



GUIDELINES FOR EXPORTING PLANS FROM TREATMENT PLANNING
SYSTEM FOR CLINICAL TRIALS

XIO VERSION 4.40.00

Version 5
March 2010

Table of Contents

Abbreviations & Glossary	3
Abbreviations & Glossary	3
1. TROG Guidelines for export of plans for QA review in Clinical Trials	4
1.1 Introduction.....	4
1.2 Export from Treatment planning systems.....	4
1.3 Software required.....	4
2. The export process	5
3. Exporting a plan from Xio	6
3.1 DICOM and RTOG export.....	6
3.2 Checklist for the plan.....	6
3.3 The export process from Xio.....	6
3.4 Exported data.....	8
3.5 Checking the file sizes of the exported data.....	8
4. Preparation of data for entry to CQMS and Swan	8
4.1 Accessing the exported files.....	8
4.2 FTP Instructions	9
4.2 Extracting and zipping the patient data.....	9
5. Uploading data for review through Central Quality Management System (CQMS) 11	
5.1 Request for institutional access to the CQMS.....	11
5.2 Entering the CQMS system.....	11
5.3 Upload your digital data.....	12
Acknowledgements	14
Appendix A: Reducing the size of a patient file for export	15

Abbreviations & Glossary

ATC	Advanced Technology Consortium
CQMS	Central Quality Management System
DICOM	Digital Communications in Medicine
DRR	Digitally Reconstructed Radiograph
DVH	Dose Volume Histogram
OAR	Organs at Risk
PTV	Planning Target Volume
RTOG	Radiation Therapy Oncology Group
SWAN	TROG Trial review software
TCOO	Trials Central Operations Office
TMC	Trial Management Committee
QA	Quality Assurance
UID	DICOM Unique Identifier

1. TROG Guidelines for export of plans for QA review in Clinical Trials

1.1 Introduction

This manual follows the steps required to export your patient plan from your treatment planning system, to make it ready for uploading into CQMS and SWAN for review.

The TROG recommendation is for the maximum file size to be 50Mb. This has been shown, with the right parameters and settings, to give all the required information.

1.2 Export from Treatment planning systems

There are two main formats used for export: DICOM and RTOG.

- Eclipse will export in DICOM only.
- Pinnacle will export in RTOG and from version 8.0h, in DICOM.
- Xio will export in both
 - DICOM .However the DICOM export does not export the DVH which is required for plan review. Also the DICOM files were not recognised as a set for anonymisation, and could only be anonymised slice by slice.
 - RTOG is not a standard option, but can be simply installed. Contact Elekta support for RTOG licence and help with the RTOG install instructions..
- Oncentra will export in DICOM only.

In general, DICOM is simpler to use.

The TROG quality assurance review requires CT slices, contours, reference points, plan, dose matrix, dose volume histograms (DVHs) and DRRs.

The US Radiation Therapy Oncology Group (RTOG) is a member of the Advanced Technology Consortium (ATC). This terminology is used in Eclipse as “ATC DICOM export”.

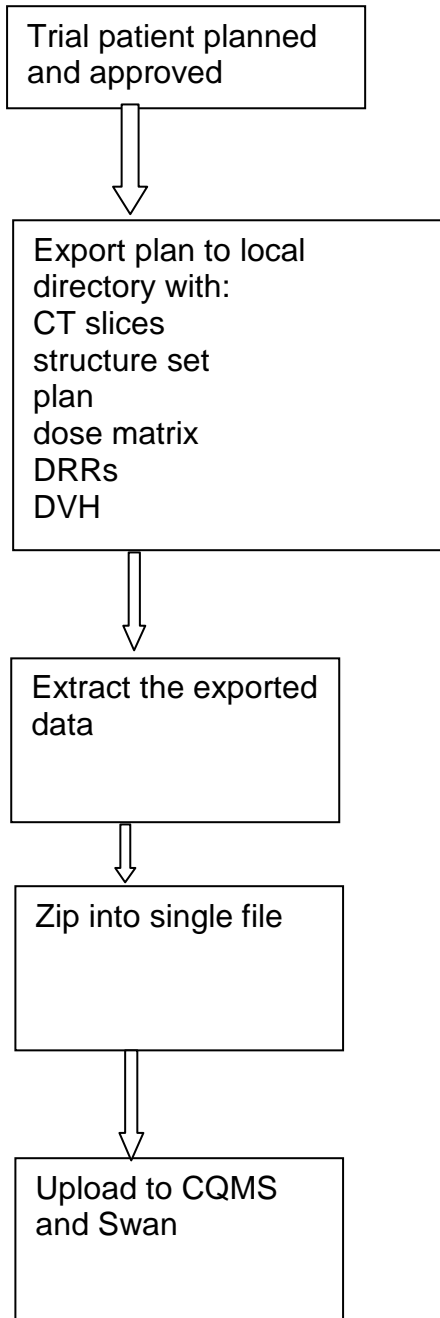
1.3 Software required

All patient files should be anonymised before export. The recommended software is DICOM Shadower, available for download at

