

Challenges of Prostate Cancer Diagnosis & Therapy to Achieve Health Equity

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Disclosure

- **Primary Employer: Mayo Clinic**
- Courtesy Appointment: University of Florida
- Advisory Roles
 - American Cancer Society
 - Pfizer Oncology Field Medical Clinical Trials Diversity Advisory Board





The CaPTC



Prostate cancer Transatlantic Consortium (CaPTC)

- Formed in 2005 and received NCI-Epidemiology & Genomics Research Program (EGRP) Consortium approval in 2011.
- **Goal** - explore the genetic and environmental etiology of prostate cancer to develop ethnically sensitive, targeted approaches that will eliminate prostate cancer disparities globally in Black men.
- Open consortium comprising a team of prostate cancer scientists, clinicians, **survivors, and advocates**
 - **Significant International Research in West Africa**



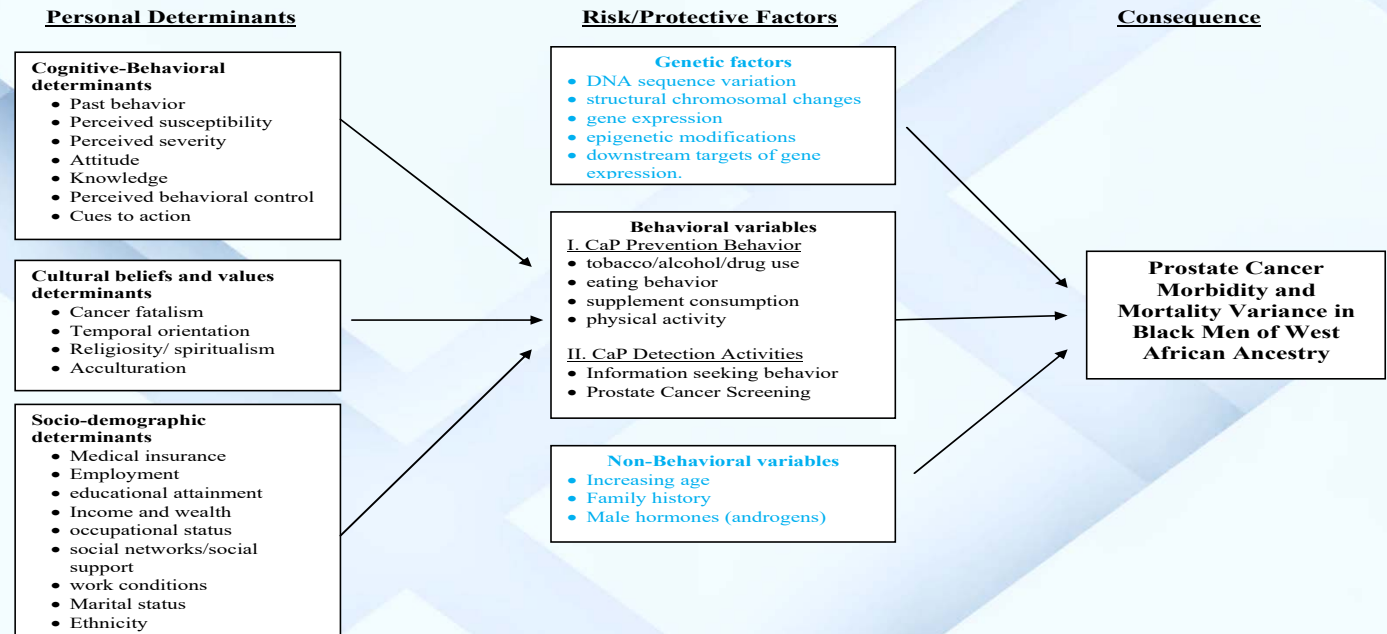
Website: <http://epi.grants.cancer.gov/captc>

Twitter Handle: @CaPTC7

CaPTC Scientific Basis

- Focuses on building a bio-behavioral model of prostate cancer in Black men.
- 20,000+ men recruited

Predictive Model of Prostate Cancer Risk, Protective and Personal Factors



Website: <http://epi.grants.cancer.gov/captc>

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Studying populations of African ancestry ...**Advantages**

- Understanding human variation
- Determining evolutionary histories of variants
- Demonstrating the analytical and clinical validity of new genetics-based tests for multiple populations
- Explaining the heritability of common quantitative traits
- Enabling prioritization of candidate genes
- Examining the genetic architecture of complex diseases, such as cancer
- Identifying SNPs associated with disease risk in admixed populations
- **Facilitating the development of new clinical tools for diverse populations**



