

Tutorials

Launching ElectronRT

In order to Launch the decimal ElectronRT app you must use the decimal Launcher to authenticate and open your desired application.

NOTE: You will need your .decimal Direct user Log in.

1. Download and install the decimal Launcher.
2. Log in with your .decimal credentials.
3. Find decimal ElectronRT and download/launch the application.

For further instructions please refer to the [decimal Launcher User Guide](#).

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DICOM Patient Import

In order to begin planning in the decimal ElectronRT App you must first have patient imaging captured and structure geometries defined. This information is brought in the ElectronRT App by importing DICOM CT and Structure Set files.

Note: DICOM patient import will be disabled until the organization configuration has been completed.

Default Import Directory

The default import directory can be set in the app settings by navigating to View → Settings. This directory will always be the default directory when importing a patient. Users can then further refine the import folder as needed starting from this default level.

Importing a New Patient

The ElectronRT application has two methods for importing new DICOM patients: 1) Manually browsing for local files and 2) setting up a DICOM receiver to accept and import DICOM patients. Refer to the sections below for details on each option.

Local File Import

If you have a set of Ct Images and structures you can import them directly into a new patient through the “Import Patients” menu.

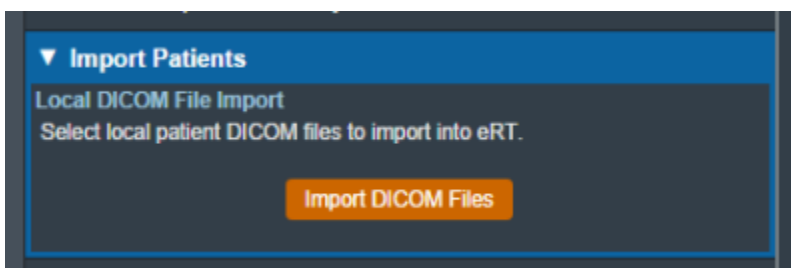


Fig. 1: Import in the Main App Page

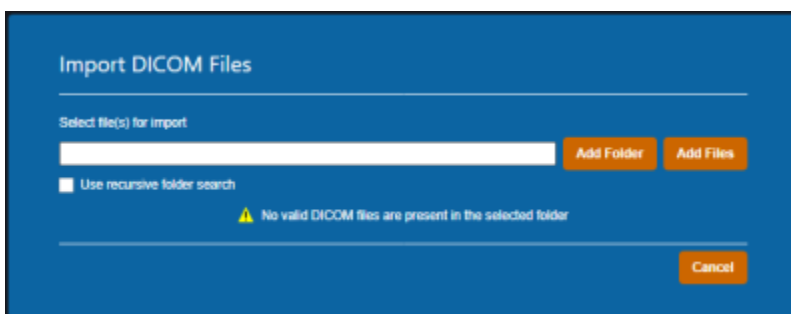


Fig. 2: Import Directory Input

The Import DICOM Files option allows you to either browse your computer or copy the path to the folder that contains the CT images and structures you wish to import. The following options are available for browsing for local files:

- **Add Folder:** Browse for an entire folder of DICOM files to import into a patient
 - Use recursive folder search: This option can be selected prior to adding a folder to recursively search and add all DICOM files within the selected folder and all sub-folders.
- **Add Files:** Browse for individual DICOM file(s) to import into a patient. Note: this option does not make use of the recursive folder search option.

A list of selected DICOM files for import will be displayed and you can choose to add more files for the selected patient or remove any files as desired.

Refer to the [Processing Imports](#) section once files have been selected to import.

DICOM Receiver Imports

Users can install and configure the [ElectronRT DICOM Receiver](#) to receive and save patients for seamless importing into the ElectronRT application.

Users can then specify a DICOM Import Monitoring Directory within the [Site Configuration's DICOM Settings](#) block that corresponds to the `storage_location` field set for the ElectronRT DICOM Receiver. Once the receiver and monitoring directory have been setup and configured, any DICOM patients sent to the ElectronRT DICOM Receiver will automatically show up within the Import Patients display as shown in

figure 3.

