National Sociodemographic Disparities in the Treatment of High-Risk Prostate Cancer: Do Academic Cancer Centers perform better than Community Cancer Centers?

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Running Head: Disparities in prostate cancer treatment by center type

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Key Words: Prostatic neoplasm; patterns of care; disparities; academic center; community center; national cancer data base.

Précis: Compared to white or privately insured patients, black, Hispanic, and uninsured patients were less likely to receive definitive therapy at both community and academic cancer centers, and among patients who received definitive therapy, black, Hispanic, and uninsured patients were more likely to experience treatment delays at both community and academic centers. Making community centers conform to academic center standards may not necessarily reduce treatment disparities.

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Abstract

Background: Most major cancer organizations seek to reduce sociodemographic disparities in high risk cancers partly by increasing access to theoretically high-quality academic-oriented cancer care. We sought to determine whether academic centers have less sociodemographic treatment disparities than community centers, using high-risk prostate cancer as a test case.

Methods: The National Cancer Data Base (NCDB) was used to identify 138,019 patients diagnosed with non-metastatic high-risk prostate cancer from 2004-2012. Multivariable logistic was used to identify independent determinants of definitive therapy. Gray's test and multivariable Cox Regression analyzed therapy timing. All analysis were stratified by academic versus community cancer center.

Results: Compared to white or privately insured patients, black, Hispanic, and uninsured patients were less likely to receive definitive therapy at both community (Adjusted Odds Ratio [AOR] 0.60; 0.56-0.64, AOR 0.69; 0.61-0.78, and AOR 0.25; 0.22-0.30, respectively) and academic cancer centers (AOR 0.50; 0.46-0.54, AOR 0.56; 0.50-0.64, and AOR 0.31; 0.28-0.36, respectively). Among patients who received definitive therapy, black, Hispanic, and uninsured patients were more likely to experience treatment delays at both community (+15, +10, and +19 days, respectively; all Gray's $P < 0.001$) and academic centers (+19, +11, and +18 days respectively); treatment delays were observed among the aforementioned groups even after multivariable Cox regression analysis ($P < 0.001$ for all adjusted hazard ratios).

Conclusions: Nationally, academic cancer centers demonstrate similarly high rates of sociodemographic disparities in cancer treatment patterns as community cancer centers. Making community centers conform to academic center standards may not necessarily reduce treatment disparities.

Introduction:

In 2015 there were 220,800 new cases of prostate cancer and 27,500 deaths due to prostate cancer in the United States alone, making prostate cancer the most common non-cutaneous cancer among men in the United States.[1]

Reducing sociodemographic disparities in high risk cancers has been a major goal of the American Cancer Society and other major cancer organizations for the last two decades.[2-4] Despite this goal, and evidence that minority black men suffer poorer prostate cancer outcomes, there have been persistent sociodemographic disparities in the management of prostate cancer without significant changes in these patterns of care over the last decade.[5-9] Disparities in cancer care certainly present a barrier to mitigating disparities in cancer outcome, though it is unclear if reducing disparities in care patterns would actually translate to better cancer outcome. Differences in quality of care may contribute to observed disparities in treatment patterns and outcomes and theoretically equal access to high-quality academic centers could act to reduce or neutralize the burden of disparities of high risk cancers.[3, 7] Although it has not been established that there are quality differences between the academic and community setting, one of the major aims of the National Cancer Institute's Community Oncology Research Program (NCORP) is to reduce cancer disparities by increasing uptake of effective, research-oriented cancer care and practices into routine community care. [4, 10]

Herein, we used the National Cancer Data Base (NCDB), recognized as the largest national cancer database in the United States (in terms of number of cases collected),[11] to evaluate national disparities in the management patterns of a high risk cancer as stratified by hospital type: community versus academic cancer center. In doing so, we sought to determine

whether national racial and sociodemographic disparities in treatment patterns of high-risk prostate cancer differ between academic versus community cancer centers.

