Understanding the hospital safety net: Hospital resource limitations impact prostate cancer treatment beyond socioeconomic disparities

Raj R. Bhanvadia, Rohit R. Badia, Fady J. Baky, Jennifer W. Tse, Yair Lotan, Solomon L. Woldu, Vitaly Margulis
Department of Urology, UT Southwestern Medical Center, Dallas, TX, United States

Cite as: Bhanvadia RR, Badia RR, Baky FJ, et al. Understanding the hospital safety net: Hospital resource limitations impact prostate cancer treatment beyond socioeconomic disparities. *Can Urol Assoc J* 2025 March 17; Epub ahead of print. http://dx.doi.org/10.5489/cuaj.9038

Published online March 17, 2025

Corresponding Author: Dr. Rohit Badia, Department of Urology UT Southwestern Medical Center**,** Dallas, TX, United States; rohit.badia@utsouthwestern.edu

***

ABSTRACT

Introduction: Safety net hospitals (SNHs) care for a substantial population of vulnerable patients and are often resource-limited. These limitations may impact treatment decisions for high-risk prostate cancer (hPCa). We performed the first population-based analysis examining SNH status and treatment decisions for localized hPCa.

Methods: National cancer database (NCDB) was queried from 2010–2016 for patients with non-metastatic hPCa. SNH status was defined as hospitals with the 95th percentile of Medicaid and uninsured caseload. Non-curative intent treatment was defined as androgen deprivation monotherapy (ADT) or no treatment. Outcomes assessed were treatment choice and overall survival (OS) by SNH status.

Results: A total of 95 747 patients with hPCa were included; 112 hospitals were identified as SNHs with mean Medicaid/uninsured caseload of 24.4% compared to 3.2% at non-SNHs ($p<0.01$). Patients at SNHs were independently associated with greater odds of non-curative

KEY MESSAGES

- Patients at safety net hospital (SNHs) are more likely to receive non-curative intent treatment for high-risk prostate cancer.
- This is independent of patient's insurance status, age, or whether the SNH is associated with an academic center.
- A significant proportion of patients who received non-curative intent treatment at SNHs were alive at 5 years and could have benefited from curative treatment.
- When patients received curative intent treatment, overall survival was not impacted by whether the hospital was a SNH or non-SNH.

intent treatment (odds ratio [OR] 2.2, p<0.01). Results were consistent across subgroups: private insurance (OR 2.2, p<0.01), age <65 (OR 2.3, p<0.01), and at academic centers (OR 1.9, p<0.01). There was no difference in OS among SNHs and non-SNHs when patients received curative treatment. Among patients who did not receive curative treatment, OS was greater at SNHs (hazard ratio 0.82, p=0.02).

Conclusions: Patients at SNHs were more likely to receive non-curative treatment independent of known socioeconomic risk factors. Private insurance or treatment at academic centers did not mitigate these disparities. Increased resources may be needed at SNHs, especially in the context of healthcare expansion, which may further strain these facilities.

INTRODUCTION

Disparities in access to high quality cancer care remains an issue for many patients of low socioeconomic status, who are often cared for at safety net hospitals (SNH).[1] High safety net burden (SNB), often associated with SNHs, is defined as the proportion of Medicaid and uninsured patients within a hospital treatment population.[2] SNB and SNH status are well-studied measures of hospital outcomes and a proxy for hospital resources.[2] SNHs are associated with lower available resources, worse surgical outcomes, increased mortality, and lower adherence to standardized quality measures.[2-4]

Among patients with high risk prostate cancer (hPCa), current American Urologic Association (AUA) guidelines recommend treatment with radical prostatectomy (RP) or radiation (RT) with androgen deprivation therapy (ADT).[5] Further, guidelines explicitly recommend against primary ADT or active surveillance (AS) of men with hPCa unless patients are symptomatic and have limited life expectancy.[5] Despite these recommendations, treatment with RP or RT remains underutilized in hPCa.[6,7] These disparities in treatment for hPCa are further exacerbated in certain at-risk populations, including minorities and patients of low socio-economic status.[8-10]