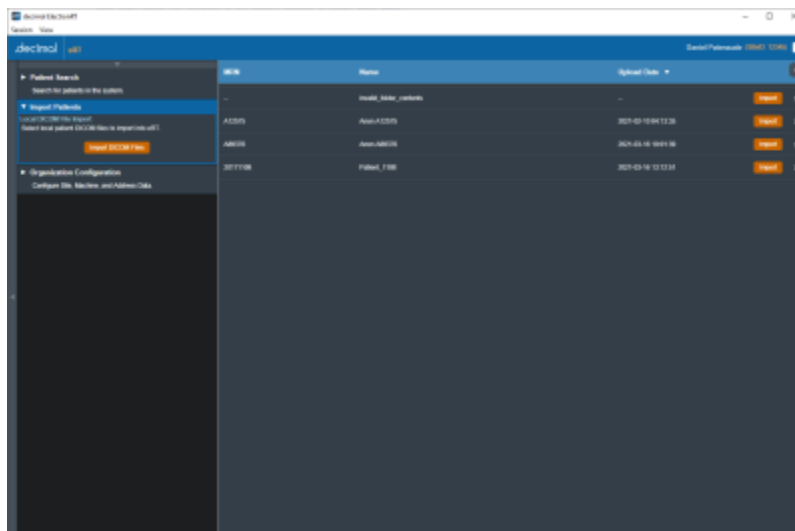


Fig. 3: DICOM Receiver Patients

Each patient received from the ElectronRT DICOM Receiver can be imported or removed from within the eRT Import Patient block.

Refer to the [Processing Imports](#) section once a patient has been selected for import.

Processing Imports

Clicking the Import button will start processing the selected files.

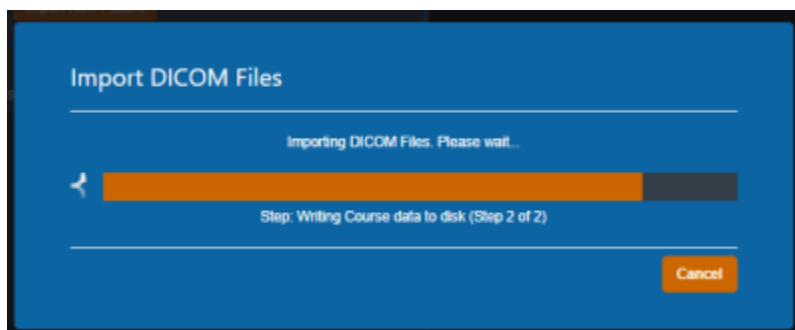


Fig. 4: Import Loading screen

If there are no Errors while importing you will be taken to a confirmation page for your import.

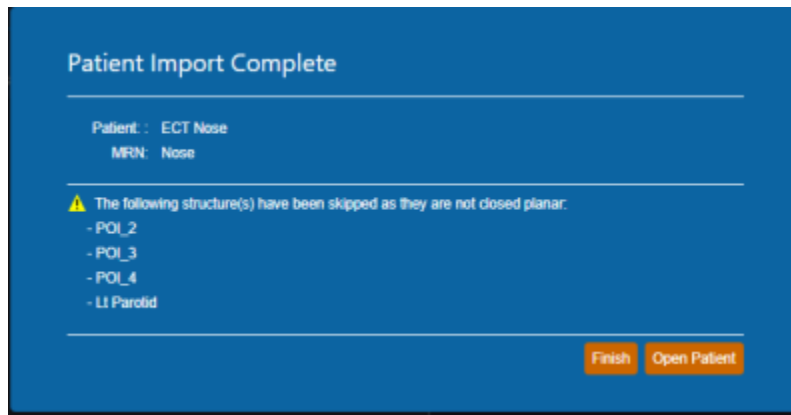


Fig. 5: Import Finalized

If there are errors, please refer to the [Common Errors](#) section below for further details.

Importing DICOM Plans

Users have the option to import DICOM Plan files in addition to CT images and structure sets. For now, only electron plans can be imported into the decimal ElectronRT app. When importing a new patient, the DICOM plan file must have the proper UUIDs that reference the structure set in order for the plan to be successfully imported. An imported plan will appear under the course of the new patient and will be marked as imported.

Refer to the [Imported Plans](#) section for more information on imported plans.

Common Errors

Missing/Undefined External Structure

If the imported DICOM Structure Set does not have a structure flagged as *RT ROI Interpreted Type (3006,00A4) EXTERNAL* you will be directed to specify the external patient structure before the import resumes. The patient external structure must be set to the defining boundary of the patient's outer surface, and not a rind skin structure.

Note: You will be warned if the selected external structure is not the structure with the largest volume. This is to prevent incorrect structure selection. For example, when a 'External' and 'Skin' structure both exist, and the 'Skin' structure is a rind, if the user selects the 'Skin' structure, the warning will state the 'External' structure has a larger volume, since that's the correct representation of the patient structure needed for the ElectronRT App.

