



# MROQC Physics Training

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## About MROQC Physics

Welcome to MROQC! Our goal is to ensure the physics data that is being uploaded is of high quality. This document will introduce each of the projects MROQC has and elaborate on what is required for each. We will also provide information about the site reports relevant to physics data and incentive measures. As you become familiar with using the databases, this document can also serve as a reference.

### **Important Links:**

MROQC Member Resources: We recommend bookmarking this page for easy access to all databases and resources. Bookmarking individual databases is not recommended. In addition, the Member Resources page will show any urgent messages related to database availability, such as an outage.

<https://www.mroqc.org/member-resources>

MROQC Physics/Dosimetry Resources: A copy of this document and other physics & dosimetry related resources may be found at the following link:

<https://www.mroqc.org/member-resources/physics-dosimetry/physics-resources>

### **Contact:**

If you still have questions after training, please don't hesitate to email [support@mroqc.org](mailto:support@mroqc.org)! This is strongly encouraged over contacting individual team members.

# Projects

All projects require physics survey submission along with DICOM data upload if applicable.

## 1. MROQC Database

**Breast:** The Breast Radiotherapy Technical Details form (BRTD) is required for all patients. Full DICOM data upload is required for EBRT only. In the case of incomplete treatment, only enter physics data if the patient has received 50% or more of their fractions.

**Lung:** The Lung Radiotherapy Technical Details form (LRTD) and full DICOM data upload is required for each patient. In the case of incomplete treatment, only enter physics data if the patient has received 50% or more of their fractions.

## 2. Bone Mets Database

The Bone Mets Radiotherapy Technical Details form (MRTD) is required for each treated plan; therefore, it is possible for a patient to have multiple MRTDs. In addition, a patient can be retreated, so it is necessary to enter the RT start date on each form in the Bone Mets database to assist in data management. Full DICOM data upload is only required for a patient's first complex course (SBRT and/or IMRT). In the case of incomplete treatment, enter physics data if the patient has received *any* treatment.

## 3. Prostate Database

The Prostate Radiotherapy Technical Details form (PRTD) and full DICOM data upload is required for each patient. The patient needs to be matched (MUSIC site) or from a P7 site. In the case of incomplete treatment, only enter physics data if the patient has received 50% or more of their fractions.

Project Name	Physics Survey		Full DICOM Data
Breast	BRTD		EBRT patients only
Lung	LRTD		All patients
Bone Mets	MRTD for each <i>plan</i>		First complex course
Prostate	Match Site: PRTD only if patient has been matched	P7 Site: PRTD entered for all eligible patients	All who meet PRTD criteria

## Uploading Data

### Physics Form:

- Log into the database that corresponds with the patient's cancer type. Click on the name of your institution to see a list of enrolled patients. Navigate to the patient record using the MRQOC ID search on the site page or by editing the web address.

**Subjects**

MROQC ID Search

Status:  Cancer Type:

Tip: A quick way to access a patient record is to enter the MROQC ID in the webpage address.

[access.mroqc.org/node/28454](https://access.mroqc.org/node/28454)

- Once you open the desired patient record, click on the "Enter Physics Data" tab. Click "Create Survey Entry" to begin the patient-specific physics survey.

**4-Physics Data**

**Breast Radiotherapy Technical Details Form**

Completed	Take Survey	Eval Date	View Survey
Create survey entry			

- Complete the physics survey. Note that branching logic is used in the online form, so additional questions may appear based on responses entered.

Example of BRTD form survey.  
All MROQC surveys have a similar format.

- Once the form is submitted, the database will display the date and time of completion of the form.

