ADVANCED TECHNOLOGY CONSORTIUM (ATC)

CREDENTIALING PROCEDURES FOR PROSTATE IMPLANT PROTOCOLS

FACILITY QUESTIONNAIRE

Institutions wishing to enter patients onto RTOG, NCCTG or ACOSOG protocols that include permanent prostate brachytherapy implants must be credentialed prior to participation in the study. Because these procedures require a team effort, the institution, the radiation oncologist and radiation physicist are credentialed as a team.

RTOG and NCCTG:

If there is more than one radiation oncologist who wishes to be credentialed, please refer to the letter from Drs. Kuban and Ibbott (RTOG) or Drs. Pisansky and Ibbott (NCCTG). The treatment team is required to submit three items.

1) Facility Questionnaire and Reference Cases
2) Knowledge Assessment Form
3) Data for a recent prostate implant performed by the radiation oncologist and physicist using the technique proposed for the RTOG or NCCTG protocol.

RTOG/NCCTG requires that the prostate team must have performed at least 10 TRUS guided prostate implants. At the bottom of the ATC Knowledge Assessment Form you will be asked to attest to this by your signature.

RTOG and NCCTG packages are to be submitted to:

Attention: Irene Harris
Radiological Physics Center
1515 Holcombe Blvd. – Box 547
Houston, TX 77030

ACOSOG: The treatment team is required to submit the following three items:

1) TIPPB Facility Questionnaire and Reference Cases
2) A case list of 15 permanent prostate seed implants which must have been performed over the last 12 months. Use Radiation Therapy Skill Verification Form (www.qarc.org)
3) Data for the 3 most recent cases performed by the brachytherapy team (See Radiation Therapy Skill Verification Form for submission requirements)

ACOSOG packages are to be submitted to:

Physics Division
Quality Assurance Review Center
825 Chalkstone Ave.
Providence, RI 02908-4735

An institution that has been credentialed for one radiation source model does not need to submit the complete package to become credentialed for a second source model. It is only necessary to submit the two reference cases, performed with the new source model. Similarly, changing to a different treatment planning system requires re-credentialing, and only the two reference cases need to be submitted.

Institutions that have the capability to submit treatment plans electronically will be expected to transmit data in digital form to the Image-Guided Therapy Center (ITC) in St. Louis (http://itc.wustl.edu/). All RTOG participants are expected to submit data electronically.

For any questions, please contact the RPC (http://rpc.mdanderson.org) at (713) 745-8989 or QARC (www.qarc.org) at (401) 456-6500.

Allow at least 4 weeks for review and approval.
Incomplete submissions will take longer.

ATC CREDENTIALING PROCEDURES FOR PROSTATE IMPLANT PROTOCOLS
FACILITY QUESTIONNAIRE

I. **Radiation Oncology Facility:** RTF #:_____
Study Group: _____ RTOG / NCCTG / ACOSOG #: _____

Facility Name:_____

Address: _____

_____

_____

Is this Facility also known by other name(s)? If so, please provide:

_____

_____

Facility where external beam will be delivered: _____

Address: _____

_____

PERSONNEL CONTACT INFORMATION

A. Radiation Oncologist Responsible for Implant Patients

Name: _____ Phone: _____

Address: _____ Fax: _____

_____ E-mail: _____

_____

B. Chair/Chief of Radiation Oncology

Name: _____ Phone: _____

Address: _____ Fax: _____

_____ E-mail: _____

_____

C. Physicist Responsible for Implant Patients

Name: _____ Phone: _____

Address: _____ Fax: _____

_____ E-mail: _____

_____

D. Dosimetrist Responsible for Implant Patients

Name: _____ Phone: _____

Address: _____ Fax: _____

_____ E-mail: _____

_____

E. Data Manager Responsible for Implant Patients

Name: _____ Phone: _____

Address: _____ Fax: _____

_____ E-mail: _____

_____

II. **Experience of personnel:**

A. For the Radiation Oncologist named above

How many ultrasound guided prostate implants have been performed in the past

6 months? _____ 12 months? _____ career total? _____

Has this person's skill been verified? by RTOG? ☐ by NCCTG? ☐ by ACOSOG? ☐ date: _____

B. For the Physicist named above

How many ultrasound guided prostate implants have been preplanned using ultrasound in the past

6 months? _____ 12 months? _____ career total? _____

How many ultrasound guided prostate implants have been evaluated with post implant CT in the past

6 months? _____ 12 months? _____ career total? _____

Has this person's skill been verified? by RTOG? ☐ by NCCTG? ☐ by ACOSOG? ☐ date: _____

III. **Equipment:**

A. Ultrasound unit (vendor and model): _____

B. CT scanner (vendor and model): _____

C. Treatment planning system

Preplan:

Vendor and version: _____

How are ultrasound images entered for pre planning? videotape ☐ digitized ☐

Other (explain): _____

_____

How are prostate and normal tissue contours entered?