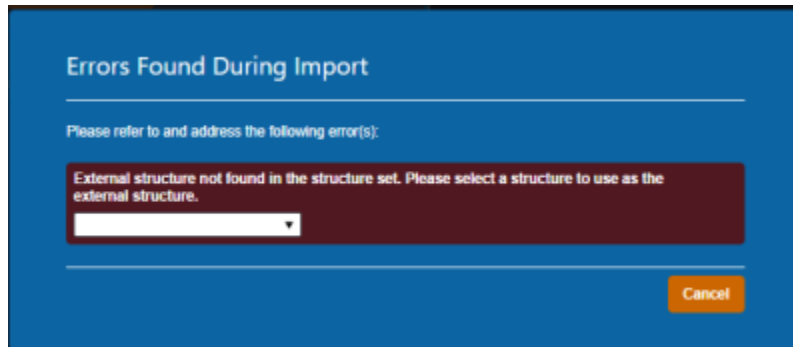


Fig. 6: Missing External Error

The drop down menu will have a list of the structures in the imported set. You will be able to select one as the external for this course then confirm your choice by pressing "Set External".

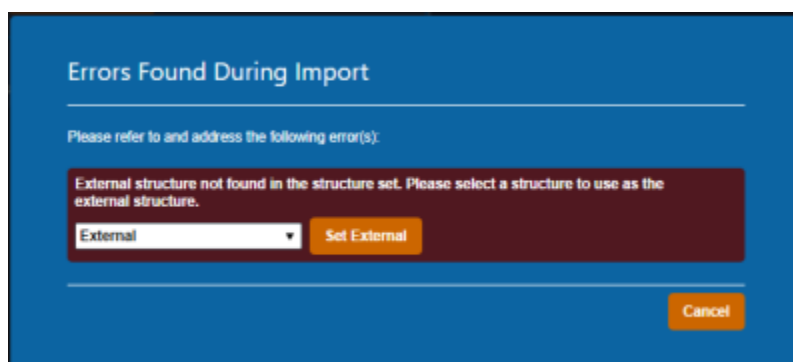


Fig. 7: Set External Dialog

Structures Skipped During Import

Structures can be skipped during Structure Set import if the structures meet the following criteria:

- Non closed planar (e.g.: points or structures where slices are not fully closed)

Structures that are skipped will be denoted at the end of the DICOM import as shown in [figure 8](#).

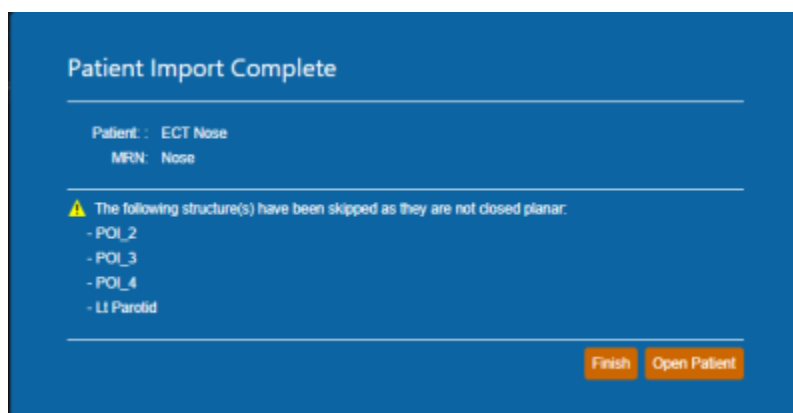


Fig. 8: Import Finalized

Importing an Existing Patient

If the files you have selected to import coincide with the MRN of a patient that already exists in the database you will receive this error.

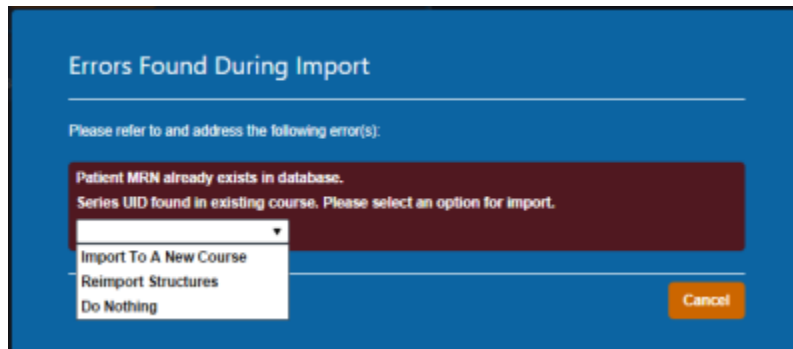


Fig. 9: Existing Patient Error

You have three options provided to resolve the error:

- **Import to a New Course**
- **Re-Import Structures**
- **Do Nothing**

Import to a New Course

Importing to a new course will simply complete the import with the app creating a new course for this patient using the new imported files (note this option will not affect any existing courses or plans for the patient).