While disparities in treatment for PCa have been studied across patient level demographic and socioeconomic factors, hospital level resources and resource constraints may have a larger than expected impact on cancer treatment decisions. Studies have shown that SNHs are associated with lower rates of major urologic cancer surgery and that hospitals with modern technology utilization are associated with higher quality prostate cancer care.[9,11] SNHs have been shown to care for a disproportionately greater number of patients with hPCa, further emphasizing the need for guideline based care at these centers.[12]

We performed the first population-based analysis examining the relationship between SNH status and treatment decisions for clinically localized hPCa. Given the well-studied resource limitations of SNHs, we hypothesized that SNHs would be associated with lower likelihood of treatment with curative intent.

METHODS

Data source

The National Cancer Database (NCDB) was queried from years 2010 to 2016. The NCDB is a facility-based, nationwide database that captures more than 70% of all newly diagnosed cancer cases in the United States from over 1,500 Commission on Cancer (CoC)-accredited facilities.[13]

Patient selection

Supplementary Figure 1 represents our selection schema for analysis. We identified patients with clinically localized (cT1-T3, N0, M0) prostate adenocarcinoma using International Classification of Disease for Oncology, third edition (ICD-O-3) histology codes (8140). We excluded patients with cT4 disease, non-adenocarcinoma histology, and patients seen at more than one CoC-accredited facility since it is not possible to allocate treatment to just one institution. Patients with missing clinical T stage, prostate specific antigen (PSA) at diagnosis, and initial treatment were also excluded. High risk prostate cancer was defined based on current AUA guidelines: PSA >20ng/ml or Gleason Grade 8-10 or cT3 disease. All other cases were excluded from analysis.[5]

Variables of interest

Patient and hospital demographic variables of interest included patient age, race (white, black, other), comorbidity, median income quartiles, insurance status, educational status, US region, hospital facility type, and diagnosis year. Prostate cancer specific variables included PSA at diagnosis, sum Gleason grade, cT stage, and initial treatment type. PSA was analyzed as both a continuous and categorical variable. Treatments were organized by use of a combination of modalities (example: RT+ ADT, RP + ADT, etc.) or a single modality alone (example: RT only, RP only, etc.) for analysis. Age was treated as a linear variable and the remainder of variables were treated as categorical variables. Comorbidities were reported based on the Charlson-Deyo comorbidity score and categorized as 0, 1, or at least 2 conditions.[14] SNB was defined as the proportion of patients with Medicaid or no insurance that presented to a participating CoC-facility.[2] SNHs were defined as facilities with greater than the 95th percentile in SNB and treated as a categorical variable for all analysis. Though there is no agreed upon definition of a SNH, we chose the 95th percentile as a rigorous measure of capturing the hospitals who disproportionately care for a high SNB.

Outcomes of interest

Our primary outcome of interest was initial treatment choice for hPCa at SNHs versus non-SNHs. Curative intent treatment was defined as receipt of either RP or RT ± ADT. Non-curative intent treatment was defined as receipt of ADT monotherapy or no therapy at all. Secondary outcomes of interest were assessment of overall survival stratified by SNH status and by initial treatment (curative versus non-curative) using the Kaplan-Meier method and multivariable Cox proportional hazards models.

Statistical analysis

Statistical analyses were performed using Stata®, version 13.0 (College Station, TX USA). For demographic analysis, Chi-Squared testing and Mann-Whitney U testing was performed for categorical and continuous variables, respectively. A multivariable logistic regression model was then constructed to examine the relationship between SNHs and odds of non-curative treatment. Variables were selected for multivariable analysis using a combination of clinical relevance and backwards stepwise selection to determine best fit. We used tolerance cutoffs of greater than 0.1 to exclude any highly co-linear variables from multivariable analysis. We subsequently generated multivariable logistic regression models examining the relationship between SNHs and odds of non-curative intent treatment among the following subgroups: patients with private insurance only, patients age less than 65 with one or less comorbidities, and patients seen at academic hospitals only. These subgroups were chosen for the following reasons: patient's with private insurance could have better access to care compared to patients limited to evaluation at SNHs, patients aged less than 65 with no comorbidity are theoretically most likely to benefit from curative intervention and restricted from access to Medicare, and patient's treated at academic centers could have better adherence to standardized guidelines compared to non-academic centers.[10,15] Overall survival was compared among non-SNH and SNHs stratified by treatment approach using both a multivariable Cox Hazards model and the Kaplan-Meier method. All analysis were two-sided and considered statistically significant at $p < 0.05$.

