Instructions for Use

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 🔧Fix Me!
        - Intent [0,1,…,N]

            - Intent data stuff here 🔧Fix Me!
            - Directive [0,1,…,N]
                - Clinical Goals

                    - Clinical Goals data stuff here 🔧Fix Me!
                - Phase
                    - Prescription

                        - Prescription data stuff here 🔧Fix Me!
        - 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
                - A specific model of a target, OAR, or other structure. A physician may provide an initial target contour and a treatment plan generated using this information. The physician may later (using the same CT image set) provide a revised target contour. Rather than import this revision as a new structure or override the original, you may specify this new contour as a variant of the original. Each contour may have only a single "active" variant and the plan will automatically update based on the selection of the active variant. However, in some cases it is not desirable to update the plan, so the user may also choose to lock the plan and simply recompute DVH and other volume based statistics based on the new active variant

geometry. In either case, variants can be used to streamline workflows and prevent accidental misuse of out-dated contours.

- 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

- **<u>Patient</u>**:
  - A person receiving medical treatment. A Patient record contains basic personal information and demographics, as well as any number of treatment Courses.
  - This is where the patient name (prefix, given name, middle name, family name, suffix), medical record number (MRN#), sex (male, female, other, any) and date of birth (month, day, year) are stored.
- **<u>Course</u>**:
  - 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.
  - The user will label the Course of treatment and specify the physician of record. The user has the option of adding a description of the course of treatment.
- **<u>Intent</u>**:
  - 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, body system, and body part (for both templating and billing purposes). An Intent can contain any number of Directives (although it's uncommon to have more than one). The user will define

the type of treatment (curative, palliative, or prophylactic), as well as the treatment site at this level. A narrative of what the physician desires to achieve as a result of the course is also saved here.

- **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 contour variants (targets and organs at risk) associated with these images. A Snapshot can contain any number of associated Requests.
  - **Variant**:
    - A specific model of a target, OAR, or other structure. A physician may provide an initial target contour and a treatment plan generated using this information. The physician may later (using the same CT image set) provide a revised target contour. Rather than import this revision as a new structure or override the original, you may specify this new contour as a variant of the original. Each contour may have only a single "active" variant and the plan will automatically update based on the selection of the active variant. However, in some cases it is not desirable to update the plan, so the user may also choose to lock the plan and simply recompute DVH and other volume based statistics based on the new active variant geometry. In either case, variants can be used to streamline workflows and prevent accidental misuse of out-dated contours.
- **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.
  - A Request may contain many trial plans that each attempt to meet the requirements of the physician, but only one may be marked as "approved".
- **Plan**:
  - A detailed model of a proton therapy treatment. Most aspects of the patient planning information are stored here (e.g. Beams, Fraction Groups, Optimization Information, and Dose Results). 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.