ISRS

International Stereotactic Radiosurgery Society

THE MINIMUM STANDARDS FOR STEREOTACTIC BODY RADIOTHERAPY CERTIFICATION

The intent of this document is to assist institutions who want to start the process of certification offered by ISRS. It illustrates minimum standards, whose compliance is the first step along the certification path.

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STANDARDS COMPLIANCE:

MANDATORY: An absolute requirement for certification.
STRONGLY RECOMMENDED: Failure to comply does not necessarily mean that certification won't be granted but will need individual assessment by the auditing team and expert group.
RECOMMENDED: A recommendation for centres striving to deliver the very best SBRT service.

	FIELD OF APPLICATION	CRITERIA FOR COMPLIANCE	REQUIREMENT
STAFFING	Staffing levels	The following specialists should be integral members of the SBRT team OR available for consultation: • Radiation Oncologist, • Medical Physicist • Medical Dosimetrist* • Radiation Technologist* • Radiologist • Nurse Staffing levels should be proportional to the number and types of patients treated. *For countries where the profession of Radiation Technologists/Radiographers is established.	**MANDATORY**
		• There is an experienced SBRT-trained medical physicist present during clinical treatments • Organizational diagram summarizing responsibilities and reporting lines present • Job descriptions present for all staff involved in SBRT	**MANDATORY**
		• A radiation oncologist is present at the beginning of the first clinical treatment and online as a minimum thereafter. • A radiation oncologist is present for all adaptive SBRT treatments	**STRONGLY RECOMMENDED**
	Specialists	• Physicians, that are specialists in the specific sites treated (eg. neurosurgeons for spine, thoracic surgeons for lung, urologists for prostate etc.), are encouraged to contribute their expertise in anatomy and knowledge of the risk/benefit of alternative treatments.	**STRONGLY RECOMMENDED**
	Training	• Staff should have documented evidence that they have received specific SBRT training • Appropriate training is gained prior to treatment to a new SBRT site is expected. This should include imaging, contouring, planning, QA and treatment delivery • Staff should have access to continual SBRT specific education on at least a 2-yearly basis	**STRONGLY RECOMMENDED**
FACILITIES AND EQUIPMENT	Imaging	• CT images with appropriate slice thickness are used for planning (see Table 1) • PET CT and/or MRI imaging are available in addition to planning CT • An appropriate motion management strategy is implemented. This is applied for clinical sites subject to respiratory motion	**MANDATORY**
		• There is an established quality assurance procedure for checking the image quality for in-room image guidance and CT/4D CT • If appropriate, an indexed radiotherapy couch-top is available for CT and MRI scanners. • There is an established quality assurance procedure for checking geometrical distortion in MRI or a patient-specific method for verifying MR distortion.	**STRONGLY RECOMMENDED**
	Treatment planning	• Target delineation is practiced for all solid targets • Careful evaluation of all treatment uncertainties should be performed prior the start of the SBRT program in order to define the CTV-PTV margin for each clinical site • Target expansion, using an appropriate motion encompassing technique is performed for respiratory motion unless eg. A breath-hold or gating technique is implemented. • OARs at risk of receiving their respective tolerance dose are delineated using an appropriate imaging modality and according to national/international guideline(s)/standards • OAR – Planning Risk Volume margins appropriate for departmental SBRT practice are made. • A CCC, AAA or Monte Carlo algorithm is used for SBRT plan calculations in areas of heterogeneity • Dose grid resolution for both dose plan and DVH calculation is ≤2 mm	**MANDATORY**
		• Treatment planning creates plans with adequate conformity * • Treatment plans are created with adequate gradient* *Plans must be evaluated and meet at least tolerance levels specified in the tables 6.1-6.3 of the UK SABR Consortium Guidelines • Treatment plans are created with adequate target inhomogeneity (max dose ≥110% of prescription dose) • A radiologist should be available for contouring consultation, if needed • For centres that treat a limited range of indications, certification can be applied for the specific indications treated.	**STRONGLY RECOMMENDED**
	Record and Verify	There is an R&V system documenting delivered treatments	**MANDATORY**
	Dose prescription	• A reference document of fraction schemes and dose ranges is in accordance with literature for different pathologies. If applicable, these are based on national or international guidelines	**MANDATORY**

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	• The treatment course, including the dose schedule, normal tissue constraints, and, if applicable, CTV/ITV and PTV margins, and IGRT instructions and tolerances, is clearly documented within the prescription • For hypofractionation, the treatment course is completed within eight fractions. • Dose reporting is standardized (eg. ICRU 91 or equivalent)	
Technical specifications	• MLC width at isocenter is ≤ 10mm • The minimum commissioned field size is ≤ 10mm • The centre has documented evidence to demonstrate that submillimetre and sub-degree geometric accuracy is achieved for stationary targets in all 6 dimensions. • An immobilization system is employed. • Pre-treatment image guidance/verification is performed • A program for interfraction motion management (including organ filling etc) is used eg. breath hold/target tracking	**STRONGLY RECOMMENDED**
	• A 6DoF treatment couch is used	**STRONGLY RECOMMENDED**
Multidisciplinary working	• Treatment plan approval involves more than one member of staff.	**MANDATORY**