RESULTS

Hospital and patient characteristics

Our study cohort included 95,747 patients with hPCa across 1,302 CoC hospitals that were eligible for analysis. 112 CoC-accredited facilities were identified as SNHs. SNHs treated a mean (IQR) of 24.4% (10.7%-32.2%) of Medicaid and uninsured patients compared to 3.2% (1.8%- 4.1%) at non-SNHs ($p < 0.01$). Table 1 describes the demographic and hospital characteristics of patients treated according to SNH status. In general, patients treated at SNHs were more likely to be younger, non-white, of the lowest income quartile, from regions with low high school education, and from the eastern U.S. The majority of patients in both cohorts had Charlson comorbidity index score of 0. Patients treated at SNHs were more likely to have initial PSA > 20ng/ml and have cT1 disease at time of diagnosis. The median (IQR) initial PSA was 11.0 (6.1- 27.0) at non-SNHs compared to 20.6 (7.7- 43.1) at SNHs ($p < 0.01$). The majority of patients in both cohorts had Gleason grades of 8-10, but the overall proportion was greater at non-SNHs (74.2% versus 63.5%, $p < 0.01$).

Treatment patterns at non-safety net versus safety net hospitals

Table 2 shows initial treatment approach stratified by SNH status. Patients at SNHs were more than twice as likely to receive non-curative intent management compared to non-SNHs (20.7% versus 8.3%, $p < 0.01$).

Table 3 reports a multivariable logistic regression model examining factors associated with receipt of non-curative intent treatment. Treatment at SNHs was independently associated with greater odds of non-curative intent treatment [OR: 2.22 (95% confidence interval [CI]: 2.06-2.41), p < 0.01]. Other factors independently associated with this included increasing age, increasing PSA, non-white race, >2 comorbid conditions. Factors associated with greater odds of curative intent treatment included increasing clinical T stage, increasing sum Gleason grade, increasing income, and treatment outside of community cancer programs (**Table 3**).

Subsequently, we constructed multivariable logistic regression models to examine odds of receiving non-curative intent management in three specific sub-groups to better understand the relationship between SNH status and initial treatment for hPCa: patients age less than 65 and minimal comorbidities (CCI Scores <=1) (Supplementary Table 1), patients with private insurance only (Supplementary Table 2), and patients treated at academic centers (Supplementary Table 3). Across all subgroups, treatment at a SNH remained independently associated with greater odds of non-curative management; subgroup age < 65, [OR: 2.32 (CI: 2.06-2.62), p < 0.01]; subgroup private insurance only, [OR: 2.19 (CI: 1.90-2.57), p < 0.01]; subgroup academic centers only, [OR: 1.87 (CI: 1.69-2.06), p < 0.01]. The remainder of the variables included in all three sub-group analysis largely followed the trends of multivariable analysis of the entire cohort (Supplementary Tables 1-3).

Overall survival at non-safety net versus safety net hospitals among hPCa

Kaplan-Meier analysis compared overall survival at non-SNHs and SNHs stratified by curative versus non-curative intent treatment (Supplementary Figure 2). Among patients who received curative intent treatment, there was no difference in 5-year overall survival between non-SNHs and SNHs (88% versus 90%, $p = 0.20$). Regardless of hospital type, 5-year overall survival was lower among patients who received non-curative intent treatment compared to patients who received curative intent treatment (Supplementary Figure 2). Among the population of patients who received non-curative intent treatment, 5-year overall survival was greater at SNHs (85% vs 75 %, $p < 0.01$). In the subset of patients who received ADT monotherapy, 5-year overall survival was greater in SNHs than non-SNHs (70% vs 62%, $p < 0.01$). Similarly, in the subset of patients who underwent watchful waiting, 5-year overall survival was greater at SNHs (85% vs 75%, $p < 0.01$). Survival was greater among patients undergoing watchful waiting compared to ADT monotherapy regardless of hospital type.