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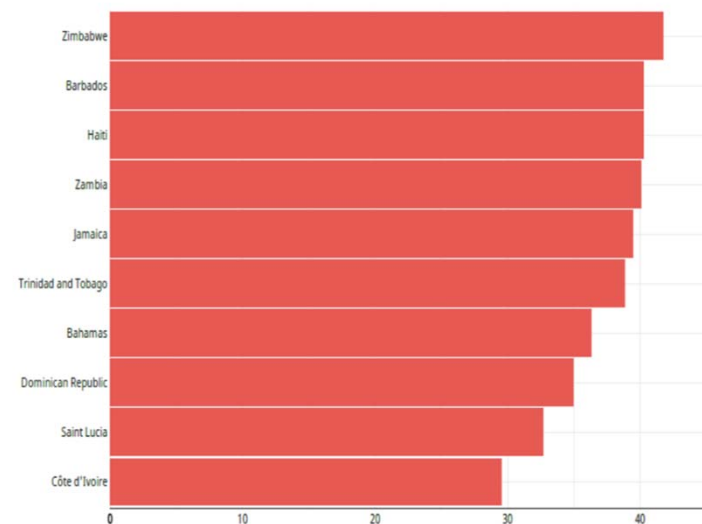
Background



Men of African Ancestry (MoAA) & Prostate Cancer

- ***On average, about 30,000 MoAA will hear the words “You have prostate cancer” annually in US.***
- The CaP disparities experienced by MoAA in the US is a microcosm of the global burden of CaP in MoAA.
- Top ten countries leading CaP mortality in the world are all AA nations

Estimated age-standardized mortality rates (World) in 2020, prostate, males, all ages



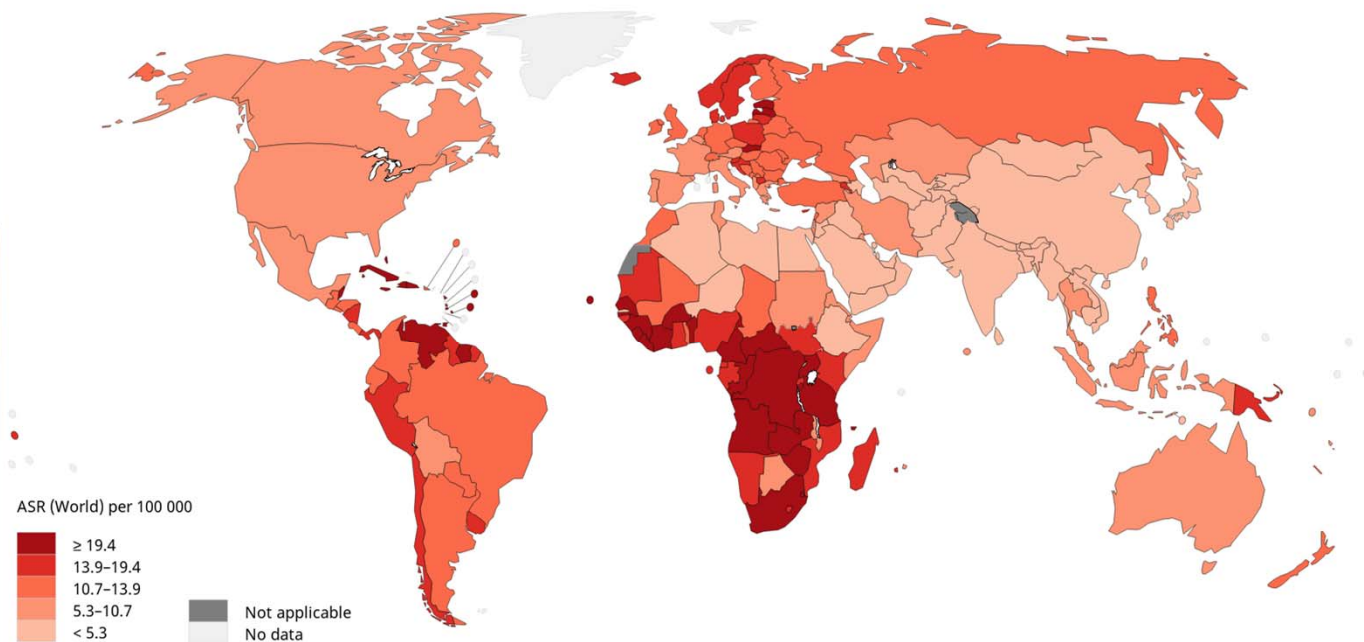
Data source: GLOBOCAN 2020
Graph production: Global Cancer
Observatory (<http://gco.iarc.fr/>)

International Agency for Research on Cancer
World Health Organization



Men of African Ancestry (MoAA) & Prostate Cancer

Estimated age-standardized mortality rates (World) in 2018, prostate, males, all ages