<http://www.trog.com.au/Default.aspx?tabid=297>

Swan accepts a single file, so all exported files must be zipped together, using Winzip.

2. The export process



3. Exporting a plan from Xio

3.1 DICOM and RTOG export

3D conformal plans

The preferred format for data submission is RTOG.

IMRT plans

The QA review requires the plan and DRRs, and also DVHs and beam data. DICOM does not support the DVH export. RTOG will export DVHs but not the beam data. For QA review it is better to have the DVHs as a digital export, and to provide the beam data as a hard copy or screendump.

3.2 Checklist for the plan

- Identify patient and plan
- Estimate the final file size (approx 50kb/CT slice)
 - How many CT slices? More than 80 slices?
 - Are there two phases?
 - Is the dose grid spacing 0.25cm x 0.25cm x 0.25cm?
 - Is the dose calculation volume set to cover?
 - The transverse cross-section
 - all contoured structures
 - 5cm above sup and inf to the field edges
 - for non-coplanar beams, all beams exit through skin surface
- Plan checked by supervisor?

3.3 The export process from Xio

3.3.1 Remove non-treatment beams

1. Call up the patient plan

2. Delete unwanted beams

Delete ALL beams that are TURNED OFF. Select the menu “Beams” from the menu-bar and select the beams that should be removed. Once all the appropriate beams have been selected, click the “Delete Beam” button.

3. Saving DVHs for RTOG export

- Open up the dialogue for calculating DVHs. To do this select the “Dose” menu, followed by the “Histogram” menu and select the “New/Edit” menu-item.

- Select only the organs relevant for the trial, eg PROFIT. You can remove organs from the DVH by dropping down the Type menu and selecting Del.
- Click the “Save DVH for RTOG” button and then click the “OK” button.
- Click the “Cancel” button.

4. Close the patient and return to the welcome screen

3.3.2 RTOG Submission

Before starting this step of the process, make sure that you know the patient’s ID

1. Display the RTOG submission panel

- i. Go to the welcome screen.
- ii. Highlight “RTOG Submission” from the list. This brings up the RTOG submission panel.

2. Select the patient

- i. Go to the top left-hand corner of the screen. There is a panel titled “Patients”.
- ii. Select the patient from the list by left clicking on them.

Note: To scroll up and down the list, hold down the middle mouse-button whilst dragging the scroll bar.

3. Select a study set

- i. Directly below the “Patients” panel, there is a panel titled “Study sets”. Go to it.
- ii. Select the study set which was used for planning (e.g. CT1)

4. Enter export information

- i. To the right of the previous two panels there is panel for entering treatment information. Go to it.
- ii. The box to the right of the label “Patient name” contains the patient’s name. Delete the patient’s name and replace it with the TROG Pre-Randomisation number (e.g. 6005_001)
- iii. Enter your name in the box to the right of the label “Writer”.
- iv. Enter the TROG Pre-Randomisation number in the box to the right of the label “Case #” (e.g. 6005_003 = 3)
- v. Click on the box titled “Submission” and select “Final”.

Note: To enter information in a box the mouse cursor must be over that box.

5. Enter plan information

- Go to the bottom left of the screen there is a panel containing plan information.
- Go to the sub panel “Plan ID” and select the plan to export from the list”.
- Enter the number of fractions in the box to the right of the label “#Tx”.
- For 3DCRT highlight the box titled “Beams” – *****DO NOT SELECT THIS FOR IMRT*****.
- Highlight the box titled “Doses”.
- Highlight the box titled “DVHs”.
- Click the button titled “Add to List”.

Note: For IMRT plans you will need to submit screen captures of the plan source data. Contact Elekta support for details of this process.

6. Enter structure information

- i. In the top right of the screen there is a panel containing structure information. Go to it.
- ii. Click the button titled “Select all”.
- iii. Click the unwanted structures in the SELECTED right side box. Only leave the structures relevant to the trial.

