treatment.

- When a modification is made it should be checked independently



Ex. ARIA editing log