Attachment C

The Prostate Journal (vol. 2, No. 2, 2000)

African American Men with Prostate Cancer Treated by Simultaneous Irradiation

W. Hamilton Williams, MD,* Frank A. Critz, MD,*
James B. Benton, MD,* Keith Levinson, MD,†
Walter Falconer, MD,* Emerson Harrison, MD,*
Clinton T. Holladay, MD,* and David A. Holladay, MD*
*Radiotherapy Clinics of Georgia, Decatur, Georgia, U.S.A.
†Georgia Urology, Decatur, Georgia, U.S.A.
‡Atlanta Urological Consultants, Atlanta, Georgia, U.S.A.

ABSTRACT

Objectives: Reportedly, African American men (AAM) with prostate cancer present with more advanced disease and have worse outcomes than white men (WM). We evaluate this concept in our series of men with prostate cancer treated with modern simultaneous irradiation in a busy private practice.

Materials and Methods: From 1993 to 1998, 1270 men with clinical stage T1T2N0 prostate cancer were treated by ultrasound-guided transperineal implantation of I-125 in the prostate and seminal vesicle (median dose 12,000 cGy) followed by external-beam radiation therapy (4500 cGy) including an additional 750 cGy seminal vesicle boost in men with adverse prognostic factors. None received neoadjuvant or adjuvant hormone therapy. The median pretreatment prostate specific antigen (PSA) level for 141 AAM and 1129 WM was 8.6 ng/ml and 7.1 ng/ml, respectively, a significant difference ($p = 0.0001$). Disease freedom is defined as achievement and maintenance of a PSA nadir of ≤ 0.2 ng/ml. The median follow-up is 24 months (range 12–86 months).

Results: Disease-free survival for the entire group is 89% (± 3%) at 5 years. Overall, or when analyzed by stage, Gleason score, or age, AAM present with higher pretreatment PSA levels than WM. However, according to pretreatment PSA groups of ≤ 4.0 ng/ml, 4.1–10.0 ng/ml, 10.1–20.0 ng/ml, and > 20.0 ng/ml, the 5-year disease-free survival rates for AAM and WM in these groups are 100% and 95%, 83% and 92%, 67% and 80%, 76% and 83%, respectively. No significant difference in disease freedom is observed within the above PSA groups or by analysis of Gleason score or stage. With disease freedom as an end point, race is not a significant factor on multivariate analysis.

Conclusions: AAM present with higher pretreatment PSA levels than WM both overall and when stratified by stage, Gleason score, or age. In this series, however, disease-free survival rates of AAM and WM are not significantly different overall or according to pretreatment variables. Thus, race does not appear to be an adverse prognostic factor after simultaneous irradiation.

INTRODUCTION

Multiple reports have documented that, in comparison with white men (WM), African American men (AAM) have a higher incidence of prostate cancer (1,2), present with more advanced disease at initial diagnosis (2–4), and appear to have a worse prognosis than WM (5–7). Explanations for these differences include both a lack of equal access to healthcare (8) and the possibility that prostate cancer in AAM is more virulent than in WM (6,7). Additionally, some reports have noted younger AAM have a poorer disease freedom than older AAM, the opposite of the finding in WM (8,9). However, there is no consensus, because other studies have not found a difference in outcome (10–14). To date, most studies, regardless of finding, were conducted in the pre-prostate specific antigen (PSA) era or have overall survival or disease-specific survival as an end point, not a PSA-defined end point (2–6,8–10,12,13).

Since the introduction of PSA for clinical use in 1987, virtually all reports on treatment results for localized prostate cancer use PSA end points to define disease freedom. PSA is the most powerful pretreatment predictor of successful prostate cancer treatment in most series, regardless of the technique used. However, of the six surgery or radiotherapy reports describing freedom from

Address correspondence and reprint requests to: Frank A. Critz, MD, 2349 Lawrenceville Highway, Decatur, GA 30033, U.S.A.

cancer using a PSA-based end point (7,11,14–17), only Zagars et al. (17) and Waterhouse et al. (16) (a study that has appeared in abstract form only) reported results with complete pretreatment PSA information. The study by Zagars et al. (17) evaluated disease freedom with a simple rising PSA level, while Waterhouse et al. (16) required two rises above 1.0 ng/mL. In this study, with complete pretreatment PSA information, we evaluate the concept of whether AAM with prostate cancer have a worse outcome than WM when treated with modern simultaneous irradiation. However, unlike other radiotherapy series, disease freedom is defined by the achievement and maintenance of a PSA nadir level of 0.2 ng/ml, the identical definition used after radical prostatectomy.