7. Export RTOG information

- i. Below the structure panel, there is a panel containing export options. Go to it.
- ii. Highlight the box titled “Scans”.
- iii. Make sure the box titled “Structs” is highlighted.
- iv. Make sure the box titled “Plans” is highlighted.
- v. Click on the box titled “Submit Method” and select “NET”.
- vi. Double check that all steps have been carried out correctly and then click the button titled “Submit”.

Note: If there is no network link to the ATC (most centres won't have a link), an error will come up saying “~FOCUS/.netrc does not exist or is not readable. FTP file submission failed. No mail is being sent.” Ignore this message.

8. Return to the welcome screen

- i. Click the button titled “Quit”.

3.4 Exported data

Data files are stored in the directory /FOCUS/rtp<1>/<1>/patient/<patientID>/RTOG, where values in <> are variables depending on the system.

3.5 Checking the file sizes of the exported data

At the directory containing the exported patient data, check the total size.

If less than 50Mb, continue with the anonymisation process in section 4.

If more than 50Mb, consider how to reduce the total size – see Appendix B.

4. Preparation of data for entry to CQMS and Swan

4.1 Accessing the exported files

The exported files need to be copied to a Windows PC for upload to CQMS. This can be done by either

- Copying the files to a PC using FTP; or
- SAMBA mount the clinic directory for a seamless transfer.

4.2 FTP Instructions

The File Transfer Protocol (FTP) provides a good method of file transfer. This series of instructions is the most complicated in this document and it's recommended that a systems administrator provide help until the process is familiar or they may choose to install a third-party FTP program for you. You will need the IP address of the planning computer in the following steps.

1. Opening the command prompt

- i. Click the "Start" button in the bottom left-hand corner of the screen.
- ii. Select "Run..." from the menu. A dialogue will pop up.
- iii. In the box to the left of the label "Open", type 'cmd'.
- iv. Click the "OK" button. The command prompt will pop up.

Note: Some computers may not have "Run..." as a menu-item. If this is the case, open the directory C:\%SystemRoot%\System32 via My Computer or Windows Explorer. When this is done, double-click the file called "cmd.exe".

2. Making an FTP connection

- i. To make a connection to the planning computer type "ftp" followed by a space and the IP address. For example, if the IP address was 165.118.253.33, then type "ftp 165.118.253.33".
- ii. Type in the username and password (for the planning machine) when prompted.

3. Changing the transfer mode to binary

- i. To change to binary mode, type "binary".

4. Transferring the RTOG information

- i. Change the current directory to the export directory by typing "cd" followed by a space and the full path of the directory. For example, if the patient ID was A0000001 and the planning machine was running FOCUS, type:
 - ii. "cd /FOCUS/rtp1/1/rtog/submit/A0000001_aapm".
 - iii. Check that the current working directory is correct, by typing "pwd".
 - iv. Transfer the files by typing "mget *.tar.Z". Press "Y" to start the transfer.
 - v. The file(s) have now been copied to the local hard disk under C:\.
 - vi. Close the FTP session by typing "bye".
 - vii. Close the Command Prompt by typing "exit".

4.2 Extracting and zipping the patient data

Extracting the compressed RTOG information

- i. Open up WinZip. (Done via the "Start" menu.)
- ii. Click on the "Open" button.
- iii. Click on the pop down menu to the right of the "Look in:" label, and select the patient folder, for example lets use "Local disk (C:)". (Assuming that the location of transferred RTOG information is C:\).
- iv. Click on the pop down menu to the right of the "Files of type:" label, and select "All archives".

- v. Select the file with the extension “.tar.Z” and click “Open”.
- vi. Click the “Yes” button when the question dialogue box pops up.
- vii. Click the “Extract” button.
- viii. Set the “Extract to:” location as the patient folder, e.g. “C:” and click the “Extract” button.
- ix. Close Winzip
- x. Delete all other files so only files like: aapm0000, aapm0001, aapm0002, etc. are left.
- xi. Navigate to the patient folder, right click, click the Winzip icon, then click the Add to patientfolder.zip.
- xii. The new .zip file can then be dragged into the patient folder and only the .zip file will be uploaded into CQMS as the SWAN upload.

5. Uploading data for review through Central Quality Management System (CQMS)

5.1 Request for institutional access to the CQMS

If you are a TROG member, please send an email to qa@trog.com.au and ask for a username and password.