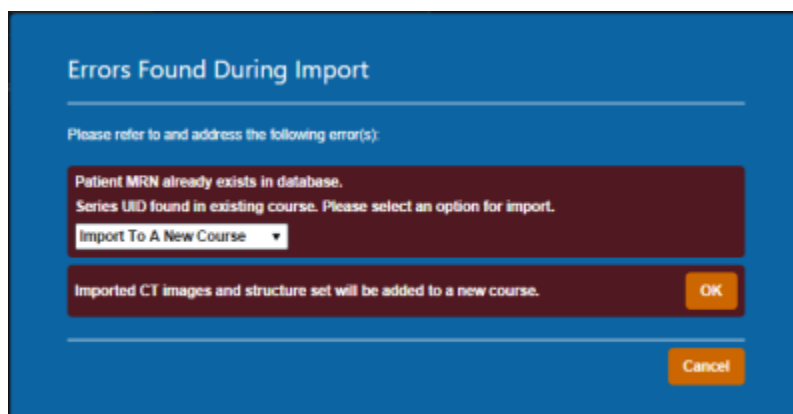


Fig. 10: Importing as a New Course

Re-import Structures

Re-Importing structures can be used if your goal is to update or add structures to an existing patient

Course.



Fig. 11: Re-Import Structures

After selecting this option, you will be presented with a list of the structures in the import.

For each you may select one of three options:

- **Do not Re-import:** Skips this structure for the re import.
- **Replace existing geometry:** Replaces the existing structure in the current Course with the imported one.
- **Import as new structure:** Imports the structure to the Course as a new structure while not affecting the existing one and allows the user to specify a new name for the new structure. If the structure does not exist currently it creates it as normal.

Errors Found During Import

Please refer to and address the following error(s):

Patient MRN already exists in database.
Series UID found in existing course. Please select an option for import.

Reimport Structures

Errors Found During Import

Please refer to and address the following error(s):

PTV	Do Not Reimport
PTV 6840	Do Not Reimport
Rt Parotid	Do Not Reimport
Cord	Do Not Reimport
Cord+5	Do Not Reimport
Ant avoid	Do Not Reimport
Post avoid	Do Not Reimport
Rt Eye	Do Not Reimport
Lt Eye	Do Not Reimport
External	Do Not Reimport
ROI US 1CM	Do Not Reimport

Cancel

Fig. 12: Re-Importing Structure List

Once you have made your decision for each structure you must select “Re-Import Structures” to finalize your changes.

nose

Do Not Reimport

90 % (Trial_1)_1

Replace Existing Geometry

Structure: 90 % (Trial_1)_1

Electron Bolus

Replace Existing Geometry

Structure: Electron Bolus

Re-Import Structures

Cancel

Fig. 13: Finalize Re-Import

Do Nothing

This is the simplest action, selecting “Do Nothing” will cancel your import and return you to the main menu.

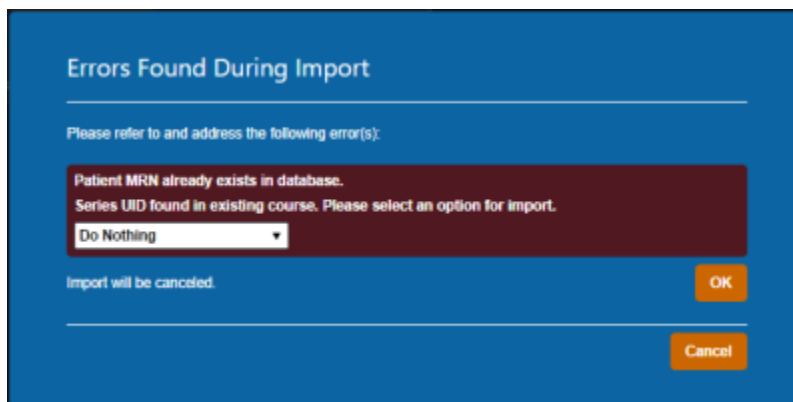


Fig. 14: Do Nothing
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Patient Courses

Once you have a Patient imported you will need to set up a Course for that patient before being able to create any treatment plans. A Course is used to define the patient's anatomy (e.g.: a single DICOM Structure Set and CT Image Set).

The Course Information settings decided here will be inherited by any plans in this Course and can be edited in the Course UI later to update all non-approved plans within the Course.

