


Radiation Oncology Manual		
	Policy Name	<b>Afterhours / Emergency Radiotherapy Treatment</b>
	Policy Number	<b>TBD</b>
	Date this Version Effective	<b>April 2022</b>
	Responsible for Content	<b>Medical physicists (MP)</b>

## I. Description

Policy and procedure for after hours or weekend emergency treatments, which are treatments planned and treated outside of normal clinic working hours.

## II. Rationale

After hours treatment bypasses the normal simulation, review, planning process and quality assurance used for all other treatment plans. The risk of erroneous patient treatment increases when circumventing the standard treatment planning procedures.

## III. Policy

### A. Machines

1. It is advised to use the machines in the following order:
  - a. (1) UNCIInf1, and (2) one of the Versa's.
  - b. The patient will be assigned to the most appropriate machine on the following business day morning with considerations for patient load.

### B. On-call Attending Policy

1. The **attending** physician (MD) on call **shall** be present for any after-hours emergency simulations and treatments.
2. MD must approve the calculation in RayStation, prescription in MOSAIQ, and portal films (all treatment fields should be ported/reviewed/approved) prior to delivery of treatment.

### C. On-call/Emergency Radiation Therapy Policies

1. All efforts should be made to ensure that the emergent delivery of radiation therapy is performed in the simplest manner possible.
2. Emergent patients may be scanned using the CT sim but only to save a simulation time slot in the following workday. The CT sim data is not to be used to create a 3D/IMRT plan for the emergent treatment
  - a. The CT sim can provide an isocenter for patient setup, separation thickness measurement, and initial field size estimate, but will not provide reference DRRs for on-board imaging. The CT scout view is often helpful to facilitate review of the machine portal images. The CT dataset will not be imported and setup in RayStation on weekends or after-hour nights.
3. If no CT simulation is needed, clinical simulation of treatment setup is performed on the accelerator.
4. Diagnostic imaging can be used to generate initial field sizes and measure patient thickness but must be verified on patient for calculation/treatment.
5. Primary MU calc will be performed by physicist (MP) using RayStation and second-checked

by MP with RadCalc

6. The maximum number of fields (per treatment site) to be used is two.
7. The use of rectangular fields is standard i.e., NO blocking or MLC shaping
8. A maximum of 10MV energy should be used if patient has a pacemaker.
9. Parallel opposed plans are always prescribed, calculated, and treated to patient's mid-plane.
  - a. with the expectation of an equal number of MU per field
10. Parallel opposed plans shall be treated isocentrically.
11. The same energy should be used for each opposed treatment field.

#### D. Re-simulation policy after an emergent/after-hours treatment

1. Clinical whole brain cases and simple spine treatments started over the weekend are **not** required to be re-simulated, however, the MD may request it.
2. CT sim Isocenter shall be placed at patient's mid-plane.

#### E. Documentation Required

1. Tx planning note from attending physician
2. Physician-approved plan in RayStation
3. Approved MOSAIQ prescription
4. 1<sup>st</sup> fraction assessment
5. Clinical set up notes from therapist (RTT) and/or MP
6. Plan documentation entered by physicist and co-signed/co-approved by MD (RayStation and RadCalc)

### IV. Clinical Setup Procedure

- A. Patient arrives for afterhours/emergency treatment
  1. RTT retrieves patient from room (or contact hospital transport if in-patient)
  2. Resident/attending MD gets consent and gives to RTT.
  3. Resident/attending MD enters simulation directive assessment in MOSAIQ.
  4. Resident documents and signs 3Ps (pregnancy, pacemaker, prior radiation)
  5. RTT checks 3Ps before sim/planning proceeds.
  6. RTT verifies that patient exists in MOSAIQ. If not, RTT adds new patient into Mosaiq from EPIC.
    - a. For registered patient:
      - i. Opens chart in EPIC
      - ii. Click on FYI (located near top of screen)
      - iii. Click on New Flag
      - iv. Type Mosaiq Rad Onc
      - v. Accept
      - vi. May take a few minutes for patient to load in Mosaiq
    - b. If patient is not registered:
      - i. Select patient [registered] "No"
      - ii. Click on patient name
      - iii. Click on demographics
      - iv. Admission
      - v. Date-Today's date

