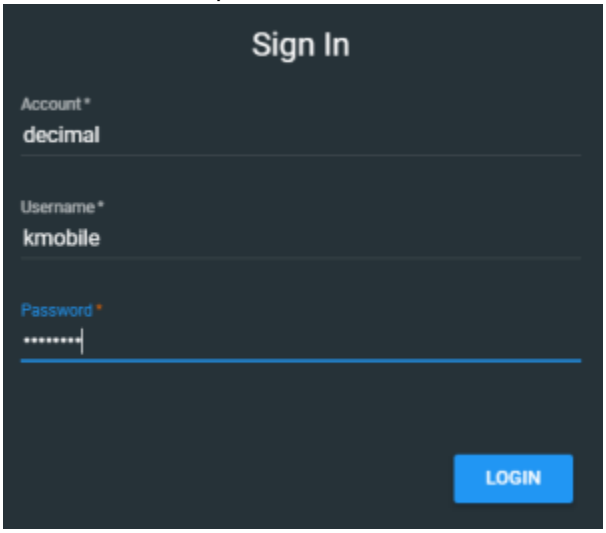
Tutorials

Launching Astroid

The Astroid *Launcher* will house the various applications that will be used as part of the Astroid Treatment Planning system. Any updates to these applications will automatically be deployed to the *Launcher*. The user will be notified that there is an update or a new version that will need installation once they have chosen an application. This will ensure that cloud version of Launcher and the local version of Launcher remain synchronized. Use the following steps to open the *Launcher* and launch the Astroid Planning App:

1. Open the *Launcher*

2. Sign in using your account, user name and password



3. Click the blue *Login* button
4. Select your realm from the list of available realms
5. From the left side tool bar select the application you would like to launch
6. Click the blue *Launch* button
    1. If there is an updated version of this application, the *Launch* button will not appear and instead an *Install* button will be available. Click this to allow the latest version to install. After the latest version is installed, the blue button will revert back to *Launch*, which you can now click
7. This will open the Astroid Planning application and bring you directly to the main patient search screen
8. You may now proceed with opening a current patient or importing a new patient

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Uploading DICOM Patient Files

The Astroid Planning App stores a list of DICOM files (only CT Image Set and Structure Set files are supported at this time) that are available and ready for Import. There are several approaches that can be used to upload DICOM files into this list.

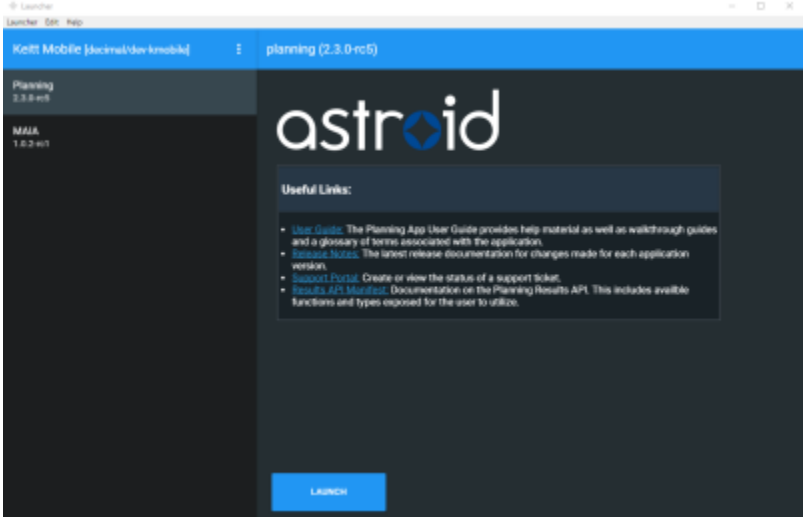
DICOM Receiver Service

For clinical users, a DICOM receiver is generally installed, allowing for direct exporting from contouring software or other planning systems for use within Astroid. In such cases, this DICOM receiver service will be pre-configured to upload the incoming files directly to Thinknode and will also create the records necessary for the DICOM files to be populated into the Astroid Planning App list of available Imports.

