Nomenclature Guidelines for Treatment Planning: Regions of Interest

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This document describes the nomenclature to be adopted by the Radiation Medicine Program along with the introduction of the new treatment planning system, RayStation.

The nomenclature is divided into three sections:

I. Normal Tissues
II. Target Volumes (GTV, CTV, ITV and PTVs)
III. Non-Anatomical Structures and Planning Volumes

I. Normal Tissues

In an approved clinical plan, any region of interest (ROI) in the treatment planning system that is for a normal anatomical structure, should be named according to the following tables.

General Principles:

() Indicate mandatory components of an ROI name

[] Indicate optional components of an ROI name

General Format:

[Structure Type]_(Structure)_[Subcomponent]_[Position Descriptor]

*A structure type is required for certain types of structures

Structure Type Examples:

*A: Artery

*V: Vein

Musc: Muscle

Cartlg: Cartilage

Position Descriptors can include:

L: Left

R: Right

I: Inferior

M: Middle

S: Superior

P: Posterior

A: Anterior

Anatomical Structure	Plan Nomenclature
Anterior Chamber (Includes lens and vitreous canals) L/R	AntChamber_L
Adrenal Gland	Glnd_Adrenal
Aorta	A_Aorta
Bladder	Bladder
Bladder	Bladder_Wall
Bone	Bone
Bowel	SmallBowel
Bowel	LargeBowel
Bowel	Bowel
Brachial Plexus L/R	BrachialPlex_L
Brain	Brain
Brain	Hippocampus_L
Brainstem	Brainstem
Breast L/R	Breast_L
Bronchus	Bronchus
Carina	Carina
Cauda Equina	CaudaEquina
Carotid Artery L/R	A_Carotid_L
Chest WALL	Chestwall
Chiasm	Chiasm
Cochlea L/R	Cochlea_L
Common Bile Duct	CommonBileDuct
Duodenum	Duodenum
Esophagus	Esophagus
External Patient Contour	External
Eye L/R	Eye_L
Femur L	Femur_L
Gallbladder	Gallbladder
Genitals	Genitals
Globe L/R	Eye_L
Heart	Heart
Hippocampus	Hippocampus_L
Humerus	Humerus_L

Anatomical Structure	Plan Nomenclature
Inferior Vena Cava	V_Venacava_I
Inner Ear L/R	Ear_Internal_L
Kidney	Kidney_L
Kidney (Combined)	Kidneys
Lacrimal Gland L/R	Lacrimal_L
Larynx	Larynx
Lens L/R	Lens_L
Lips	Lips
Liver	Liver
Liver (non-GTV)	LiverMinusGTV
Liver Capsule (0.5 cc volume surrouding liver edge)	LiverCapsule
Lung L/R	Lung_L
Mandible	Mandible
Middle and inner ear L/R	Acoustic_L
Middle Ear L/R	Ear_Middle_L
Non-GTV Lung	LungsMinusGTV
Optic Nerve L/R	OpticNrv_L
Oral Cavity	OralCavity
Pancreas	Pancreas
Parametrium	Parametrium
Parotid Gland L/R	Parotid_L
Penile Bulb	PenileBulb
Penis	Penis
Pharyngeal constrictor muscle	Musc_Constrict
Pharyngeal constrictor muscle (inferior)	Musc_Constrict_I
Pharyngeal constrictor muscle (middle)	Musc_Constrict_M
Pharyngeal constrictor muscle (superior)	Musc_Constrict_S
Pituitary Gland	Pituitary
Postcricoid Pharynx	Cricoid
Prostate	Prostate

Anatomical Structure	Plan Nomenclature
Rectum	Rectum
Rectum	Rectal_Wall
Renal Hilum L/R	Kidney_Hilum_L
Renal Cortex L/R	Kidney_Cortex_L
Retina L/R	Retina_L
Ribs	Rib01_R
Sacrum	SacralPlex
Scrotum	Scrotum
Seminal vesicles	SeminalVes
Sigmoid	Colon_Sigmoid
Skin	Skin
Spinal Canal	SpinalCanal
Spinal Cord	SpinalCord
Spleen	Spleen
Stomach	Stomach
Submandibular Gland L/R	Submand_L
Superior Vena Cava	V_Venacava_S
Temporal Lobe	TemporalLobe
Testis (L/R)	Testis_L/R
Thecal Sac	ThecalSac
Thyroid	Thyroid
Thyroid Cartilage	Cartlg_Thyroid
Trachea	Trachea
Urethra	Urethra
Uterus	Uterus
Vagina	Vagina
VenaCava	V_VenaCava
Vertebra	VB_([C|T|L|S][1-12])

Planning Risk Volumes

Planning risk volumes may be created for planning purposes. The plan nomenclature should be used in the following format:

(ROI name)_PRV##

Where ## is the value in millimetres of the expansion used to create the planning risk volume.