Defined on planning system ☐ defined on ultrasound unit and input as above ☐

Other (explain): _____

_____

Is a point source approximation used? Yes ☐ No ☐

If yes, do you use an: anisotropy constant ☐ anisotropy factors ☐

If not, explain your procedures for determining and accounting for seed orientation.

_____

Post Implant Plan:

Vendor and version: _____

How are the CT images entered for post planning? CD ☐ tape ☐ optical disc ☐

digitized from hardcopy ☐ electronically from the scanner ☐ electronically via network ☐

Other (explain): _____

_____

How are prostate and normal tissue contours entered?

Defined on planning system ☐ defined on CT and input as above ☐

Other (explain): _____

_____

Dose calculation matrix resolution is ____ mm x ____ mm x ____ mm.
(should be ≤2mm x ≤2mm x axial slice width)

Dose volume histograms calculated by computer? Yes ☐ No ☐

Dose volume histograms available as graphs? Yes ☐ No ☐

Dose volume histograms available as tables? Yes ☐ No ☐

How do you superimpose dose distributions on CT images? By computer ☐ By hand ☐
If by hand; describe technique: _____

_____

Is a point source approximation used? Yes ☐ No ☐
If yes, do you use an: anisotropy constant ☐ anisotropy factors ☐
If not, explain your procedures for determining and accounting for seed orientation.

D. Radiation Sources:

^{125}I: Vendor/Model: _____ Typical source strength/seed: _____
Vendor/Model: _____ Typical source strength/seed: _____

^{103}Pd: Vendor/Model: _____ Typical source strength/seed: _____
Vendor/Model: _____ Typical source strength/seed: _____

___ Special ordered for each patient
___ Prepared from in-house inventory

E. Implant Technique: ___ Loose seeds (e.g., Mick applicator)
___ Disposable preloaded needles (seeds with spacers interspersed)
___ Stranded products or dissolvable sutures

F. Do you immobilize the prostate during the implant procedure, for example, with anchor needles?

IV. **Quality Assurance Procedures: (attach additional sheets if necessary)**

A. Source strength verification:

1. Dosimetry system used for in-house verification of seed activity:

   Vendor: _____ Model: _____

2. How is the calibration of this system directly traceable to NIST? (Attach copies of ADCL certificates)

3. What are the QA procedures to verify that the calibration of this system has not changed?

4. For each seed model, what is the NIST calibration date to which your chamber calibration is traceable?

5. How frequently are these QA procedures performed? _____
6. Describe your measurement technique for verifying seed strengths of individual patients.

7. Number of seeds assayed per patient: ____% or ____seeds
8. What is your criterion for agreement with the vendor? +/-5% ☐, +/-7% ☐, +/-10% ☐,

   Other (explain) _____

   _____

9. What seed strength is used for treatment planning? your own measurements ☐ vendor ☐

   Other (explain) _____

B. Source accounting:

1. Are radiographs taken at the completion of the implant? Yes ☐ No☐

   If yes: AP ☐ lateral ☐ oblique ☐ stereo ☐ other: _____

2. Describe procedures used to account for all seeds at the time of implant:

3. Describe procedures used to account for all seeds at the time of post implant planning:

4. Describe techniques used to identify seeds and avoid identifying the same seed on multiple CT slices:

5. What is the discrepancy limit for unaccounted seeds and what action do you take if the discrepancy exceeds the limit?

C. Other dosimetry and QA procedures:

1. Describe any calculations done at the time of commissioning to verify the accuracy of the computer generated treatment plan:

2. Describe your method for ensuring that the dosimetric parameters you use are consistent with the NIST calibration of the source and your calculation method (point source approximation vs. line source):

3. Describe any other procedures followed to assure that the dose calculations are in accordance with the requirements of the protocol:

3. Describe any other quality assurance procedures pertinent to these brachytherapy procedures:

Reference Cases

Please calculate and attach isodose distributions for the single seed and geometric implant described below. Sources should be the model ^{125}I or ^{103}Pd seeds (from the list of models complying with the AAPM prerequisites – see http://rpc.mdanderson.org) that you choose to treat your patients, with source strength specified exact at the beginning of the implant. Do the calculations as you would do them clinically using the TG-43 dosimetry, detailing any assumptions necessary.