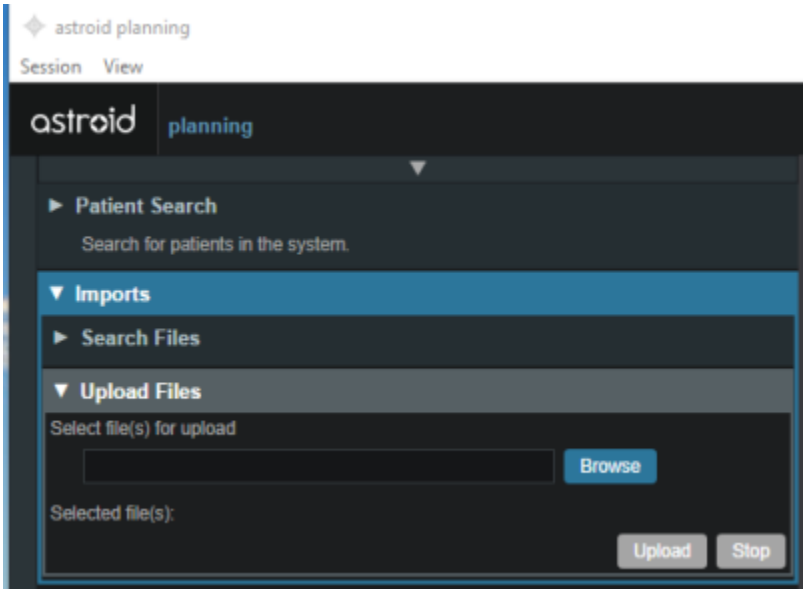
Uploading using the Planning App

DICOM files can also be uploaded directly from the Astroid Planning App. The steps below describe the process in detail.

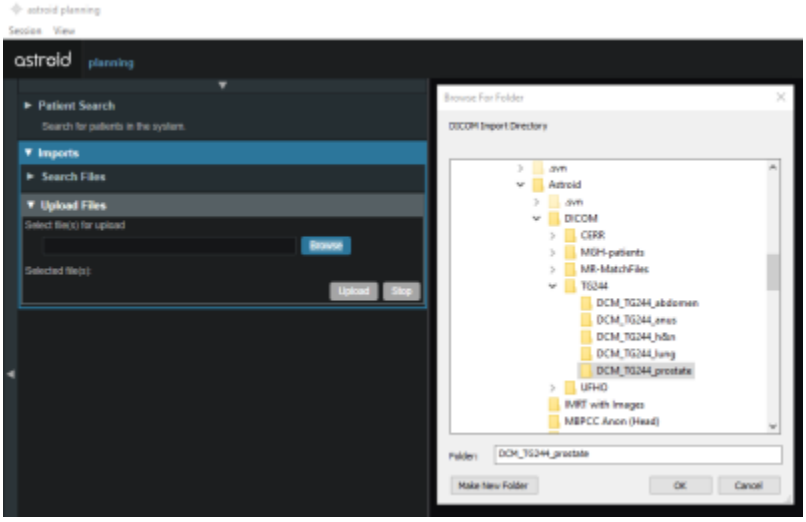
1. Open the Launcher and choose the appropriate realm and application to work in



