

**AMERICAN BRACHYTHERAPY SOCIETY
PROSTATE LOW-DOSE RATE TASK GROUP**
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General Inclusion Criteria:

- *Life expectancy > 5 years*
- *Clinical stage*
 - T1b-T2c and selected T3
- *Gleason score*
 - Gleason scores 2-10
- *PSA*
 - In almost all cases, a PSA \leq 50 ng/mL
- *No pathologic evidence of pelvic lymph node involvement*
- *No distant metastases*

Exclusion Criteria:

- *Relative contraindications*
 - Severe urinary irritative/obstructive symptomatology
 - Extensive TURP defect
 - Substantial median lobe hyperplasia
 - Prostate dimensions larger than the grid (i.e., > 60 mm in width and > 50 mm in height)
 - Severe pubic arch interference
 - Gross seminal vesicle involvement
 - Prior pelvic radiotherapy
 - Inflammatory bowel disease
 - Pathologic involvement of pelvic lymph nodes
- *Absolute contraindications*
 - Distant metastases
 - Life expectancy < 5 years

Physics and dosimetry:

- *Sources*
 - Pd-103 or I-125
 - Sources included on the joint AAPM/RPC Registry should be used

- *Treatment planning system*
 - Commissioned prior to first use, with source-specific documentation and QA
 - Image-based
 - Volumetric based upon contiguous slice acquisition
 - Slice spacing appropriate to resolution requirements
 - Typical preplanning and intraoperative procedures: ≤ 5 mm
 - Typical post implant evaluation: ≤ 5 mm
 - Three-dimensional calculation
 - DVH-based analysis

- *Dosimetry*
 - Dosimetry in accordance with 2004 AAPM TG-43U1 methodology
 - 2-D source characterization preferred only when source orientation is evident
 - The prescribed dose, or mPD, will normally be the intended minimum dose delivered to the planning target volume (PTV)
 - The reference dose will normally be the prescribed dose. For non-standard prescriptions, particularly when evaluating dose to critical structures, the reference dose should be that stated in the section on prescription doses.
 - D and V quantifiers for structures with ill-defined extent (urethra and rectum) may be cited in terms of cubic centimeters in addition to percentage of the volume of the structure

Treatment Planning:

- *Planning target volume:*
 - Prostate
 - Prostate with margin
 - Seminal vesicles
 - Prostate minus non-cancerous regions of the gland (e.g., anterior base)
 - Image-guided target volumes such as indium-111 or MR spectroscopy

- *Seed loading approach:*
 - Modified uniform
 - Inverse planning
 - Computer optimized
 - Modified peripheral

- *Treatment Planning*
 - Can be performed prior to or at the time of brachytherapy using nomograms or treatment planning computers
 - Prescription dose must encompass the target volume
 - Evaluated prostate dose parameters may include V_{100} , V_{150} , V_{200} , D_{90}

- Evaluated urethral dose parameters may include UV_{125} , UV_{150} , UD_{50} , UD_{30} , UD_5 and/or maximum and minimum doses
- Evaluated rectal dose parameters may include the volume (cc) of the rectum exposed to prescription doses (RV_{100}) and/or the posterior treatment margin (in mm)
- *Dose homogeneity:*
 - The importance of dose homogeneity is unclear, however, efforts should be made to limit the volume of the high dose regions
- *Urethral sparing techniques:*
 - Attempts should be made to maintain the average urethral dose below 150% mPD

Intraoperative Procedure:

- *Standard brachytherapy procedure consists of a transperineal template approach with image-guidance usually using biplanar transrectal ultrasonography, although MR and CT have been used*
 - Geometric accuracy of the ultrasound image should be verified with a quality assurance phantom
 - Coincidence of the template position and the image grid should be demonstrated
- *Fluoroscopy may be used as a supplement*

Source Delivery System:

- *Pre-loaded needles*
 - Free
 - Sutured or connected
- *Mick applicator*

Patient Selection Criteria:

- *Monotherapy:*
 - Clinical stage T1b-T2b and Gleason score ≤ 6 and PSA ≤ 10 ng/mL
 - Select higher risk patients
 - Salvage of select radiation therapy failures
- *Boost:*
 - \geq clinical stage T2c and/or Gleason score ≥ 7 and/or PSA > 10 ng/mL
- *Special clinical situations:*
 - Inadequate information exists to recommend supplemental XRT based on perineural invasion, percent positive biopsies and/or MRI-detected extracapsular penetration