Methods:

Study population

Our study population was derived from the National Cancer Data Base (NCDB),[11] a database created by the joint effort of the Commission on Cancer (CoC) and the American Cancer Society (ACS). NCDB is a nationwide hospital-based database that captures 70 percent of newly diagnosed cancers in the United States (all cases are diagnosed and treated at CoC accredited cancer programs). Patients diagnosed with non-metastatic high-risk (with at least one high-risk factor: PSA > 20, or GS 8-10, or ≥ cT3a)[12] prostate cancer from 2004-2012 were identified from the database for study purposes. We restricted our study population to only one cancer diagnosis, prostatic adenocarcinoma. We excluded patients with unknown tumor stage, Gleason score, PSA level or patients without available definitive treatment information. Selection criteria for the study are displayed in Figure 1. The institutional review board of our facility approved this study.

Statistical analysis

Descriptive statistics were used to present the baseline characteristics. Categorical variables were assessed with Chi-square test; continuous variables were compared with student-t test or Mann-Whiney U test as appropriate. Receipt of definitive therapy was defined as receipt of either radical prostatectomy or receipt of radiation therapy plus androgen deprivation therapy as defined by the NCDB (notably there is no time limit to when first course treatment is

captured, though most first course treatment in the NCDB is within a year of diagnosis—as was the case in our study population). We used multivariable logistic regression to identify the independent predictors for receipt of treatment. Univariable cumulative incidence functions were used to illustrate the timing of definitive therapy as stratified by race and hospital type. Multivariable Cox regression was applied to determine adjusted hazard ratios for time to receipt of definitive treatment. As a sensitivity analysis, all aforementioned analyses were repeated stratified by age group (age less than or equal to 70 and age greater than 70).

Demographic covariates assessed in the multivariable regression analyses included age, race, insurance status, residence type, distance to the reporting hospital, household income, the percent of education level less than high school for each patient's area of residence; clinical variables included Charlson-Deyo comorbidity score (0, 1, ≥2), tumor stage, prostate-specific antigen (PSA), Gleason score, and hospital setting (academic versusnon-academic). Distance to the reporting hospital was categorized into tertiles: 1st tertile (≤6.7 miles), 2nd Tertile (6.7-20.4 miles), 3rd tertile (> 20.4 miles). Household income and the percent of education level less than high school for each patient's area of residence were based on the 2012 American Community Survey data; the residence type was based on the 2003 United States Department of Agriculture Economic Research Service. All statistical analyses were performed using SAS® version 9.4. (SAS Institute Inc., Cary, NC, USA). We used a two-sided p-value<0.05 in all analyses as criteria for statistical significance.

Results:

Baseline patient characteristics

Definitive therapy rates for high-risk prostate cancer were 87.8% at academic cancer centers and 90.6% at community cancer centers. White patients had similarly high rates of definitive therapy at both academic and community centers (90.8 and 91.5%, respectively), while black and Hispanic patients treated at academic hospitals received definitive therapy 79.7% and 79.4% of the time, respectively, versus 87.1% and 86.4% at community centers, respectively (Figure 2; P<0.001). Patients managed at academic centers were younger, more racially diverse, and more likely to come from metropolitan areas when compared to patients managed at community cancer centers (all P < 0.001; Table 1). Clinical characteristics including PSA, Gleason Score, T stage, and Charlson comorbidity score were all clinically similarly, yet statistically different between patients managed at academic versus community cancer centers.

Sociodemographic disparities in receipt of prostate cancer stratified by treatment facility type

After robust multivariable adjustment for clinical and sociodemographic factors, compared to white or privately insured patients, black, Hispanic, and uninsured patients were less likely to receive definitive therapy at both community (Adjusted Odds Ratio [AOR] 0.60; 95% CI 0.56-0.64, AOR 0.69; 95% CI 0.61-0.78, and AOR 0.25; 95% CI 0.22-0.30, respectively [all P<0.001]) and academic cancer centers (AOR 0.50; 95%CI 0.46-0.54, AOR 0.56; 0.50-0.64, and AOR 0.31; 0.28-0.36, respectively[all P<0.001]) (Table 2).