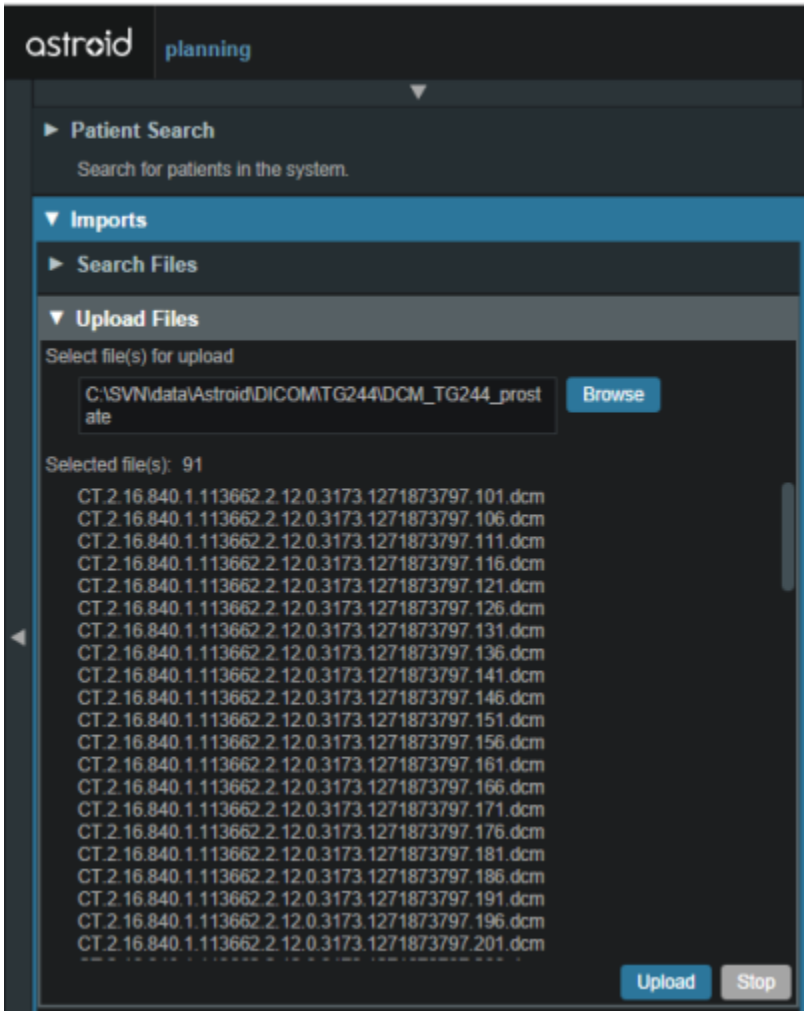
2. Choose the *Imports* block and click the blue Browse button in the *Upload Files* sub-block



3. Navigate to the directory where the DICOM image and structure set files are stored and click Ok



    1. All DICOM files found in the selected directory will populate in the list field
4. If the file list appears correct, click the blue Upload button in the bottom right corner to start the Upload
    1. This may take a couple of minutes to complete



5. Once the file(s) finished uploading they will appear in the list of available files, click back on the *Search Files* sub-block to return to the list of available files

Bulk Importing using Python

Note: This section requires the user to be familiar with python and the existing .decimal python libraries.

Importing a new patient into the Planning App requires taking a local DICOM directory and posting each of the files through the Dicom App utilizing Thinknode. Each DICOM patient is posted to the Thinknode ISS and an entry is then added to the thinknode RKS that allows the Planning App to see that a new patient has been added. The steps below explain how to upload patient DICOM files using the open source python Astroid Script Library.

1. From the .decimal GitHub repository open and edit the post_dicom_patient_rks.py python file.
2. Ensure the thinknode.cfg file is set appropriately for your user, account, and realm.
3. Edit the following line to point to the directory in which the DICOM patient files are located (note: all DICOM files in this directory will be uploaded):

```
# Post patient data into ISS
obj_list_id = dicom.make_dicom_object_from_dir(iam, 'F:/Datasets/demo-patient/prostate')
```

4. Run the script and allow the patient to upload to thinknode ISS. After the DICOM patient files are uploaded to ISS, an RKS entry will be created for the Planning App to recognize it as a DICOM file that is available for import.