Case 1: A single seed, strength 0.5U (μGy m^2 h^{-1}) (use 2.5 U for ^{103}Pd): If your software allows and you use a line source approximation, calculate both in the longitudinal and mid-transverse planes of the seed. Please submit isodose lines from 0.2 to 100 Gy. (Lines 0.2, 0.5, 1, 5, 10, 50, & 100 Gy are preferred.)

Dosimetry Calculations:
Write below the equation that will be used for hand calculating the instantaneous dose-rate to an arbitrary point from a single seed in the TG-43 formalism. (If possible give notations used by your treatment planning computer). The intent is for you to be able to verify that the values of various parameters in your treatment planning system are the same as in TG-43.

Define the variables in the equation:

For each seed model used to treat patients on this protocol, submit the data used by your treatment planning computer for the following parameters:

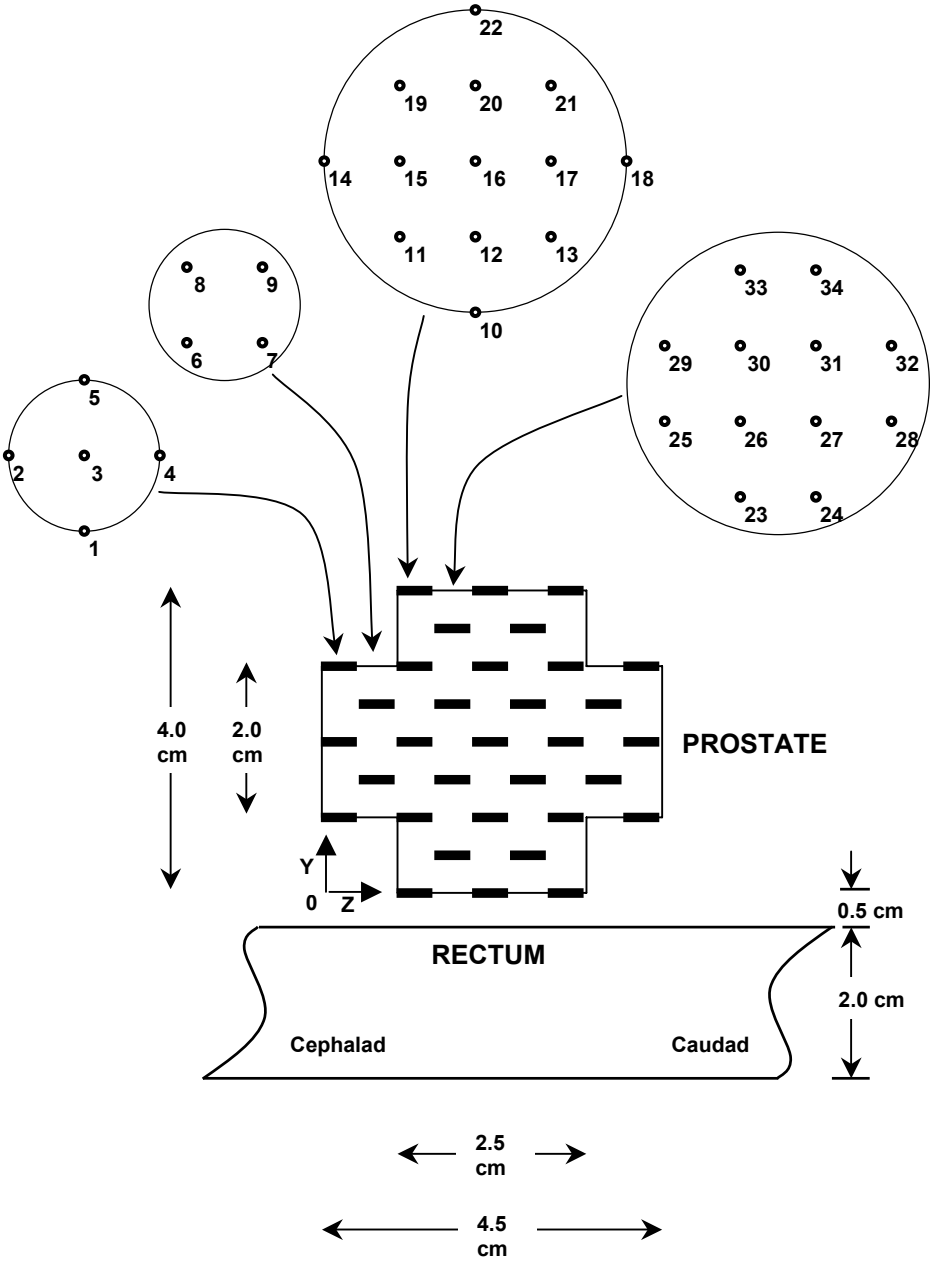
- Dose rate constant (Λ)
- Anisotropy constant (ϕ) and/or factors
- Radial dose function
- The units of S_K are : _____
- Do your ^{125}I dose calculations agree with TG-43 to within $\pm$5% from 5-70 mm? Yes ☐ No ☐
- Do your ^{103}Pd dose calculations agree with TG-43 to within $\pm$5% from 5-50 mm? Yes ☐ No ☐