7. RTT obtains face photos and uploads into MOSAIQ
  8. MD enters and affirms diagnosis into MOSAIQ
- B. RTT brings patient to treatment vault or CT sim
1. RTT identifies patient by two independent means (photo ID, armband, etc.)
  2. RTT sets up patient on couch according to MD simulation assessment.
  3. For CT simulation, isocenter is placed at patient mid-plane.
    - i. Patient thickness and initial field sizes can be measured here.
  4. Recent diagnostic CTs can also be used to get a patient thickness and field size estimate but should be verified on patient before calculation/treatment.
  5. For clinical simulations, if portal films are requested before calculation, physics will need to create a simulation field to use portal imager
  6. To create simulation field(s):
    - ii. Diagnosis/Prescription needs to exist in MOSAIQ
    - iii. Create a treatment field, choose machine and enter the following:
      1. Field ID: SIM
      2. Field Name: SIM
      3. Tolerance: UNC\_Non-IGRTdaily
      4. Type: Static
      5. Modality: Xrays
      6. Energy: 6MV
      7. Monitor Units: 1 MU
      8. Gantry Angle
      9. Collimator Angle
      10. Portal Image Settings
        1. Monitor Units: 2 for "Planned" and "Open"
        2. Delta: 10
    - iv. Right click on the Viewer window and choose "Simple MLC" and set jaw size
    - v. Confirm MLC is showing up in the field by clicking Ctrl+Q to view MLC
    - vi. Create any additional fields
    - vii. Ready to port patient

Treatment Field Definition - MR#: HBOInF1\_MQ281 ZZZ\_Mosaiq281\_Upgrade, HBOInF1

Rx Site: T3-T7      Dose: 0 cGy/2.000 cGy      Fractions: 0/5      Approved:      Calibration:      **OK**

Field: SIM    SIM AP      Dose:      cGy      Field Tx: [0]      Approved:      **Cancel!**

Machine: UNCVersa2      cGy/MU: 0.000      Tolerance: [UNC\_Non-IGRTdaily]      Last Treated:      << Field Setup

**Beam**

Type: Static  
Modality: Xrays  
Energy: 6  
Monitor Units: 1.0

Wedge MU:  
Time: 0.00  
Doserate: 0  
Arc Direction:  
MU/Deg: 0.00  
Start Angle: 0.0  
Stop Angle: 0.0

Accessories/Slots  
Wedge:  
Compensator:  
Block:  
Bgus:

**Gantry/Collimator**

Gantry Angle: 0.0  
Collimator Angle: 0.0  
Field Size X: 0.0  
Field Size Y: 0.0  
Jaw X1: 0.0  
Jaw X2: 0.0  
Jaw Y1: 0.0  
Jaw Y2: 0.0

Enlarge/Edit Beam's Eye View

**Couch**

Vertical: 0.0  
Lateral: 0.0  
Longitudinal: 0.0  
Angle: 0.0  
Pedestal: 0.0

Isocenter  
X:      Y:      Z:

**Viewer**

BEV    Note

Portal Image    Planned    Open  
Monitor Units: 2.0    2.0  
Dose Coef: 0.000    0.000  
Delta:      10.00

EPID      SID: 0.0

Treatment Field Will Be Added

- Approve...      Ctrl+A
- Field Delta      Ctrl+K
- Calibration Status...      Ctrl+O
- Enlarge/Edit Beam's Eye View...      Ctrl+M
- Display Reference Image      Ctrl+R
- Display Shaped Port...      Ctrl+H
- Display MU Per Segment Details      Ctrl+2
- Simple MLC...**
- Import...      Ctrl+T
- Flip      Ctrl+I
- Enable MLC
- Asymmetric Jaws
- Recommended Jaws      Ctrl+J
- Apply Limits      Ctrl+Y
- Plan Documents...
- Couch Capture Only      Ctrl+1
- Auto Setup      Ctrl+S
- Portfilm...      Ctrl+F
- Settings Capture      Ctrl+E
- Toggle MLC      Ctrl+L
- Portal Image Blocking...      Ctrl+B
- Site Setup      Ctrl+P
- Graphical Print      Ctrl+G
- Preferences