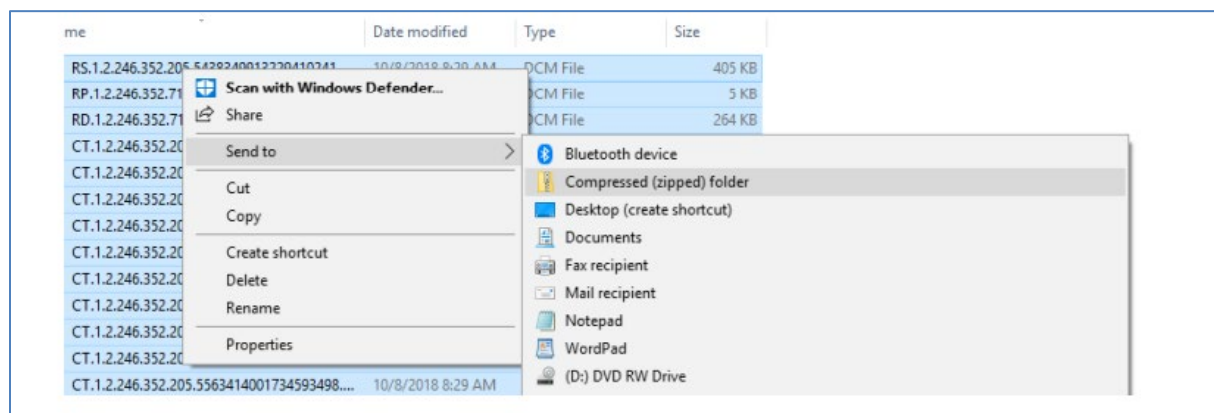
**Breast Radiotherapy Technical Details Form**

Completed	Take Survey	Eval Date	View Survey
2022-06-07 11:06	Retake Survey		View results

# Uploading Data

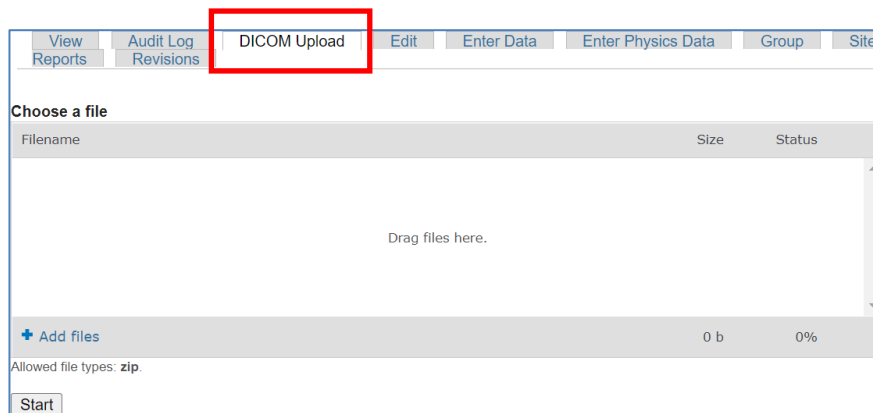
## DICOM Data:

- Preparation:
  - Ensure that all required structures have TG-263 compliant names. See the Physics Tip Sheet (also included in appendix of this document for convenience) for required structures. Use the [TG\\_263 Structures Spreadsheet](#) if you are unsure if a required structure name is TG-263 compliant.
  - Export DICOM files from your TPS:
    - Imaging series (CT, MR, US)
    - RTplan
    - RTDose: one per plan. Please do not submit one per beam. It is not necessary to create a Dose Sum for submission to MROQC.
    - RTstruct
    - Please do not submit RTRecord or RTImage format files. These cannot be anonymized by the MROQC tool and will be rejected at the time of upload.
  - Compress DICOM files into a zip folder for upload. Do not use any sub-folders. If a patient was resimulated, include the files for all treatments in a single zip folder. The upload tool will sort and summarize the files by series.

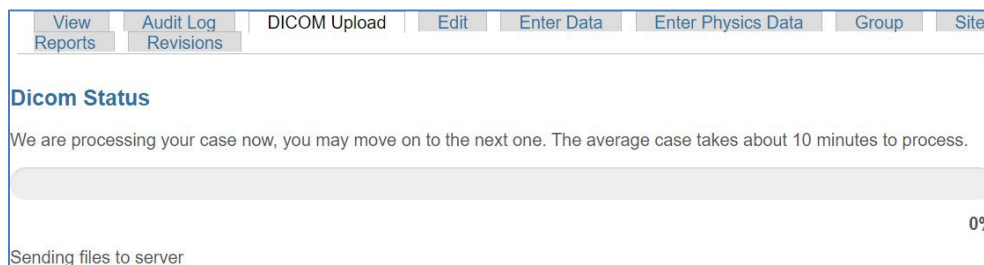


## DICOM Data (continued):

- Click on the “DICOM Upload” tab in the database for the desired patient.



