**Objectives**

- To ensure that consistent safe methods are used in acquiring CT planning images.
- To ensure that all relevant information has been recorded and checked during scanning (or subsequent modifications and verifications) of treatment plans.
- To ensure exposure factors are recorded appropriately by radiographers.
- To ensure that documentation is forwarded appropriately to enable an efficient process between departments.

**Responsibilities**

CT scanner radiographers are responsible for ensuring that:

- Required QA checks have been carried out as described in WI 9.1.21.
- Scanner faults are reported as per QAP 10.1 Inspection and Maintenance of Equipment
- Patients have adequate preparation before scanning procedures.
- CT scans and CT verifications are carried out appropriately as per clinical protocols
- All localisation data and relevant patient information is recorded fully and accurately.
- All tasks are completed to ensure the patient pathway can continue.
- Statistics regarding machine workload and maintenance are recorded.

**Method**

- Radiographers working in pairs carry out scanning tasks.
- Each specific episode of CT scanning must be carried out and completed by a consistent pair of operators whose signatures on relevant dynamic documents (DD's) and questionnaires demonstrate that the appropriate tasks have been carried out.
- Operator 1 during scanning process refers to the radiographer who executes the exposure.
- Operators may delegate certain tasks to other Radiographers or Student Radiographers as appropriate but the responsibility for completion of these tasks remains with the pair of operators.
- For non-contrast, enhanced 3DCT scans in free breathing: One of the operators must be CT trained i.e. fully completed relevant CT training form. The other operator, as a minimum, must have completed CT Level 1 or Stages 1-6 of CTCF Level 2a General CT Initial Training.

  CT Radiographers who are supervising / assessing radiographers who are in the process of completing CT Level 1 or Stage 6 of CTCF Level 2a, must ensure the signatures of two trained operators are evident on relevant DD's and CT questionnaires as detailed in the relevant CTCF form.

  A radiographer who has progressed to the scanning without direction stage (i.e. Stage 7 of CTCF Level 2a) may sign off / approve relevant DD's and CT questionnaires.
- For all other scan types (i.e. DIBH, 4DCT, IV etc): Both operators must have completed relevant CTCF form. They must also sign off / approve relevant DD's and CT questionnaires as per CTCF including when they are supervising / assessing radiographers in training.
- Adequate scans must be acquired to enable appropriate virtual simulation or CT planning. This will include a margin outside the proposed treatment site.
  Refer to electronic radiotherapy referral, and ARIA Journal, Clinical protocols and/or CT training manual for specific details. Also, refer to relevant WI's for specific techniques as appropriate.
  NB Scan protocols may vary for patients in Clinical trials. Refer to relevant trial protocols or process documents.
- Radiographers must consult with the Clinician if there is any uncertainty about scan area required.

## A. <u>All patients attending CT scanner (except CT verifications)</u>

The Radiographers must carry out procedure according to relevant WI's, QAP's or Clinical protocol and complete the following tasks.
***A new CT general or CT/IV encounter must be completed for each CT session.***

| **Operator 1 and Operator 2**<br>**(Specific tasks may only require 1 radiographer. However, the other radiographer must check it has been carried out)** | **Operator 1** |
|---|---|
| ▪ Prior to scanning check for details of proposed treatment site / technique as appropriate e.g.<br>  ○ Electronic radiotherapy referral and ARIA journal<br>▪ Ensure patients information has been checked as per WI 9.1.33 Information Requirements for Pre-treatment Planning Exposures and Clinical Mark-up<br>▪ Ensure scanning procedure is justified (i.e. requested on electronic radiotherapy referral or a completed "physician order" by appropriate practitioner or is within clinical protocols). Refer to QAP 9.1b and QAP 9.8a<br>▪ Check for details of previously treated areas (PTA's) on electronic radiotherapy referral and ARIA (and history if available).<br>▪ Check for previous reference tattoos.<br>▪ Check for any relevant information on EPIC e.g. allergies, last oncology clinic annotation<br><br>NB Any amendment from electronic radiotherapy referral must be documented in ARIA journal and/or Aria prescribe treatment workspace. Refer to Appendix B for further details. | |
| • Check consent documentation is complete including pregnancy status if appropriate. | |
| • Check that patient ID has been checked and recorded by Operator 1 **as per QAP8.3a Patient Identification.**<br>• As per encounter, check if photo ID has been attached. If not take and import photo if appropriate as per WI8.3.2 Patient Photographic Identification. | • Check and record **patients' ID, as per QAP8.3a,** before executing the exposure |
| • At initial scan, check that the patient is not pregnant if appropriate and recorded by Operator 1 **as per QAP8.3b Pregnancy Status** and **WI 8.3.3 Inclusive Pregnancy Status Radiation Exposure Safety Check**. | • Confirm that the patient is not pregnant if appropriate, **as per QAP8.3** and **WI 8.3.3 Inclusive Pregnancy Status Radiation Exposure Safety Check,** before executing the exposure of initial scan. Approve the CT operator record to indicate that this has been completed. |
| • Ensure patient has adequate preparation before scanning e.g. bladder, rectal preparation, fasting.<br>• Ensure pre-procedure checks have been completed and recorded on Q9.1.3 IV Contrast Contra-indications and Q9.1.5 Oral Contrast Contra-indications for patients receiving contrast media and that the Clinician administrating the contrast media is informed of any contra-indications. | |