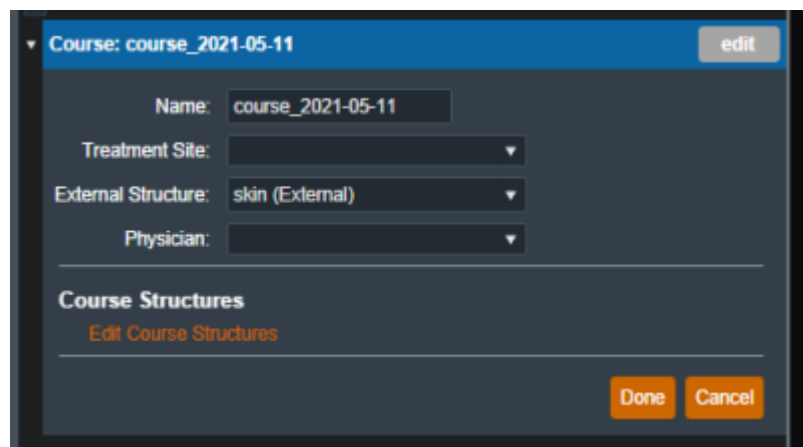


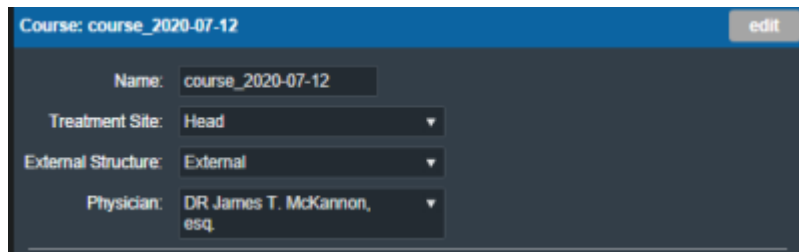
Fig. 15: Empty Course Block

Course

In the Course block you can set the following fields:

- **Name** : Initially this label is automatically generated but can be changed as desired.
- **Treatment Site** : This list is taken from your site settings, you are able to add or remove treatment sites from the Site Configurations block. For more information please refer to the [Site Settings](#).
- **External Structure**: The external structure will be automatically determined based on DICOM structure types during import. You are also able to override the initial selection with any other structure in the structure list if desired.
- **Physician** : This list is taken from your site settings, you are able to add or remove physicians from

the Site Configurations block. For more information please refer to the [Site Settings](#).

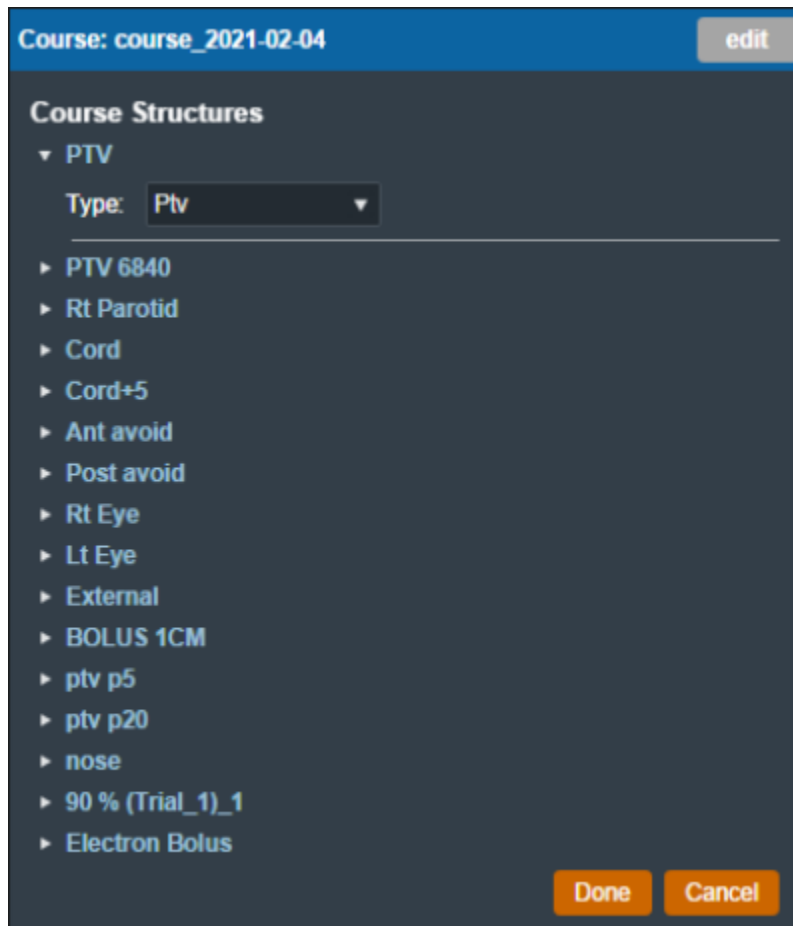


The screenshot shows a form for editing a course. At the top, it says "Course: course_2020-07-12" with an "edit" button. Below this, there are four fields: "Name:" with the value "course_2020-07-12", "Treatment Site:" with a dropdown menu showing "Head", "External Structure:" with a dropdown menu showing "External", and "Physician:" with a dropdown menu showing "DR James T. McKannon, esq".