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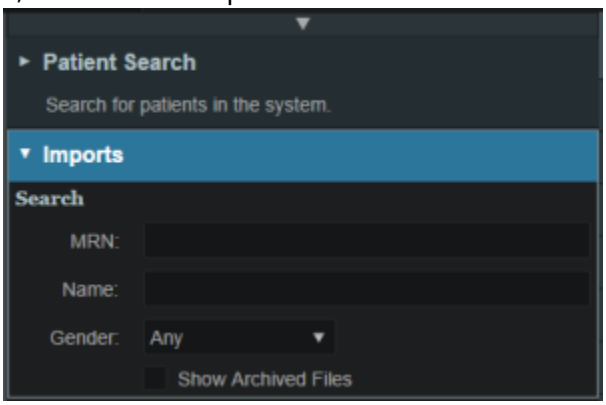
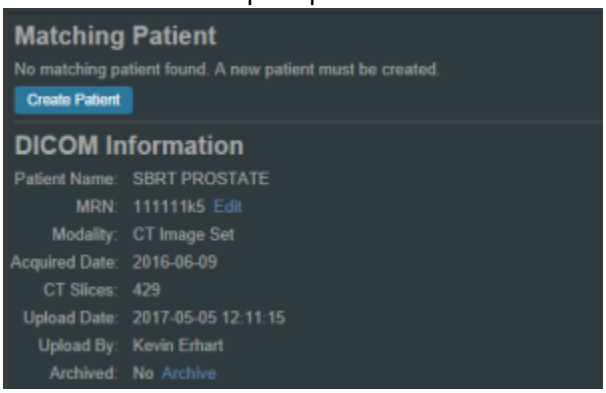
Importing Patient Data

Now that a patient has been uploaded from DICOM, the Planning App should recognize that new patient files are available to import into a Planning patient.

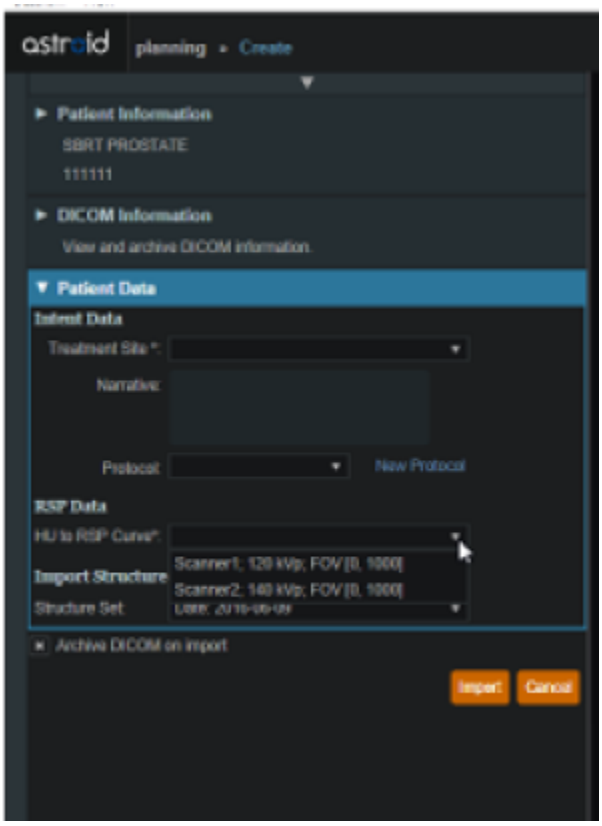
1. Open the Astroid Launcher and launch the Planning App from your realm
2. Once Astroid Planning starts, click on the Imports Block in the task control pane on the left side



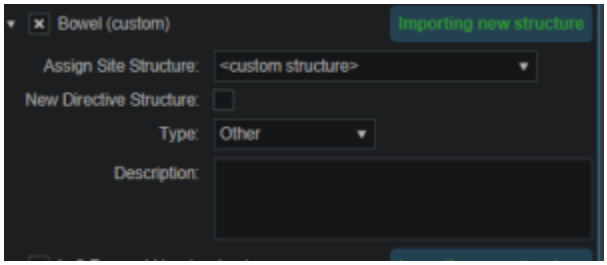
3. Select the CT image set from the list of available files for import
4. Ensure that the MRN is correct
5. Click the *Create Patient* button to start the import process



