IGRT Credentialing in NCTN Trials

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Purpose:

To make Image Guided Radiation Therapy (IGRT) credentialing a more unified, consistent and efficient process across the entire National Clinical Trial Network (NCTN).

Method:

IGRT plays a role in several advanced NCTN trials. Previously an institution had to be IGRT credentialed for each protocol. When institutions were allowed to use previous credentials for new protocols it was limited to the same disease site as the original credentialing. The credentialing was analyzed by the physics PI of the protocol. We consulted with several of these physicists to determine what is important to consider when reviewing submissions and to learn ways to apply credentialing more broadly.

Image guided radiation therapy (IGRT) for credentialing purposes is defined as external beam radiation therapy with positional verification using imaging prior to each treatment fraction. It is a complete process that extends from the imaging at the time of CT-simulation through imaging the patient on the treatment unit to delivery of the dose. Requirements for IGRT include:

- The treatment planning must be imaged-based (CT) with the capability of transferring the treatment data to a verify/record system.
- The treatment unit must have “on-board” (or “in-room”) imaging (including the placement of a diagnostic CT unit in the treatment room) that has a fixed frame-of-reference with an origin that is precisely related to the frame-of-reference origin for the treatment device (isocenter).
- The treatment unit must have software that allows registration of the images and calculates required shifts.

IGRT Requirements:

For IGRT credentialing each institution must complete the online IGRT Questionnaire and submit IGRT datasets for two sequential fractions for a patient in each of the following three disease sites:

- HN or Brain
- Pelvis
- Lung or Liver or Pancreas

The datasets will be submitted via TRIAD in DICOM format.

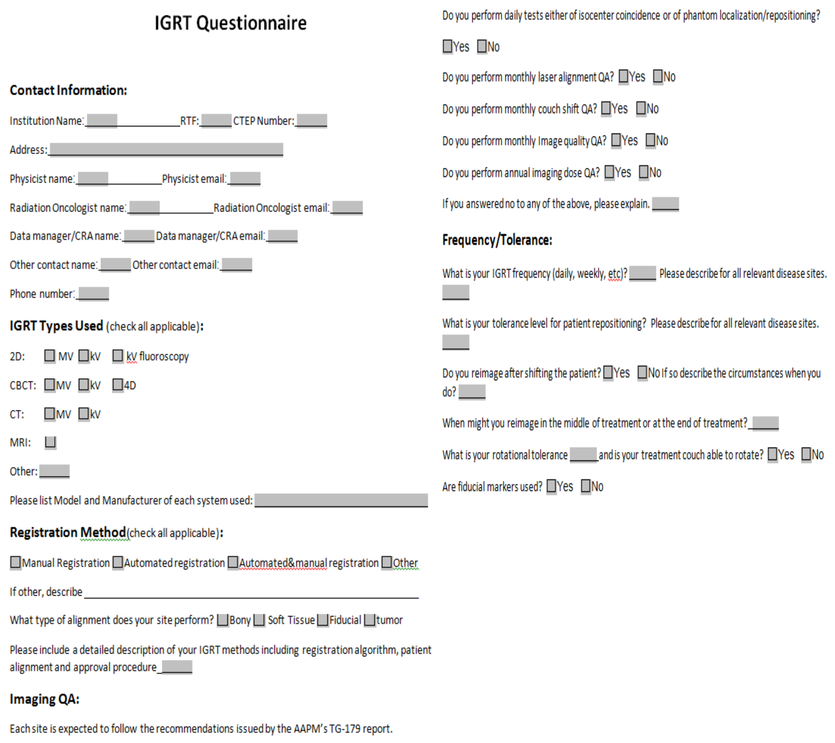
Method (cont’d):

Data Submission:

The following items should be submitted via TRIAD for EACH* of the three disease sites listed above:

- Planning CT scan, in DICOM format, for a single patient
- DICOM RT Structure Set
- DICOM RT Plan File
- DICOM RT Dose File
- Localization images (e.g. cone beam CT or MRI) in DICOM format for two sequential fractions
- DICOM spatial registration file, if available
- Completed DDSI once data is uploaded to TRIAD
- Completed Online IGRT Questionnaire (Figure 1)

*If the site is only interested in obtaining credentialing for soft tissue IGRT, the HN/Brain submission can be omitted. Likewise the Liver/Lung/Pancreas submission can be omitted if only boney anatomy credentialing is required. However, IROC strongly suggests that all images are submitted at one time to ease the credentialing process.



