


Prostate Cancer in the Caribbean: A Baseline Assessment of Current Practices and Potential Needs

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Abstract

Afro-Caribbean men have a higher risk of prostate cancer than any other population of men in the world. However, the Caribbean is composed of a heterogeneous group of healthcare systems located on small islands which makes population-based studies difficult to conduct and interpret. The aim of this review is to compile previously published data on the state of prostate cancer in Caribbean men and to highlight potential healthcare needs that can be addressed by public health efforts. We reviewed three databases and identified relevant papers that were subsequently searched by the authors. Peer-reviewed studies published in the English language after 2010 with a focus on prostate cancer diagnosis, management, and outcomes of Caribbean men were prioritized. Afro-Caribbean men were found to have a higher incidence and mortality rate compared to their counterparts. Misperception about the disease, lack of regional guidelines, and poor access to care are compounding factors that result in worse outcomes for these men compared to high-income nations. Urologists and oncologists in the region, while well-trained, are limited in number and in most cases do not offer newer treatment modalities. Overall, only a few island nations have cancer registries, and there remains a significant need for more population-based studies to assess guideline adherence and outcomes. Until further research and investment in the region is made, the disparity between the care received by Afro-Caribbean men and their counterparts will likely remain.

Keywords

Caribbean, prostate cancer, health disparity, oncology, global health

Introduction

As the life expectancy of men continues to rise, age-related malignancies such as prostate cancer have become increasingly prevalent and burdensome. International registries have projected increases in the incidence rates of prostate cancer for men older than 65 years of age in nearly every country.¹ Although simultaneous advancements in diagnosis, active surveillance, and surgical management of prostate cancer have resulted in improved cancer control and overall reduced morbidity and mortality from disease and treatment, these benefits have not been distributed equally among all socioeconomic classes, races, and countries.²

Black men tend to receive less PSA screening, ineffective treatment modalities and inferior treatment facilities. Higher incidence of disease and stage at presentation in these men likely also contribute to the overall disparity.³ African and

Afro-Caribbean men particularly face a unique combination of challenges when dealing with prostate cancer including more aggressive disease and worse outcomes due to germline susceptibility, late diagnosis, and socioeconomic constraints. The Caribbean has a high number of African descendants with reports of greater than 90% of the population originating from West Africa starting in the 17th century with some immigrants

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also arriving from Central Africa (Congo).⁴⁻⁶ International guidelines have attempted to provide guidance on risk stratification and treatment decisions though these are limited by variability in available resources, practice patterns and specialty clinics.⁷

The National Comprehensive Cancer Network (NCCN) has published harmonized guidelines for the treatment of prostate cancer in Sub-Saharan Africa and the Caribbean with recommendations of lower-level care options to be considered when cost or travel for higher level-care is prohibitive.⁸ Yet, a follow-up study evaluating guideline adherence of ten countries found that within Sub-Saharan Africa, clinical workup information was severely lacking and curative approaches were underused. For example, less than one-fifth of the non-metastatic group received therapy with curative intent.⁷ Meanwhile, the Caribbean, despite having its own set of harmonized NCCN guidelines, lacks a comprehensive assessment of presentation, patterns of care, guideline adherence, and health outcomes of men afflicted with prostate cancer.

We thus aim to review existing literature to develop a better understanding of current practices within the greater Caribbean region to identify specific healthcare needs that may potentially improve prostate cancer care. The assessment of these needs is necessary prior to addressing gaps in healthcare and improving the quality of urologic oncology services available to patients in the Caribbean and Latin America.

Methods

A detailed literature review was performed to identify all relevant peer-reviewed articles, systematic reviews, and editorials published in the English language describing the prevalence, presentation, treatment, and health-related outcomes of prostate cancer in Caribbean men. The search was performed using the MEDLINE database, Web of Science, and Google Scholar. Primary search terms that were utilized included: “prostate cancer” and “Caribbean” along with supplementary phrases such as “epidemiology,” “management,” “prevalence,” “care patterns,” and “prognosis.”

Articles published after 2010 were prioritized though news articles, editorials, and population-based studies were considered regardless of date of publication as long as they were deemed to be relevant. The scope of the search was mostly limited to the greater Caribbean region though studies from other countries with Caribbean men were also reviewed. All searches were performed during September 2021 by the authors of this study.