6. Ensure that the date and time displayed in Astroid matched the current date and time in the current Windows OS.
7. Fill in the requested Patient Intent, taking care to select the appropriate *Treatment Site* as this selection contains the template information that will be used during structure set import
8. Select the appropriate HU to RSP curve (as shown below)



9. The corresponding structure set (SS) file to import with these images will automatically be selected. The structures will show up below the Patient Data box in the Import structures box (note that the available choices will be automatically filtered based on the structure set DICOM UID information)
    1. The structures associated with the data set will be seen in a list of the available structures
    2. Here you may choose whether or not to import each structure by checking or unchecking the box beside each structure name
    3. Matched, Assigned, and Custom structures are designated with corresponding tags at the end of the structure name in the structure list
        1. You may only edit structures that are shown as *Custom*, which indicates the name did not exactly match a course structure from the *Treatment Site* template selected above
        2. For all custom structures, the type is by default set to the value from the DICOM file. If there is no type specified in the DICOM file the type will be set to “Other”, unless it contains the letters “TV” (as in PTV or CTV), in which case it is assigned the type of “Target”; the type may be changed here if needed
        3. Alternatively you may *Assign* a *Custom* structure to a course level template structure using the provided drop down menu (this is useful when structure names contain typos or contour names otherwise do not match your standard site protocols)
            1. Assigning a custom structure to a defined course structure will result in the imported structure inheriting all the predefined structure properties (e.g. name, type, color)



10. Once all structures have been selected, assigned, and edited as needed, click the *Import* button to create the patient and import the CT Images and Structures into it
11. The patient is now created and all available data has been imported
12. Click on the *Back to Import* button to return back to the *Imports* task

Structures in the Data Model

There are multiple levels that various structures can live at. Each level and structure type will effect how the structure will relate to the plan. Refer to the Structure Data Model Guide for more details.

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Courses

Overview

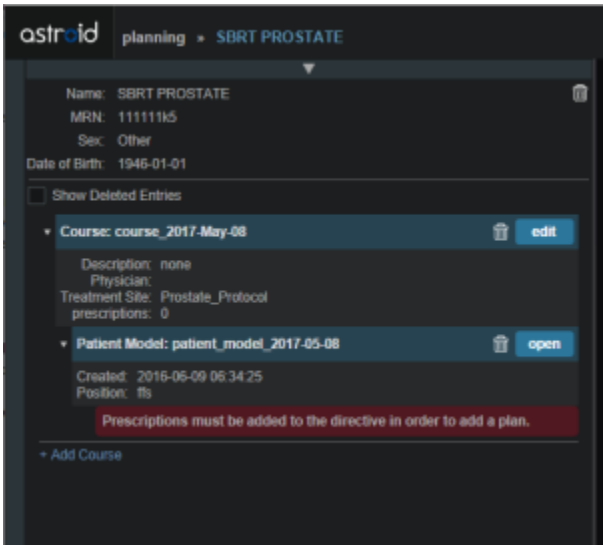
The Astroid patient data model uses a hierarchy of items to model the real world workflow patterns of the radiotherapy treatment process. Please refer to the **Heirarchy (Data Model) page** if you are not familiar with these concepts.

During patient creation (i.e. Importing) a patient record is created containing a *Course* and a *Patient Model*. During Import the required data for the Course and Patient Model are entered, however, the Course remains incomplete. The Course will still require physician directive information including the breakdown of the treatment *Prescriptions* and (optionally) the specification of *Clinical Goals*. Before creating a *Plan* this information must be entered. Once the Prescription is complete, plans can be created. The following sections provide a walk through for completing the *Course* information.