MATERIALS AND METHODS

From February 1993 to April 1998, 1276 men with clinical stage T1T2N0 prostate cancer were treated by simultaneous radiation (implantation of I-125 in the prostate followed by external-beam radiotherapy). According to race, 141 (11%) were AAM, 1129 (88.5%) were WM, and 6 (< 1%) were of other races. For this analysis, these latter six men are excluded. All men had biopsy-proven prostate adenocarcinoma. Staging evaluation was by digital rectal exam. Twenty-seven (2%) of the 1270 men had a pretreatment staging lymphadenectomy (N0); otherwise, pretreatment planning computed axial tomography scans were negative for lymphadenopathy (NX). Table 1 documents the clinical characteristics of all men according to race. All 1270 men underwent ultrasound-guided transperineal implantation of I-125 in the prostate and seminal vesicle. The median prostate implant dose, calculated at the capsule, was 12,000 cGy (range 8,000–18,000 cGy). Three weeks postimplant, the prostate, seminal vesicles, and periprostatic tissue were treated with 4500 cGy of external-beam irradiation at 150 cGy per treatment, 5 days per week, via a combination of bilateral arc and conformal beam technique. Two hundred sixty-seven men with adverse prognostic factors also received a 750-cGy external beam boost to the

TABLE 1. Clinical characteristics[a]

Characteristics	Overall	AAM	WM	*p* Value
N:	1270	141 (11%)	1129 (89%)	
Median age (range) (years)	65 (40–88)	63 (44–73)		0.001
Follow-up (months)				
Median	24			
Range	12–72			
Pretreatment PSA, ng/ml				
Median (mean)	7.10 (9.0)	8.5 (11.3)	7.05 (8.7)	<0.001
Range	0.3–87	2.8–72.8	0.3–87	
0–4.0	96 (7%)	5 (3%)	91 (8%)	
4.1–10	830 (65%)	80 (57%)	750 (66%)	
10.1–20	274 (22%)	38 (27%)	236 (21%)	
>20.0	70 (6%)	18 (13%)	52 (5%)	
Stage				
T1	584 (46%)	70 (50%)	514 (46%)	
T2	686 (54%)	71 (50%)	615 (54%)	NS
Gleason score[b]				
2–6	939 (74%)	104 (74%)	835 (74%)	
7–10	311 (26%)	37 (26%)	274 (26%)	NS

[a]NS, not significant.
[b]Gleason scores were unavailable on 20 patients.

seminal vesicles. No man received hormonal therapy before recurrence.

Disease freedom is defined as the achievement and maintenance of a post-treatment PSA nadir level of ≤ 0.2 ng/ml. Treatment failure is defined by a PSA nadir level of > 0.2 ng/ml or a subsequent rise in PSA above this level. Follow-up was performed every 6 months, with a median follow-up of 24 months (average 27 months; range 12–72 months). Disease-free survival rates are calculated by the Kaplan-Meier life table estimates method from the month of implantation, including 95% confidence intervals. Comparison between survival curves is performed by the Wilcoxon Rank-Sum Test. Comparisons of normally distributed pretreatment characteristics are performed with the chi-square test. Tests of PSA distribution are performed with the Mann-Whitney *U* test. Multivariate analysis was performed by the Cox proportional hazards model.

