## Behind the scenes

This section is written to help the reader understand how the program writes and maintains the information present. It is not recommended for the user to manually alter the files created without a high level of confidence. However, should issues arise, the program can be re-downloaded from the site.

### Creation of ROIs

Each ROI is saved as an individual text file, consisting of three lines. The first line is the RGB color which will be presented for the ROI in the treatment planning system/within the generated RT Structure file. The second line is the associated ontology, detailed below. The third line is the ROI Interpreted Type, as listed in the DICOM Standard Browser1. The Interpreted Type can be changed at any time within the template software, as shown in Figure 2 in the main document.

### Creation of Ontologies

DICOM RT Structures have Identification Code Sequences that relate a ROI with a name defined by the coding scheme. The code value is typically unambiguous code rather than natural language, e.g., ‘12738006’. The code meaning is text that is human interpretable. Detailed descriptions of each of these can be found in the DICOM Standard Browser for identification code2.

The sequence is defined by several items, including a code value, coding scheme designator, and code meaning. The coding scheme designator is a short string that relates the code value to a human interpretable value. A list of available code schemes can be found online3.

Any newly created ROI must have an associated ontology. These ROIs can be uploaded manually by including a Common Name, associated Code, and Code Scheme. For example, the ‘Brain’ in the Foundation Model of Anatomy (FMA)4 is defined as having a code value of 508015.

While all DICOM approved coding schemes will function within the program, the online templates are built around the Systemized Nomenclature of Medicine – Clinical Terms (SNOMED-CT) scheme, as is the recommended coding scheme of TG-263U1. The value for ‘Brain’ in SNOMED-CT is 12738006, as seen in Figure 1.

Graphical user interface

Description automatically generated

Figure 1: Demonstration of ontology for ‘Brain’. Based on the SNOMED-CT, the ‘Brain’ structure has a code value of 12738006.

When ontologies are not present, a newly created ROI will default to ‘Undefined Normal Tissue’, which is not an FMA ontology but instead a Varian Medical Systems code.

# References

1. RT ROI Interpreted Type Attribute – DICOM Standard Browser. Accessed February 9, 2023. https://dicom.innolitics.com/ciods/rt-structure-set/rt-roi-observations/30060080/300600a4

2. RT ROI Identification Code Sequence Attribute – DICOM Standard Browser. Accessed February 9, 2023. https://dicom.innolitics.com/ciods/rt-structure-set/rt-roi-observations/30060080/30060086

3. Nema D. Coding Schemes. Accessed February 9, 2023. https://dicom.nema.org/medical/dicom/current/output/chtml/part16/chapter\_8.html

4. Foundational Model of Anatomy - Summary | NCBO BioPortal. Accessed July 22, 2022. https://bioportal.bioontology.org/ontologies/FMA?p=summary

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