



QARC Questionnaire for Stereotactic Radiosurgery (SRS) with a Gamma Knife

Return the completed form to: QARC
Suite 201
640 George Washington Highway
Lincoln, RI 02865-4207

This questionnaire, with the requested information, must be submitted to QARC before patients can be placed on a stereotactic protocol. The data will be used by QARC in the review and verification of protocol treatments.

Check the applicable boxes and write in the requested information. Wherever it says "Describe", you may submit a published paper, an internal report, the vendor's descriptive literature, or provide a short description. Use additional pages, if necessary.

Please complete a sample RS-1 patient dosimetry summary form for a non-protocol patient treated in your institution.

If you have questions, please call the QARC Protocol Dosimetrist at 401-753-7600 or fax 401-753-7601 or email Physics@QARC.org.

I. General

Institution _____

Physicist who can answer questions about dosimetry, quality assurance, and dose calculations for stereotactic irradiation:

Name _____ Telephone _____

Address _____ Fax _____

Email _____

Will you treat pediatric patients? Yes No

If yes, will you routinely anesthetize pediatric patients during the radiosurgery procedure?

Yes No

If yes, please include a letter documenting the method of anesthesia that will be employed during the procedure.

How long has your institution been performing SRS? _____

Number of SRS cases treated at your institution in the past six months: _____

III. Dose Calculations

A. Please describe the calibration procedure used for this unit when new sources are installed.

B. What routine calibration checks do you perform? _____

C. How frequently? _____

IV. Quality Assurance

A. Techniques to verify patient position

Describe: _____

B. Techniques to verify source "ON/ OFF" accuracy

Describe: _____

C. Techniques to verify the dose distribution

Frequency: Annually Periodically

Describe: _____

D. When the Co-60 source is changed, what QA procedures do you follow, in addition to the calibration procedure described in IIIA?

Describe: _____

E. How do you verify the dose? _____



QARC Questionnaire for Stereotactic Radiosurgery (SRS) with a Linear Accelerator

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I. General

Institution _____

Physicist who can answer questions about dosimetry, quality assurance, and dose calculations for stereotactic irradiation:

Name _____ Telephone _____

Address _____ Fax _____

Email _____

Will you treat pediatric patients? Yes No

If yes, will you routinely anesthetize pediatric patients during the radiosurgery procedure?
Yes No

If yes, please include a letter documenting the method of anesthesia that will be employed during the procedure.

How long has your institution been performing SRS? _____

Number of SRS cases treated at your institution in the past six months _____

II. Equipment

A. Treatment unit used for stereotactic irradiation:

Manufacturer, model _____

Nominal beam energy _____ MV. Source- isocenter distance _____ cm.

Variation of isocenter over the range of gantry angles and couch rotations employed is _____ mm.

Describe how this is determined (e.g. "beam spots"). How frequently is this determined?

The calibration of this unit is routinely verified by the RPC (mailed TLD's) Yes No

Most recent date: _____

B. Head-frame

Commercial system, manufacturer, model: _____

System not commercially available. Describe: _____

C. Fixation system (i.e., head-frame to isocenter or treatment couch, if applicable)

Commercial system, manufacturer: _____

System not commercially available. Describe: _____

D. Treatment planning system

Commercial system, manufacturer, model: _____

System not commercially available. Who developed it? _____

Describe the procedure used to define the target volume in three dimensions (using CT, MRI, or other).

Can your system accommodate more than one isocenter? Yes No

If yes, how many? _____

Can the system provide isodoses in three orthogonal planes? Yes No

Can the system generate dose-volume histograms for target volume? Yes No
for volumes of interest? Yes No

Can the system perform image fusion? Yes No

Is image fusion routinely used for your SRS treatments? Yes No

What image set is routinely used for definition of target volumes and normal tissues?

CT MR Fused (i. e. both)

What image set is routinely used for dose calculation? CT MR

III. Data for dose calculations

A. Beam monitor units (MU)

For this accelerator, 1 MU = _____ cGy...

... to water or muscle, at _____ cm distance from the nominal source (s)
(distance = SSD + depth), at _____ cm depth in water with _____ cm X _____ cm field size.

Calibration protocol used is: TG 51 TG 21 SCRAD NORDIC
 Other _____

If this does not completely describe your calibration, add information separately.

B. Beam data

1. Collimator field size is defined at: 100 cm other _____ cm

2. Collimator sizes available: Circular _____ cm _____ cm
_____ cm _____ cm
_____ cm _____ cm

Describe any non-circular collimators: _____

3. The standard field for relative output factors is _____
at _____ cm distance
at _____ cm depth

4. Relative output factors for the different collimators were measured:
with a _____ detector at _____ depth
in water other _____

5. Depth dose dependences of dose for the different collimators were measured with a _____ detector.

6. Depth dose dependence of dose was measured for
 each collimator or

list if not all:

7. Profiles of the beams were measured with a _____ detector

in water other _____

for each collimator or list _____

8. Submit an isodose distribution (in color) for a single stationary beam for a typical collimator used for stereotactic irradiation. Normalize to 100% at 5 cm depth. Please state SSD and field size on the submission.

IV. Dose Calculations

A. Calculation of dose when the prescription point is at isocenter, for a stationary beam

If we were to use a single stationary beam, we would calculate the dose $D(d,s)$ at isocenter (depth d , field size s , determined by the collimator) for a monitor setting.

using the relation $D(d,s) = \text{TPR}(d,s) \text{OF}(s)$ where the $\text{TPR} = 1$ at depth $d_{\text{ref}} =$ _____ cm for all collimators, and $\text{OF} = D(d_{\text{ref}},s)$ is the output factor;

using the relation $D(d,s) = \text{TMR}(d,s) \text{OF}(s)$ with $\text{TMR} = 1$ at the depth of maximum dose $d_m =$ _____ cm, which varies with the collimator, and $\text{OF} = D(d_m,s)$;

using another calculation technique. In this case describe your method. _____

relying on our commercially available treatment planning system to calculate the monitor units; Name of program _____, version _____.

B. Calculation of doses off-axis

For stereotactic irradiation, we calculate the dose at a distance r from the central axis by

multiplying the central-axis value with $\text{OAR}(d,s,r)$, which is

measured in water for each collimator, at one depth

measured in water for each collimator, at multiple depths

measured in water for some, but not all, collimators, at one depth

measured in water for some, but not all, collimators, at multiple depths

other method (describe separately).

C. Arc Techniques

When calculating the monitor units to be delivered in an arc,

- we use the same approach as in IV.A but with
 - the average depth
 - averaged every _____ degrees of arc
 - the average TPR, TMR etc.;;
 - averaged every _____ degrees of arc
- we use another method (describe separately).

V. Quality Assurance

A. Techniques to verify mechanical accuracy (couch, gantry, collimator, head frame, etc.)

Before every treatment

Describe: _____

Periodically (indicate frequency)

Describe: _____

B. Techniques to verify the treatment dose

Describe: _____

C. Techniques to verify the dose distribution

Describe: _____