Sociodemographic disparities in timing of treatment stratified by treatment facility type

The median time to receipt of definitive treatment among patients who ultimately received definitive therapy was 83 days after diagnosis, regardless of race or hospital setting. In academic centers, the median time to receipt of definitive treatment among white patients was 83 days versus 102 days for black patients and 94 days for Hispanic patients (Gray's P <0.001; Figure 3a). In community centers, the median time to receipt of definitive therapy among white patients was 77 days versus 92 days among black patients and 87 days among Hispanic patients (Gray's P <0.001; Figure 3b).

Even after robust multivariable adjustments, black, Hispanic, and uninsured patients were still less likely to receive timely definitive therapy at both community (Adjusted Hazard Ratio [AHR] 0.78; 95% CI 0.76-0.80, AHR 0.91; 95% CI 0.87-0.95, and AHR 0.77; 95% CI 0.72-0.82, respectively [all P<0.001]) and academic cancer centers (AHR 0.75; 95%CI 0.73-0.77, AHR 0.91; 0.86-0.96, and AHR 0.75; 0.70-0.79, respectively [all P≤0.001]) (Table 2)

Sensitivity Analysis

All aforementioned analyses including both multivariable analyses for receipt of definitive treatment and multivariable Cox models for time to receipt of treatment were repeated stratified by age (age less than or equal to 70 and age greater than 70) and there were no differences in any of the findings as stratified by age group.

Discussion:

We used the nation's largest cancer registry to evaluate contemporary national disparities in the management patterns of high-risk cancer as stratified by hospital type. Given the size and

comprehensive nature of the NCDB, the patterns of care described in this study are likely the best available estimation and reflection of national disparities in high-risk prostate cancer patterns of care across academic and community cancer centers.

In this study we found that black and Hispanic patients have nearly half the odds of receiving definitive therapy relative to white patients across both community and academic cancer centers. Similarly, uninsured patients have nearly one-fourth the odds of receiving definitive therapy relative to privately insured patients across both community and academic cancer centers. Furthermore, black, Hispanic, and uninsured patients are all more likely to experience significant delays in receipt of treatment when compared to white or privately insured patients across both community and academic cancer centers.

Our study highlights the novel finding that academic cancer centers are not performing better than community cancer centers when it comes to disparities in cancer treatment patterns for high-risk cancers. Academic cancer centers, in fact, have strikingly similar rates of disparities in the treatment of minorities and uninsured patients with high-risk prostate cancer when compared to community cancer centers. These results have major implications for ongoing efforts by many major national cancer organizations that seek to reduce or eliminate disparities in cancer treatment patterns and outcomes. Specifically, our results imply that more will need to be done than simply increase access to high quality research focused cancer centers, as is one of the major aims of the NCORP as a part of National Cancer Institute's initiative to reduce cancer disparities.[4, 10]

The fact that disparities exist across cancer care centers, regardless of academic versus community center structure, suggests that there may be something intrinsic about systemic, provider, or patient-level issues that may be interfering with treatment. It may be the case that

the systems involved with cancer care are incredibly complex to navigate and patients from more at risk groups are more likely to receive later diagnoses, not receive proper treatment, or be lost to follow-up. It has been suggested and demonstrated that patient navigators may help reduce cancer care disparities by helping patients most at risk of getting substandard care due to complex systems of cancer care.[13, 14] Alternatively, it may be the case that there are differences in treatment due to patient preferences, or even physician bias.[15, 16]

Both community and academic centers need to identify and address the issues and processes that are leading to racial and sociodemographic differences in the treatment of high-risk cancers. Although this study may be the first and certainly largest national study to demonstrate similar rates of disparity across community and academic centers, current national cancer registry studies are not able to comprehensively identify the processes that lead to the observed disparities. Researchers from the National Health Institute, however, have recently developed Cancer Care Delivery Research (CCDR) which focuses on how systems, processes of care, delivery models, financing and reimbursement, available treatments, and both physician and patients attitudes, beliefs, and behaviors contribute to access to cancer care and cancer outcomes.[17] CCDR or a similar type of research should be implemented at both community and academic cancer centers in order to elucidate the factors that are leading to sociodemographic differences in the management of high-risk cancers. Once these factors are identified, interventions and programs can be tailored to address those factors in an effort to reduce disparities in the treatment and outcomes of cancer.