Isotopes and Prescription Doses

- *Pd-103*

- Monotherapy
 - 125 Gy mPD
- Boost (with 41.4 – 50.4 Gy XRT)
 - 90-100 Gy mPD
- *I-125*
 - Monotherapy
 - 145 Gy mPD
 - Boost (with 41.4 – 50.4 Gy XRT)
 - 108-110 Gy mPD

Supplemental XRT

- *Target volume:*
 - Prostate and seminal vesicles with margin
 - Prostate, seminal vesicles and pelvic lymph nodes for patients with a substantial risk of pelvic lymph node involvement
- *XRT technique:*
 - Conventional
 - 3-dimensional conformal
 - Intensity modulated
- *Rectal dose:*
 - For patients receiving 45 Gy of external beam radiation therapy, the D_{50} (the dose delivered to 50% of the rectum) should be kept as low as possible
- *Timing:*
 - Either before or after brachytherapy is acceptable.

Androgen Deprivation Therapy

- *Accepted regimens:*
 - LHRH agonist with or without an anti-androgen
 - Anti-androgen with or without a 5α -reductase inhibitor
- *Indications:*
 - Cytoreduction for select large glands or significant pubic arch interference
 - Neoadjuvant androgen deprivation therapy should be initiated 2-3 months prior to brachytherapy
 - Adjuvant treatment
 - Controversial
 - If indicated, optimal duration is unknown

Postoperative Dosimetry

- *Imaging:*
 - CT-based

- MRI-based
- Fusion of CT and/or MRI and/or ultrasound
- *Timing:*
 - CT most commonly obtained on either day 0, 1, or 30
 - Timing should be consistent within each brachytherapy program
- *Recommended evaluated postoperative dosimetric parameters:*
 - V_{100}
 - V_{150}
 - V_{200}
 - D_{90}
 - Urethral doses – should include UV_{125} , UV_{150} , UD_{50} , UD_{30} , UD_5 and/or maximum and minimum dose
 - Rectal doses – cubic centimeters of rectum which received \geq prescription dose (RV_{100})

Post-Treatment Evaluation

- *Biochemical assessment:*
 - Serial PSA determinations – baseline at 3-6 months and then every 6 months and/or as per institutional protocol
- *Physical examination:*
 - Role of routine DRE is controversial
- *Quality of Life:*
 - Urinary, bowel, and sexual function should be prospectively assessed
- *Post-Treatment Biopsy:*
 - Should be reserved for protocol settings or in clinical situations where salvage local therapy is being considered

SELECTED READING

OVERVIEW

- Zelefsky MJ, Whitmore WF Jr. Long-term results of retropubic permanent 125iodine implantation of the prostate for clinically localized prostatic cancer. *J Urol* 1997; 158:23-9.
- Nag S, Beyer D, Friedland J, *et al.* American Brachytherapy Society (ABS) recommendations for transperineal permanent brachytherapy of prostate cancer. *Int J Radiat Oncol Biol Phys* 1999; 44:789-799.
- Stone NN, Stock RG. Complications following permanent prostate brachytherapy. *Eur Urol* 2002; 41:427-433.
- Blasko JC, Mate T, Sylvester JE, *et al.* Brachytherapy for carcinoma of the prostate: Techniques, patient selection, and clinical outcomes. *Semin Radiat Oncol* 2002; 12:81-94.
- Merrick GS, Wallner KE, Butler WM. Permanent interstitial brachytherapy in the management of carcinoma of the prostate gland. *J Urol* 2003; 169:1643-1652.
- Merrick GS, Wallner KE, Butler WM. Minimizing prostate brachytherapy-related morbidity. *Urology* 2003; 62:786-792.
- Merrick GS, Wallner KE, Butler WM. Patient selection for prostate brachytherapy: More myth than fact. *Oncology* 2004; 18:445-452.