TABLE 2. Distribution of pretreatment PSA by clinical factors[a]

Factors	AAM	WM	*p* Value
Stage			
T1	7 (2.82–38)	7.1 (0.3–42)	0.56
T2	10.5 (3.9–72.8)	7 (0.8–87.8)	<0.001
Gleason score			
2–6	8 (2.82–38)	6.7 (0.3–60.4)	<0.004
7–10	15.1 (4.2–72.8)	7.8 (0.86–87.8)	<0.002
Age (years)			
<65	7.8 (2.82–41)[b]	6.5 (0.8–47.8)[c]	<0.002
≥65	10.5 (4.4–72.8)	7.3 (0.3–87.8)	<0.001

[a]Values given in ng/ml (ranges).
[b]$p < 0.005$ between age groups.
[c]$p < 0.001$ between age groups.

RESULTS

A comparison of the pretreatment clinical characteristics between AAM and WM is given in Table 1. The median pretreatment PSA level for AAM was 8.5 ng/ml (range 2.8–72.8), and for WM it was 7.05 ng/ml (range 0.3–87), a significant difference ($p < 0.001$). We also analyzed PSA distribution according to race in the following pretreatment subgroups: Stage T1 or T2, Gleason scores 2–6 or 7–10, and age < 65 years or ≥ 65 years. Table 2 demonstrates that in all comparisons except for Stage T1 disease, AAM presented with a significantly greater PSA burden than WM. In the case of Gleason score of 7–10, AAM had nearly double the PSA level of WM (15.1 versus 7.8 ng/ml, respectively). According to age distribution within race, both AAM and WM who were ≥ 65 years presented with significantly higher pretreatment PSA levels than their younger counterparts ($p < 0.005$ and $p < 0.001$, respectively). Both younger AAM and older AAM had higher PSA levels than their WM counterparts ($p < 0.002$ and $p < 0.001$, respectively). AAM were significantly younger when they received their diagnoses than WM, with median ages of 63 and 67 years, respectively ($p = 0.001$). No significant difference was noted in the distribution of Gleason score or stage.

Overall disease freedom for the entire group of 1270 men is 89% (± 3%) at 5 years with no significant difference in disease-free survival observed between AAM and WM (Fig. 1). In addition, when men were stratified according to pretreatment PSA groups, no difference in disease-free survival was observed (Fig. 2 A–D). To minimize the effect of sample size, we additionally analyzed all men with PSA levels of ≥ 10.1 ng/ml according to race. The 5-year disease-free survival rates for AAM and WM were 72% and 80%, respectively ($p = 0.18$), a nonsignificant difference. At the 5-year follow-up, no difference in disease freedom was noted according to clinical stage or Gleason scores (Table 3). When AAM

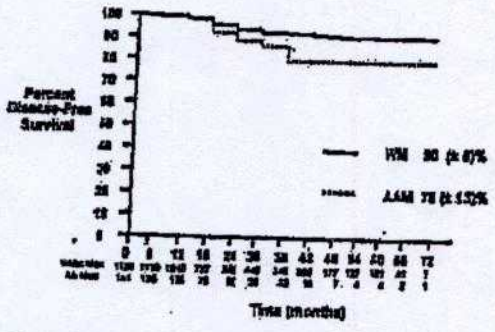

FIG 1. Comparison of disease-free survival rates for AAM versus WM. Disease freedom is defined as the achievement and maintenance of a PSA nadir level of ≤ 0.2 ng/ml. No significant difference is noted in disease-free results ($p = 0.09$). The overall disease-free survival rate for all 1270 men at 5 years is 89% (± 3%).