Fig. 16: Course Example

Course Structures

Certain tasks within eRT require structures to be set to a specific type, and their type is set based on the DICOM RT ROI Interpreted Type (3006,00A4) tag during initial patient import. The Course Structures user interface allows users to change the type of each structure within the patient course.



The screenshot shows the "Course Structures" interface for course_2021-02-04. It has an "edit" button at the top right. Below the title "Course Structures", there is a "PTV" section with a "Type:" dropdown menu set to "Ptv". Below this is a list of structures with expandable arrows: PTV 6840, Rt Parotid, Cord, Cord+5, Ant avoid, Post avoid, Rt Eye, Lt Eye, External, BOLUS 1CM, ptv p5, ptv p20, nose, 90 % (Trial_1)_1, and Electron Bolus. At the bottom right, there are "Done" and "Cancel" buttons.

Fig. 17: Editing Course Structures

Note: The RT ROI Interpreted Type (3006,00A4) tag is optional in a DICOM RT Structure Set. As such, the structure type drop down may be empty if no structure type was specified in the imported DICOM files.

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Electron Treatment Plans

Once the patient has a course with a valid prescription, a plan can be created. When adding a new plan to a patient, the user will be prompted to add a name and an optional description for the plan.

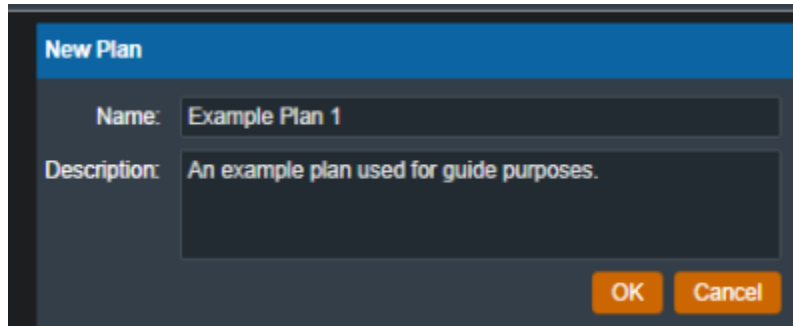


Fig. 18: Creating a Plan

From the Patient Overview, the user can choose to clone an existing plan. As the cloned plan will be a copy of the original plan (except for the plan name and if cloning an approved plan, the clone will be unapproved), the user should name the cloned plan appropriately to avoid confusion.

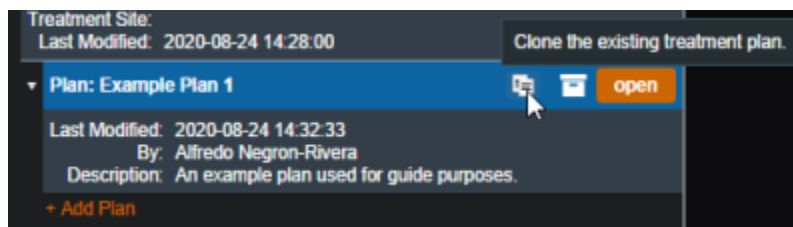


Fig. 19: Cloning a Plan

The user may also choose to make an existing plan inactive. Doing so will remove (hide) the plan from the Patient Overview. The user can view inactive plans and have the option to make them active again if they click the "Show Inactive Plans" check box.