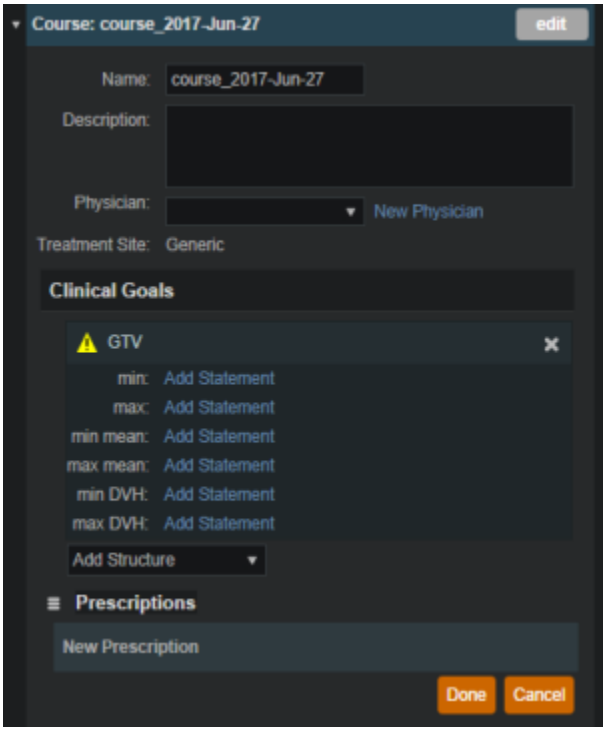
Prescriptions are cumulative. For example: when adding a second prescription, it is assumed that the highest dose from the first Rx has already been delivered to the target for the second prescription. Therefore, the total dose to all targets in the second prescription will have the first prescription's highest dose added.

Completing the Course Prescription

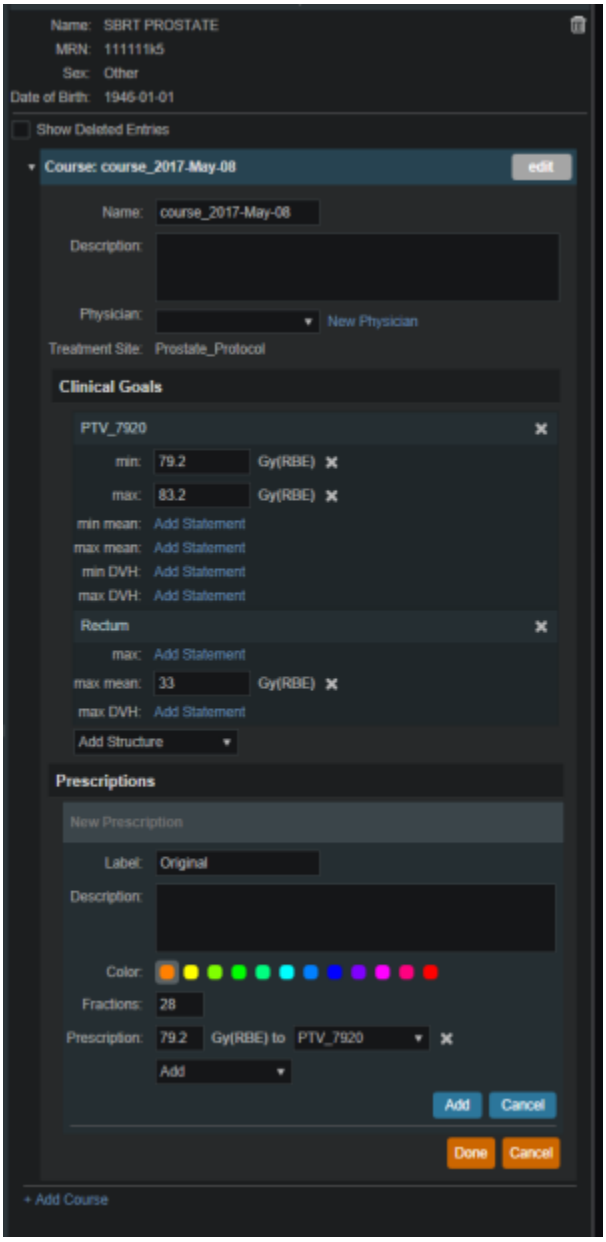
1. From the *Patient list*, select a patient to be opened by clicking the patient row
2. The patient will open to the *patient overview* task and a message will appear telling the user to complete the Prescription information