IGRT Questionnaire

Contact Information:

Institution Name: _____ RTF: _____ CTEP Number: _____

Address: _____

Physicist name: _____ Physicist email: _____

Radiation Oncologist name: _____ Radiation Oncologist email: _____

Data manager/CRA name: _____ Data manager/CRA email: _____

Other contact name: _____ Other contact email: _____

Phone number: _____

IGRT Types Used (check all applicable):

2D: ☐ MV ☐ kV ☐ kV fluoroscopy

CBCT: ☐ MV ☐ kV ☐ 4D

CT: ☐ MV ☐ kV

MRI: ☐

Other: _____

Please list Model and Manufacturer of each system used: _____

Registration Method (check all applicable):

☐ Manual Registration ☐ Automated registration ☐ Automated&manual registration ☐ Other

If other, describe _____

What type of alignment does your site perform? ☐ Bony ☐ Soft Tissue ☐ Fiducial ☐ tumor

Please include a detailed description of your IGRT methods including registration algorithm, patient alignment and approval procedure. _____

Imaging QA:

Each site is expected to follow the recommendations issued by the AAPM’s TG-179 report.

Do you perform daily tests either of isocenter coincidence or of phantom localization/repositioning?

☐ Yes ☐ No

Do you perform monthly laser alignment QA? ☐ Yes ☐ No

Do you perform monthly couch shift QA? ☐ Yes ☐ No

Do you perform monthly Image quality QA? ☐ Yes ☐ No

Do you perform annual imaging dose QA? ☐ Yes ☐ No

If you answered no to any of the above, please explain. _____

Frequency/Tolerance:

What is your IGRT frequency (daily, weekly, etc)? _____ Please describe for all relevant disease sites. _____

What is your tolerance level for patient repositioning? Please describe for all relevant disease sites. _____

Do you reimage after shifting the patient? ☐ Yes ☐ No If so describe the circumstances when you do? _____

When might you reimage in the middle of treatment or at the end of treatment? _____

What is your rotational tolerance _____ and is your treatment couch able to rotate? ☐ Yes ☐ No

Are fiducial markers used? ☐ Yes ☐ No

Figure 1: IGRT Questionnaire

Support:

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Method (cont’d):

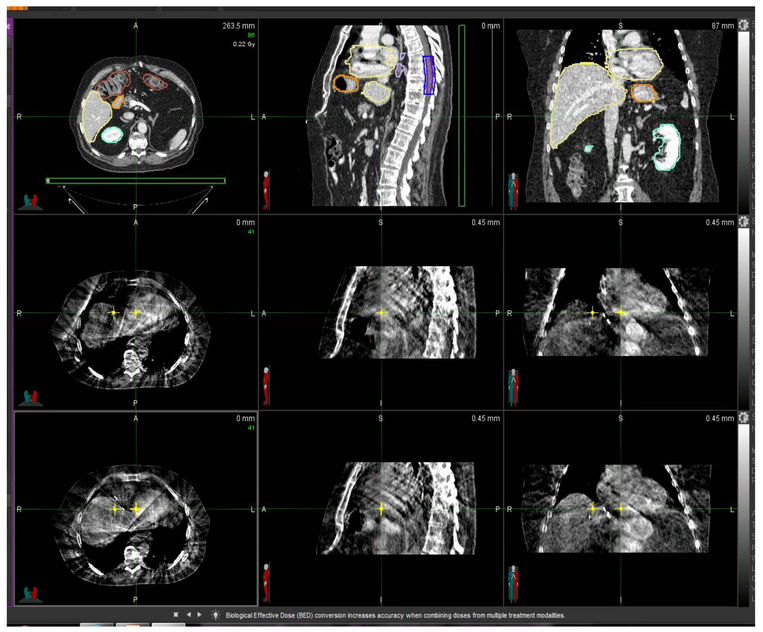

Figure 2: Example of a liver IGRT submission

Results:

For trials open in 2016, IGRT credentialing can be simplified to cover either boney anatomy or soft tissue. This revised credentialing will cover all disease sites based on the type of anatomy, unless otherwise stated within the protocol. Institutions will submit will complete an online questionnaire about their IGRT procedures. Boney anatomy requirements will include submission of data from 2 sequential fraction of both a patient aligned with boney anatomy and pelvic patient. Soft tissue will require similar submissions for a patient aligned using soft tissue and a pelvic patient. Institutions will only be required to submit the pelvic patient once. Data should be in DICOM format and includes planning CT set, RT structure set, RT plan file, RT dose file, localization images and spatial registration file (if available). Reviews will be done by IROC-Houston staff who will continue to provide feedback to the sites.

Conclusion:

This revised IGRT credentialing process will bring consistency, a savings in time and effort for both the IROC Houston QA office and to those institutions wanting to be credentialed to participate in NCTN Trials.