Our results must be viewed within the limitations of this study. The NCDB is a hospital-based cancer registry that only captures patients diagnosed and treated at CoC accredited cancer programs and not from centers that are not CoC accredited cancer programs and so our data may

not reflect trends from smaller cancer centers. Nevertheless, the NCDB is recognized as the nation's largest cancer registry, capturing 70% of incident cancers and as such represents one of the best databases to analyze national patterns of care in cancer treatment disparities. Furthermore, we were still able to capture disparities in the management of high-risk prostate cancer at both CoC accredited academic and community cancer centers, and it should be expected that other non-CoC accredited centers would have similar rates of disparities.

Despite the potential limitations, our study is the first NCDB report on national disparities in the treatment of a high-risk cancer as stratified by hospital type. Nationally, academic cancer centers demonstrate similarly high rates of racial and sociodemographic disparities in cancer treatment patterns when compared to community cancer centers. Making community centers conform to academic center standards may not necessarily reduce treatment disparities and both academic and community cancer centers must work on identifying and addressing processes that lead to disparities in the treatment of aggressive cancers.

References:

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2015. CA Cancer J Clin. 2015;65: 5-29.

2. Byers T, Mouchawar J, Marks J, et al. The American Cancer Society challenge goals. How far can cancer rates decline in the U.S. by the year 2015? Cancer. 1999;86: 715-727.

3. Ward E, Jemal A, Cokkinides V, et al. Cancer disparities by race/ethnicity and socioeconomic status. CA Cancer J Clin. 2004;54: 78-93.

4. National Cancer Institute: Cancer Health Disparities. Available at: http://www.cancer.gov/about-nci/organization/crchd/cancer-health-disparities-fact-sheet#q16. Accessed 4 September 2015.

5. Zeliadt SB, Potosky AL, Etzioni R, Ramsey SD, Penson DF. Racial disparity in primary and adjuvant treatment for nonmetastatic prostate cancer: SEER-Medicare trends 1991 to 1999. Urology. 2004;64: 1171-1176.

6. Underwood W, De Monner S, Ubel P, Fagerlin A, Sanda MG, Wei JT. Racial/ethnic disparities in the treatment of localized/regional prostate cancer. J Urol. 2004;171: 1504-1507.

7. Barocas DA, Gray DT, Fowke JH, et al. Racial variation in the quality of surgical care for prostate cancer. J Urol. 2012;188: 1279-1285.

8. Mahal BA, Aizer AA, Ziehr DR, et al. Trends in disparate treatment of African American men with localized prostate cancer across National Comprehensive Cancer Network risk groups. Urology. 2014;84: 386-392.

9. Mahal BA, Aizer AA, Ziehr DR, et al. The association between insurance status and prostate cancer outcomes: implications for the Affordable Care Act. Prostate Cancer Prostatic Dis. 2014;17: 273-279.

10. National Cancer Institute Community Oncology Research Program. Available at: http://ncorp.cancer.gov/about/. Accessed 1 March 2016.

11. Bilimoria KY, Stewart AK, Winchester DP, Ko CY. The National Cancer Data Base: a powerful initiative to improve cancer care in the United States. Ann Surg Oncol. 2008;15: 683-690.

12. NCCN Clinical Practice Guidelines in Oncology. *Prostate Cancer* 2014. Available at: http://www.nccn.org. Accessed 30 December 2013.

13. Moy B, Chabner BA. Patient navigator programs, cancer disparities, and the patient protection and affordable care act. Oncologist. 2011;16: 926-929.

14. Hede K. Agencies look to patient navigators to reduce cancer care disparities. J Natl Cancer Inst. 2006;98: 157-159.

15. Schulman KA, Berlin JA, Harless W, et al. The effect of race and sex on physicians' recommendations for cardiac catheterization. N Engl J Med. 1999;340: 618-626.

16. Ryoo JJ, Ordin DL, Antonio AL, et al. Patient preference and contraindications in measuring quality of care: what do administrative data miss? J Clin Oncol. 2013;31: 2716-2723.