The results of the Kaplan-Meier analysis are supported by the multivariable Cox hazards models (Supplementary Tables 4 & 5). Among patients who received curative intent treatment, there was no difference in overall mortality among patients treated at SNHs and non-SNHs (HR: 1.02, $p = 0.77$). Increasing age, black race, increasing comorbidity, more recent diagnosis year, worsening T stage and Gleason grade were all associated with higher hazard of overall mortality among patients treated with curative intent. Treatment at non-community hospitals, and increasing income were associated with lower hazard of overall mortality (Supplementary Table 4). Among patients who did not receive curative intent treatment, overall mortality was lower

among patients treated at SNHs compared to non-SNHs, even after adjusting for receipt of ADT monotherapy (HR: 0.82, $p = 0.02$, Supplementary Table 5).

DISCUSSION

This study demonstrates that patients in SNHs, defined by their high SNB, were more than twice as likely to receive non-curative intent treatment than those in non-SNHs (20% vs 8%). When patients received curative intent treatment, the site of treatment did not impact overall survival. A significant proportion of patients who received non-curative intent treatment at SNHs were alive at 5 years and could have benefited from curative treatment. There are several questions regarding the factors that lead to lower rates of treatment including the resources available for treating patients and whether the decision on treatment is impacted by physician or patient preferences. These results have wide-reaching implications, namely that hospital resource availability may play a much larger than previously understood role in dictating treatment decisions among at risk populations with hPCa.

Previous studies have documented disparities in PCa treatment and survival by socioeconomic factors.[4,8,10,16] Our data supports these findings and also found that SNHs were independently associated with non-curative intent treatment. Even in patients with private insurance, SNH status remained an independent predictor of non-curative intent treatment. Despite theoretically improved care access, hospital resource burden still impacted treatment choice, suggesting that at least some of the discrepancies in care are a result of the treatment facility.

The lower rate of curative treatment at SNHs occurred despite treating a patient population that was younger and with less comorbidities. It is possible that uncaptured differences in patient comorbidities or overall health status, which is typically thought to be worse at SNHs, could be driving differences in treatment decisions.[17] Further, it is thought that SNHs serve a younger demographic of patients than non-SNHs. This is because SNHs care for low-income individuals, which include a high proportion of those with Medicaid and younger citizens living in large metropolitan areas (Table 1).[18] While AUA guidelines do allow for watchful waiting in patients with high-risk disease and a shorter than 5-year life expectancy, patients with hPCa at SNHs were on average 65 years old, with an expected 18-year additional life expectancy.[19,20] Further, more than 75% of the non-curative intent treatment cohort was alive at 5 years, suggesting that these patients would have benefitted from curative intent treatment. On subgroup analysis, patients aged less than 65 with minimal to no comorbidities were still less likely to receive curative intent treatment at SNHs. Therefore, it is unlikely that underreported comorbidities account for a significant portion of the discrepancy found between non-SNHs and SNHs.

The majority of SNHs were affiliated with academic centers in our study. Previous studies have highlighted that an academic affiliation can sometimes overcome resource limitations at SNHs.[21] However, our findings are not consistent with this in that SNHs had a higher odds of non-curative intent management of hPCa.

Gerhardt et al. has shown an association between robotic availability at hospital facilities and greater rates of definitive management, supporting that hospital resource availability impacts treatment decisions.[9] The reason behind this remains unknown. It is possible that institutions with the presence of a multidisciplinary genitourinary oncology clinic or fellowship trained physicians have increased use of technology. Further, hospital systems with a higher SNB, including SNHs, have been shown to have longer wait times for clinic appointments, imaging, and treatment scheduling in non-urologic fields.[22] Indeed, patients at SNHs were less likely to undergo RP compared to non-SNHs in our study. Further, the decrease in RP usage was not associated with a commensurate increase in RT usage at SNHs leading to a decreased overall curative intent treatment rate at SNHs.