TREATMENT PLANNING

- Merrick GS, Butler WM. Modified uniform seed loading for prostate brachytherapy: Rationale, design, and evaluation. *Tech Urol* 2000; 6:78-684.
- Zelefsky MJ, Yamada Y, Marion C, *et al.* Improved conformality and decreased toxicity with intraoperative computer-optimized transperineal ultrasound-guided prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2003; 55:956-63.
- Merrick GS, Butler WM, Wallner KE, *et al.* Extracapsular radiation dose distribution following permanent prostate brachytherapy. *Am J Clin Oncol* 2003; 26:E178-E189.
- Nedeia E, Wallner K, Reed D, *et al.* Extraprostatic seed placement and its effect on seed loss. *Cancer J* 2005; 11:147-51.
- Crook JM, Potters L, Stock RG, *et al.* Critical organ dosimetry in permanent seed prostate brachytherapy: Defining organs at risk. *Brachytherapy* 2005; 4:186-194.
- Merrick GS, Butler WM, Wallner KE, *et al.* Variability of prostate brachytherapy preimplant dosimetry: A multi-institutional analysis. *Brachytherapy* 2005, in press.

PHYSICS and DOSIMETRY

- Bice WS, Jr., Freeman JE, Russell LF, Jr., et al. Use of image coregistration in salvage prostate brachytherapy. *Tech Urol* 2000;6:151-156.
- Butler WM, Merrick GS, Dorsey AT, et al. Comparison of dose length, area, and volume histograms as quantifiers of urethral dose in prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2000;48:1575-1582.
- Butler WM, Merrick GS, Dorsey AT, et al. Isotope choice and the effect of edema on prostate brachytherapy dosimetry. *Med Phys* 2000;27:1067-1075.
- Crook J, Milosevic M, Catton P, et al. Interobserver variation in postimplant computed tomography contouring affects quality assessment of prostate brachytherapy. *Brachytherapy* 2002;1:66-73.
- DeWerd LA, Huq MS, Das IJ, et al. Procedures for establishing and maintaining consistent air-kerma strength standards for low-energy, photon-emitting brachytherapy sources: recommendations of the Calibration Laboratory Accreditation Subcommittee of the American Association of Physicists in Medicine. *Med Phys* 2004;31:675-681.
- Dubois DF, Bice WS, Jr., Prestige BR. CT and MRI derived source localization error in a custom prostate phantom using automated image coregistration. *Med Phys* 2001;28:2280-2284.
- Han BH, Wallner KE. Dosimetric and radiographic correlates to prostate brachytherapy-related rectal complications. *Int J Cancer* 2001;96:372-378.
- Han BH, Wallner K, Merrick G, et al. The effect of interobserver differences in post-implant prostate CT image interpretation on dosimetric parameters. *Med Phys* 2003;30:1096-1102.
- Hilts M, Spadinger I, Keyes M. Comparison of methods for calculating rectal dose after (125)I prostate brachytherapy implants. *Int J Radiat Oncol Biol Phys* 2002;53:775-785.
- Lee WR, Roach M, 3rd, Michalski J, et al. Interobserver variability leads to significant differences in quantifiers of prostate implant adequacy. *Int J Radiat Oncol Biol Phys* 2002;54:457-461.
- Lindsay PE, Van Dyk J, Battista JJ. A systematic study of imaging uncertainties and their impact on 125I prostate brachytherapy dose evaluation. *Med Phys* 2003;30:1897-1908.
- McLaughlin PW, Narayana V, Drake DG, et al. Comparison of MRI pulse sequences in defining prostate volume after permanent implantation. *Int J Radiat Oncol Biol Phys* 2002;54:703-711.
- Merrick GS, Butler WM, Dorsey AT, et al. Influence of timing on the dosimetric analysis of transperineal ultrasound-guided, prostatic conformal brachytherapy. *Radiat Oncol Investig* 1998;6:182-190.