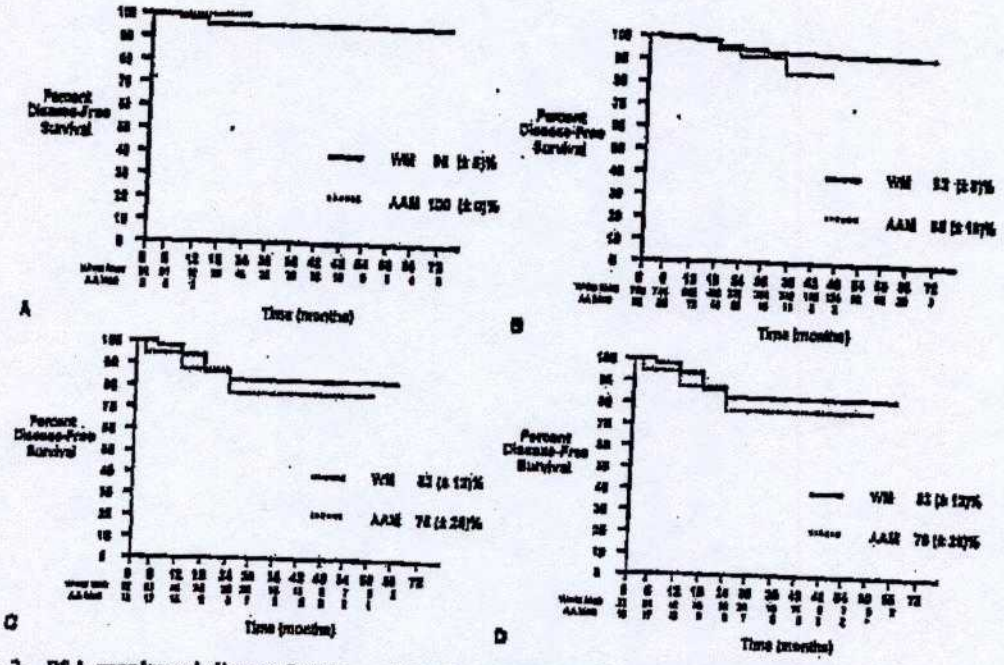

FIG. 2. PSA-monitored disease freedom of AAM versus WM based on stratification of pretreatment PSA level groups of ≤ 4.0 ng/mL, 4.1–10.0 ng/mL, 10.1–20.0 ng/mL, and > 20.0 ng/mL, respectively. No significant difference is appreciated in disease-freedom among these groups ($p = 0.76$, 0.59, 0.37, and 0.49, respectively).

and WM were stratified within race according to age groups of < 65 years or ≥ 65 years, no difference in the disease-free survival rate was noted. In addition, no differences were noted when comparing older AAM to older WM and younger AAM to younger WM. (Table 3).

On multivariate analysis, pretreatment PSA level and Gleason score were significant predictors of subsequent disease freedom, whereas clinical stage, age, and race were not significant (Table 4).

DISCUSSION

Our finding that AAM with prostate cancer present with significantly higher pretreatment PSA levels than do WM is similar to observations by other investigators. Moul et al. (3) reported that AAM with clinical stage T1T2N0 prostate cancer before radical prostatectomy had significantly higher pretreatment PSA levels than did WM, even when the pretreatment PSA level was simultaneously controlled for stage, grade, and age. After surgery, Moul et al. (7) correlated pretreatment PSA levels with microscopic examination of the prostatectomy specimens, demonstrating a direct correlation of PSA levels with tumor volume for both races. Importantly, these investigators noted that AAM and WM had similar PSA values per unit of tumor volume. The mean tumor volume for AAM was 8.1 cc, which was significantly greater than the mean 4.68 cc tumor volume for WM. Moul et al. (7) concluded that pretreatment PSA level is a reasonable surrogate for the higher tumor volume of AAM. In a separate radical prostatectomy study, Powell et al. (5) also noted that AAM have a higher chance of capsular penetration and a significantly higher rate of positive margins than WM.

In men without prostate cancer, Eastham et al. (18) found that PSA levels are higher in AAM than in WM. After an evaluation of screening prostate biopsy specimens, these authors also discovered that AAM have a higher incidence of prostatic inflammation and suggested this as the cause of the elevated PSA level in AAM relative to WM without prostate cancer. Thus, there may be more than one cause for the difference in PSA level presentation between the two races.