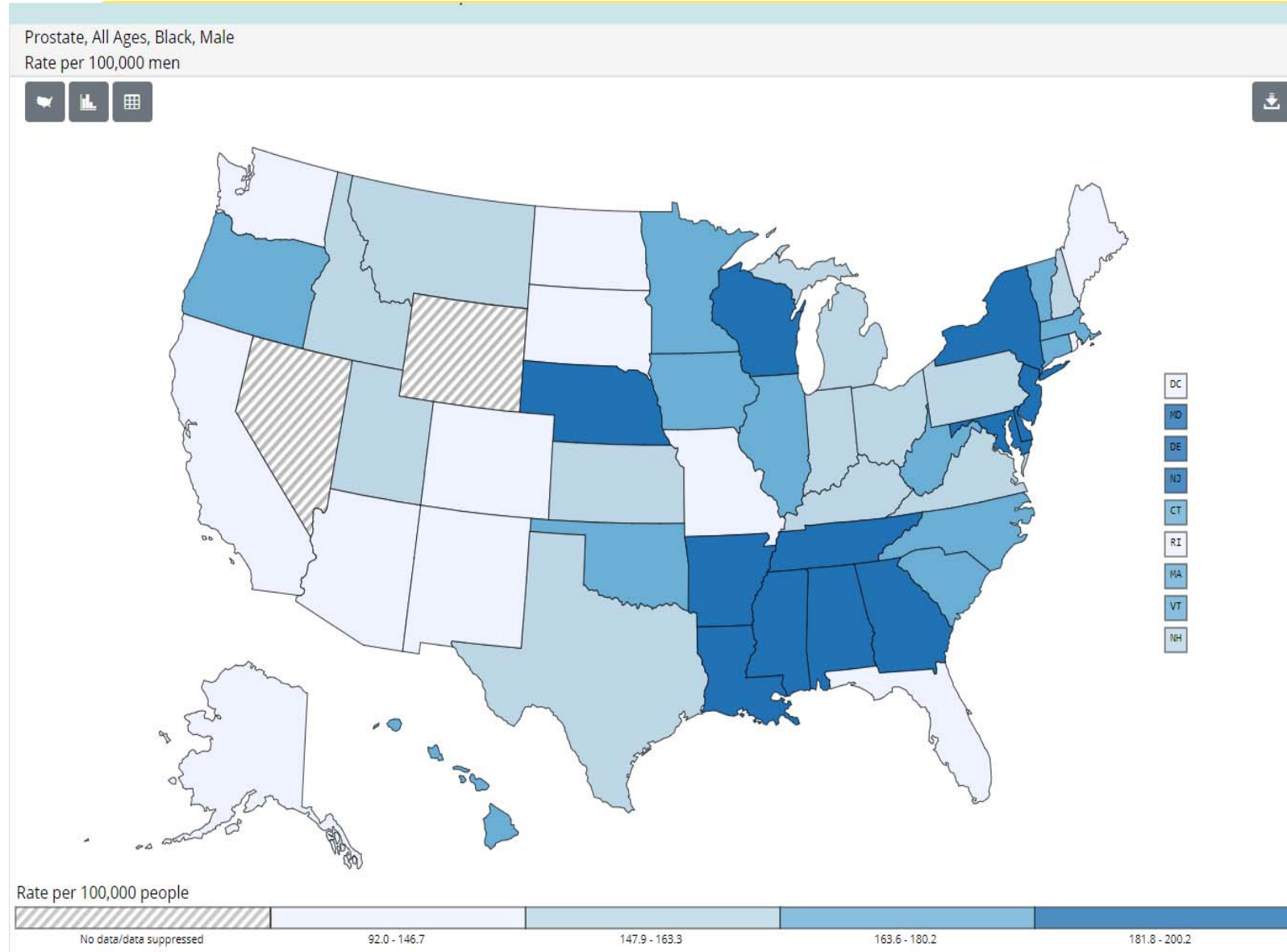
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Data source: GLOBOCAN 2018
Graph production: IARC
(<http://gco.iarc.fr/today>)
World Health Organization