Evidence Synthesis

Prevalence/Incidence of Prostate Cancer within the Caribbean. The Caribbean has one of the highest age-standardized prostate cancer incidences in the world with 76 cases per 100 000 population per year.^{9,10} In Jamaica, 304

men out of 100 000 are diagnosed annually, in Barbados 160 men out of 100 000, and in Tobago, nearly 10% of adult men were found to have prostate cancer annually.^{5,6} Between 2008 and 2013, 292 men out of every 100 000 were diagnosed in Guadeloupe.¹¹ Reports from the French West-Indies, Cuba, and Puerto Rico corroborate these statistics while also highlighting an increased risk of diagnosis in men with less formal education and lower socioeconomic status—a contrast from the United States where less education is associated with less screening.¹²⁻¹⁴ A lack of national screening guidelines including the use of PSA testing suggests that the true rates are likely higher.

Etiology of Prostate Cancer in the Caribbean

Age and race have been linked as major factors implicated in the development of prostate cancer with access to screening, biopsy, and appropriate treatment modalities inevitably contributing to survival rates.¹⁵

A study published in 2012 by Taksler et al found that the prostate cancer-specific mortality in the US was 1320 more cases per 100 000 males among black than white men due primarily to tumor characteristics, treatment selection, and socioeconomic status. Seventy six percent of the mortality gap could be explained solely by higher incidence of disease in black men.³ In another study evaluating autopsies, black men had higher Gleason grades and volume of disease compared to their counterparts after accounting for age.¹⁶ In Trinidad and Tobago, Afro-Trinidadians were five times more likely to have prostate cancer than the other ethnicities living on the islands and presented with higher Gleason scores, prostate-specific antigen (PSA) values and risk of mortality.¹⁷

After completion of the Human Genome Project, several studies discovered potential prostate cancer susceptibility genes in African descendants that could explain this racial disparity including a copy number gain of *MIR151* (MicroRNA 151a), the presence of hereditary prostate cancer 1 susceptibility locus (HPC1, caused by mutations in the *RNASEL* gene), and an allele specific to African ancestry—Broad11934905 A. Though, the detailed mechanisms of action and pathways of these markers as well as their clinical relevance remain uncertain.¹⁸

Even among men of African descent, black men from the Caribbean have higher rates of age-standardized mortality compared to African Americans and those from Sub-Saharan Africa. This has historically been explained by differences in health care access, diagnosis, and screening with some potential bias also introduced through methodology used for generating rates.¹⁹ In Martinique, Trinidad, and Tobago, intermediate and high risk groups represented 92% of diagnosed cases reflecting a later stage of presentation possibly due to poor disease awareness and health care infrastructure.¹³ Caribbean-born black men diagnosed in the US had significantly higher survival rates compared to those diagnosed in the Caribbean. Additionally, while Caribbean-born black men