After radical prostatectomy, Moul et al. (7) observed a 62% 5-year disease-free survival rate for WM (mean pretreatment PSA level 9.9 ng/

TABLE 3. 5-year disease-free survival rates of AAM versus WM according to pretreatment clinical factors[a]

Factors	AAM	WM	p Value[b]
Stage			
T1 (n)	78 (70)[c]	92 (514)	0.16
T2 (n)	77 (71)	88 (615)	0.24
Total	(141)	(1129)	
Gleason score[d]			
2–6 (n)	82 (104)	92 (835)	0.34
7–10 (n)	62 (37)	83 (274)	0.12
Total	(141)	(1109)	
Age (years)			
<65 (n)	78 (80)[e]	91 (482)[f]	0.38
	p = 0.76	p = 0.57	
≥65 (n)	78 (61)	89 (647)	0.14
Total	(141)	(1129)	

[a]Values are given as percentage (No.).
[b]Chi-square analysis used.
[c]For 48 months.
[d]Twenty men did not have Gleason scoring.
[e]p = 0.76 between age groups for AAM.
[f]p = 0.57 between age groups for WM.

ml), which was significantly better ($p = 0.018$) than the 38% 5-year disease-free survival rate for AAM (mean pretreatment PSA level 15.8 ng/ml). This significant difference in treatment outcome is particularly impressive because the median follow-up time was only 13.9 months in the study by Moul et al. (3) and only 45 WM and 4 AAM were at risk for 5-year follow-up. Furthermore, this study was conducted in the U.S. Military, which provides equal access in healthcare.

TABLE 4. Multivariate analysis of pretreatment factors

Factor	p Value
Pre-PSA	<0.001
Gleason score	<0.002
Stage	0.587
Age	0.184
Race	0.173

In contrast, Iselin et al. (14) studied 115 AAM and 1204 WM after radical prostatectomy, finding no difference in pathologic stage or PSA-defined disease-free survival rates, although the latter data were not shown. In specimen-confined tumors, AAM had a greater tumor volume than WM, which is similar to the findings of Moul et al. (7). Interestingly, AAM and WM in the specimen-confined group had similar disease-free survival rates, which suggests that complete removal of the cancer can equalize outcome despite the greater tumor burden. However, because AAM with positive margins tended to fail earlier than WM with positive margins, the authors believe that AAM may have biologically more aggressive tumors (14).

After monotherapy by transperineal implantation of radioactive iodine or palladium in the prostate, Waterhouse et al. (16) noted a 66% 3-year disease-free survival rate for 158 WM compared with a 39% 3-year disease-free survival rate for 38 AAM with clinical stage T1T2N0 prostate cancer. AAM had a higher pretreatment PSA level than did WM, but Gleason score and clinical stage were similar for both groups. Recurrence was defined as two consecutive PSA increases above 1.0 ng/ml. According to the authors, the treatment outcome was not statistically different between the races because of the small number of AAM.

After monotherapy with external beam radiation, Kim et al. (15) noted a significantly higher disease-free survival rate for WM (median pretreatment PSA level 13.8 ng/ml) than AAM (median pretreatment PSA level 68.4 ng/ml). Because of the very high pretreatment PSA levels in AAM, it is likely that most of these men had metastatic disease when treated. Zagars et al. (17) also evaluated treatment outcome after external-beam irradiation alone in a study of 116 AAM and 1085 WM with clinical stage T1–T4 prostate cancer. In contrast to the report by Kim et al. (15), the pretreatment PSA levels were much lower: the median for AAM was 14.0 ng/ml and that for WM was 9.5 ng/ml, a significant difference. With disease freedom defined as a rising PSA regardless of the nadir achieved, no significant difference was observed between AAM and WM when stratified by pretreatment PSA levels, Gleason scores, or stages of disease.

However, postradiotherapy PSA nadir level is the most important predictor of subsequent disease freedom after prostate cancer radiotherapy (19–21). Further, Horwitz et al. (22) have shown that varying the definition of disease

freedom after radiotherapy can enhance the reported disease-free survival rate. Because the study by Zagars et al. (17) included a disproportionate number of AAM who received hormonal therapy and lacked a strict PSA nadir-based definition of disease-free survival, the treatment results may be overstated.

Similar to Moul et al. (3), we found that AAM have a significantly greater PSA level than WM even after stratification of pretreatment clinical factors (Table 2). However, in the present study, no difference was observed in disease freedom between AAM and WM overall (Fig. 1), by pretreatment PSA groups (Fig. 2 A–D), or when men were stratified by stage, Gleason score, or age (Table 3). Also, we found no evidence that young AAM fare worse than older AAM or young WM. On multivariate analysis, race is not a significant prognostic factor when men are treated by simultaneous radiation (Table 4).