- Drag the compressed folder into the box where it says “Drag files here” or click “Add files” in the lower left corner of the tool. Click “Start” to submit the files. A progress bar will appear.



During the upload process, files are anonymized and summarized. Once the files are finished uploading, a summary report will appear for your review. The report includes a file summary, beam summary, and DVH data. Please review each section of the report to ensure the files were interpreted correctly by the DICOM upload tool.

DICOM data uploads typically take less than 10 minutes, depending on the size of the upload and available computing resources for the upload tool. If the upload is taking longer than 30 minutes, please contact [support@mroqc.org](mailto:support@mroqc.org) for assistance.

View Audit Log DICOM Upload Edit Enter Data Enter Physics Data Revisions

Upload a different file Print

**Patient: '24848' ID:24848**

**Report generated: 2022-08-29 12:19:17**

CT scan summary

Study ID	Series #	CT Datetime	Slices	Num plans	Num doses	Errors
none	1	20180709 102134.723000	43	1	1	

Study id: none; Study Description: none  
 CT series: '1' Study Date/time: 20180709 102214.987000 (43 images)  
 --- Plan Details ---  
 Plan 'Placeholder':

Plan 'Placeholder' Beam Summary

Beam #	Name	Type	Rad Type	Energy	Gantry	Fxn Gp 1 1 fxn Rx: Unknown
1	Field 1	STATIC	PHOTON	6	0	113.8870809 MU



## Site Reports

Once you are logged into one of the MROQC databases and you click on the name of your institution, you will see a tab labeled “Site Reports.” These reports provide additional resources to monitor the status and quality of your uploaded data.

View
Audit Log
DICOM Upload
Edit
Enter Data
Enter Physics Data
Group
Site Reports

Revisions

- [\\_2022 Pay for Performance \(P4P\) Report](#)
- [\\_2023 CQI VBR/Gold Card Report](#)
- [2023 Pay for Performance \(P4P\) Report](#)
- [2024 CQI VBR/Gold Card Report](#)
- [Clinical-Data Checker Problems](#)
- [Clinical-Missing Forms](#)
- [Demographics-Site Specific](#)
- [Physics- Missing Data](#)
- [Physics-Data Checker Problems](#)
- [Physics-Required Questions](#)

The table below shows each report that is relevant to physics data abstractors and the database it can be found in.

Report	Breast & Lung	Bone Mets	Prostate
Physics-Data Checker Problems	✓	✓	✓
Physics-Missing Data	✓	✓	✓
Pay for Performance (P4P) Measures	✓	✓	✓
CQI-VBR and Gold Card Measures	✓	✓	✓
RT Start Date Errors		✓	
Prostate Matching Status Report			✓

## Physics: Data Checker Problems

- This report will display any inconsistencies with the uploaded physics survey or DICOM data. The first tab of the report displays the patient and problem number(s).

The screenshot shows a web interface for 'Physics - Data Problems'. At the top left, there is a blue box that says 'Data is up to date as of' with the date '8/29/22' below it. Below this is a table with three columns: 'MROQC ID', 'Data Probs', and 'Performance Measures Year'. The 'MROQC ID' column contains the value '12345', and the 'Data Probs' column contains the value '10'. The 'Performance Measures Year' column is empty. At the bottom of the interface, there are two tabs: 'Physics - Data Problems' (which is active) and 'Physics - Data Problems Key'.

- The second tab of the report displays the descriptions that correspond to each problem number. If you are unsure about how to resolve a data problem, please email [support@mroqc.org](mailto:support@mroqc.org).