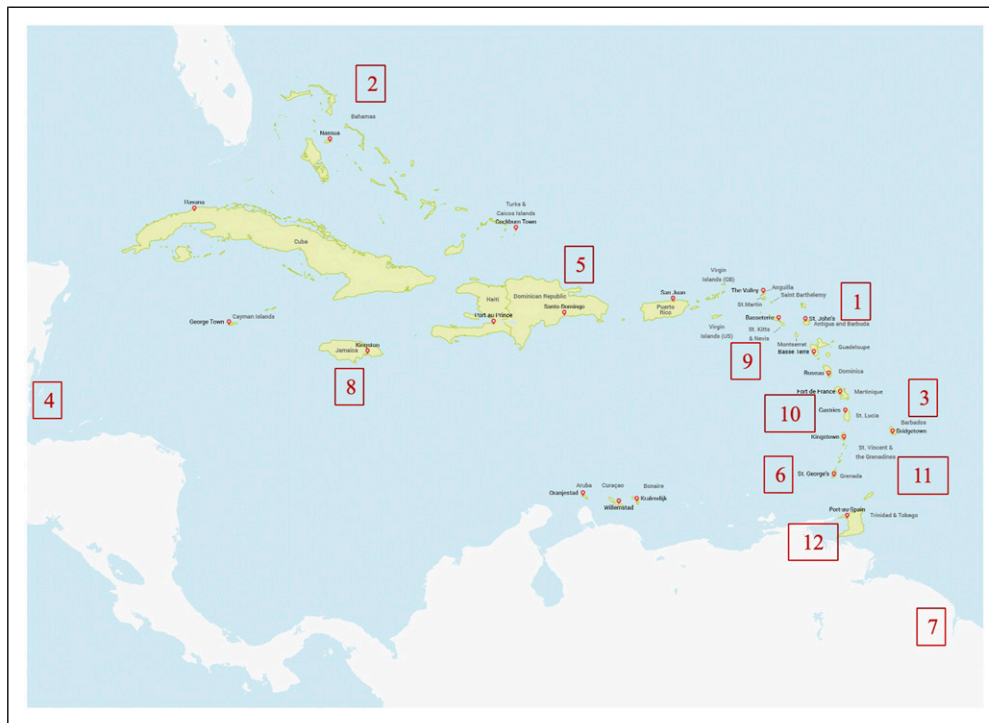


Figure 1. Map of the Caribbean with small island nations associated with [Table 1](#).

in Brooklyn had similar survival rates compared to US-born black men, those from Guyana and Trinidad and Tobago had 12- and 4-fold increased risk of death, respectively.²⁰ Both a genetic predisposition and socioeconomic factors likely contribute to Caribbean men having higher rates of prostate cancer diagnosis and mortality.

Access to Care for Prostate Cancer Patients Within the Caribbean

Access to urologic care within the Caribbean varies by region ([Figure 1](#)). Antigua is home to the Mount St John's Medical Center which has a capacity of 187 beds, making it the main public referral center. It employs 3 urologists, 3 radiologists, 2 pathologists and 2 oncologists. Antigua also has The Cancer Center Eastern Caribbean (TCCEC), a private medical facility serving patients from Antigua, Barbuda, and the Eastern Caribbean. TCCEC provides CT scanning, TRUS biopsies, chemotherapy, and EBRT, all of which are subsidized by the government. Staging is performed with CT imaging, as positron emission tomography (PET) scanners are not yet available on the island and histopathology assessment is limited. For treatment, minimally invasive prostatectomy, brachytherapy, and focal therapies are not utilized; therefore, EBRT with ADT or radical retropubic prostatectomy are the primary modalities of treatment.²¹

For the 1.3 million residents of Trinidad and Tobago, the largest urologic ward contains 24 beds with two operating rooms and 14 total practicing urologists as of 2018. Radical

prostatectomy, EBRT, brachytherapy, and hormone therapy are all available treatment options.¹⁷ In Jamaica, a country with a population of 2.8 million, there are urology services at two hospitals with 19 urologists, though this number has been increasing since 2014.²² Guyana, Barbados, and St Lucia all have fewer than four urologists for their islands and Grenada employs a general surgeon for urologic care. Though, there is little published information on how many of these urologists perform radical prostatectomies or even manage prostate cancer.²³ Martinique has diagnostic and therapeutic management mostly in line with international recommendations, except for PET-CT imaging.²⁴ Available resource data are further presented in [Table 1](#).

Radiation oncology services are only available in 50% of Caribbean countries and only one country had a sufficient number of radiation oncologists according to a population-based analysis published in 2020.²⁵ There is less information on the resources available in the rest of the Caribbean countries. Due to the limited number of specialists, primary care physicians are often the point of first contact for patients with suspected prostate cancer providing PSA testing and making decisions on the need for biopsy.²⁶

Screening for Prostate Cancer in the Caribbean

Two-thirds of urologists surveyed from nine countries in the Caribbean believed that PSA-based screening improves survival in the Afro-Caribbean male and recommend screening starting at the age of 40 years. A majority supported rewriting

Table I. Resource allocation within the Caribbean small island nations for the management of prostate cancer.⁴⁰⁻⁴³