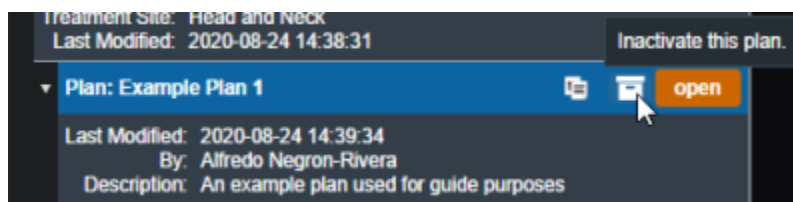


Fig. 20: Making a Plan Inactive

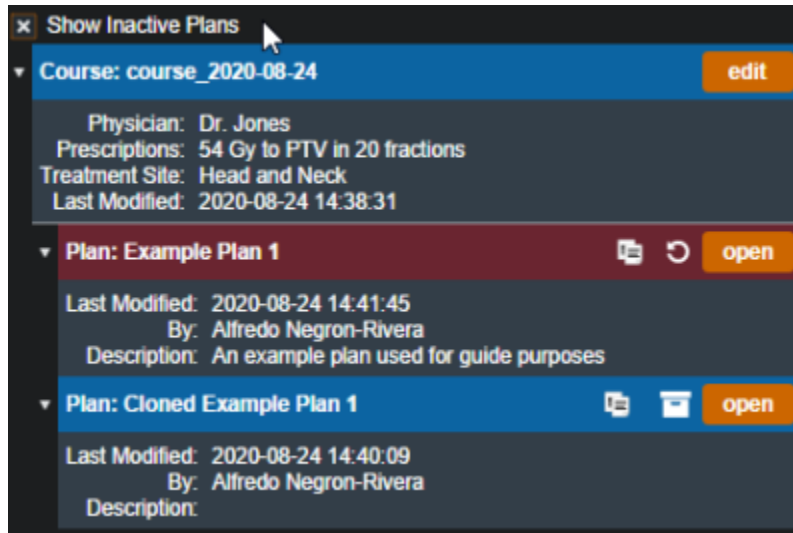


Fig. 21: Viewing Inactive Plans

Approved Plans

Refer to [Plan Approval](#) for information on approved plans.

Plan History

The plan history UI exists within the *General Info* block of the plan overview. This interface allows users to view the details of all changes to a treatment plan, view the plan as it was at the time of each revision (as read-only), and make any past revision “active” as the current revision (i.e. restore a plan to match the selected revision).

Refer to [figure 22](#) below for a detailed explanation for each of the Plan History features.