Our study has several limitations. Foremost, there is no consensus definition in defining SNHs in population-based datasets.[23-25] We sought to mitigate this by defining our SNB cut-offs using the entire cohort of urologic cancers within NCDB, rationalizing that a larger cohort of cancer patients would help generate a more accurate measure of SNB and broaden the generalizability of the data.[26] By defining SNHs as the 95th percentile in Medicaid and uninsured patient caseload in our dataset, our patient distribution across SNHs and non-SNHs approached patient distributions reported in prior studies.[11,12,26]

We cannot ascertain the role of patient preference or patient trust in rates of non-treatment, and there very well may be differences in patient populations between SNHs and non-SNHs that are not captured in our analysis. Further, many patients at SNHs were classified as high risk based on PSA values with lower Gleason grades; It is certainly possible that elevated PSA could have been due to processes other than prostate cancer. The NCDB reports a single PSA value, so we are not able to parse out whether patients had multiple elevated PSAs prior to further evaluation. This is an inherent drawback of the database. While the NCDB does capture some data on comorbidity, it does not capture data on performance status and other medical comorbidities that may impact estimated life expectancy and decision for treatment. While we have data on overall survival, the NCDB lacks estimates of cancer specific survival. Unfortunately, datasets examining cancer specific survival, such as SEER, lack hospital level data necessary for analysis of SNHs. Further, based on the data there are a low number of high risk prostate cancer cases per SNH per year. Though this may raise concern regarding generalizability of results, it is important to underscore that the NCDB captures more than 70% of incident cancer cases in the U.S. The NCDB database only includes CoC-accredited facilities, and thus SNHs may be underrepresented in this dataset. Our study also found an association between more recent diagnostic years and increased overall mortality, which would appear to be a counterintuitive finding compared to other studies of malignancies. It is possible that this increase in mortality is related to changes in national recommendation for PSA screening; indeed one study examining mortality changes between and after the United States Preventative Services Task Force (USPTF) grade “D” recommendation of PSA screening noted a steadily declining prostate cancer mortality rate for men aged 60-69 years from 1999 to 2012 followed by

a significant increase in prostate cancer mortality from 2014 to 2019 coinciding with the USPTF recommendation.[27]

Finally, NCDB data is subject to errors at the level of the local tumor registry and coding may be less accurate at SNHs.[28]

CONCLUSION

SNH status independently impacts treatment beyond known socioeconomic and demographic risk factors. SNB was associated with increased odds of non-curative management for hPCa, including in patients ≤65 years old with minimal comorbidities, those with private insurance, and those treated at academic centers. Alarmingly, more than 75% of hPCa patients who received non-curative intent treatment were alive at 5 years and would have probably benefited from curative treatment. As such, it is paramount that further resources be invested into the care provided at SNHs to close the gap in care for vulnerable populations, especially in the context of recent Medicaid expansions which may further strain these vulnerable facilities.