	Screening	Urologists	Oncologists	CT imaging	Chemotherapy	EBRT
1 Antigua and Barbuda	Opportunistic	3	5	Yes	Yes	Yes
2 Bahamas	Opportunistic		2	Yes	Yes	Yes
3 Barbados	No	4	4	Yes	Yes	Yes
4 Belize	Opportunistic	2	1	Yes	Yes	Yes
5 Dominica	No	5	1	Yes	Yes	Yes
6 Grenada	No	1	2	No	Yes	No
7 Guyana	No		4	Yes	Yes	Yes
8 Jamaica	Opportunistic	1	15	Yes	Yes	Yes
9 St Kitts and Nevis	No	1	Yes	Yes	No	
10 St Lucia	Opportunistic	4	1	No	Yes	No
11 St Vincent and the Grenadines	No		2	Yes	Yes	No
12 Trinidad and Tobago	No	14	10	Yes	Yes	Yes

the international guidelines, presumably those published by the NCCN, to allow for earlier and more frequent screening due to the increased risk of diagnosis and progression in Afro-Caribbean men.²⁶ Though, in most Caribbean countries, no official screening program exists and adherence to international guidelines is unknown. In Martinique in 2013, digital rectal exam (DRE) was performed in 94% of patients diagnosed with prostate cancer though the general population screening rate was not measured.¹³ Jamaica does have an early detection program recommending screening for men older than 40 years though the majority of men still did not receive a DRE as they were not advised by their physicians to have this done. Among 2000 Jamaican men over the age of 55 years of age interviewed in 2009, only 35% reported having prostate exams. Despite the increasing use of PSA testing, half of the men diagnosed with prostate cancer in Kingston and St Andrew initially presented only after the onset of symptoms.²⁷ There are also groups in Jamaica that promote unproven preventative and curative options that result in public misinformation.²⁷

Typical barriers to screening have been reported by several groups and include perceived discomfort of the DRE, male gender of the examining physician, and fear of cancer.⁵ In a survey of Belizean men aged between 40 and 70 years, 49% reported screening tests to be too expensive and 56% feared that the doctor may find cancer. Only 64% of patients knew where to get screened. It was estimated in this group that 81% had not been screened despite the majority of patients visiting the doctor at least once a year.¹⁵ Lower rates of education and literacy in older Caribbean men has also been linked to under-use of screening services, though in Belize 87% of the study population was aware of prostate cancer and 41% had some knowledge regarding the disease.²⁰ Prostate cancer fatalism, the perception that cancer is a death sentence, has also been reported to be higher in Caribbean-born black males compared with US-born black males.²⁸

Less screening results in higher rates of prostate cancer specific mortality in this population likely due to higher stage of presentation.³

Presentation Patterns of Afro-Caribbean Men

Few population-based cohort studies exist that evaluate stage at presentation of Caribbean men. In Martinique, out of 473 cases analyzed in 2013, 84% presented with localized disease with 14% having node positive and distant metastatic disease.¹³ The median PSA at diagnosis for men in Jamaica was between 30 and 37 ng/mL with one study finding that 30% of men were stage T3 or higher. In a study of 508 men in Tobago, median PSA was 6.3 ng/mL though ranged from 0.3 to 18 330 ng/mL.^{19,29} Among over 3000 men studied in Guadeloupe, 32% presented with PSA level over 10 ng/mL and 14% presented with at least Gleason 8 disease.¹¹ A retrospective study performed in Martinique and France similarly showed 13% of the Martinique cohort with locally advanced disease compared to 5% in the French cohort.³⁰ Afro-Caribbean men also were found to have a higher number of positive cores (median of 2 vs 1) compared to other ethnicities within a retrospective study conducted in the United Kingdom.³¹

Overall, there is an increased risk of Caribbean men being diagnosed at later stages with reports from Guadeloupe and Martinique finding 12% and 14% of men, respectively, had metastatic disease from the outset compared to 4% in Caucasians and 8% in African American men. The increased potential of cancer cells to attach, migrate, and invade in this population potentially explains the higher rates of metastatic disease.^{13,32} Recent investigations into optimal first-line treatment for men with advanced stage prostate cancer in this population highlight the need for developing region-specific guidelines as the Afro-Caribbean patient may benefit disproportionately from certain classes of medications.³³

Clinical Care Pathways Within the Caribbean

Although healthcare systems vary among countries within the Caribbean, similar patterns exist when comparing trends in diagnostic capabilities and treatment paradigms. An overall scarcity of biopsy materials, histopathologists, cancer registries, and over-reliance on hospital systems present challenges to the diagnosis and work-up of prostate cancer in Caribbean men.³⁴