Problem	Problem Description
1	There is a mismatch between the number of doses or plans reported in physics survey and in the DICOM data. Please update the survey or DICOM data set as appropriate.
2	Physics survey: please specify at least one initial plan to the target.
3	Physics survey: dose per fraction is outside the range 1-18 Gy.
4	RTPlan(s) not associated with other DICOM data. Please re-export DICOM data to establish links between files.
5	Breast laterality is different in survey and DVH. Please review.
6	Physics survey: Number of fractions must be an integer.
7	Review DVH data to confirm that absolute dose units are represented. Max dose is larger than 90 Gy.
8	Review DVH data to confirm heart volume. Volume is outside range 240cc-1400cc.
9	Survey indicates that patient was re-simulated but DICOM upload contains 1 CT series. Update survey or DICOM data.
10	Survey indicates that patient was not re-simulated but DICOM upload contains multiple CT series. Update survey or DICOM data.

The screenshot also shows the same two tabs at the bottom: 'Physics - Data Problems' and 'Physics - Data Problems Key'.

## Physics: Missing Data

This report will display any patients that are missing a physics form. Physics data is expected to be uploaded within 6 weeks after end of treatment.

Data is up to date as of						
9/9/22						
MROQC ID	Cancer	Date of Enrollment	Missing Brtd	Wks Since Enrollment	Rt End Date	Wks Since Eot
12345	breast	8//8/18	1	235.1	4/5/18	231.15

## Pay For Performance (P4P) Measures

If you navigate to the Pay for Performance Measures site report, you should see a page similar to the picture below. Note that the report shown is for a dummy site, so all measures have 0/0 frequencies. On the top of the webpage there are different tabs you can navigate through to see performance measures individually including the timeliness of physics data submission. Although Pay For Performance monthly reports sent to your site are comprehensive, the reports on the databases are only tracking data in that individual database.

Measures (All)
Physics Timeliness
Node-Positive Breast
Lung Esophageal Dose
Paddick CI
Exclusion Report

2024 Pay for Performance Report

Data up to date as of

RT End Date - Begin

RT End Date - End

Measure	Threshold	Frequency (n/d)	Percentage Met (%)
In node-positive breast cancer patients, the irradiated nodal group(s) is(are) contoured and named per TG-263 naming convention AND the dose to the supraclavicular (SCV), infraclavicular (ICV or Axillary Level 3), Axilla (Level 1 & 2), and/or internal mammary node (IMN) is reported.	>= 70%	(0/0)	0%
For lung cancer patients treated with conventional fractionation, the mean esophageal dose is <29 Gy AND the esophageal max dose (D2cc) is <61 Gy.	>= 65%	(0/0)	0%
For SBRT treatment of lung cancer with a single PTV, the Paddick Conformity Index is ≥0.85.	>= 80%	(0/0)	0%

## CQI-VBR and Gold Card Measures

This report is similar to the Pay for Performance report and summarizes the compliance rate for VBR and Gold Card incentive programs. Navigate to second tab on bottom of webpage to see fallout (non-compliant) cases.

Measures (All)
Node-Positive Breast
Lung Esophageal Dose
Paddick CI
Exclusion Report

**2025 Gold Card and VBR Report**

Data up to date as of

RT End Date - Begin

RT End Date - End

Measure	Threshold	Frequency (n/d)	Percentage Met (%)
In ≥70% of node-positive breast cancer patients, the irradiated nodal group(s) is(are) contoured and named per TG-263 naming convention AND the dose to the supraclavicular (SCV), infraclavicular (ICV or Axillary Level 3), Axilla (Level 1 & 2), and/or internal mammary node (IMN) is reported.	≥ 70%	(0/0)	0%
For ≥65% of lung cancer patients treated with conventional fractionation, the mean esophageal dose is <29 Gy AND the esophageal max dose (D2cc) is <61 Gy.	≥ 65%	(0/0)	0%
For SBRT treatment of lung cancer with a single PTV, the Paddick Conformity Index is ≥0.85.	≥ 80%	(0/0)	0%

If "Percentage Met" cell is highlighted in green - it indicates the measure is met  
 If "Percentage Met" cell is highlighted in red - it indicates the measure is not met

## RT Start Date Errors

This report only exists on the Bone Mets database and detects when a MRTD start date is different from the clinical (M1 form) start date. If you see there is an error in the MRTD Form RT Start Date Check (you will have to navigate to the second tab on the bottom of the webpage to get here), try to figure out which date (clinical or physics) is incorrect and if necessary correct in the form. If an MRTD form was submitted when it shouldn't have been, click "retake survey" on the physics survey and choose to exclude the form (last question in MRTD form).