Therefore, whether comparing disease-free survival rates overall or according to various pretreatment clinical characteristics, or when evaluating race by multivariate analysis, AAM have the same treatment outcome as WM when treated by simultaneous radiation even though AAM present with significantly higher pretreatment PSA levels. These observations may be of greater interest because this study was conducted in a community-based private practice where most men with prostate cancer will be treated, whereas the study by Moul et al. (3) was conducted in a single U.S. tertiary-care military institution.

Assuming that the higher PSA levels of AAM reflect more extensive disease, simultaneous radiation may be one reason that AAM have outcomes equal to WM. An I-125 implant that has a 60-day half-life initially is placed in the prostate. Three weeks after the implantation, external-beam radiation is started and given daily for 6 weeks. Thus, organ-confined malignant and benign prostate epithelium is irradiated simultaneously, which intensifies the intraprostatic radiation dose. Extracapsular disease is not treated by seed implantation alone. Because extracapsular disease is present subclinically in at least half of all men with clinical stage T1T2N0 prostate cancer, and even in 25% of men with a pretreatment PSA level of ≤ 4.0 ng/ml (23), all men in this study had irradiation of microscopic extracapsular disease by the follow-up external beam radiation. Therefore, although AAM present with higher pretreatment PSA levels than WM, which is indicative of greater intraprostatic tumor volume and more extensive extracapsular disease, simultaneous radiation may equalize the treatment outcomes for both races.

These observations correlate with the findings of Waterhouse et al. (16), Moul et al. (7), and Iselin et al. (14). Because prostate implantation alone does not effectively treat extracapsular disease, and because AAM present with higher pretreatment PSA levels than WM, AAM should have a failure rate greater than WM when treated by prostate implantation alone, as observed by Waterhouse et al. (16). In the radical prostatectomy study by Moul et al. (7), > 80% of both AAM and WM had a nerve-sparing radical prostatectomy, almost always a bilateral nerve-sparing procedure. Because AAM presented with more extensive disease than WM but had the same rate of nerve-sparing radical prostatectomies, more AAM would be expected to have disease recur. While no comment is made in the report of Iselin et al. (14) regarding the use of nerve-sparing surgical techniques, the concept of comprehensive treatment for AAM is supported because all men with specimen-confined tumors in their series had similar outcomes despite larger tumor volumes for AAM.

The findings in this study are encouraging but should be interpreted cautiously. This study is similar to those of Moul et al. (7) and Iselin et al. (14) in terms of the number of AAM at risk as well as in length of follow-up for those patients treated in the PSA era; nonetheless, the follow-up is short. The PSA levels for AAM in this report are lower than those reported by Moul et al. (7), perhaps reflecting a lower disease burden. Additionally, some investigators have suggested that because of educational and economic differences between the races, PSA screening efforts have not been as effective among AAM as WM (24,25). Twenty-seven percent of the Georgia population is African American (26), whereas only 11% of men in this report were AAM. Therefore, through educational or economic selection measures, AAM treated in our private-practice clinic may not reflect the overall AAM population.

On the other hand, the results achieved in the treatment of AAM in this report may reflect the current status of prostate cancer management relative to race better than other published reports. Vijayakumar et al. (27) noted that the average pretreatment PSA level in AAM has declined sharply, even more than in WM, over the periods 1988 to 1995, reflecting increased use of PSA screening. In this study, AAM were treated

between 1993 and 1998 when PSA screening was performed even more intensively. Thus, through more extensive PSA screening was conducted during the years covered by this study, earlier detection of prostate cancer in AAM may be responsible for the lack of a significant difference in treatment outcome between AAM and WM.