**(All patients attending CT scanner cont. )**

| Operator 1 and Operator 2<br>(Specific tasks may only require 1 radiographer. However the other radiographer must check it has been carried out) | Operator 1 |
|---|---|
| • Ensure covering Clinician is available in pre-treatment area, if IV contrast is to be administered | |
| • Position patient correctly on CT couch | |
| • Draw on reference marks using LAP lasers **<br>- This is normally 3 reference marks -overhead and 2 sidelights on a stable location and as close to treatment area as possible.<br>- For some treatment sites additional reference marks may be required e.g. Pelvis + PA nodes or extremities.<br>- Occasionally, due to a difficult or unusual set-up, the routine reference marks may not be possible. The position should be determined in these circumstances on a patient-to-patient basis.<br>- If patient has previous tattoos, consider if these are appropriate or if new ones are required.<br>• Place a radiopaque marker along these marks.<br>• **Zero internal laser couch position<br>• Move couch to determine the appropriate start position of topogram with internal laser.<br><br>**** For Stereotactic brain planning it is not necessary to add reference marks. The lasers should be zeroed along anterior aspect of frame at level of ball bearings** (see CT Clinical Training Manual for further information). | |
| • Select the correct patient from the scanner schedule and confirm patient details against relevant patient details in Aria registration (Name, H&C number and DOB).<br>NB If the patient has 2 appointments e.g. rescans on the same day, then check the appointment time so that separate accession numbers are used.<br>• Enter initials of patients Consultant and exam description. | • Check that the following are correct on the scanner registration page:<br>○ Patient's details<br>○ Exam description<br>• Enter the operators initials on the scanner registration page |
| • Confirm appropriate scanning protocol is used and appropriate patient orientation is selected. | • Select appropriate scanning protocol |
| Carry out / check the following<br>• Enter appropriate starting and finishing points for each series e.g. topogram, control scans, helical etc.<br>• Ensure the patient outline is included in the displayed FOV and adjust if required.<br>• Confirm auto-transfer is set appropriately (see Appendix A)<br>• Acquire topogram(s)<br>• Check topogram for evidence of metal prosthesis and import appropriate prosthetic protocol or contact medical physics if required.<br>• Acquire the relevant series<br>• Export images if appropriate (see Appendix A) | • Scan required area (as per electronic radiotherapy referral and / or Clinical protocols) |

**(All patients attending CT scanner cont. )**

| Operator 1 and Operator 2<br>(Specific tasks may only require 1 radiographer. However the other radiographer must check it has been carried out) | Operator 1 |
|---|---|
| • Record or check that the following scan details are recorded on Q9.1.6 CT Session<br>  ○ Date of scan<br>  ○ Scan accession number (or time of first image if no accession number available)<br>  ○ Description of scanned area including phase if appropriate<br>  ○ Number of topograms, control scans and images acquired along with the scanning interval.<br>  ○ Any prep e.g. full bladder, fasting etc.<br>  ○ An indication of the position of any other radio-opaque markers positioned for the scan e.g. along scars, visible swellings etc.<br>  ○ Dose Length Product (DLP) for the scan performed<br>  ○ Any Additional comments necessary for planning.<br><br>• Operator 2 will record the ARIA username of Operator 1 and then approve the questionnaire ensuring they are logged into Aria in their own username and password. | . |
| • Operator 2 will initiate the Data prep task i.e. import the scan images into Aria, create user origin and measure the couch to pin height. (see CT Training Manual for further details). This will be recorded on the appropriate immobilisation data dynamic document. The dynamic document will be 'signed off'.<br>• Data prep task will be put 'in progress' by Operator 2<br><br>**NB** The data prep task will be completed by Treatment planning for 4DCT scans. | • Confirm Data prep task and immobilisation information, 'Approve' immobilisation Data dynamic document by entering Aria username and password.<br>• Complete the Data Prep Task |
| • Tattoo reference marks after gaining informed verbal consent from patient, if appropriate.<br>• Operators 1 and 2 must confirm that informed verbal consent was obtained and sign off / approve CT operator dynamic document.<br>• Operators 1 or 2 can delegate this task. If this occurs then details must be clearly recorded on DD 9.1.2b CT Operator Record | • Obtain informed verbal consent and Tattoo reference marks or delegate procedure to another appropriately trained radiographer and supervise if appropriate |
| • Take any necessary photographs after obtaining informed consent which will be recorded on DD9.1.2b CT Operator Record i.e.<br>  • To demonstrate the use of patient-specific immobilisation devices e.g. wax blocks, breast supporting devices. (This does not include standard beam direction shells).<br>  • To demonstrate unusual or difficult patient positioning.<br>• Operators 1 or 2 can delegate this task. If this occurs then details must be clearly recorded on DD9.1.2b CT Operator Record. | • Obtain informed verbal consent and take photographs or delegate the procedure to another appropriately trained radiographer / student and supervise if appropriate. |
| • Give patient appropriate information regarding next appointment. If appropriate complete an "Appt for trt" task<br>• Ensure transport / interpreter is arranged if required and the appropriate tasks have been created and resourced appropriately | |
| • Manually complete CT appointment in ARIA Appointment scheduling. | |