Example:

SpinalCordPRV05: an expansion of the ROI SpinalCord by 5 mm.

II. Nomenclature for Target Volumes (GTV, CTV, ITV and PTVs)

Target nomenclature guidelines apply to any GTV, CTV, ITV and PTV generated in the planning process. A general formula has been generated as indicated below, with details on each element in the subsequent pages.

PTV Descriptor /Plan Identifer	Type of Target	Target Specifier	Numbering for spatially distinct targets	Designation of Imaging and Sequential Order	Target Structure Specifier			Total Prescription Dose in cGy
					Target Description	Laterality	Nodal Level Descriptor	
G	A	B	C	D	E1	E2	E3	F
	GTV							
	CTV							
	ITV							
	PTV							

Mandatory

Optional/Mandatory - Dependent Upon Type of Target and Protocol

Optional (*G for GTV and CTV is for specific use-case only)

Not Applicable

GTV: [G]_GTV(B)[C][_D][_E1][_E2|_E2_E3|E2E3]

CTV: [G]_CTV(B)[C][_D][_E1][_E2|_E2_E3|E2E3] _F

ITV: ITV(B)[C][_D][_E1][_E2|_E2_E3|E2E3] _F

PTV: [G]_PTV(B)[C][_D][_E1][_E2|_E2_E3|E2E3] _F

Details on the Elements of the Target Nomenclature

a. Type of Target (Element "A")

This element is mandatory and there are four options:

GTV: Gross Tumour Volume

CTV: Clinical Target Volume

ITV: Internal Target Volume

PTV: Planning Target Volume

b. Target Specifier (Element "B")

This element is mandatory and there are 3 options to identify the type of target:

- p: primary
- n: nodal
- m: metastases

Examples: GTVp to designate primary disease or GTVm to designate a GTV that is a metastasis.

c. Numbering for Spatially Distinct Targets (Element "C")

Arabic numerals are added immediately after the target specifier if there are two spatially distinct targets that are otherwise identified in the same manner.

Example: A palliative case treating a metastasis in a rib and a vertebral body, in the same CT scan or plan could be GTVm1 and GTVm2.

d. Designation of Imaging and Sequential Order (Element "D")

This component of the nomenclature is optional and will not be required in many scenarios due to the treatment planning architecture in which a single ROI can have multiple geometries associated with various image sets. In specific scenarios, a site group could use this element of the nomenclature if an ROI from a secondary dataset must be associated with the primary CT scan. These use cases should be documented in the planning protocol.

Examples: CTVp_MRI for a primary target defined using a magnetic resonance image or CTVp_CT2 for a primary defined on a second CT scan.

e. Structure Specifier (Element "E")

i. Target Description ("E1")

- Optional component of the nomenclature
- Use of this component is site dependent and acceptable names should be defined by individual site groups
- Some acceptable descriptors may be applicable to GTV and subsequent GTV and CTVs , while some may be applicable to CTV only
- Examples of acceptable E1 elements groups:
  - sb: surgical bed
  - Boost: boost
  - V: venous thrombosis
- Examples:
  - CTVn_SB_7000
  - GTVp_boost_5000

ii. Laterality (Or Position Indicator) ("E2")

- L: Left
- R: Right
- I: Inferior
- P: Posterior
- A: Anterior
- S: Superior
- M: Middle

iii. Nodal Level Descriptor ("E3")

- The definition of the nodal level descriptors is the responsibility of the site group if this is relevant to that site
- If the nodal level descriptor is used, the target specifier (element "B") must be "n"

f. Total Prescription Dose (Element "F")

- All CTV, ITV and PTV volumes must have the intended prescription dose added as the final element, after an underscore
- The total dose, expressed in centiGray will be included

g. PTV Descriptor or Plan Identifier (Element "G")

This is an optional tag that is used when modifications are made to the true PTV for specific reasons.

