

# Astroid Patient Data Model

The following page describes the hierarchy of data used to manage patient data records within the Astroid planning environment.

## Hierarchy

- Patient
    - Course [0,1,...,N]
      - Course data stuff here 
      - Intent [0,1,...,N]
        - Intent data stuff here 
        - Directive [0,1,...,N]
          - Clinical Goals
            - Clinical Goals data stuff here 
          - Phase
            - Prescription
              - Prescription data stuff here 
- Conceptual Structure List [0,1,...,N]
  - Conceptual Point List [0,1,...,N]
  - Snapshot [0,1,...,N]
    - Imaging Data
    - Structure Data [0,1,...,N]
      - Active Variant
        - The user has the ability to modify a DICOM structure in the contouring software, keeping the same original name, and bring it into ASTROID. This new structure will be a variant of the original structure. It will be given a label a, b, c, etc depending on the number of modifications. The user may also choose to give it a new color to distinguish from a previous variable.
        - The user has the ability to choose which variation they want to calculate to or they may choose a variant to visualize; such as in the case of a tumor shrinkage- i.e. the original tumor and tumor (variant a) is the tumor after "X"Gy. This allows the user to have multiple structures to easily switch between different variables for visualizations. This also for simplification of regarding the nomenclature of the specific volumes.
- Variant List [0,1,...,N]

- Request [0,1,...,N]
  - Plans [0,1,...,N]
    - Image Calibration
    - Points [0,1,...,N]
    - Structures [0,1,...,N]
    - Calculation Grid
    - Treatment Room
    - Beams [1,...,N]
      - Snout
      - Devices & Spot Options
      - DRRs
    - Fraction Groups [1,...,N]
      - Target
      - Constraint [0,1,...,N]
      - Target Dose Constraints [1,...,N]
        - Target
        - Constraint [0,1,...,N]
        - Beamset [1,...,N]
          - Constraint [0,1,...,N]
          - Beam [1,...,N]
    - Constraints [0,1,...,N]
    - Objectives [0,1,...,N]
    - Dose Results

## Descriptions

- **Patient:**
  - A person receiving medical treatment. A Patient record contains basic personal information and demographics, as well as any number of treatment Courses.
- **Course:**
  - A prescribed regimen to be followed to treat a specific disease occurrence for a specific period of time. A Course will contain the physician's Intent.
- **Intent:**
  - The physician's purpose for this Course of radiation treatment. An Intent contains information about any protocols this patient is under, as well information regarding the disease site (for both templating and billing purposes). An Intent can contain any number of Directives (although it's uncommon to have more than one).
- **Directive:**
  - The physician's orders for treating this course. A Directive contains information about the prescription, phases, and other clinical goals for the Course. A Directive also contains any number of Snapshots.
- **Snapshot:**
  - A description of the patient's anatomy. Contains a single CT image set and all structures (targets and organs at risk) associated with these images. A Snapshot can contain any number of associated Requests.
- **Request:**

- A message giving an alert that a Plan needs to be created. As DICOM Gen2 is finalized and implemented, a request can be implemented from many locations, including the TPS itself, a contouring program, or other workflow management software tools. The request will include the date of implementation and the number of fractions to be treated (can be all fractions or a specific number of fractions). Until DICOM Gen2 is widely supported, the Request will simply be a “click-through” in Astroid as it will be the treatment planner directly creating it.
- **Plan:**
  - A detailed model of a proton therapy treatment. Most aspects of the patient planning process take place here. A Plan should satisfy the Request and meet the prescription and goals laid out within the Directive in so much as is possible. Physicians will approve a Plan to indicate it is ready to proceed to QA and (if successful) on to actual patient treatment. There should be only one “approved” Plan per Request.

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