**(All patients attending CT scanner cont. )**

| Operator 1 and Operator 2<br>(Specific tasks may only require 1 radiographer. However the other radiographer must check it has been carried out) | Operator 1 |
|---|---|
| • Ensure correct Care Path Template (CPT) has been booked for patient and any changes requested after initial booking have been actioned. | |
| • Transfer patient accessories to the appropriate place<br>a) Beam Direction shells / thermoplastic shells<br>○ To checking room<br>b) Vac bags<br>○ To checking room<br>c) Patient specific bolus or other immobilisation devices<br>○ To checking room (may be kept in virtual simulator office until virtual simulation planning is completed if applicable) | |

## B. Patients attending for Brachytherapy CT verifications (Gynae & Prostate)

The Radiographers must carry out procedure according to relevant WI's, QAP's or Clinical protocol and complete the following tasks.

***A new CT- Brachy encounter must be completed for each CT session.***

| Operator 1 and Operator 2<br>(Specific tasks may only require 1 radiographer. However, the other radiographer must check it has been carried out) | Operator 1 |
|---|---|
| • Ensure scanning procedure is justified (i.e. requested on electronic radiotherapy referral or a completed "physician order" by appropriate practitioner or is within clinical protocols). Refer to QAP 9.1b, QAP 9.8a and QAP9.9e<br>• **NB** Any amendment from the electronic radiotherapy referral must be documented in ARIA journal and/or Aria prescribe treatment workspace. Refer to Appendix B for further details. | |
| • Check consent documentation is complete | |
| • Check that the patient ID has been checked and recorded by Operator 1 **as per QAP 8.3a** | • Check and record **patients' ID, as per QAP8.3a,** before executing the exposure |
| For Gynae verifications:<br>• The Brachytherapy Radiographer / Nurse is responsible for ensuring that the patients' bladder is adequately filled as per WI 9.9.2c (Cervix Brachytherapy Bladder Filling Protocol Nursing procedure)<br>The scanning radiographer should confirm that this has been completed before carrying out the exposure.<br>For Prostate verifications:<br>• Complete the 'Pre CT / Mark-up' task prior to scanning, to confirm that the patient has had his LDR seed implant carried out in Mount Vernon.<br>• Ensure that the patient has had adequate bladder preparation as per CT training manual. | • Ensure patient preparation has been adequately completed. |
| • Position patient as per CT training manual. | • Acquire scans as detailed in CT training manual. |

| | |
|---|---|
| • Select the correct patient from the scanner schedule and confirm patient details (Name, Hospital number and DOB)<br>• Enter initials of patients Consultant and exam description<br><br>• NB If the patient has 2 appointments e.g. rescans on the same day then check the appointment time so that separate accession numbers are used. | • Check that the following are correct on the scanner registration page:<br>○ Patients details / Exam description<br>• Enter operators initials on scanner registration page<br>• Select appropriate scan protocol |

**(Patients attending for brachy verifications cont. )**

| Operator 1 and Operator 2<br>(Specific tasks may only require 1 radiographer. However the other radiographer must check it has been carried out) | Operator 1 |
|---|---|
| For Gynae verifications:<br>• Ensure the CT- Brachy encounter has been completed and all relevant Questionnaires and documents have been signed off and /or approved<br>For Prostate verifications:<br>• Ensure the CT- Brachy encounter has been completed and all relevant Questionnaires and documents have been signed off and /or approved<br>• Ensure all reconstructions have been completed | |
| • Manually complete CT appointment in Aria Appointment scheduler. | |