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PATIENT	Patient Selection	Patients are discussed prior to treatment at a multidisciplinary tumour board meeting	**STRONGLY RECOMMENDED**
	Minimum numbers	• ≥ 25 SBRT treatments are delivered over the year • For each treatment site, certification requires ≥10 treatments per year	**STRONGLY RECOMMENDED**
	Follow up	• Patients are routinely followed up • Patient data including follow up and complications are routinely stored in a clinical database and reviewed at a multi-disciplinary meeting if needed.	**RECOMMENDED**
PHYSICS QUALITY CHECKS	QA Equipment	• A chamber for absolute dose calibration is available with a valid calibration certificate traceable to a national standard laboratory in conformance with local regulation • One or more detectors appropriate for small field dosimetry are available • If active motion management is used, a motion phantom is available	**MANDATORY**
	Frequency	• Treatment unit output constancy measurements for linacs are performed daily. • Independent treatment plan specific QA is available and performed for SBRT treatments. Eg. Independent MU calculation and/or patient specific QA measurements • A timeout is performed prior to initiating treatment • Radiation versus mechanical isocentre/beam position tests are performed on a planned and systematic basis (Recommended on a daily basis, mandatory on a monthly basis) • The imaging isocenter is verified to match the treatment isocenter on a daily basis (if applicable). • If surface guidance is used a QA programme, tailored for SGRT, is performed on a regular basis End-to-end tests are performed on a regular basis (eg. for lung SBRT a moving phantom E2E test is employed)	**MANDATORY**
		• The commissioning/acceptance of the treatment platform has been documented. • The TPS calculation model is validated (this may include a standard beam model and a small-field beam model) for SBRT planning. • The SBRT equipment has undergone an independent dosimetrical audit for SBRT related treatments (For new centres the audit performed at the ISRS certification visit can be used) • The co-registration algorithm (rigid or deformable) for fusion of different imaging modalities, is checked for accuracy prior to clinical use	**STRONGLY RECOMMENDED**
	ISRS dosimetrical audit	For the ISRS independent dosimetrical audit: • Dosimetric accuracy must be achieved within 3% if measured with a chamber or 5% is measured with OSLDs • A Gamma criteria of 3%/2mm local, with 20% of max thresholds: Both criteria ≥ 95 % Pass Both criteria ≥ 90 % needs improvement Either criteria < 90 % Fail	**STRONGLY RECOMMENDED**
QUALITY SYSTEM	Procedures and Protocols	• A QA programme, dedicated to SBRT procedures and protocols is in place • For linac platform QA, AAPM Task Group 142 SRS/SBRT or similar tolerance levels should be followed. • There is a written procedure for plan checking • There is a written procedure for treatment for the main disease indications available • There is a written procedure for Quality Assurance checks • A log of all system services, failures, errors, changes, and upgrades is maintained • There is a written list of dose tolerances • There is a written schedule of QA checks • Procedures are reviewed on a yearly basis	**STRONGLY RECOMMENDED**
	Quality and event reporting	• The centre has an established Quality Program (policies and procedures) • There is a culture of open communication. • Events are reported and remedial action is taken when needed	**MANDATORY**
		• There is a Quality Management Team that has regular documented meetings • Clinical peer review is performed • Quality management meetings are regularly held • Audits are routinely performed to improve departmental processes	**STRONGLY RECOMMENDED**

Table 1. Imaging and motion management techniques and tolerances

Site	Imaging for planning	Slice thickness	Interfraction management	Intrafraction management tolerance	Intrafraction management
Spine	MR & CT	<2mm	CBCT/IGRT	1.0mm	CBCT/IGRT intrafraction + SGRT
Lung	4DCT/PET	≤3mm	4DCBCT/IGRT	3.0mm	SGRT/IGRT
Prostate	MR & CT	≤3mm	CBCT/IGRT	3.0mm	CBCT/IGRT intrafraction + SGRT
Liver	MR/4DCT/PET	≤3mm	4DCBCT/IGRT	3.0mm	SGRT/IGRT
Pancreas	CT/PET	≤3mm	CBCT/IGRT	3.0mm	SGRT/IGRT
Abdominal lymph nodes	MR/CT/PET	≤3mm	CBCT/IGRT	3.0mm	SGRT/IGRT
Bone Metastases	CT/PET	≤3mm	CBCT/IGRT	1.5mm	SGRT/IGRT

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