Create Simple MLC - MR#: HAMSTER007 ZZZ\_PHYSICS\_QA, RESIDENT HAMSTER

Field: TEST    TEST AP      **OK**

**Simple MLC Field Dimensions**

Field Size X: 0.0  
Field Size Y: 0.0

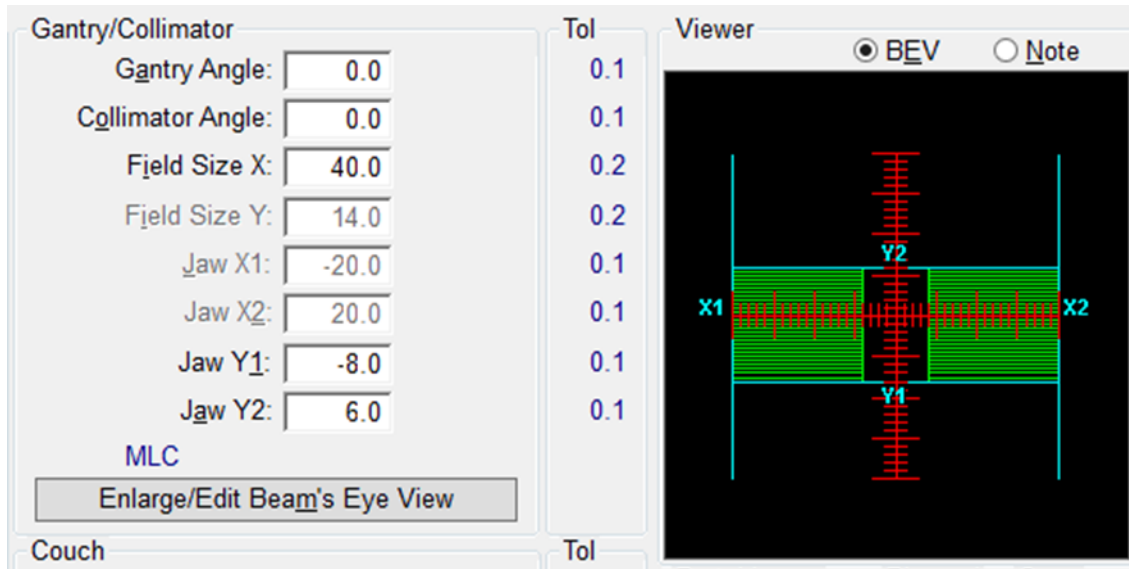
Asy      Jaw X1: 0.0  
                    Jaw X2: 0.0

Asy      Jaw Y1: 0.0  
                    Jaw Y2: 0.0

Enter the field dimensions to create new MLC and jaw positions. Individual leaf retraction limitations can cause an irregular opening. The jaws are set to their recommended positions.

**Click OK in the Field Definition window to save the new positions.**

**Cancel!**



5. If MV port films do not have adequate image quality to comfortably confirm patient setup within field, a kV iso field can be created:
    - a. Highlight a treatment field under the current MOSAIQ prescription
    - b. Click the "Tx Field" button in D&I
    - c. Click "Yes" to confirm field copy
    - d. You do not need to copy the MLC shape
    - e. Enter standard kV iso field information:
      - i. Field ID: S1-1 (if patient has multiple courses of radiation you may need to use S2 or S3 and so on)
      - ii. Field description (AP ISO or LAT ISO)
      - iii. Type: kV Setup
      - iv. Select appropriate XVI preset
      - v. Set tolerance table
  6. RTT, MP, and MD look at light field on patient
  7. RTT draws light field on patient
  8. RTT measures patient thickness and records SSD.
  9. Physicist verifies thickness & SSD
  10. RTT records setup documentation notes in the simulation field in MOSAIQ (positioning, devices, etc.)
  11. RTT adds tattoos/stickers
  12. RTT removes patient from table (long wait on hard table) and moves them to the recovery room
  13. RTT uploads setup photos
  14. RTT fills out "Emergent/Afterhours Treatment Information" document confirming parameters with physician and physicist. See document in Appendix D.
- C. MP performs calculation
1. MP calculates MU for emergent patient by following the "Weekend Treatments – RayStation Script" P&P located on Frodo. Also, can be found on network drive: <\\vscifs1\physicsQAdat\Polices> and Procedures\EmergencyTreatmentsOnElekta\