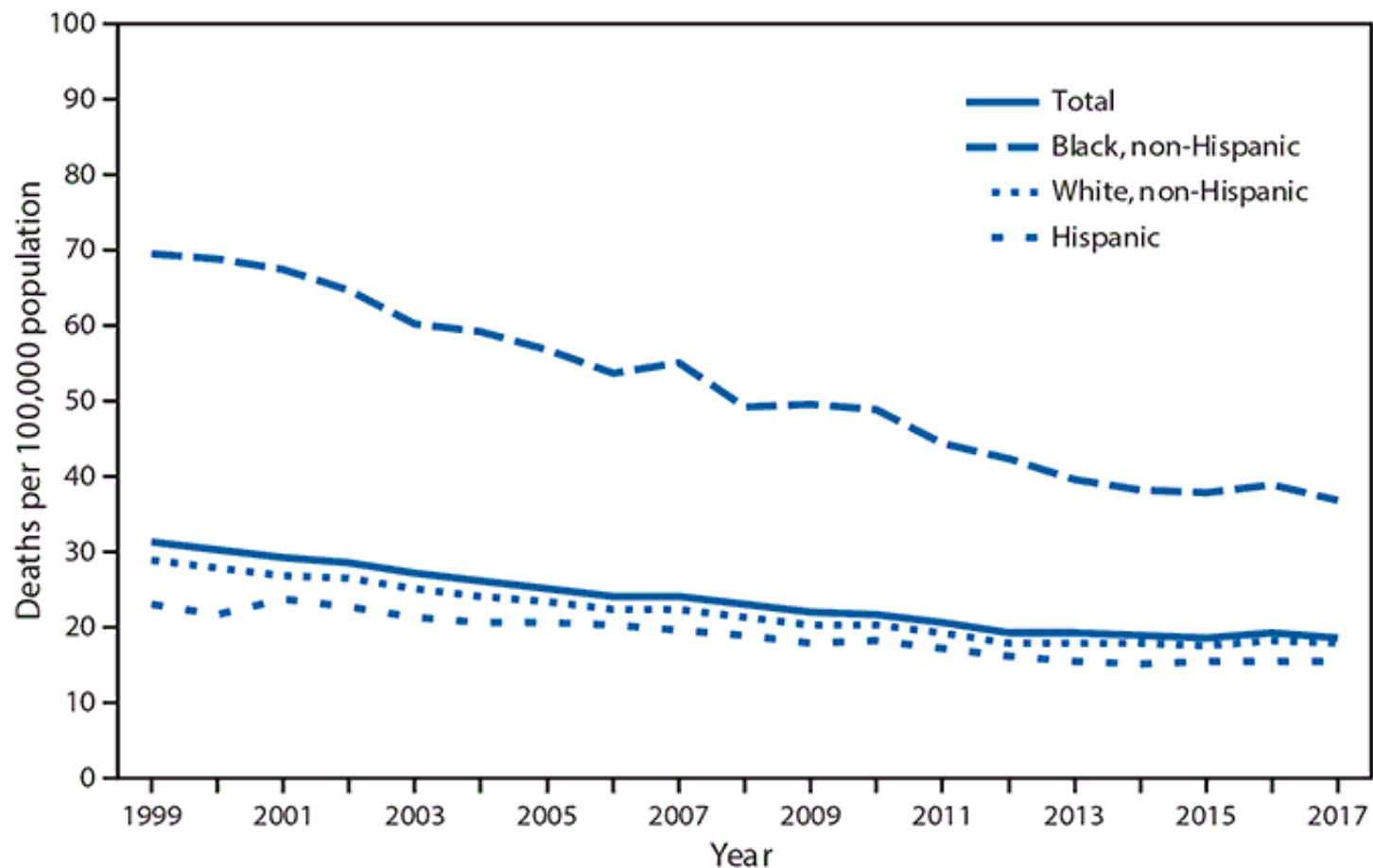
Prostate Cancer Incidence in the United States in 2014 to 2018 among Black Men

Odedina FT, Yates C & Kaninjing. Prostate Cancer among African American Men. In *The Health of African Americans in the Southern United States*. Eds Coughlin SS, Williams L and Akintobi TH. Johns Hopkins University Press (In Press)



Prostate cancer mortality among US population 1999 - 2017

Odedina FT, Yates C & Kaninjing. *Prostate Cancer among African American Men. In The Health of African Americans in the Southern United States. Eds Coughlin SS, Williams L and Akintobi TH. Johns Hopkins University Press (In Press)*