17. Kent EE, Mitchell SA, Castro KM, et al. Cancer Care Delivery Research: Building the Evidence Base to Support Practice Change in Community Oncology. J Clin Oncol. 2015;33: 2705-2711.

Figure Legends:

Figure 1. Study Selection Criteria

Figure 2. Rate of definitive therapy (with either radical prostatectomy or radiation therapy plus androgen deprivation therapy) stratified by race (N= 138,019).

Figure 3a. Cumulative incidence of receipt of definitive treatment in academic centers stratified by race (N = 42,769)

Figure 3b. Cumulative incidence of receipt of definitive treatment in community centers stratified by race (N = 76,792)

Table 1. Patient baseline characteristics by hospital type

	Academic Cancer Center (N=50,319)	Community Cancer Center (N=87,700)	P-value
Treatment status (%)			
Received definitive treatment	44179 (87.8)	79416 (90.6)	<.0001
No treatment	6122 (12.2)	8284 (9.5)	
Age (mean, 95%CI)	65.4 (65.3-65.4)	67.2 (67.1-67.3)	<.0001
Race (%)			<.0001
Non-Hispanic White	34,957 (69.5)	68,384 (78.0)	
Black	9,697 (19.3)	12,429 (14.2)	
Hispanic	2,258 (4.5)	3,356 (3.8)	
Other	2,162 (4.3)	2,420 (2.8)	
Unknown	1,245 (2.5)	1,111 (1.3)	
PSA (median, IQR[1])	12.6 (28.7)	13.7 (29.8)	<.0001
Gleason score (%)			<.0001
<=6	6125 (12.2)	12,706 (14.5)	
7	11514 (22.9)	19,052 (21.7)	
8-10	32680 (65.0)	55,942 (63.8)	
T Stage (%)			<.0001
T1	24427 (48.5)	41119 (46.9)	
T2	16867 (33.5)	32088 (36.6)	
T3	8476 (16.8)	13490 (15.4)	
T4	549 (1.1)	1003 (1.1)	
Charlson Score (%)			<.0001
0	43,239 (85.9)	73,839 (84.2)	
1	6,079 (12.1)	11,733 (13.4)	
2+	1,001 (2.0)	2,128 (2.4)	
Insurance Status (%)			<.0001
None	1,655 (3.3)	1,471 (1.7)	
Private	22,670 (45.1)	34,305 (39.1	
Medicaid	1,907 (3.8)	2,067 (2.4)	
Medicare	21,774 (43.3)	47,146 (53.8)	

Other Government	1,080 (2.2)	1,535 (1.8)	
Unknown	1,233 (2.5)	1,176 (1.3)	
Distance to facility (%)			<.0001
1st tertile (≤6.7 miles)	15,917 (31.6)	34950 (39.9)	
2nd tertile (6.7-20.4 miles)	15,294 (30.4)	30377 (34.6)	
3rd tertile (> 20.4 miles)	19,108 (38.0)	22373 (25.5)	
Median Household Income[2]			<.0001
Less than $38,000	8,740 (17.4)	15,610 (17.8)	
$38,000-$47,999	9,806 (19.5)	22,067 (25.2)	
$48,000-$62,999	12,192 (24.2)	23,856 (27.2)	
$63,000+	18,859 (37.5)	24,737 (28.2)	
Unknown	722 (1.4)	1,430 (1.6)	
Percent Less than high school education[3]			<.0001
21% or more	8,317 (16.5)	14,628 (16.7)	
13%-20.9%	11,708 (23.3)	22,581 (25.8)	
7%-12.9%	14,979 (29.8)	28,866 (32.9)	
Less than 7 %	14,627 (29.1)	20,249 (23.1)	
Unknown	688 (1.4)	1,376 (1.6)	
Residence type			<.0001
Metropolitan	42,527 (84.6)	65,000 (74.1)	
Urban	5,596 (11.1)	17,062 (19.5)	
Rural	6,79 (1.4)	2,725 (3.1)	
Unknown	1,497 (3.0)	2,913 (3.3)	