Element G Options	Description	Example
Eval	Indicates a PTV that has been modified by retracting the PTV volume from the patient external contour (or the contour encompassing the patient plus bolus) by 5 mm. This indicates a PTV that is intended to be used for the purposes of plan evaluation.	Eval_PTVm_2000
Opt	Indicates a PTV that has been modified to create a PTV that is to be used for treatment plan optimization. PTVs with this tag should NOT be used for evaluation purposes and are only intended as a tool for optimization.	Opt_PTVp_7800
Numerical Letter (e.g. A or B)	Indicates a GTV or CTV that had previously been used for planning purposes on the same image set. A re-plan is required but the original GTV or CTV that is being modified for the replan is copied and renamed with the prefix to identify the plan or beamset that it was linked to.	A_GTVp C_CTV_R2_7000

III. Nomenclature for Non-Anatomical Structures

A. Medical Devices or Non-Anatomical Regions of Interest

Device or Item	Nomenclature
Pacemaker	Pacemaker
Defibrillator	Defibrillator
Prosthesis	Prosthesis_(Anatomy)_(Laterality)
Hip Prosthesis	Prosthesis_Hip_L
Colostomy Bag	Bag_Ostomy or Ostomy_Bag
Markers	Markers
Leads	Leads
Wire	Wire
Surgical Clips	Clips
Foley Catheter	Foley
Stent	Stent
Left Ventricular Assist Device	LVAD
Anatomical Shield (e.g. Scrotal Shield)	Shield_(Anatomy) e.g. Shield_Scrotum
Stereotactic Frame	Frame
Fixation Device (e.g. eye fixation device)	Device_Eye
Region of Interest Generated from Isodose Line	IDL_#### (where #### is the dose used to create the ROI in cGy)
Contraction (by 5 mm) of the External Contour for Creation of Evaluation Structures	x_miniExternal

B. Density Overrides

A “fix” prefix should be applied to any contour that is intended to be used with a density override.

Please refer to the density override document (LINK) for information on density and material assignments for planning purposes.

Description of Density Override	Nomenclature
Override of artifacts surrounding dental amalgam (outside of the amalgam itself)	fixAmalgam
Override for bolus included at the time of planning, but not at the time of CT-simulation	fixBOLUSXX (where XX is the bolus thickness in mm)
Override for imaging contrast that was present at the time of simulation but will not be present at the time of treatment	fixContrast
A general override that could be applied to areas of artifact related, for example, to a prosthesis. This is applied outside of the prosthesis to correct streaking artifacts.	fixArtifact
Override air (such as gas in bowel) that would not be expected to be present at the time of treatment.	fixAir
Override that is used to account for anatomy that will not be in the same location at the time of delivery. Example is an arm that will be moved into a different position.	fix(Anatomy)
Override that is used on a metallic prosthesis.	fixProsthesis_(Anatomy)_(Laterality)

C. Additional nomenclature for optimization, planning or evaluation

The prefixes and suffixes that are included in the table before should be used for any non-target and non-anatomical structure that is in the plan and is used for optimization, planning or evaluation process.

The "x" prefix is mandatory for any structures that are not targets, normal anatomy or specifically identified previously in this document.

Additional prefixes are recommended in combination with the "x" prefix as detailed in the table below. Please refer to site-specific planning protocols for further instructions.

Nomenclature	Type	Description of Use	Example
x	**prefix**	**Optimization prefix. This prefix is used for any structure that is used in the optimization/planning process. "x" can also be used in combination with other prefixes, if further description of the type of volume is desired, but the "x" will always be first.**	**xRing**
ref	prefix	Reference prefix. This prefix is used to identify a contour that the radiation oncologist may have used as reference at some point in the planning process, but is not intended to be an explicit target for treatment.	refEdema refNode
lim	prefix	Applied as a prefix for structures that will be used in the optimization process to limit dose to a specific region.	x_limAnterior
_####	suffix	#### is the dose value in cGy. Often used in conjunction with one of the prefixes or with non-anatomical contours such as isodose lines.	IDL_4000 x_limPostNeck_2000

in	prefix	Applied as a prefix for normal tissue contours that partially overlaps with a target volume and defines the portion that is inside the target volume. An optional suffix can also be used to identify a partial volume that is inside a specific dose level, where the suffix is #### with the target dose specified in cGy. Format: xin(Anatomy)(_Laterality)(_####)	x_inParotid_L x_inParotid_L_6300 x_inMandible_7000
out	prefix	Applied as a prefix for normal tissue contours that partially overlaps with a target volume and defines the portion that is outside of the target volume.	x_outLiver
fix	prefix	Prefix used to identify any contours with a density or material override	fixAmalgam
Eval	prefix	Prefix that can be used to identify a structure that is used in the evaluation of the plan, following a site-specific protocol.	
Prefix for filter for imaging??		Prefix applied to enable limited export/import of contours for image guidance purpose	