REFERENCES

1. Smedley BD SA, Nelson AR. Institute of Medicine (US) Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. National Academies Press (US). (http://www.ncbi.nlm.nih.gov/books/NBK220358/).
2. Wakeam E, Hevelone ND, Maine R, et al. Failure to rescue in safety-net hospitals: Availability of hospital resources and differences in performance. *JAMA Surg* 2014;149:229. https://doi.org/10.1001/jamasurg.2013.3566.
3. Wang EH, Yu JB, Abouassally R, et al. Disparities in treatment of patients with high-risk prostate cancer: Results from a population-based cohort. Urology 2016;95:88-94. https://doi.org/10.1016/j.urology.2016.06.010.
4. Wong RJ, Hirode G. The effect of hospital safety-net burden and patient ethnicity on in-hospital mortality among hospitalized patients with Cirrhosis. *J Clin Gastroenterol* 2021;55:624-630. https://doi.org/10.1097/MCG.0000000000001452.
5. Sanda MG, Cadeddu JA, Kirkby E, et al. Clinically localized prostate cancer: AUA/ASTRO/SUO Guideline. Part I: Risk Stratification, shared decision making, and care options. *J Urol* 2018;199:683-90. https://doi.org/10.1016/j.juro.2017.11.095.
6. Cooperberg MR, Carroll PR. Trends in management for patients with localized prostate cancer, 1990-2013. JAMA 2015;314:80. https://doi.org/10.1001/jama.2015.6036.
7. Weiner AB, Matulewicz RS, Schaeffer EM, et al. Contemporary management of men with high-risk localized prostate cancer in the United States. Prostate Cancer and Prostatic Diseases 2017;20:283-288. https://doi.org/10.1038/pcan.2017.5.
8. Coughlin SS. A review of social determinants of prostate cancer risk, stage, and survival. *Prostate Int* 2020;8:49-54. https://doi.org/10.1016/j.prnil.2019.08.001.
9. Gerhard RS, Patil D, Liu Y, et al. Treatment of men with high-risk prostate cancer based on race, insurance coverage, and access to advanced technology. *Urol Oncol* 2017;35:250-256. https://doi.org/10.1016/j.urolonc.2016.12.004.
10. Mahal BA, Ziehr DR, Aizer AA, et al. Getting back to equal: The influence of insurance status on racial disparities in the treatment of African American men with high-risk prostate cancer. *Urol Oncol* 2014;32:1285-91. https://doi.org/10.1016/j.urolonc.2014.04.014.
11. Herrel LA, Ye Z, Miller DC. Utilization and outcomes of inpatient urological care at safety net hospitals. *J Urol* 2015;194:1380-5. https://doi.org/10.1016/j.juro.2015.04.098.
12. Porten SP, Richardson DA, Odisho AY, et al. Disproportionate presentation of high risk prostate cancer in a safety net health system. *J Urol* 2010;184:1931-6. https://doi.org/10.1016/j.juro.2010.06.116.
13. National Cancer Database. American College of Surgeons. (http://www.facs.org/quality-programs/cancer/ncdb).
14. Wong ML, McMurry TL, Schumacher JR, et al. Comorbidity assessment in the National Cancer Database for patients with surgically resected breast, colorectal, or lung cancer (AFT-01, -02, -03). *J Oncol Pract* 2018;14:e631-e643. https://doi.org/10.1200/JOP.18.00175.
15. Lester-Coll NH, Park HS, Rutter CE, et al. The association between evaluation at academic centers and the likelihood of expectant management in low-risk prostate cancer. *Urology* 2016;96:128-35. https://doi.org/10.1016/j.urology.2016.06.042.

16. Shavers VL. Racial and Ethnic Disparities in the Receipt of Cancer Treatment. *J Natl Cancer Inst* 2002;94:334-357. https://doi.org/10.1093/jnci/94.5.334
17. Balasubramanian BA, Garcia MP, Corley DA, et al. Racial/ethnic differences in obesity and comorbidities between safety-net- and non safety-net integrated health systems. Medicine 2017;96:e6326. https://doi.org/10.1097/MD.0000000000006326.
18. Sutton JP, Washington RE, Fingar KR, Elixhauser A. Characteristics of safety-net hospitals, 2014. Healthcare Cost and Utilization Project (HCUP) Statistical Briefs. Rockville (MD) 2006.
19. Prostate Cancer: Clinically Localized Guideline - American Urological Association. (https://www.auanet.org/guidelines/guidelines/prostate-cancer-clinically-localized-guideline).
20. Actuarial Life Table. (https://www.ssa.gov/oact/STATS/table4c6.html).
21. Chertack N, Ghandour RA, Singla N, et al. Overcoming sociodemographic factors in the care of patients with testicular cancer at a safety net hospital. *Cancer* 2020;126:4362-4370. https://doi.org/10.1002/cncr.33076.
22. Bradley CJ, Dahman B, Shickle LM, Lee W. Surgery wait times and specialty services for insured and uninsured breast cancer patients: Does hospital safety net status matter? *Health Serv Res* 2012;47:677-97. https://doi.org/10.1111/j.1475-6773.2011.01328.x
23. Hefner JL, Hogan TH, Opoku-Agyeman W, Menachemi N. Defining safety net hospitals in the health services research literature: A systematic review and critical appraisal. *BMC Health Serv Res* 2021;21:278. https://doi.org/10.1186/s12913-021-06292-9.
24. McHugh M, Kang R, Hasnain-Wynia R. Understanding the safety net: Inpatient quality of care varies based on how one defines safety-net hospitals. Med Care Res Rev 2009;66:590-605. https://doi.org/10.1177/1077558709334895.
25. Popescu I, Fingar KR, Cutler E, et al. Comparison of 3 safety-net hospital definitions and association with hospital characteristics. *JAMA Netw Open* 2019;2:e198577. https://doi.org/10.1001/jamanetworkopen.2019.8577.
26. Sarkar RR, Bachand K, Sheridan P, et al. Quality of care at safety-net hospitals and the impact on pay-for-performance reimbursement. *Int J Radiat Oncol Biol Phys* 2019;105:S179. https://doi.org/10.1016/j.ijrobp.2019.06.218.
27. Burgess L, Aldrighetti CM, Ghosh A, et al. Association of the USPSTF grade D recommendation against prostate-specific antigen screening with prostate cancer-specific mortality. *JAMA Netw Open* 2022;5:e2211869. https://doi.org/10.1001/jamanetworkopen.2022.11869
28. Badia RR, Wong D, Ghandour R, et al. Validation of testicular germ cell tumor staging in nationwide cancer registries. *Urol Oncol* 2021;39:838 e1-838 e6. https://doi.org/10.1016/j.urolonc.2021.09.011