In Antigua and Barbados, small nations in the northern Caribbean of around 100 000 people, prostate cancer remains the leading cause of death as recently as 2015. As in many other neighboring islands, health care is delivered through a tiered approach with both a public and private option. TRUS biopsies are mostly performed in the private sector due to availability of hardware and disposables. Most patients requiring specialized care present to Mount St John's Medical Centre in Antigua where 187 beds, three urologists, three radiologists, two pathologists, and two oncologists provide subsidized care for the region. The private medical facility offers two urologists, two radiologists, transrectal ultrasound guided (TRUS) prostate biopsies, external beam radiation therapy (EBRT), chemotherapy, and hormone therapy such as abiraterone acetate, though the latter needs to be procured from abroad. The primary modality of treatment is EBRT with ADT though radical retropubic prostatectomy is available in the private sector.³⁵

Trinidad and Tobago also have a tiered healthcare system where a skewed distribution of urological services has made the administration of prostate cancer management difficult for patients and providers. Nevertheless, PSA testing is widely available and there is now access to TRUS guided-biopsies. Active surveillance, radical prostatectomy, brachytherapy, and EBRT are also all available as potential treatment modalities. Between 2010 and 2017, hormonal therapy was the most prevalent treatment followed by EBRT. Wait times for radiation therapy are also relatively short at 6 to 8 weeks. Only 5% of men were treated with open radical prostatectomy—the laparoscopic technique has not yet been adopted in this region.¹⁷

The Bahamas, like other Small Island Developing States (SIDS), lack national radiotherapy facilities and have one main provider of radiotherapy at the publicly funded The Cancer Centre Bahamas (TCCB). For 203 cases queried at the TCCB, the median time to initiating EBRT was 189 days with ADT being prescribed quickly after diagnosis. Seven different urologists and oncologists referred patients to the center for treatment during the study period between 2004 and 2016.³⁶ In contrast, in Jamaica patients often wait 1 to 2 years to receive EBRT due to a limited number of radiation facilities, limiting treatment options for men with localized prostate cancer to open prostatectomy or referral to another island.⁵

During a similar period in Martinique, 370 consecutive cases receiving ¹²⁵I brachytherapy were reviewed and all patients were found to have been treated consistent with the

French Urology Association guidelines with 12.7% receiving neoadjuvant hormone therapy. These patients were all evaluated with pretreatment endorectal MRI scans and bone scintigraphy, when appropriate. Pretreatment ADT was provided for 3 months for patients with high prostate volume or poor urinary function.³⁷ High-intensity Focused Ultrasound (HIFU) has also been used in the French West Indies with encouraging results as 74% of post-procedural biopsies at a median of 8 months were negative.³⁸ This is the only documented use of focal ablation throughout the Caribbean.

Palliative care remains another sector that is severely lacking throughout the Caribbean. It is estimated that in 2012, approximately 1700 patients in Barbados would have benefited from end-of-life care with a significant portion of these patients likely being men with terminal prostate cancer. Trinidad, Tobago, Antigua, and Barbuda all have hospice services available but are similarly underfunded. In Jamaica, a 32-bed palliative care facility erected in 1963 remains the only inpatient option for patients with terminal cancer.⁵ NGOs also provide community-based care in Guyana and Belize, though there is still an unmet need for more resources in the area.

Limited data have been published on the availability and distribution of TRUS-biopsies, the number of urologists and oncologists treating prostate cancer, and overall practice patterns among most of the Caribbean nations. Most of these countries depend on public health care systems that have been historically underfunded resulting in poor access to guideline recommended treatments and cancer-registries. Public and private partnerships at the local level and the adoption of sibling hospitals have been attempted to build capacity and improve outcomes for the region with mixed results.³⁹

There remains a need for further assessment of individual nations' available resources and clinical care pathways which may guide future efforts to improve access to care and oncologic outcomes. In Belize, our group has recently developed hospital-specific guidelines for the management of prostate cancer—among other urologic malignancies. A national cancer registry has also been initiated that will allow for assessment of retrospective data on guideline adherence and outcomes as well as development of policies for cancer control, potentially serving as a model for other regions.