1. IQR=interquartile range
2. Percentage may not sum to 100 due to rounding

Table 2. Multivariable logistic regression models for receipt of definitive treatment by hospital type and multivariable Cox regression models for time to receipt of definitive treatment by hospital type (N= 138,019). [1]

	Academic Cancer Center		Community Cancer Center	
	AOR for Receipt of Definitive Therapy (95% CI) [2]	**AHR for Time to Receipt of Definitive Therapy (95% CI)** [2]	**AOR for Receipt of Definitive Therapy (95% CI)** [2]	**AHR for Time to Receipt of Definitive Therapy by (95% CI)** [2]
Race				
Black	0.50 (0.46-0.54)	0.75 (0.73-0.77)	0.60 (0.56-0.64)	0.78 (0.76-0.80)
Hispanic	0.56 (0.50-0.64)	0.91 (0.86-0.96)	0.69 (0.61-0.78)	0.91 (0.87-0.95)
Other	0.86 (0.75-0.99)**β**	1.03 (0.98-1.08)	0.99 (0.85-1.14)	0.90 (0.85-0.94)
Non-Hispanic White	Ref	Ref	Ref	Ref
Insurance status				
none	0.31 (0.28-0.36)	0.75 (0.70-0.79)	0.25 (0.22-0.30)	0.77 (0.72-0.82)
Medicaid	0.47 (0.42-0.54)	0.79 (0.75-0.84)	0.41 (0.36-0.47)	0.75 (0.72-0.80)
Medicare	1.16 (1.07-1.25)	0.89 (0.87-0.92)	1.09 (1.02-1.17)	0.92 (0.90-0.94)
Other Government	2.75 (2.03-3.73)	0.64 (0.60-0.69)	1.77 (1.36-2.31)	0.66 (0.62-0.70)
Private	Ref	Ref	Ref	Ref
Distance to facility				
3rd tertile (> 20.4 miles)	1.19 (1.10-1.30)	1.00 (0.98-1.03)	1.24 (1.15-1.33)	1.02 (0.99-1.04)
2nd tertile (6.7-20.4 miles)	1.07 (0.99-1.16)**α**	0.99 (0.96-1.01)	1.07 (1.01-1.13)**μ**	1.01 (0.99-1.03)
1ST tertile (≤6.7 miles)	Ref	Ref	Ref	Ref

1. Model adjusted for age, race, PSA, Gleason score, T-stage, Charlson score, Insurance status, distance to facility, facility location, household income, education level, and residence type
2. All confidence intervals that do not include 1.0 have P < 0.001 except: α =0.06, β=0.04, μ=0.023.