## Documentation

Relevant CTCF forms
Electronic Radiotherapy Referral
WI 8.3.2 Patient Photographic Identification
WI 8.3.3 Inclusive Pregnancy Status Radiation Exposure Safety Check
WI 9.1.21 Siemens CT-Sim QA
WI 9.1.1a DIBH scanning using RGSC
WI 9.1.1e Breast scanning (free-breathing)
WI 9.1.1c Breast Treatment using Electrons
WI 9.1.38 Retrospective 4DCT - Acquisition and analysis
WI 9.1.39 Abdominal compression for CT planning
WI 9.1.9 Cranio-spinal Planning and Treatment
WI 9.1.34 Method for administration of contrast media.
WI 9.1.33 Information Requirements for Pre-treatment Planning Exposures and Clinical Mark-up
WI 9.9.2c Cervix Brachytherapy Bladder Filling Protocol
QAP 9.1b Procedure for Use of CT
QAP 9.8a Referral back to CT by Radiographers
QAP 8.3a Patient Identification
QAP 8.3b Pregnancy Status
QAP 9.9e Referral Procedure for prostate LDR and HDR patients
Q9.1.3 IV Contrast Contra-indications
Q9.1.5 Oral Contrast Contra-indications
Q9.1.6 CT Session
DD9.1.2b CT Operator Record

## Appendix A: Transfer of CT images to Planning systems

The majority of scan protocols incorporate auto-transfer of scan images to the appropriate planning system. Radiographers should check that these are correct before scanning.
However, there may be occasions when auto-transfer is not used e.g. possibility of a rescan / reconstruction / no H&C number. In these circumstances, radiographers will manually have to transfer the scans on the CT scanner to the required systems. This will be ARIA except in the following circumstances

| Technique | Transfer of Images |
|---|---|
| Brachytherapy | Topogram to ARIA |
| | Patient to Brachytherapy (Oncentra Brachy) |

## Appendix B: Electronic Radiotherapy Referrals

Evidence of justification for the initial planning CT exposures is indicated by the final "sign-off" of an entitled IR(ME)R Practitioner on the electronic radiotherapy referral. Due to updated or additional information becoming available after processing of an electronic radiotherapy referral, the details may need amended for justification of this initial planning scan. Other information on the radiotherapy referral may not affect the justification for the planning images but still might need amended and recorded by the Practitioner.

**A new electronic radiotherapy referral is required in the following cases.**

- Addition of another treatment site
  - Exception: palliative areas where the additional treatment site does not affect the scanning protocol justified on the original referral.
    In these circumstances, details regarding the additional area, can be recorded as an approved note in ARIA Journal, by the Practitioner,
- Amendment to treatment site e.g.
  - Laterality of treatment site e.g. RIGHT to LEFT
  - Change in proposed treatment volume that affects the scanning protocol justified on the original referral e.g. inclusion of SCF nodes
  - Request to scan outside recommended scanning levels for specific site not documented on original electronic radiotherapy referral e.g. entire femur for a hip treatment

Responsibilities of Radiographers

When a new electronic radiotherapy referral is submitted at planning stage, the pre-treatment radiographers should ensure:

- Booking office staff are contacted and advised that new radiotherapy referral needs urgently processed. This should include importing referral into ARIA documents along with the addition / removal of any activities within the CPT. It should also include the erroring of any previous referrals as appropriate.
- Original referrals have been errored in ARIA/cancelled in EPIC if appropriate (i.e. depending on whether original site is included on 2nd referral or still valid on 1st)
- Any laterality annotations / treatment site annotations in ARIA appointment notes are amended appropriately. Ensure that CPT has been updated and appointment slots increased if required e.g. for additional palliative site.
- A non-conformity is raised if change is due to incorrect documentation

**An approved ARIA Journal note by the Practitioner is required in the following cases**

| Change to radiotherapy referral requiring an approved ARIA Journal note by Practitioner | Action required by Radiographers |
|---|---|
| Change in request for IV or Oral contrast | Change type of CT appointment in ARIA and confirm CPT is still appropriate – amend if required.<br>Create a standalone appointment for the original activity to capture the original booking and cancel with a note e.g. not for IV |
| Change in requirement for Bolus / immobilisation | Create mould room appointment if required and link to CPT |
| Minor amendment to treatment site e.g. T4-T7 to T6-T9 i.e. does not affect the scanning volume | N/A |
| Request to make minor change to scanning levels e.g. include extra vertebra or scan higher for H&N scans. | N/A |
| Change in Imaging requirements e.g. 3D to 4DCT | Change type of CT appointment in ARIA and confirm CPT is still appropriate – amend if required.<br>Create a standalone appointment for the original activity to capture the original booking and cancel with a note e.g. not for 4DCT |
| Change in planning modality | CPT will need to be amended appropriately |
| Change in Dose / fractionation | Amend CPT as appropriate |
| Details of PTA's (i.e. same area treated previously)<br>This can alternatively be recorded in "Prescribe Treatment workspace" | N/A |
| Details of other Radiotherapy (i.e. different site) | N/A |
| Category of patient | Amend category of appointments in ARIA CPT and in Diagnosis workspace as appropriate |