- Mizowaki T, Cohen GN, Fung AY, et al. Towards integrating functional imaging in the treatment of prostate cancer with radiation: the registration of the MR spectroscopy imaging to ultrasound/CT images and its implementation in treatment planning. *Int J Radiat Oncol Biol Phys* 2002;54:1558-1564.
- Nag S, Ellis RJ, Merrick GS, et al. American Brachytherapy Society recommendations for reporting morbidity after prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2002;54:462-470.
- Narayana V, Roberson PL, Winfield RJ, et al. Impact of ultrasound and computed tomography prostate volume registration on evaluation of permanent prostate implants. *Int J Radiat Oncol Biol Phys* 1997;39:341-346.
- Narayanan S, Cho PS, Marks RJ, 2nd. Three-dimensional seed reconstruction from an incomplete data set for prostate brachytherapy. *Phys Med Biol* 2004;49:3483-3494.
- Nath R, Anderson LL, Luxton G, et al. Dosimetry of interstitial brachytherapy sources: recommendations of the AAPM Radiation Therapy Committee Task Group No. 43. American Association of Physicists in Medicine. *Med Phys* 1995;22:209-234.
- Nath R, Anderson LL, Meli JA, et al. Code of practice for brachytherapy physics: report of the AAPM Radiation Therapy Committee Task Group No. 56. American Association of Physicists in Medicine. *Med Phys* 1997;24:1557-1598.
- Polo A, Cattani F, Vavassori A, et al. MR and CT image fusion for postimplant analysis in permanent prostate seed implants. *Int J Radiat Oncol Biol Phys* 2004;60:1572-1579.
- Potters L, Cao Y, Calugaru E, et al. A comprehensive review of CT-based dosimetry parameters and biochemical control in patients treated with permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2001;50:605-614.
- Potters L, Calguaru E, Thornton KB, et al. Toward a dynamic real-time intraoperative permanent prostate brachytherapy methodology. *Brachytherapy* 2003;2:172-180.
- Prestidge BR, Bice WS, Kiefer EJ, et al. Timing of computed tomography-based postimplant assessment following permanent transperineal prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 1998;40:1111-1115.
- Rivard MJ, Coursey BM, DeWerd LA, et al. Update of AAPM Task Group No. 43 Report: A revised AAPM protocol for brachytherapy dose calculations. *Med Phys* 2004;31:633-674.
- Schwartz DJ, Davis BJ, Vetter RJ, et al. Radiation exposure to operating room personnel during transperineal interstitial permanent prostate brachytherapy. *Brachytherapy* 2003;2:98-102.
- Smith S, Wallner K, Merrick G, et al. Interpretation of pre- versus postimplant TRUS images. *Med Phys* 2003;30:920-924.

- Stock RG, Stone NN. Importance of post-implant dosimetry in permanent prostate brachytherapy. *Eur Urol* 2002;41:434-439.
- Waterman FM, Dicker AP. Effect of post-implant edema on the rectal dose in prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 1999;45:571-576.
- Waterman FM, Dicker AP. The impact of postimplant edema on the urethral dose in prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2000;47:661-664.
- Williamson JF, Coursey BM, DeWerd LA, et al. On the use of apparent activity (Aapp) for treatment planning of 125I and 103Pd interstitial brachytherapy sources: recommendations of the American Association of Physicists in Medicine radiation therapy committee subcommittee on low-energy brachytherapy source dosimetry. *Med Phys* 1999;26:2529-2530.
- Williamson JF, Coursey BM, DeWerd LA, et al. Recommendations of the American Association of Physicists in Medicine on 103Pd interstitial source calibration and dosimetry: implications for dose specification and prescription. *Med Phys* 2000;27:634-642.
- Williams JF, Butler W, DeWerd L, et al. Recommendations of the American Association of Physicists in Medicine regarding the impact of implementing the 2004 Task Group 43 report on dose specifications for ¹⁰³Pd and ¹²⁵I interstitial brachytherapy. *Med Phys* 2005; 32:1424-1439.
- Yue N, Chen Z, Peschel R, et al. Optimum timing for image-based dose evaluation of 125I and 103PD prostate seed implants. *Int J Radiat Oncol Biol Phys* 1999;45:1063-1072.
- Zelefsky MJ, Yamada Y, Cohen G, et al. Postimplantation dosimetric analysis of permanent transperineal prostate implantation: improved dose distributions with an intraoperative computer-optimized conformal planning technique. *Int J Radiat Oncol Biol Phys* 2000; 48:601-608.

ULTRASOUND QA

- Goodsitt MM, Carson PL, Witt S, et al. Real-time B-mode ultrasound quality control test procedures. Report of AAPM Ultrasound Task Group No. 1. *Med Phys* 1998; 25:1385-1406.