Prostate Cancer Survival Outcomes Within the Caribbean

Given the lack of high-quality systematic data published on prostate cancer throughout the Caribbean, mortality rates are mostly calculated through extrapolation. Only Barbados, Jamaica, Guyana, and Trinidad and Tobago have internationally accepted cancer registries and with the remainder of the published data relying on individual clinical sites, cancer-related non-government organizations (NGOs) and ministries of health.³⁹ In an age-adjusted analysis of prostate cancer mortality rates, every Caribbean nation except for the Turks and Caicos had a higher rate than the US. Saint Vincent and

the Grenadines and Montserrat reported a mortality rate of 115 men per 100 000 population, followed by Dominica with 91 men, and Grenada with 90 men, compared to 11.5 men per 100 000 population in the United States.³⁹

In Jamaica, Black men with low-risk disease have been shown to exhibit adverse pathologic features after radical prostatectomy, thus rates of whole-gland therapy are higher than for Caucasian populations. A study based out of the University Hospital of the West Indies revealed a 5-year biochemical-free survival rate of 78% after prostatectomy. In another study, Jamaican men presented with higher PSA levels than African American men treated at Columbia University Medical Center though five year biochemical-free survival was similar for both groups, though still less than the Caucasian men included in the study.

A retrospective study of 216 men with non-metastatic prostate cancer in the Bahamas revealed a 5-year and 10-year overall survival of 94% and 87%, respectively. Disease-free survival was 90% at 5 years and 100% for low-risk disease. All patients in this cohort were treated with EBRT with the option of ADT.³⁶ A similar analysis performed in Martinique of 370 consecutive men treated with brachytherapy revealed a 5-year biochemical recurrence free survival of 91.6% with improved survival when neoadjuvant hormone therapy was administered.³⁷

For metastatic hormone-sensitive prostate cancer, men in Guadeloupe have an overall median survival of 15 months if treated with ADT plus chemotherapy group and 20 months if treated with ADT and anti-androgen therapy such as abiraterone or enzalutamide.³² Overall mortality data for all incident cases of cancer from Guadeloupe's cancer registry suggest an age-adjusted mortality rate of 24 men per 100 000 person-years with overall survival at 5-years being 91%.¹¹

Prostate cancer is the leading cause of cancer-related death in the Caribbean with a mortality rate which is the highest in the world. Overall mortality rates within the Caribbean remain high and have increased by 40% since 1990 while the US and UK have experienced significant improvement in survival.^{9,12} Age-standardized mortality rate within all of the Caribbean as of 2020 is 28 per 100 000 compared to 8.3 in North America and 9.8 in Western Europe.¹⁰ In Jamaica, the rate is as high as 54 per 100 000 men and 42 per 100 000 in Belize.¹⁵

Conclusion

Prostate cancer presents a significant burden to men in the Caribbean—a region with the highest incidence and mortality rates in the world. Afro-Caribbean men are at particularly high risk of developing aggressive prostate cancer that requires earlier and more frequent screening and a lower threshold for definitive treatment. However, heterogeneity of available diagnostics and treatments combined with pervasive misinformation regarding the disease present robust challenges to providers. Harmonized guidelines by the NCCN and hospital-specific decision trees have been instrumental in standardizing

care for this unique population, though further specialized recommendations may be beneficial for practitioners limited by available resources.

Needs assessments performed throughout specific regions of the Caribbean are paramount to further improving delivery of prostate cancer care tailored to the local population. For example, information campaigns in Jamaica may prove beneficial in improving PSA screening rates and combatting adoption of unproven treatments. In the French West Indies, efforts to promote the use of focal therapy may allow men with sexual health concerns to pursue prostate cancer treatment which they otherwise may have deferred.

Increased collaboration among Caribbean countries along with the development of cancer registries are needed for a more robust collection of epidemiologic data, allowing for measurement of progress and improvement in region-specific interventions. This will also create opportunities for further research of the genetic and molecular characteristics of disease, improving guidance of cancer management. Significant gains have already been made in the treatment of prostate cancer in the region, though further investment in research and resource allocation would go a long way in improving prostate cancer-specific outcomes in the Caribbean.

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