3. The Prescription information is part of the Course, which can be edited by clicking on the blue *edit* button beside the Course label in the patient overview
4. The *Course* Prescription information is **mandatory** to fill out in order to proceed with planning and at a minimum one Prescription must be created (Clinical Goals are optional)
5. The *Course* contains some basic information as well as two blocks of data: *Clinical Goals* and *Prescriptions*
6. *Clinical Goals* are used fill in the “goals” (objectives) the physician would like to see achieved by the plan
    1. To add a goal, simply select click *Add Structure* and select a desired structure (the choices in the structure drop down will be set by the treatment site template) to which goals should be added
    2. The user can create goals for tumor volumes as well as Organs at Risk (OAR) and can specify minimum dose, maximum dose, mean dose, and volume based (DVH) goal types
    3. The *Clinical Goals* will be used for reporting purposes to describe the physician's intent for the treatment; these do not affect the calculation or plan directly
7. The second major part of the *Course* are the *Prescriptions*
    1. This is where the user will fill in the number of fractions and the prescription dose that specified by the physician
    2. Note that a prescription **must** be created in order to start the planning process
8. Click *New Prescription* under *Prescriptions* to create a new empty phase
    1. The *Prescription* label and description are free text fields that the user can enter to help identify a particular phase as needed
        1. If the structure chosen is not contained within the patient model a yellow triangle will appear next to the structure chosen alerting the user



2. A color may be selected for the Phase to aid in identification as well
3. The number of fractions to be treated should entered and at least one *Prescription* value must be added (the choices available in the structure drop down will be only the targets from the selected treatment site template)



4. Once all Prescription information has been entered, click the blue *Add* button to complete the Prescription

9. Additional prescriptions may be added at this point if needed (for example, for a treatment needing a base treatment and a boost)
10. The *Course* should now be complete
    1. Click on the *Done* button to return back to the *Patient Overview*

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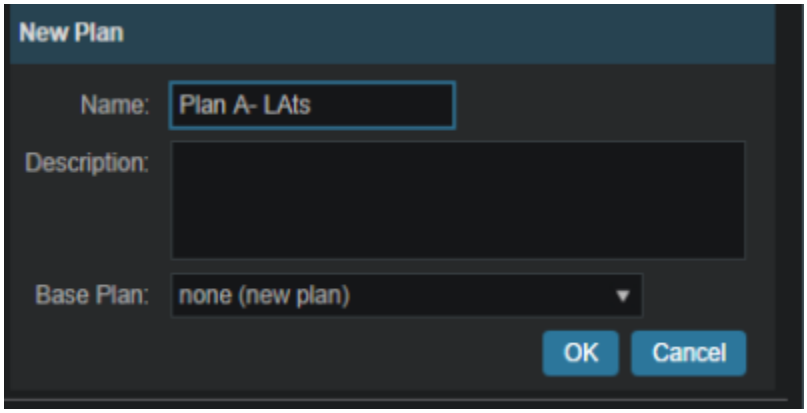
Creating a Plan

1. The point has now been reached where a *Plan* can be created
2. Click on the blue *Add Plan* link under the *Patient Model* to create a new plan
    1. In the box that opens the user should name the plan and add any description they may want



    2. Note that the *Base Plan* option is used to specify whether an empty plan should be created or if the new plan should be pre-filled using the selected *Plan Template* (details on *Plan Templates* can be found here)
    3. Click on the blue *OK* button when finished and the *Plan* has been created
3. Open the plan and begin the planning process by clicking on the blue *Open* button next to the new plan
    1. Note that users are free to have as many plans as desired within a the *Patient Model* and each Plan will specify which portion of the Course Prescriptions it is attempting to implement

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