

A common nomenclature for radiotherapy parameters for efficient database handling

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Background I

- Local databases with detailed RT-information - generated by treatment planning systems (TPS), oncology information systems (OIS) etc
- Medical records with some RT-information
- National quality registries with very limited RT-information (INCA **IN**formation network for **CA**ncer care)
- Evaluation depends largely on existing tools in the TPS, OIS and a lot of manual work
- Access to structured RT-databases containing relevant quality parameters is necessary for efficient research, clinical evaluation and reporting

Background II

- RT-database project in Umeå (MIQA)
- Cooperation within U-CAN (Uppsala-Umeå Comprehensive Cancer Consortium)
- Regulations from SSM (Swedish Radiation Safety Authority) require clinical evaluation and reporting
- SSM support from 2012 for a project carried out in Uppsala and Umeå
- Vinnova support from 2012 for the project as part of a larger project (Testbädd för innovativ strålbehandling)

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Project goals:

- To create local infrastructures and local databases which can serve as tools for efficient research, evaluation and reporting
- To create tools and systems for linking local databases to a national quality registry so that the registry can be updated continuously
- To create a common, Swedish naming convention for RT-information adapted to current national and international standards
- To identify a basic set of RT-parameters which can be imported from the local databases into a national quality registry, INCA.

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RT-information in the national quality registry INCA

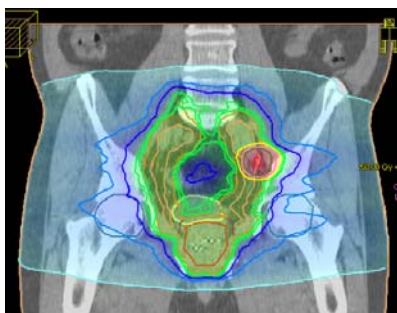
Breast cancer			
Target volume		Dose	
Breast/thoracic wall	Yes/No	Total dose excl boost	Gy
Axillary lymph nodes	Yes/No	Boost therapy	Yes/No
Supraclavicular lymph nodes	Yes/No	Boost dose	Gy
Parasternal lymph nodes	Yes/No		

Bladder cancer	
Radiotherapy	Yes/No

Prostate cancer			
Target volume		Dose	
Vesicles	Yes/No	Total dose	Gy
Lymph nodes	Yes/No	Dose/fraction	Gy
Boost therapy	Yes/No	Treatment technique	

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Primary aim with the database project



Summarize the information in terms of key numbers

For example:

- Dose to different risk organs
- Dose to target
- Number of fractions
- Dates for treatment start & stop
- GTV/CTV/PTV volumes



National quality registry (INCA)

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The proposed standard naming convention is based on:

Santanam *et al.*, Standardizing Naming conventions in Radiation Oncology, IJROBP, 83(4): 1344-1349, 2012 for **RISK ORGANS**

ICRU Report 83, 2010: Prescribing, Recording, and Reporting Intensity-Modulated Photon-Beam Therapy (IMRT) for **TARGET VOLUMES**

ICD-10 diagnose code standard

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Standard names	Description	Standard names	Description
AnalCanal	Anal Canal	Esophagus_Middle	Middle Esophagus
A_Pulmonary	Pulmonary Artery	External	Skin
A_Carotid	Carotid Artery	Eye	Eye
A_Brachiocephali	Brachiocephalic Artery	Femur	Femur
A_Coronary	Coronary Artery	FemoralJoint	Femoral Joint
A_Subclavicular	Subclavicular Artery	FrontalLobe	Frontal Lobe
A_Hypophyscal	Hypophyscal Artery	GHJoint	Glenohumeral Joint
Aorta	Aorta	Globe	Eye Globe
AnalSphincter	Anal Sphincter	Glottis	Glottis
Atrium	Atrium	GreatVessel	Great Vessel
Bladder	Bladder	Heart	Heart
BladderWall	Bladder Wall	Hippocampus	Hippocampus
BrachialPlexus	Brachial Plexus	Hypothalamus	Hypothalamus
Brain	Brain	Kidney	Kidney
BrainStem	Brain Stem	LargeBowel	Large Bowel
Breast	Breast	Larynx	Larynx
BronchialTree	Bronchial Tree	LacrimalGland	Lacrimal Gland
BaseOfTongue	Base of Tongue	Lens	Eye Lens
Carina	Carina	Lips	Lips
CaudaEquina	Cauda Equina	Liver	Liver
Cerebellum	Cerebellum	Lung	Lung
Cerebrum	Cerebrum	Mandible	Mandible
Chiasm	Optic Chiasm	MassMuscle	Masseter Muscle
CN_VII	Seventh Cranial Nerve	Mediastinum	Mediastinum
CN_VIII	Eighth Cranial Nerve	MainBronchus	Main Bronchus
Cervix	Cervix	OccipitalLobe	Occipital Lobe
Cochlea	Cochlea	OpticNerve	Optic Nerve
Colon	Colon	OralCavity	Oral Cavity
ConstrMuscle	Constrictor Muscle	Ovary	Ovary
Cornea	Cornea	Parametrium	Parametrium
Duodenum	Duodenum	ParietalLobe	Parietal Lobe
Ear_Middle	Middle Ear	Pancreas	Pancreas
Ear_External	External Ear	Parotid	Parotid
Esophagus	Esophagus	PelvicBones	Pelvic Bones
Esophagus_Upper	Upper Esophagus	PenileBulb	Penile Bulb
Esophagus_Lower	Lower Esophagus	Penis	Penis