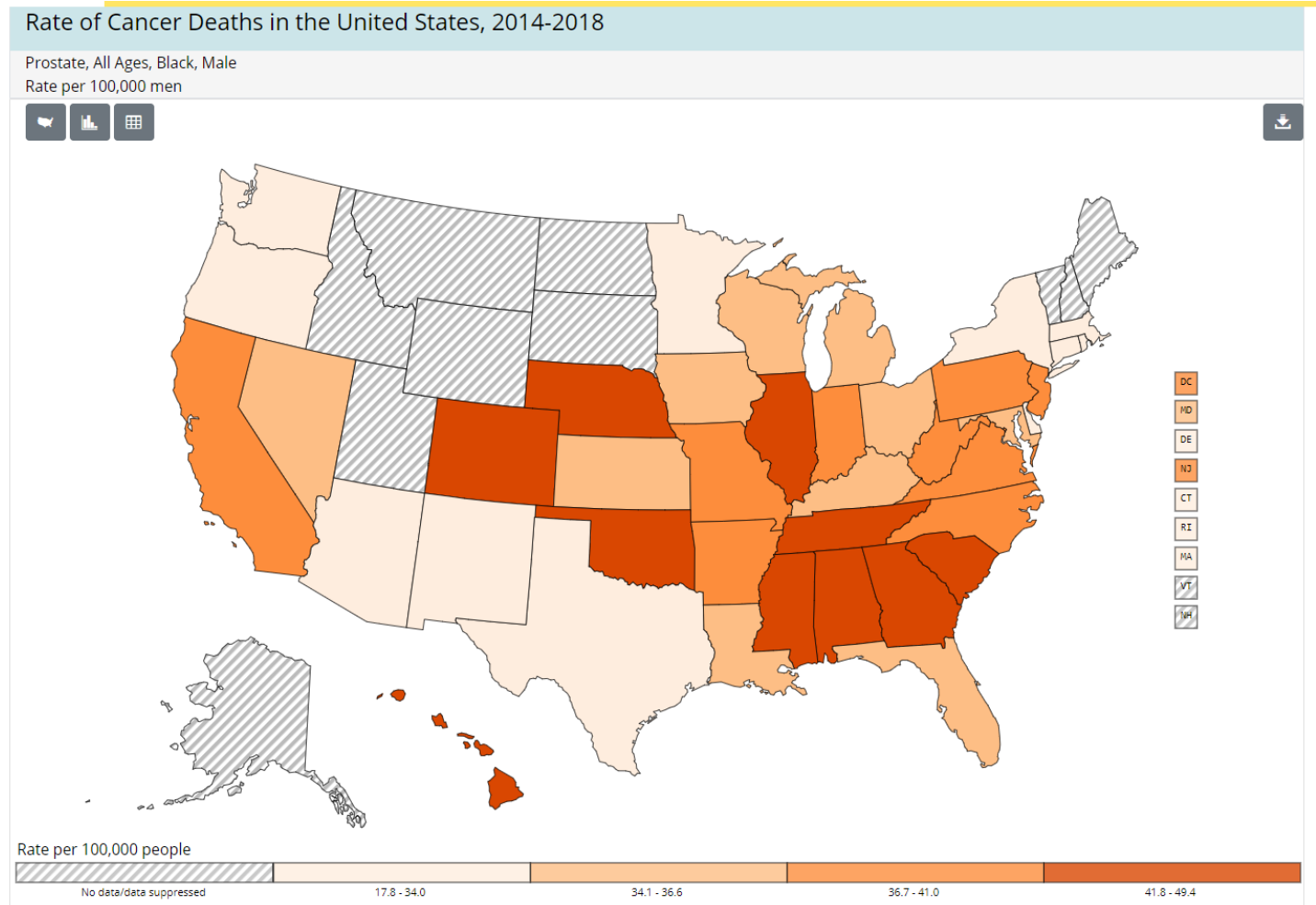


* Deaths per 100,000 population, age-adjusted to the 2000 U.S. standard population.

Rate of Prostate Cancer Deaths among Black men in the US, 2014-2018

Odedina FT, Yates C & Kaninjing.

Prostate Cancer among African American Men. In *The Health of African Americans in the Southern United States*. Eds Coughlin SS, Williams L and Akintobi TH. Johns Hopkins University Press (In Press)



Prostate Cancer Risk Factors

- Age
 - African-Born BM most likely to be diagnosed at an earlier age compared to USBM and CBBM
- Family history
- Genetic factors
- Behavioral Risk Factors
 - cigarette smoking (mortality)
 - Black men have the highest smoking prevalence compared to Black women, White men and White women
 - excess body weight (advanced CaP)
 - height
 - Alcohol
 - some evidence for higher consumption of dairy product, high calcium diet, low plasma Vitamin E concentration and low plasma selenium concentration



Cancer Epidemiol Biomarkers Prev. 2020 July ; 29(7): 1357–1364. doi:10.1158/1055-9965.EPI-19-1344
Prostate Cancer Prostatic Dis. 2021 Sep 2. doi: 10.1038/s41391-021-00451-z.



Disparities in Prostate Cancer Diagnosis



Diagnosis Challenges

- MoAA have a 1 in 7 lifetime probability of developing CaP
 - Non-Hispanic White men have 1 in 9 lifetime probability of developing CaP
- MoAA have a 1 in 25 lifetime probability of dying from CaP.
 - Non-Hispanic White men have 1 in 45 lifetime probability of dying from CaP.
- Diagnosed with advanced stage disease
 - Prostate cancer grow more aggressively



Cancer Epidemiol Biomarkers Prev. 2020 July ; 29(7): 1357–1364. doi:10.1158/1055-9965.EPI-19-1344
Prostate Cancer Prostatic Dis. 2021 Sep 2. doi: 10.1038/s41391-021-00451-z.

Why Diagnosis Disparities?

- Genetic factors
- Hormonal factors
 - circulating PSA and testosterone concentrations
- Environmental factors
 - Diet, Vit D levels
- Gene-environment interactions