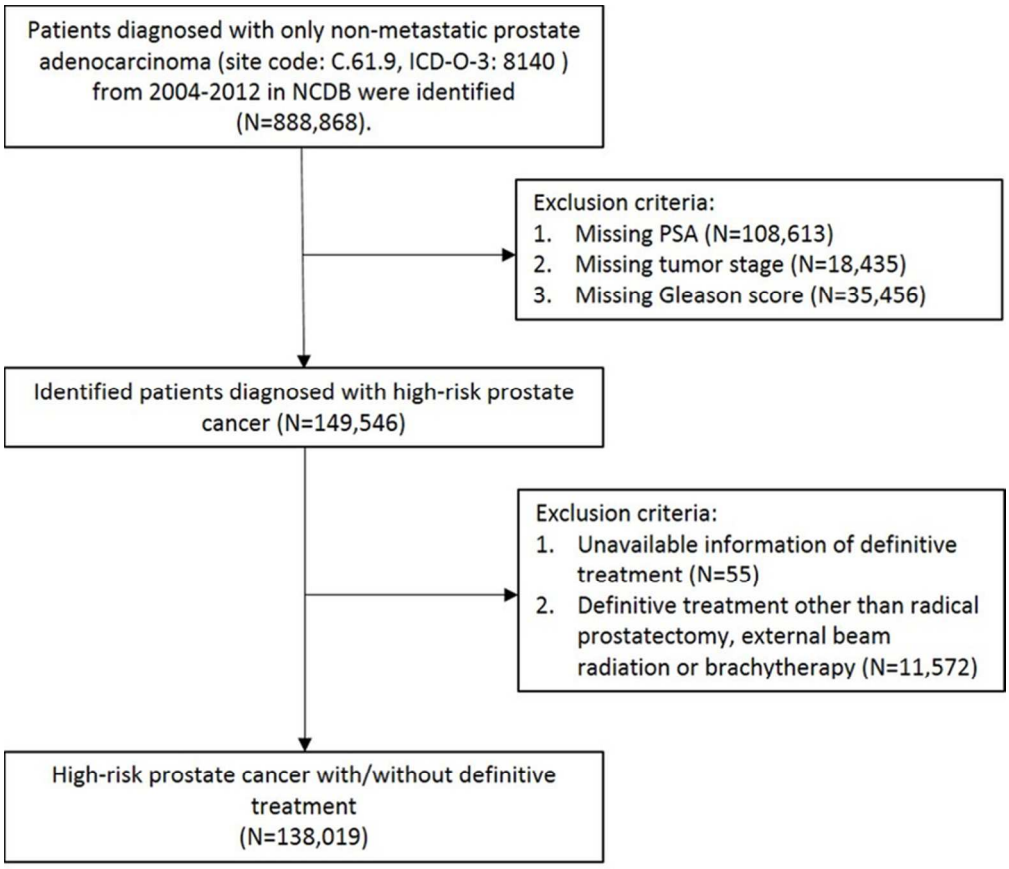

Figure 1. Study Selection Criteria
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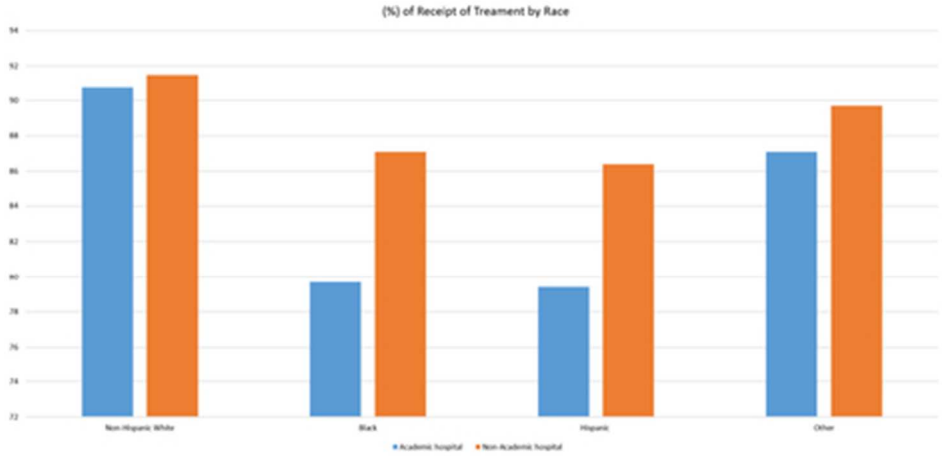