Web Intelligence

Track Drill Filter Bar Freeze Outline

### RT Start Date Check: M1 - MRTD Form

Data up to date as of

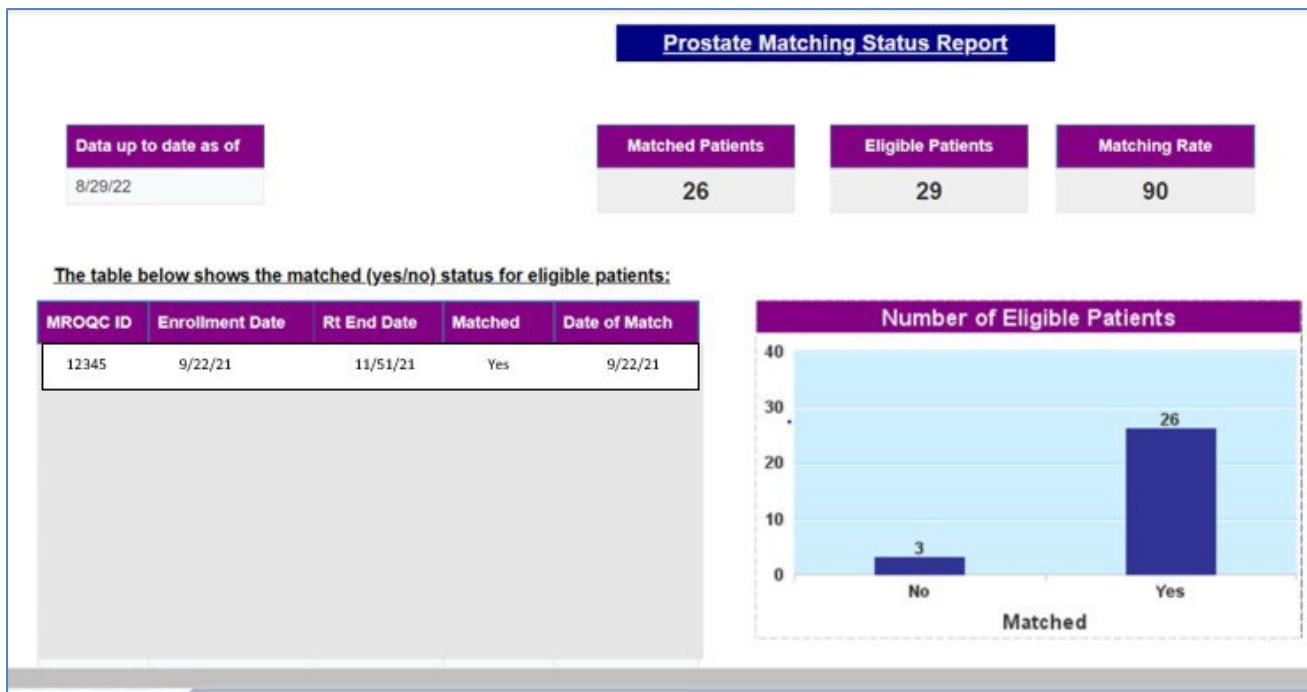
*\*Patients on this report have one or more RT start dates for MRTD form that do not match the RT start dates listed on the M1 form. Please verify the treatment dates.*

MROQC ID	RT Start M1	Rt Start Mrtd

M1 - Clinical Forms RT Start Date Check | M1 - MRTD Form RT Start Date Check

### Prostate Matching Status Report

This report displays if patient has been matched with a MUSIC patient. Once the patient is matched, physics form and DICOM upload are required. Note, this is only relevant if your site is a matching site. If your site is a P7 form site, patient-specific physics data should be uploaded regardless of matching.



## How to Complete Training

To obtain credit for completing training, please submit a ticket or email [support@mroqc.org](mailto:support@mroqc.org) with the subject “Physics Training Completed”.

Someone from the MROQC Physics team will reach out to schedule a 20-minute check-in about a month after training is completed.


If you have any questions, please submit a ticket or email [support@mroqc.org](mailto:support@mroqc.org).