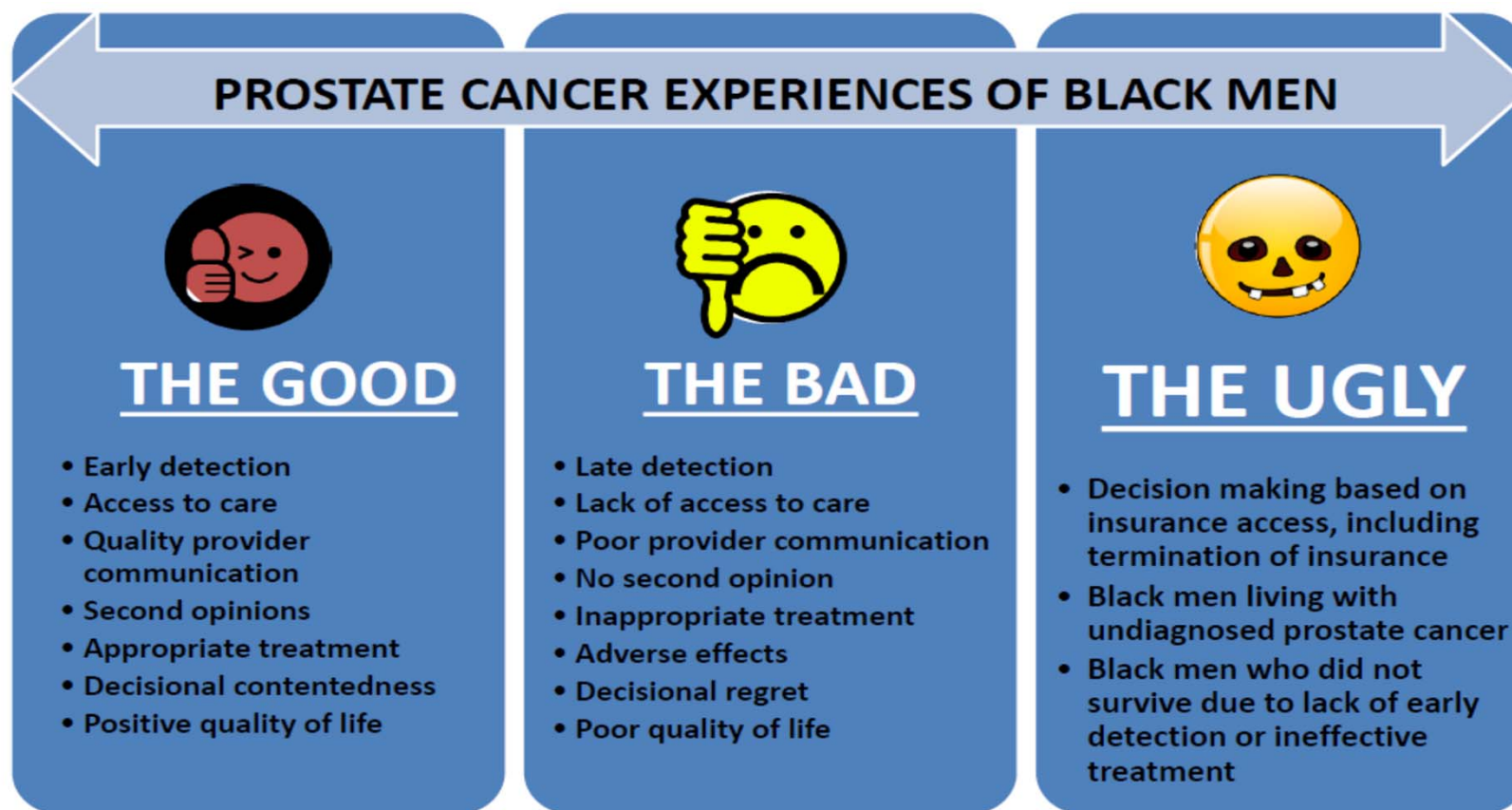
Other Reasons for Diagnosis Disparities

- Screening controversy has significantly impacted diagnosis
 - tailored screening recommended for Black men
- Lower PSA screening in MoAA
 - Complicated by United States Preventive Services Task Force (USPSTF) recommendations
 - Decline in PSA screening led to increase in de novo metastatic diseases