CONCLUSION

In this study of race and prostate cancer, AAM with clinical stage T1T2NX prostate cancer treated in private practice present with higher pretreatment PSA levels than WM. Nonetheless, after the evaluation of treatment outcome, AAM have the same disease-free survival rates as WM when treated by simultaneous radiation. If their higher pretreatment PSA levels reflect greater tumor burden and, thus, more locally advanced disease, simultaneous irradiation appears to compensate for the more extensive rates of prostate cancer in AAM.

REFERENCES

1. Landis SH, Murray T, Boldon S, Wingo PA. (1999) Cancer statistics, 1999. *CA Cancer J. Clin.* 49: 8–31.
2. Mettlin CJ, Murphy GP, Rosenthal DS, Menck HR. (1998) The National Cancer Data Base Report on prostate carcinoma after the peak in incidence rates in the U.S.: The American College of Surgeons Commission on Cancer and the American Cancer Society. *Cancer* 83: 1679–1684.
3. Moul JW, Sesterhenn IA, Connelly RR, et al. (1995) Prostate-specific antigen values at the time of prostate cancer diagnosis in African-American men. *JAMA.* 274: 1227–1281.
4. Polednak AP, Flannery JT. (1992) Black versus white racial differences in clinical stage at diagnosis and treatment of prostate cancer in Connecticut. *Cancer* 70: 2152–2158.
5. Powell IJ, Heilbrun LK, Sakr W, et al. (1997) The predictive value of race as a clinical prognostic factor among patients with clinically localized prostate cancer: A multivariate analysis of positive surgical margins. *Urology* 49: 726–731.
6. Robbins AS, Whittemore AS, Van Den Eeden SK. (1998) Race, prostate cancer survival and membership in a large health maintenance organization. *J. Natl. Cancer Inst.* 90: 986–990.
7. Moul JW, Douglas TH, McCarthy WF, McLeod DG. (1996) Black race is adverse prognostic factor for prostate cancer recurrence following radical prostatectomy in an equal access health care setting. *J. Urol.* 155: 1667–1673.
8. Powell IJ, Schwartz K, Hussain M. (1995) Removal of the financial barrier of health care: Does it impact on prostate cancer at presentation and survival?: A comparative study between black and white men in a veterans affairs system. *Urology* 46: 825–830.
9. Austin JP, Aziz H, Powers L, et al. (1990) Diminished survival of young blacks with adenocarcinoma of the prostate. *Am. J. Clin. Oncol.* 13: 465–469.
10. Brawn PN, Johnson EH, Kuhl DL, et al. (1993) Stage at presentation and survival of white and black patients with prostate carcinoma. *Cancer* 71: 2569–2572.
11. Fowler JE, Terrell F. (1996) Survival in black and whites after treatment for localized prostate cancer. *J. Urol.* 156: 133–136.
12. Optenberg SA, Thompson IM, Friedrichs P, et al. (1995) Race, treatment and long-term survival in an equal-access medical care delivery system. *JAMA.* 274: 1599–1605.
13. Roach M III, Jiandong L, Pilepich M, et al. (1999) Long term survival after radiotherapy alone: Radiation Therapy Oncology Group prostate cancer trials. *J. Urol.* 161: 864–868.
14. Iselin CE, Fox JW, Vollmer RT, et al. (1998) Surgical control of clinically localized prostate carcinoma is equivalent in African-American and white males. *Cancer.* 83: 2353–2360.
15. Kim JA, Kuban DA, el Mahdi AM, et al. (1995) Carcinoma of the prostate: Race as a prognostic indicator in definitive radiation therapy. *Radiology* 194: 545–549.
16. Waterhouse RL, Stock RG, Stone N. (1998) Brachytherapy in the treatment of prostate cancer in African-Americans. *Proceedings of the National Medical Association.* New Orleans, LA. August 1998. Abstract U-25, p. 76.
17. Zagars GK, Polack A, Pettway CA. (1998) Prostate cancer in African-American men: Outcome following radiation therapy with or without adjuvant androgen ablation. *Int. J. Radiat. Oncol. Biol. Phys.* 42: 517–523.
18. Eastham JA, May RA, Whatley T, et al. (1998) Clinical characteristics and biopsy specimen features in African-American and

white men without prostate cancer. *J. Natl. Cancer Inst.* 90: 756–760.