Case 2: The diagram on the following page represents a cylindrical prostate and rectum. Assume the dimensions of the prostate and rectum in the drawing to be both the PTV and ETV.

The purpose of this reference case is principally to verify the consistency of your calculations with TG-43. Perform calculations for the implant shown in the diagram using seeds of source strength 0.5 U (μGy m^2 h^{-1}) (use 2.5 U for ^{103}Pd).

- Submit isodose distributions in all axial planes. (0.5 cm spacing)
- Submit the following isodose lines: 290, 217, 145, 130, 73 and 36 Gy
- Submit the volumes of prostate and rectum as calculated by the treatment planning system.
- Submit integral dose-volume histogram (DVH) tables in 10 Gy increments for:
  (i) Planning target volume (PTV).
  (ii) Rectum in prostate region.

Note: If you wish to use more than one of the approved seed models, please submit cases 1 and 2 for each seed model.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cm
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PROSTATE
Y
0
Z
0.5 cm
RECTUM
2.0 cm
Cephalad
Caudad
2.5
cm
4.5
cm

REFERENCE CASES – PAGE 2

Prostate Reference Case
Case #2
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(x,y,z) Coordinates of center of seeds

Seed #	x	y	z1	z2	z3	z4
1	2	1	0.25			4.25
2	1	2	0.25			4.25
3	2	2	0.25			4.25
4	3	2	0.25			4.25
5	2	3	0.25			4.25
6	1.5	1.5	0.75			3.75
7	2.5	1.5	0.75			3.75
8	1.5	2.5	0.75			3.75
9	2.5	2.5	0.75			3.75
10	2	0	1.25	2.25	3.25	
11	1	1	1.25	2.25	3.25	
12	2	1	1.25	2.25	3.25	
13	3	1	1.25	2.25	3.25	
14	0	2	1.25	2.25	3.25	
15	1	2	1.25	2.25	3.25	
16	2	2	1.25	2.25	3.25	
17	3	2	1.25	2.25	3.25	
18	4	2	1.25	2.25	3.25	
19	1	3	1.25	2.25	3.25	
20	2	3	1.25	2.25	3.25	
21	3	3	1.25	2.25	3.25	
22	2	4	1.25	2.25	3.25	
23	1.5	0.5	1.75	2.75		
24	2.5	0.5	1.75	2.75		
25	0.5	1.5	1.75	2.75		
26	1.5	1.5	1.75	2.75		
27	2.5	1.5	1.75	2.75		
28	3.5	1.5	1.75	2.75		
29	0.5	2.5	1.75	2.75		
30	1.5	2.5	1.75	2.75		
31	2.5	2.5	1.75	2.75		
32	3.5	2.5	1.75	2.75		
33	1.5	3.5	1.75	2.75		
34	2.5	3.5	1.75	2.75		

Total # of seeds: (5x2 + 4x2 + 13x3 + 12x2) = **81**