Santanam et al. Standardizing Naming conventions in Radiation Oncology, IJROBP, 83(4): 1344-1349, 2012

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Standard names	Description
Perineum	Perineum
Pericardium	Pericardium
Pharynx	Pharynx
PharynxConst	Pharyngeal Constrictor
Pituitary	Pituitary
Prostate	Prostate
PubicSymphysis	Pubic Symphysis
Rectum	Rectum
RectalWall	Rectal Wall
Retina	Retina
Rib	Rib
Sacrum	Sacrum
SalivaryGland	Salivary Glands
SeminalVesicle	Seminal Vesicle
SmallBowel	Small Bowel
SpinalCord	Spinal Cord
Spleen	Spleen
Stomach	Stomach
Submandibular	Submandibular Gland
Supertentorial	Supertentorial
TemporalLobe	Temporal Lobe
Testis	Testis
Thyroid	Thyroid
TMJoint	Temporomandibular Joint
Trachea	Trachea
Tongue	Tongue
Urethra	Urethra
Uterus	Uterus
V_Azygos	Azygos Vein
V_CavaInferior	Inferior vena cava
V_CavaSuperior	Superior vena cava
V_Pulmonary	Pulmonary Vein
V_SubClav	SubClavicular Vein
Vagina	Vagina
VB_Cervical	Cervical Vertebrae
VB_Thoracic	Thoracic Vertebrae
VB_Lumbar	Lumbar Vertebrae
VB_Sacrum	Sacrum Vertebrae
Ventricle	Ventricle
Vessels	Vessels
Vulva	Vulva

Bold-faced names are new and have been added to the existing Advanced Technology Consortium list of structure names.

Structure names added to Santanam et al by Umeå & Uppsala

Parotid_L Parotid_R
 Submandibular_L Submandibular_R
 Cochlea_L Cochlea_R
 Lung_L Lung_R
 Lung_total
 FemoralHead_L FemoralHead_R
 Lens_L Lens_R
 OpticNerve_L OpticNerve_R
 Hippocampus_L Hippocampus_R
 Retina_L Retina_R
 Kidney_L Kidney_R
 Eye_L Eye_R

And more to come...

Some variations can be tolerated via mapping of alias, for example

"Body" can be mapped to "External"

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NAMING OF TARGET VOLUMES based on ICRU 83

Name	Type	Comment
GTV	Single/primary	
GTVT1	Multiple/primary	T1, T2 etc
GTVN1	Multiple/node	N1, N2 etc Not the TNM classification!
CTV	Single/primary	With addition _xx for dose
CTVT1	Multiple/primary	T1, T2 etc _xx = dos and _R & _L = right & left side
CTVN1	Multiple/node	N1,N2 etc _xx = dose
PTV_xx	Single/primary	xx=dose
PTVT1_xx	Multiple/primary	T1, T2 etc xx=dose
PTVN1_xx	Multiple/node	N1, N2 etc xx=dose

After the standard name additional information can be given within brackets:

CTVN1_R_50 (PET verified) means right hand side PET verified lymph node receiving 50 Gy.

Standard naming convention tested in three university hospitals: Umeå, Uppsala and Örebro

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Other items for standardisation

Treatment localisation (behandlingsområde):

Brain, thorax, pelvis etc

Colours of structures and target volumes in TPS

PRV and ITV

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Goals for the common nomenclature

The nomenclature will now be sent for comments to a number of Swedish clinics

A first version of the common nomenclature will be ready by January 2014

A common nomenclature is essential for the Skandion proton therapy project

The common nomenclature is accepted in all Swedish RT-clinics

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Thank you!

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