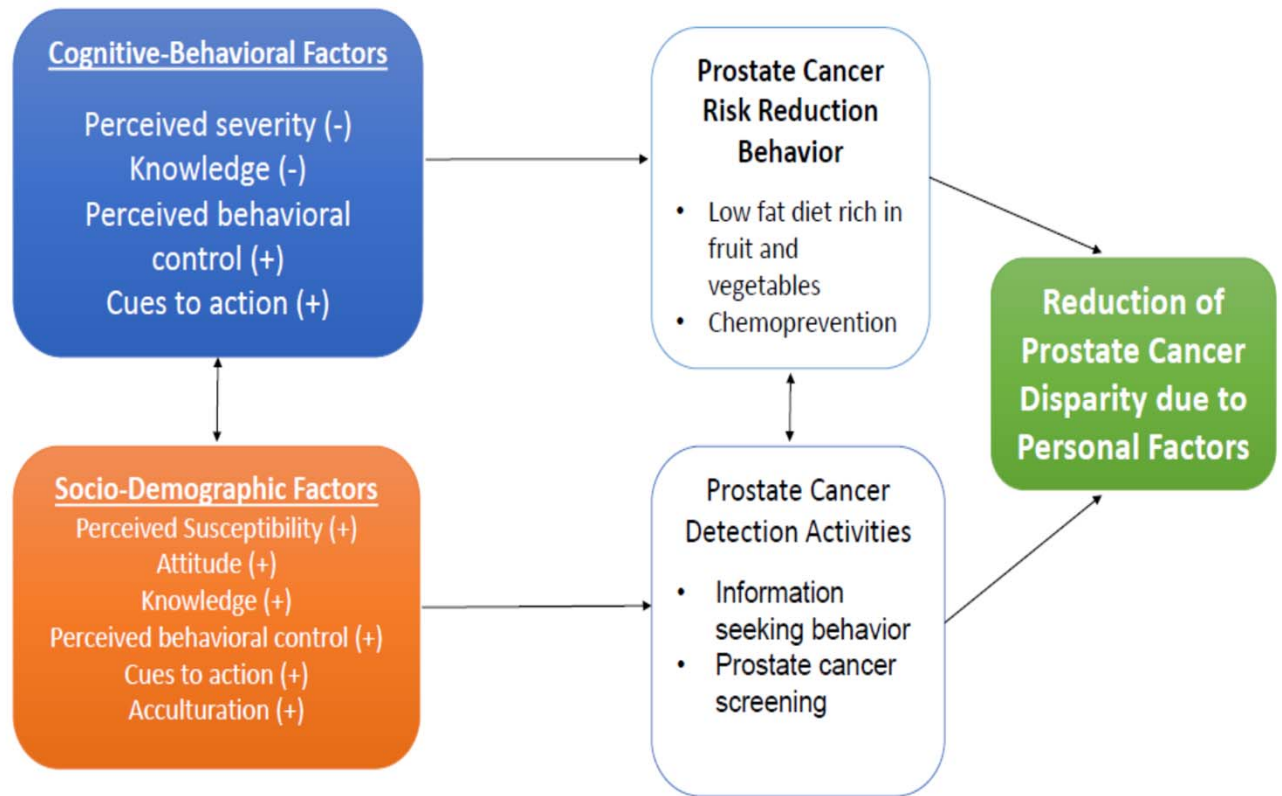


Prostate Cancer Experiences of Black Men: The Good, The Bad and The Ugly

The experiences of the Black prostate cancer survivors across the prostate cancer care continuum were categorized into “the good”, “the bad” and “the ugly”.

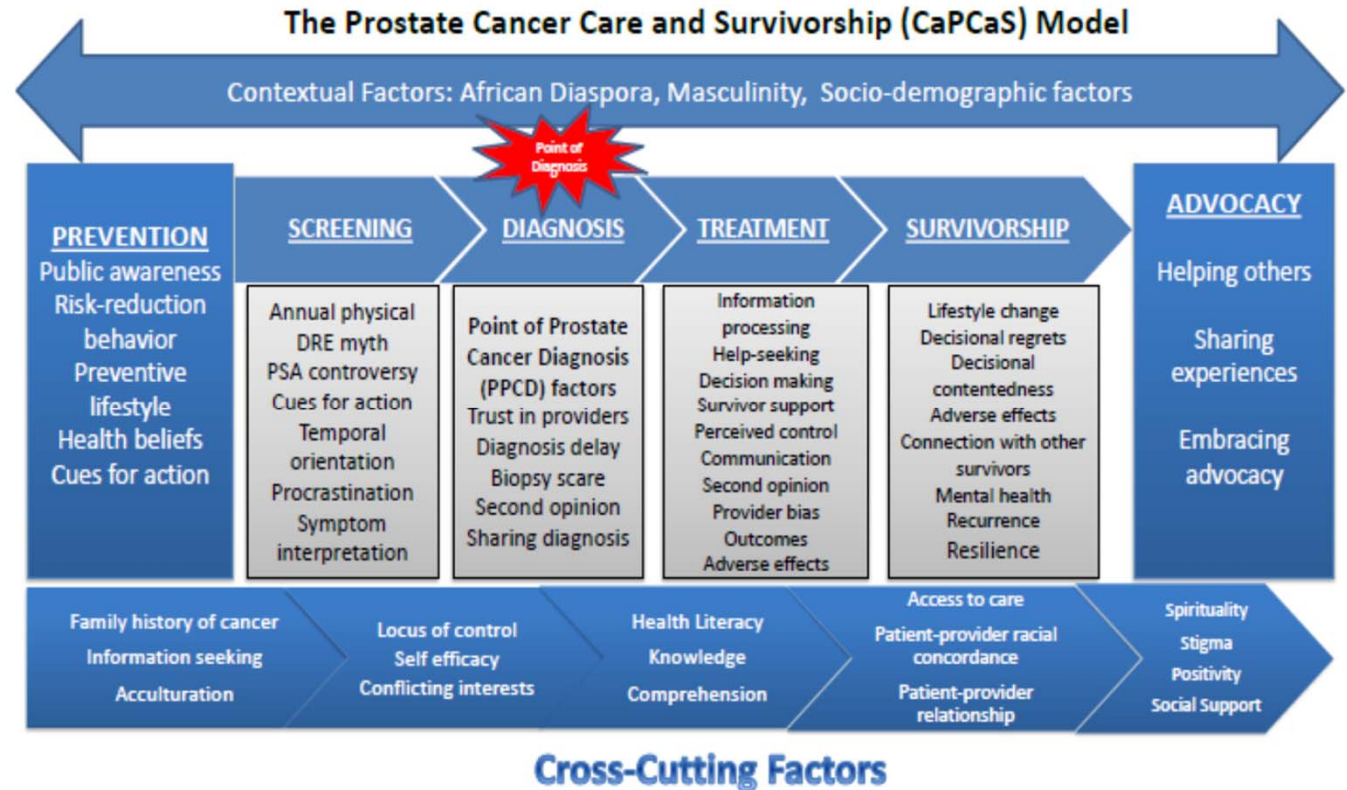


Interpersonal factors for Diagnosis Disparities



The Prostate Cancer Care and Survivorship (CaPCaS) Model

A Prostate Cancer Care and Survivorship (CaPCaS) model was created representing the trajectory of prostate cancer prevention, screening, diagnosis, treatment, survivorship, and advocacy.