BIOCHEMICAL OUTCOMES

- Stock RG, Stone NN, Tabert A, et al. A dose-response study for I-125 prostate implants. *Int J Radiat Oncol Biol Phys* 1998; 41:101-108.
- Zelefsky MJ, Hollister T, Raben A, et al. Five-year biochemical outcome and toxicity with transperineal CT-planned permanent I-125 prostate implantation for patients with localized prostate cancer. *Int J Radiat Oncol Biol Phys* 2000; 47:1261-1266.
- Blasko JC, Grimm PD, Sylvester JE, et al. Palladium-103 brachytherapy for prostate carcinoma. *Int J Radiat Oncol Biol Phys* 2000; 46:839-850.

- Grimm PD, Blasko JC, Sylvester JE, *et al.* 10-year biochemical (prostate-specific antigen) control of prostate cancer with ¹²⁵I brachytherapy. *Int J Radiat Oncol Biol Phys* 2001; 51:31-40.
- Dattoli M, Wallner K, True L, *et al.* Long-term outcomes after treatment with external beam radiation therapy and palladium 103 for patients with higher risk prostate carcinoma. *Cancer* 2003; 97:979-983.
- Kollmeier MA, Stock RG, and Stone NN. Biochemical outcomes after prostate brachytherapy with 5-year minimal follow-up: Importance of patient selection and implant quality. *Int J Radiat Oncol Biol Phys* 2003; 57:645-653.
- Sharkey J, Cantor A, Solc Z, *et al.* 103Pd brachytherapy versus radical prostatectomy in patients with clinically localized prostate cancer: a 12-year experience from a single group practice. *Brachytherapy* 2005; 4:34-44.
- Potters L, Morgenstern C, Calugaru E, *et al.* 12-year outcomes following permanent prostate brachytherapy in patients with clinically localized prostate cancer. *J Urol* 2005; 173:1562-1566.

SUPPLEMENTAL XRT

- Blasko JC, Grimm PD, Sylvester JE, *et al.* The role of external beam radiotherapy with I-125/Pd-103 brachytherapy for prostate carcinoma. *Radiother and Oncol* 2000; 57:273-278.
- Wallner K, Merrick G, True L, *et al.* 20 Gy versus 44 Gy supplemental beam radiation with Pd-103 prostate brachytherapy: Preliminary biochemical outcomes from a prospective randomized multicenter trial. *Radiother and Oncol* 2005; 75:307-310.

ANDROGEN DEPRIVATION THERAPY

- Potters L, Torre A, Ashley R, *et al.* Examining the role of neoadjuvant androgen deprivation in patients undergoing prostate brachytherapy. *J Clin Oncol* 2000; 18:1187-1192.
- Lee L, Stock RG, Stone NN. Role of hormonal therapy in the management of intermediate- to high-risk prostate cancer treated with permanent radioactive seed implantation. *Int J Radiat Oncol Biol Phys* 2002; 52:444-452.
- Merrick GS, Butler WM, Wallner KE, *et al.* Impact of supplemental external beam radiotherapy and/or androgen deprivation therapy on biochemical outcome after permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2005; 61:32-43.

URINARY MORBIDITY

- Terk MD, Stock RG, Stone NN. Identification of patients at increased risk for prolonged urinary retention following radioactive seed implantation of the prostate. *J Urol* 1998; 160:1379-1382.

- Thomas MD, Cormack R, Tempny CM, *et al.* Identifying the predictors of acute urinary retention following magnetic resonance-guided prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2000; 47:905-908.
- Merrick GS, Butler WM, Wallner KE, *et al.* Prophylactic versus therapeutic alpha blockers following permanent prostate brachytherapy. *Urology* 2002; 60:650-655.
- Hinerman-Mulroy A, Merrick GS, Butler WM, *et al.* Androgen deprivation-induced changes in prostate anatomy predict urinary morbidity following permanent interstitial brachytherapy. *Int J Radiat Oncol Biol Phys* 2004; 59:1367-1382.
- Merrick GS, Butler WM, Wallner KE, *et al.* Long-term urinary quality of life following permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2003; 56:454-461.
- Wallner K, Lee H, Wasserman S, *et al.* Low risk of urinary incontinence following prostate brachytherapy in patients with a prior TURP. *Int J Radiat Oncol Biol Phys* 1997; 37:565-569.
- Merrick GS, Butler WM, Wallner KE, *et al.* Effect of transurethral resection on urinary quality of life after permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2004; 58:81-88.
- Allen ZA, Merrick GS, Butler WM, *et al.* Detailed urethral dosimetry in the evaluation of prostate brachytherapy-related urinary morbidity. *Int J Radiat Oncol Biol Phys* 2005; 62:981-987.
- Merrick GS, Butler WM, Wallner KE, *et al.* Dysuria after permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2003; 55:979-985.