- D. MD approves RayStation plan, MOSAIQ prescription & documentation
- E. MP transfers plan to MOSAIQ
  - 1. MP transfers plan parameters and RayStation documentation
  - 2. RTT, resident, or independent MP verifies all plan parameters in MOSAIQ
  - 3. MP performs secondary MU calculation via RadCalc (independent verification of RayStation) and transfers RadCalc document to MOSAIQ
- F. RTT conducts timeout prior to imaging patient with MD (required) and MP (optional) present.
- G. RTT performs pre-treatment imaging
  - 1. RTT takes ports to verify field shape, size, isocenter
  - 2. MD reviews/revises/approves ports prior to treatment
- H. RTT treats patient through MOSAIQ
  - 1. Verify that treatment is recorded
  - 2. Schedule subsequent treatments if additional weekend treatments are needed

## V. Appendices

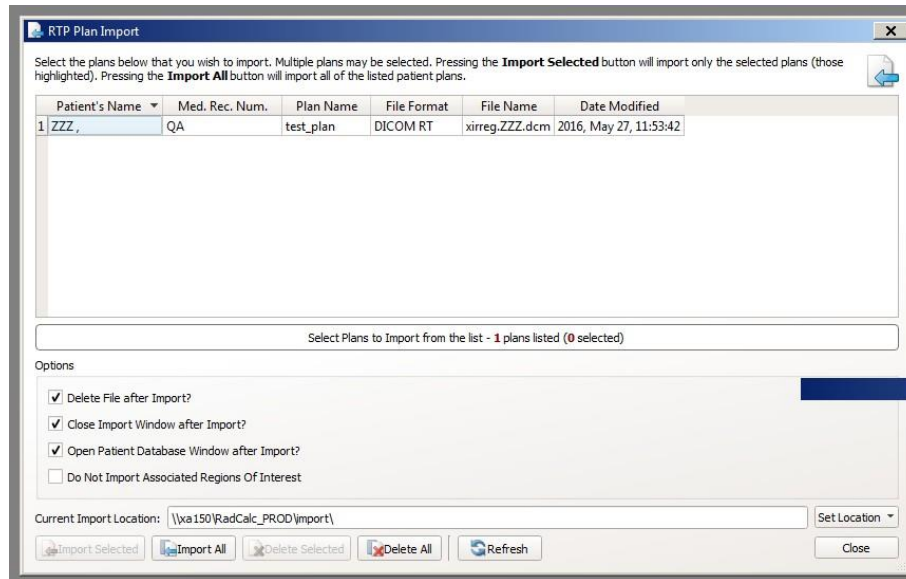
- A. Physics Planning & Secondary MU check
- B. Weekend Treatment Physics QA Checklist
- C. Billing Charges
- D. Weekend treatment summary information document
- E. Emergent workflow flowchart

## Appendix A: Physics Planning & Secondary MU check (required):

Use the “Weekend Treatments – RayStation Script” P&P located on Frodo.

It contains all the necessary information for a MP to perform a simple 2D calculation in RayStation and how to send the field information to MOSAIQ.

Once the calculation is complete, export the Plan from RayStation to RadCalc. Open the RadCalc program via Citrix, select “Import” and select the plan file that corresponds to the patient calculation.



Once the physicist verifies the secondary MU calculation is correct, print the RadCalc report to the ESCAN directory.

## Appendix B: After-hours / Emergent Pre-Tx Physics QA Checklist (required)

(NOTE: THIS IS AVAILABLE AS AN ESCRIBE DOCUMENT IN MOSAIQ)

Patient Name:

DOB:

Date:

Diagnosis:

Physicist:

### Calc/chart prep – MOSAIQ, RayStation

Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Confirm</b> patient name, MRN, DOB, gender are present in Mosaic; if not, have the RTs <u>ENTER THEM</u>
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Confirm 3 P's</b> (Pacemaker/ prior tx/pregnancy) <b>AND CONSENT</b> present ( <b>witness</b> if needed)
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Check Rx</b> in <b>RayStation</b> agrees w/TxPlanNote; <b>xxx cGy/fraction x yy fractions = zzz cGy TOTAL</b>
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Perform</b> Planning Time-Out Assessment w/attending
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>RayStation</b> calc agrees w/ <b>Clinical Sim</b> document and <b>MD</b> directive (energy, FS, norm pt, accessories, etc.). <b>*EXPORT IT to Mosaic AND to RadCalc*</b>
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Perform</b> 2 <sup>nd</sup> MU check with RadCalc
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Import</b> plan into Mosaic; set up <b>prescription, fields</b> and <b>treatment calendar</b>
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Import</b> RadCalc and RayStation Plan Document. <b>Associate</b> plan document with prescription
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Verify</b> prescription in Mosaic is approved by MD
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Approve</b> Site Setup, Treatment Fields, plan document, and RadCalc 2 <sup>nd</sup> MU document
Y <input type="checkbox"/>	N/A <input type="checkbox"/>	<b>Bill</b> the patient; complete off QCL