Figure 2. Rate of definitive therapy (with either radical prostatectomy or radiation therapy plus androgen deprivation therapy) stratified by race (N= 138,019)
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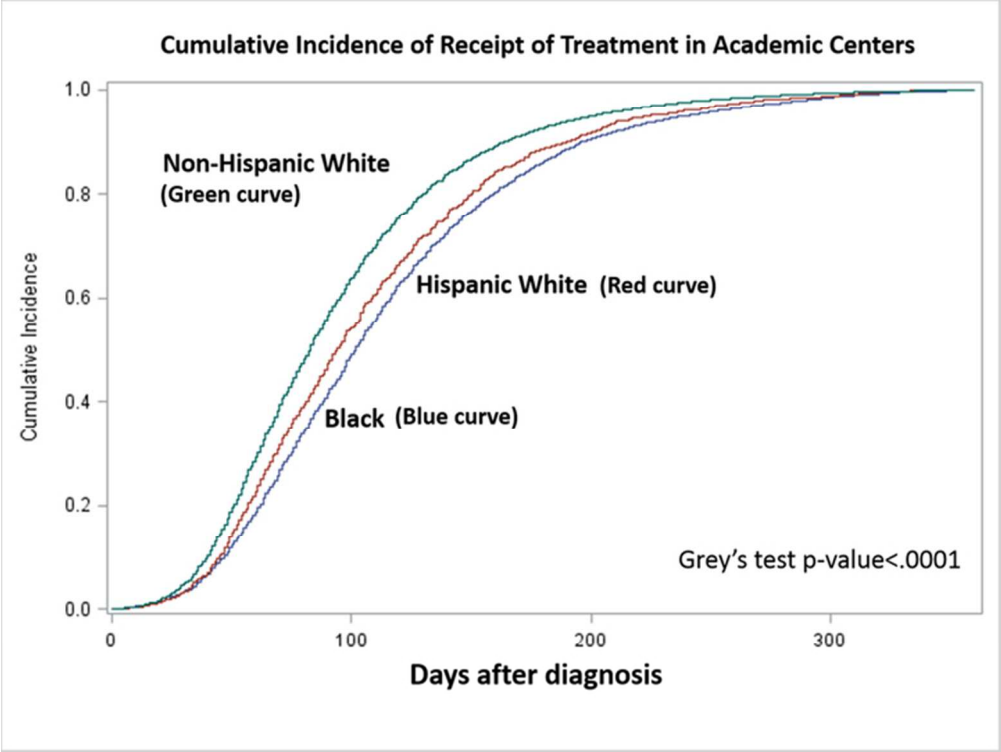

Figure 3a. Cumulative incidence of receipt of definitive treatment in academic centers stratified by race (N = 42,769)
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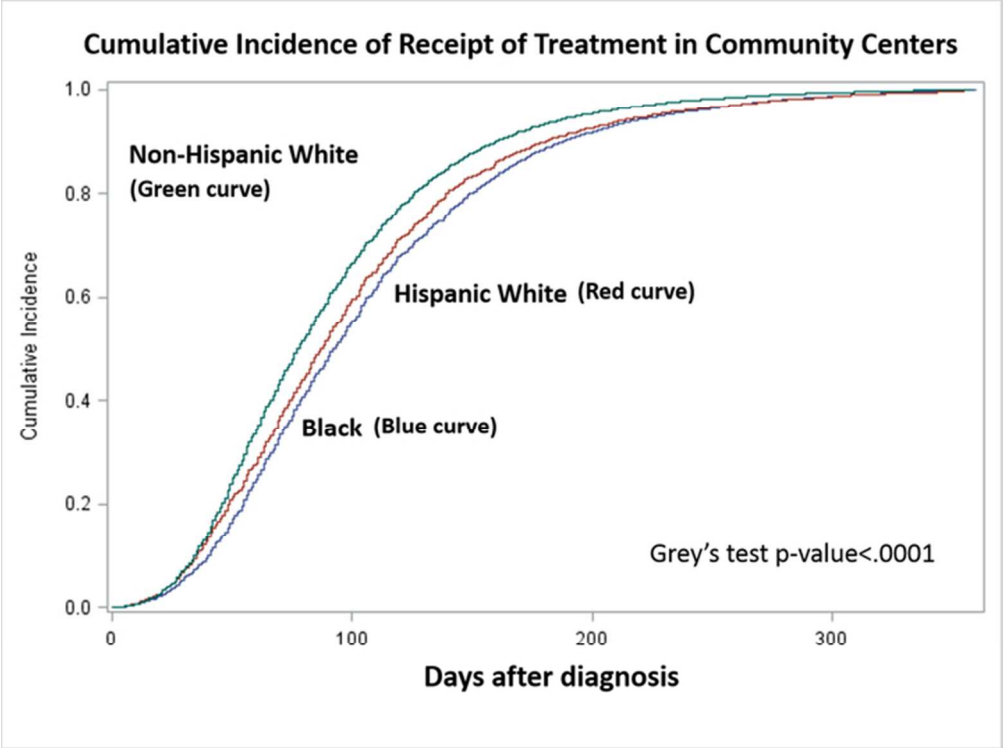

Figure 3b. Cumulative incidence of receipt of definitive treatment in community centers stratified by race (N = 76,792)
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