FIGURES AND TABLES

Table 1. Demographic and hospital characteristics of patients with high-risk prostate cancer by safety net hospital status

Variable	Non-safety net hospital	Safety net hospital	p
Number of patients, n	89 452	6295	
Safety net burden (%)			<0.01
Mean (SD)	3.2% (1.9%)	24.4% (19.3%)	
Median (IQR)	2.8% (1.8–4.1%)	14.7% (10.7–32.2%)	
Age			<0.01
Mean (SD)	67 (9)	65 (9)	
Median (IQR)	67 (61–72)	65 (59–71)	
Race, n (%)			<0.01
White	71 325 (79.7)	3037 (48.2)	
Black	14 029 (15.7)	2693 (42.8	
Other	4098 (4.6)	5265 (9.0)	
CCI scores, *n* (%)			0.02
0	71 806 (80.3)	5099 (81.0)	
1	13 942 (15.6)	909 (14.4)	
>2	3704 (4.1)	287 (4.6)	
Median income quartile, n (%)			<0.01
<$30 000	10 516 (12.2)	1986 (32.4)	
$30 000–34 999	15 115 (17.5)	1002 (16.3)	
$35 000–45 999	23 933 (27.7)	1479 (24.1)	
$46 000	37 006 (43.6)	1673 (27.2)	
Insurance status, n (%)			<0.01
Not insured	1283 (1.4)	763 (12.1)	
Private	36 145 (40.4)	1738 (27.6)	
Medicaid	2526 (2.8)	1015 (16.1)	
Medicare	46 237 (51.7)	2557 (40.6)	
Other government	2193 (2.5)	128 (2.0)	
Unknown	1068 (1.2)	94 (1.6)	
Percent no high school degree, n (%)			<0.01
>17.6%	15 967 (18.1)	2948 (47.4)	
10.9–17.5%	22 001 (24.9)	1491 (24.0)	

6.3–10.8%	25 923 (29.3)	1000 (16.1)	
<6.3%	24 415 (27.7)	777 (12.5)	
Region, n (%)			<0.01
West	14 713 (16.5)	664 (10.6)	
Midwest	24 745 (27.7)	989 (15.7)	
South	32 057 (35.8)	2484 (39.5)	
East	17 920 (20.0)	2157 (34.2)	
Hospital type, n (%)			< 0.01
Community cancer program	7160 (8.0)	719 (11.4)	
Comprehensive community cancer program	38 935 (43.5)	718 (11.4)	
Academic program	32 460 (36.3)	4089 (65.0)	
Integrated network cancer program	10 880 (12.2)	768 (12.2)	
Diagnosis year, n (%)			<0.01
2010	11 548 (12.9)	829 (13.2)	
2011	12 224 (13.7)	786 (12.5)	
2012	11 118 (12.4)	874 (13.9)	
2013	11 942 (13.4)	870 (13.8)	
2014	12 489 (14.0)	833 (13.2)	
2015	14 329 (16.0)	1030 (16.4)	
2016	15 802 (17.7)	1073 (17.1)	
Clinical tumor (T) stage, n (%)			<0.01
cT1	50 802 (56.8)	4045 (64.3)	
cT2	28 653 (32.0)	1573 (25.0)	
cT3	9997 (11.2)	677 (10.7)	
PSA range (ng/mL)			<0.01
Mean (SD)	21.3 (23.0)	29.5 (27.4)	
Median (IQR)	11.0 (6.1–27.0)	20.6 (7.7–43.1)	
PSA groups (ng/mL), n (%)			< 0.01
0–9.9	41 693 (46.6)	2069 (32.9)	
10.0–20.0	16 308 (18.2)	1003 (15.9)	
>20.0	31 451 (35.2)	3223 (51.2)	
Gleason score, n (%)			<0.01