19. Critz FA, Tarlton RS, Holladay DA. (1995) Prostate specific antigen-monitored combination radiotherapy for patients with prostate cancer: I-125 implant followed by external-beam radiation. *Cancer* 75: 2383–2391.
20. Crook JM, Bahadur YA, Bociek RG, et al. (1997) Radiotherapy for localized prostate carcinoma. The correlation of pretreatment prostate specific antigen and nadir prostate specific antigen with outcome as assessed by systematic biopsy and serum prostate specific antigen. *Cancer* 79: 328–336
21. Zietman AL, Tibbs MK, Dallow KC, et al. (1996) Use of PSA nadir to predict subsequent biochemical outcome following external beam radiation therapy for T1-2 adenocarcinoma of the prostate. *Radiother. Oncol.* 40: 159–162.
22. Horwitz EM, Vicini FA, Ziaja EL, et al. (1996) Assessing the variability of outcome for patients treated with localized prostate irradiation using different definitions of biochemical control. *Int. J. Radiat. Oncol. Biol. Phys.* 36: 565–571.
23. Partin AW, Kattan MW, Subong EN, et al. (1997) Combination of prostate-specific antigen, clinical stage, and Gleason score to predict pathological stage of localized prostate cancer. A multi-institutional update. *JAMA.* 277: 1445–1451.
24. Myers RE, Wolf TA, Balshem AM, et al. (1994) Receptivity of African-American men to prostate cancer screening. *Urology* 43: 480–487.
25. Denmark-Wahnefried W, Catoe KE, Paskett E, et al. (1992) Characteristics of men reporting for prostate cancer screening. *Urology* 42: 269–275.
26. Bureau of the Census. (1990) *1990 U.S. Census Data.* Government Printing Office, Washington, D.C.
27. Vijayakumar S, Vaida F, Weichselbaum R, Hellman S. (1998) Race and the Will Rogers phenomenon in prostate cancer. *CA Cancer J. Clin.* 4: 27–34.

NCHA
PO Box 4449
Cary, NC 27519 - 4449

919 / 677-2400
919 / 677-4200 fax
www.ncha.org

North Carolina Hospital Association

April 11, 2008

MEMORANDUM

TO: Tom Elkins, DHSR Planner
Elizabeth Brown, DHSR Chief of Budget & Planning

FROM: Mike Vicario, Vice President of Regulatory Affairs
919-677-4233 <mvicario@ncha.org>

SUBJECT: Comment: Cary Urology Petition for a methodology to establish need for an IMRT/IGRT – capable linear accelerator

The Cary Urology petition proposes a separate linear accelerator methodology for a prostate cancer center. The petition reports that 20% of linear accelerator pts are there for prostate cancer, and that NC men have higher prevalence rates. The petition argues that many NC counties have high death rates, perhaps attributable to a very high incidence in non-white males. It focuses on the need for appropriate conformal therapy and suggests that a more integrated care team (including urology and oncology) approach would be used.

North Carolina's approach to establishing need for linear accelerators considers that patients seek treatment locally for therapies like radiation oncology that require multiple visits. Most likely an existing linear accelerator facility will be closer to a patient with the disease than the proposed new center and therefore more likely to seek services locally. Each of the three existing centers mentioned in the petition are located in metropolitan areas with populations over 2.5 million persons, more than twice the population of the Raleigh-Durham metropolitan area.

2000 Metropolitan Population Estimates	
Atlanta, GA MSA	4,112,198
Denver--Boulder--Greeley, CO CMSA	2,581,506
Cleveland--Akron, OH CMSA	2,945,831

The petitioner reports that there are now 7 operational linear accelerators in Wake County and an additional linear accelerator from last year's SMFP. The petitioners expressed need for more widespread education on prostate disease and more integrated treatment approaches has merit. However an approach that establishes new equipment need for disease-based clinics in addition to the existing utilization-based methodology is potentially duplicative to the existing process and should not be considered as a supplement to the existing methodology.

NCHA recommends that the Council support the existing need methodology and encourage the petitioner to work with existing linear accelerator providers.