If you are not a TROG member, please email qa@trog.com.au with this information:

Name

Phone

Fax

Email

Job Title

Site (Hospital)

Department

5.2 Entering the CQMS system

Please visit TROG website (<http://www.trog.com.au/>) and click at the right frame on the CQMS (Figure 1)



Figure 1. TROG website, link to CQMS (red)

- For first time visitors, it is recommended to follow the e-Learning (2nd point), before using the system (Figure 2, green marking "T")

- For data submission, please click on the access to CQMS (Figure 2, red marking “2.”), and wait until a new webpage appears



Figure 2. CQMS page with link to data submission entry (red) and e-Learning (green)

Login with the provided username and password to enter into the system



Figure 3. CQMS entry page

5.3 Upload your digital data (DICOM-RT or RTOG format)

Before starting the upload procedure, please make sure:

- All patient data are anonymized (responsibility of the local investigator!)
- All data (CT-image, contours, dose, plan) are packed into a zip file (recommended)

Trials which are open at your centre will be shown under My Trials. This example is uploading data for the 07.01 DCIS trial.

Please click on My Trials / Trial: 07.01 DCIS RTQA checklist (Figure 4)



Figure 4. CQMS desktop interface

- select [Swan upload]

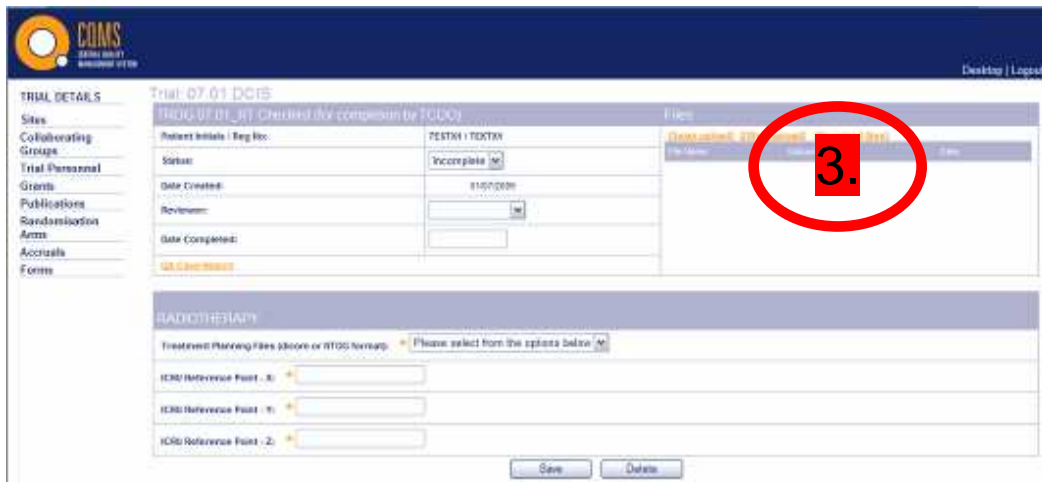


Figure 5. Digital data upload for review [Swan upload]

- Please click on **Browse** and select the zipped file with the information to be submitted
- click on **Upload File** - please note that the uploading can take several minutes.
- Once the data is uploaded (it will be automatically extracted from the zip), all files will be shown at the CQMS window (Figure 6, red [4]).
- Please make sure (again), that all files are uploaded.

Figure 6. Completed digital submission (uploaded files [4], provided information [5])

- Finally, please fill in the Radiotherapy part (Figure 6, red [5]), with the information about the data format and the coordinates of the ICRU Reference point.
- Click on Save to complete the submission.

Acknowledgements

Dave Willis, Peter MacCallum Cancer Centre, for section 5.

Richard Oates, Peter MacCallum Cancer Centre, for Xio information

Appendix A: Reducing the size of a patient file for export

Some clinical plans use a large CT scan set, with image slices more than 5cm from field edges and which may not contribute to the data required for the QA review.

Similarly, the dose calculation volume may cover regions beyond the irradiated volume.

The recommended total limit for the files is 50Mb before zip – this may not be identified until the plan has been exported to a location outside of Xio. It is important to measure the folder size before anonymisation.

Initial assessment of a treatment plan before export should include a close look at the

- calculation volume

A calculation volume far beyond the irradiated volume may result in an unnecessarily large dose matrix file (check the file size with the prefix RD).

- scan length

A long scan length is often indicative of a total export package greater than 50Mb.