Comments/special instructions: \_\_\_\_\_

To add this eScribe document, go to patient Documents, Add-Escribe

Choose "PHY-PreTxck\_Emerg". The relevant eScribe template should associate with the document.

Encounter | CC List | Confirmed

Encounter Information

Patient: ZZZ\_Mosaiq281\_Upgrade, HBC HBCInf1\_MQ281

Document Type: PHY- PreTxck\_Emerg  Repeat

Dictated By: Dance, Michael J.  Repeat

Review Req By:   Default to Attending MD

Co-Sign Req By:

Transcribed By: Dance, Michael J.

Encounter Date: 12/20/2023

Transcribed Date:

Department: UNC Radiation Oncology

Status: Pending

Account:

Template: PHY- After-hours\_Emergent Pre-tx cklist\_XIF

Document Will Be Added

OK  
Cancel  
Edit  
Status  
Process  
Note

## Appendix C: Billing for emergent treatments (required)

### **For treatment planning with the weekend script that produces simple, rectangular fields:**

**1. Add either: 77306 (ISODOSE PLAN SIMPLE)**

A simple teletherapy isodose plan when there are one or two unmodified ports directly at one volume of interest. This code includes basic dosimetry calculations.

*Best used for a single treatment site using an AP/PA*

**OR**

**Add: 77307 (ISODOSE PLAN COMPLEX)**

A complex teletherapy isodose plan when multiple treatment areas, tangential ports, the use of wedges, blocking, rotational beams, or special beam considerations will be used. This code includes basic dosimetry calculations.

*Use for when MD is treating more than one site emergently, e.g., two AP/PA sites, or one AP/PA and one lateral beam arrangement*

**2. 77334 (HC TX DEVICE COMPLEX).**

Add the number of fields used. Most emergent cases will equal two.

### **For imaging**

**Add: 77417 (HC PORT IMAGES(S))**

Number of port films = number of 77417 charges. E.g., porting both the AP and PA fields should be charged as two, 77417 charges

**If patient also undergoes a CT-sim to save a timeslot for the following week:**

**Add: 77290 (HC SIMULATION COMPLEX)**

Note: Finance will then change the portal film (77417) charges to a non-charged version (nc-77417) due to bundling in with a same day CTsim.

### **Special physics**

**Add: 77370 (SP PHYSICS CONSULT)**

For example, if you need to do a MOSFET measurement due to patient having a pacemaker. *Note: The MD will need to submit a MOSFET request form and you will need to fill out the reports after the measurement is complete.*

Appendix D: Emergent/Afterhours Treatment Summary Information

**Emergent Treatment Information**

<b>Patient Name:</b>	<b>MRN:</b>		
<b>Consent?</b>	<b>Y</b>	<b>N</b>	
<b>Simulation Assessment?</b>	<b>Y</b>	<b>N</b>	
<b>Pacemaker?</b> (circle one)	<b>Y</b>	<b>N</b>	
<b>Prior Rads?</b> (circle one)	<b>Y</b>	<b>N</b>	
<b>Tx Site:</b>			
<b>Energy:</b>			
<b>Rx:</b>			
<b>Rx depth (cm):</b>			
<b>Patient Separation (AP/PA):</b>			
<b>Patient Separation (LAT):</b>			
<b>Field Size (X):</b>			
<b>Field Size (Y):</b>			
<b>Technique:</b> (circle one)	<b>AP/PA</b>	<b>Opposed-LATS</b>	<b>AP</b>
<b>Linac:</b>			
<b>SSD (100 – ½ separation):</b>			

**Staff Present:**

<b>Treating MD/MD Resident:</b>	
<b>RTTs:</b>	
<b>MPs:</b>	

# Appendix E: Emergent/Afterhours Workflow Flowchart