RECTAL MORBIDITY

- Snyder KM, Stock RG, Hong SM, *et al.* Defining the risk of developing grade 2 proctitis following 125I prostate brachytherapy using a rectal dose-volume histogram analysis. *Int J Radiat Oncol Biol Phys* 2001; 50:335-341.
- Gelblum DY and Potters L. Rectal complications associated with transperineal interstitial brachytherapy for prostate cancer. *Int J Radiat Oncol Biol Phys* 2000; 48:119-124.
- Merrick GS, Butler WM, Wallner KE, *et al.* Rectal function following brachytherapy with or without supplemental external beam radiation: Results of two prospective randomized trials. *Brachytherapy* 2003; 2:147-157.
- Merrick GS, Butler WM, Wallner KE, *et al.* Late rectal function following prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2003; 1:42-48.
- Tran A, Wallner K, Merrick G, *et al.* Rectal fistulas after prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2005; 63:150-154.

SEXUAL DYSFUNCTION

- Zelefsky MJ, Eid JF. Elucidating the etiology of erectile dysfunction after definitive therapy for prostate cancer. *Int J Radiat Oncol Biol Phys* 1998; 40:129-133.
- Stock RG, Kao J, Stone NN. Penile erectile function after permanent radioactive seed implantation for treatment of prostate cancer. *J Urol* 2001; 165:436-439.
- Potters L, Torre T, Fearn PA, *et al.* Potency after permanent prostate brachytherapy for localized prostate cancer. *Int J Radiat Oncol Biol Phys* 2001; 50:1235-1242.
- Merrick GS, Wallner K, Butler WM, *et al.* Short-term sexual function after prostate brachytherapy. *Int J Cancer* 2001; 96:313-319.
- Merrick GS, Butler WM, Dorsey AT, *et al.* A comparison of radiation dose to the neurovascular bundles in men with and without prostate brachytherapy induced erectile dysfunction. *Int J Radiat Oncol Biol Phys* 2000; 48:1069-1074.
- Merrick GS, Butler WM, Wallner KE, *et al.* The importance of radiation doses to the penile bulb vs. crura in the development of postbrachytherapy erectile dysfunction. *Int J Radiat Oncol Biol Phys* 2002; 54:1055-1062.
- Merrick GS, Butler WM, Wallner KE, *et al.* Erectile function after prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2005; 62:437-447.

PSA SPIKES

- Cavanagh W, Blasko JC, Grimm PD, Sylvester JE. Transient elevation of serum prostate-specific antigen following (125)I/(103)Pd brachytherapy for localized prostate cancer. *Semin Urol Oncol* 2000;18:160-5.
- Merrick GS, Butler WM, Wallner KE, *et al.* Prostate-specific antigen spikes after permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2002; 54:450-456.
- Critz FA, Williams WH, Levinson AK, *et al.* Prostate specific antigen bounce after simultaneous irradiation for prostate cancer: the relationship to patient age. *J Urol* 2003;170:1864-1867.
- Reed D, Wallner K, Merrick G, *et al.* Clinical correlates to PSA spikes and positive repeat biopsies after prostate brachytherapy. *Urology* 2003; 62:683-688.

The American Brachytherapy Society (ABS) low dose rate prostate cancer task group has developed generalized criteria for the use of brachytherapy in the management of prostate cancer. These criteria are intended to guide radiation oncologists, urologists and physicists in making decisions regarding therapy. The complexity and severity of a patient's clinical condition should dictate the selection of appropriate treatment. The availability of equipment and/or personnel may influence therapy. Approaches classified as investigational by the U.S. Food and Drug Administration (FDA) has not been considered in developing these criteria. The ultimate decision regarding the appropriateness of any treatment must be made by the attending physician.