≤6	6697 (7.6)	676 (10.8)	
7	16 160 (18.2)	1599 (25.7)	
8–10	65 856 (74.2)	3960 (63.5)	

CCI: Charlson comorbidity index; IQR: interquartile range; PSA: prostate-specific antigen; SD: standard deviation.

Table 2. Treatment decision by safety net hospital status

Variable	**Non-safety net hospital**	**Safety net hospital**	**p**
Initial treatment			<0.01
Overall curative intent treatment, n (%)	82 088 (91.7%)	4992 (79.3%)	
Radical prostatectomy only, n (%)	31 205 (34.9)	1491 (23.7)	
Radical prostatectomy and radiation, n (%)	2190 (2.5)	146 (2.3)	
Radical prostatectomy and ADT, n (%)	3562 (4.0)	192 (3.1)	
Radical prostatectomy and unknown radiation or ADT, n (%)	6890 (7.7)	367 (5.8)	
Radiation therapy only, n (%)	7112 (8.0)	499 (7.9)	
Radiation therapy and ADT, n (%)	31 129 (34.8)	2297 (36.5)	
ADT only, n (%)	3712 (4.2)	561 (8.9)	<0.01
No treatment, n (%)	3652 (4.1)	742 (11.8)	<0.01

ADT: androgen deprivation therapy.

Table 3. Multivariable logistic regression model of odds of non-curative treatment, all patients.			
Variable (n= 84 990)	**Odds ratio**	**p**	**95% CI**
Safety net hospital status			
Non-SNH	Ref.	Ref.	Ref.
SNH	2.22	<0.01	2.06–2.41
Age	1.09	<0.01	1.08–1.10
Race			
White	Ref.	Ref.	Ref.
Black	1.56	<0.01	1.46–1.66
Other	1.35	<0.01	1.22–1.50
CCI scores			
0	Ref.	Ref.	Ref.
1	0.95	0.12	0.88–1.01
>2	1.39	<0.01	1.25–1.55
Clinical T stage			
T1	Ref.	Ref.	Ref.
T2	0.74	<0.01	0.70–0.79
T3	0.72	<0.01	0.66–0.78
PSA	1.001	<0.01	1.001–1.001
Sum Gleason grade			
6	Ref.	Ref.	Ref.
7	0.36	<0.01	0.33–0.39
8–10	0.35	<0.01	0.33–0.38
Median income quartile			
$0- 29 999	Ref.	Ref.	Ref.
$30 000–34 999	0.90	<0.01	0.83–0.97
$35 000–45 999	0.82	<0.01	0.76–0.88
$46 000+	0.70	<0.01	0.65–0.76
Hospital type			
Community cancer program	Ref.	Ref.	Ref.
Comprehensive community cancer program	0.65	<0.01	0.60–0.70

Academic program	0.91	0.02	0.84–0.99
Integrated network cancer program	0.58	<0.01	0.52–0.64
Year	1.04	<0.01	1.03–1.06

The model was adjusted for age, race, CCI scores, clinical T stage, PSA, sum Gleason grade, income, hospital type, and diagnosis year. CI: confidence interval; CCI: Charlson comorbidity index; PSA: prostate-specific antigen; SNH: safety net hospital.