Thank you!



# Appendix: Physics Tip Sheet


## [Download Physics Tip Sheet](#)



## Physics Tip Sheet

For any additional questions, please email [support@mroqc.org](mailto:support@mroqc.org)

Last Updated June 2024



Breast	Lung																							
<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr style="background-color: #f0f0f0;"> <th colspan="2" style="text-align: left; padding: 2px;">TG-263 Required Structures:</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">All Patients:</td> <td style="padding: 2px;">Node Positive Patients (only regions irradiated):</td> </tr> <tr> <td style="padding: 2px;">CTVsb</td> <td style="padding: 2px;">LN Ax L1 L/R</td> </tr> <tr> <td style="padding: 2px;">PTVsb</td> <td style="padding: 2px;">LN Ax L2 L/R</td> </tr> <tr> <td style="padding: 2px;">Heart</td> <td style="padding: 2px;">LN Ax L3 L/R</td> </tr> <tr> <td style="padding: 2px;">Lung L/R</td> <td style="padding: 2px;">LN IMN L/R or LN IMNs</td> </tr> <tr> <td style="padding: 2px;">PTV_Breast_L/R (whole breast)</td> <td style="padding: 2px;">LN_Sclav_L/R</td> </tr> <tr> <td style="padding: 2px;">Breast L/R (partial breast)</td> <td></td> </tr> </tbody> </table> <p><b>Full DICOM Upload Requirements (EBRT only):</b></p> <ul style="list-style-type: none"> <li>CT</li> <li>Dose</li> <li>Plan (scaled to delivered fx)</li> <li>Structures</li> </ul> <p><b>Physics Form:</b> Filled out once per patient at the end of treatment</p> <ul style="list-style-type: none"> <li>Breast Radiotherapy Technical Details Form (BRTD)</li> </ul> <p><b>2024 Quality Measures:</b></p> <ul style="list-style-type: none"> <li>Node-positive patients: Nodal groups are labeled per TG-263 and dose is reported</li> <li>Fewer than 5% of 2024 patients have a quality report error as of 12/31/24</li> </ul>	TG-263 Required Structures:		All Patients:	Node Positive Patients (only regions irradiated):	CTVsb	LN Ax L1 L/R	PTVsb	LN Ax L2 L/R	Heart	LN Ax L3 L/R	Lung L/R	LN IMN L/R or LN IMNs	PTV_Breast_L/R (whole breast)	LN_Sclav_L/R	Breast L/R (partial breast)		<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr style="background-color: #f0f0f0;"> <th style="text-align: left; padding: 2px;">TG-263 Required Structures:</th> </tr> </thead> <tbody> <tr><td style="padding: 2px;">GTV/IGTV/ITV</td></tr> <tr><td style="padding: 2px;">PTV</td></tr> <tr><td style="padding: 2px;">Esophagus</td></tr> <tr><td style="padding: 2px;">Heart</td></tr> <tr><td style="padding: 2px;">Lungs-GTV/IGTV/ITV</td></tr> <tr><td style="padding: 2px;">SpinalCord or SpinalCanal</td></tr> </tbody> </table> <p><b>Full DICOM Upload Requirements:</b></p> <ul style="list-style-type: none"> <li>CT</li> <li>Dose</li> <li>Plan (scaled to delivered fx)</li> <li>Structures</li> </ul> <p><b>Physics Form:</b> Filled out once per patient at the end of treatment</p> <ul style="list-style-type: none"> <li>Lung Radiotherapy Technical Details Form (LRTD)</li> </ul> <p><b>2024 Quality Measures:</b></p> <ul style="list-style-type: none"> <li>Conventionally fractionated patients: mean esophageal dose is &lt;29 Gy AND esophageal D2cc is &lt;61 Gy</li> <li>SBRT patients with 1 PTV: Paddick Conformity Index is <math>\geq 0.85</math></li> <li>Fewer than 5% of 2024 patients have a quality report error as of 12/31/24</li> </ul>	TG-263 Required Structures:	GTV/IGTV/ITV	PTV	Esophagus	Heart	Lungs-GTV/IGTV/ITV	SpinalCord or SpinalCanal
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