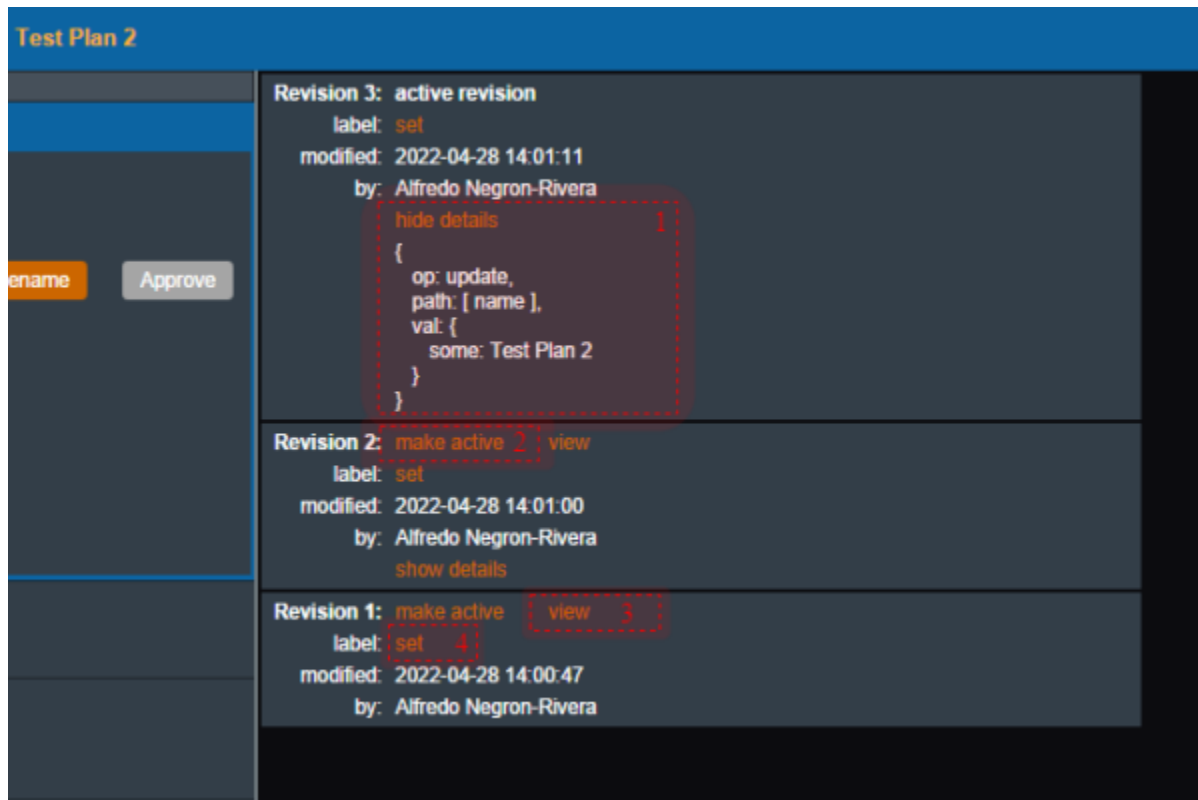


Fig. 22: Plan History

Plan History UI Explained

- [1] **Show/Hide Details**: Provides details of the changes for each revision. Currently the revision comparison shows a textual comparison between the selected revision and the immediately preceding revision.
 - For example: the details shown for Revision #3 tell us that the *Update* operation was performed on the variable *name* to the value *Test Plan2*. Or in other words, the plan's name was updated to 'Test Plan2'.
- [2] **Make Active**: Makes the desired selected revision the current active revision of this plan (i.e. reverts the plan to match this revision).
- [3] **View**: Opens the selected revision for review by the user in a read-only view mode.
- [4] **Set**: Sets the revision label to a user-provided value.

Imported Plans

After a DICOM plan is successfully imported, it will appear under the course containing the structure set that the plan is linked to it. The plan is marked as imported in the Patient Overview.

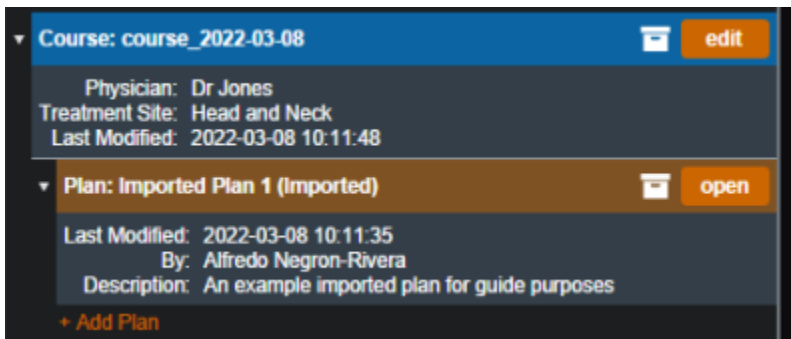


Fig. 23: Imported Plan in Patient Overview

When opening a newly imported plan, the user must first select the CT curve and treatment machine in order to view the imported plan overview.

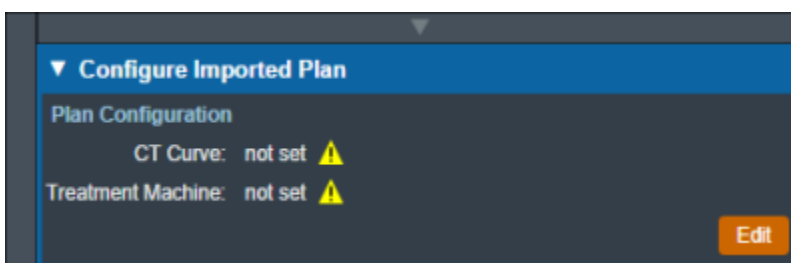


Fig. 24: Imported Plan Configuration

Unlike plans created in the decimal ElectronRT plan, users are limited in what they can do with imported plans. Users cannot add points, density overrides, or edit beams other than adding a [Structure as Bolus](#) into an imported plan. Users can [approve](#) imported plans and [order devices](#) from approved imported plans, but they cannot use QA Tools.

Packing and Exporting Plans

If a plan has to be sent to .decimal for the purpose of troubleshooting, the user is able to pack and export the plan into a zipped folder that can be imported into a different site while still using the data of the original site and machine. The Pack and Export Plan button found after expanding the Plan database info in the General Info block will generate the necessary zipped folder.

Only unapproved plans can be packed. If you require to pack and send .decimal an approved plan, please clone the plan and send the cloned unapproved plan to .decimal.

The resulting .zip file can be sent to .decimal to unpack and view your patient/plan to reproduce any application issues.

Note: The packed data does potentially contain PHI/PII so should only be sent to .decimal staff using secure file transfer services. The exported files are not encrypted (so that .decimal staff can re-import them), but are a non-human readable, proprietary compressed binary format.

▼ General Info

Plan Info

Plan name: Example Plan 1

Plan description:

Edit / Rename

Approve

History

Number of revisions: 3

Created by: Alfredo Negrón-Rivera

Creation Date: 2022-03-08 10:54:22

Last modified by: Alfredo Negrón-Rivera

Last modified date: 2022-03-08 10:55:03

▼ Plan database info

Patient ID: 1

Course ID: 3

Plan ID: 5

Pack and Export Plan

Fig. 25: Pack and Export Plan Option

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