Point of Prostate Cancer (PPC)

“I feel that in the doctor, uh, urologist office there should be someone after someone is given that diagnosis to sit with them and chat with them and- and make sure they’re-they’re all right before they walk out of the office.”

Status of Black Men at PPCD	At PPCD, Black men	At PPCD, Black men need
<p><u>Diverse in terms of</u></p> <ul style="list-style-type: none"> Ethnicity Health literacy Spirituality Trust in healthcare system/physician Prior experience with cancer Perceived susceptibility to cancer Delayed time for diagnosis Fear of diagnosis 	<p><u>Experience</u></p> <ul style="list-style-type: none"> Helpful information Lack of empathy <p><u>Have emotional reaction of</u></p> <ul style="list-style-type: none"> Shock Disbelief Fear Denial Overwhelmingness “Why me” syndrome Impact on manhood Cancer fatalism Hope Acceptance Religious coping Resilience Will to live Need for immediate resolution 	<ul style="list-style-type: none"> Physician that makes them comfortable Time to reflect on the diagnosis Psycho-oncology support Emotional support Second opinion on diagnosis





Area-level factors associated with spatial variation of prostate cancer incidence for black men

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Original Report

THE JOURNAL OF COMMUNITY AND SUPPORTIVE ONCOLOGY; 2017;15(1):10-19

Point of prostate cancer diagnosis experiences and needs of black men: the Florida CaPCaS study

Folakemi Odedina, PhD,^a Mary Ellen Young, PhD,^b Deidre Pereira, PhD,^c Christopher Williams, MD,^d Jeniffer Nguyen, PhD,^a and Getachew Dagne, PhD^e

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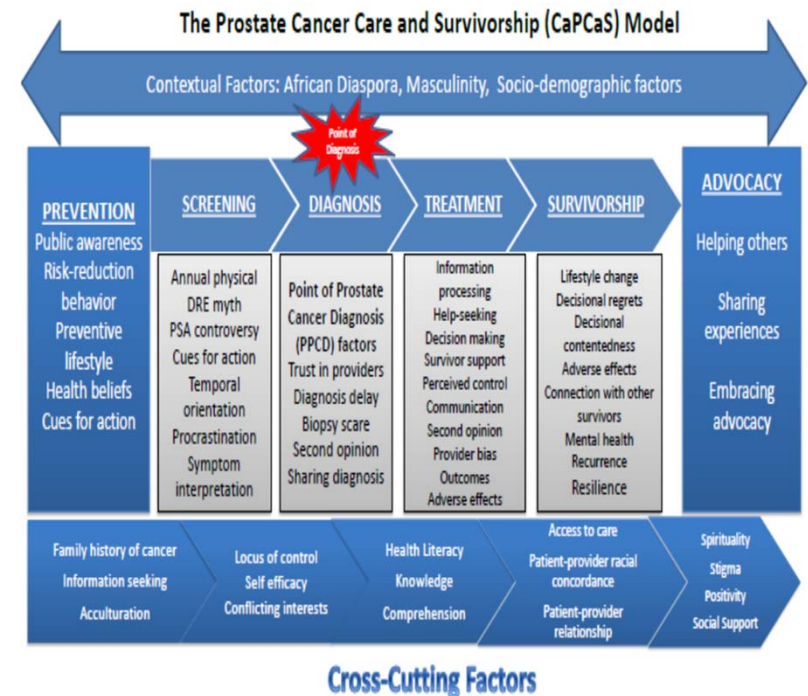
Open Access

Needs of Black Men at the Point of Prostate Cancer Diagnosis (PPCD): The Florida CaPCaS Study

Odedina, F.T^{1*}, Young, M.E², Pereira, D², Williams³, Nguyen, J¹, Dagne, G⁴

Point of Prostate Cancer Diagnosis (PPCD) as a crucial point for clinical intervention for Black men.

- A crucial point for all the men is the **Point of Prostate Cancer Diagnosis (PPCD)**, where they experience shock, hope, fear, resilience, denial, cancer fatalism, disbelief, and thoughts about impact of disease on manhood.
 - The need for emotional support and the time to reflect on prostate cancer diagnosis is critical at the PPCD.



Interpersonal factors for Diagnosis Disparities

“In the beginning, I realized, you know, the screening portion, uh, it was scary. You know, all you hear is, when you hear the word prostate cancer you hear, uh, you didn’t hear white guys dying. You were hearing the Black man disease, or the blacks dying at a higher rate because of stats saying they’re not getting medical treatment, they’re getting diagnosis late, or they’re not adequate getting medical care. Those were the things I heard. Did I know anything about the disease? No. You just seen public service announcement: Black mens are dying from prostate cancer, you know, at a higher rate from their White counterparts.” [Participant 2039]



Interpersonal factors for Diagnosis Disparities

“ And I was in a daze just listening to cancer, you know. I- I went to my car and sat a while because ***I was not, um, in the-in the mind to-to drive. I could've been dangerous.*** And I felt, and I-I've said this to several people, ***I didn't expect the doctor to remain there holding my hands. He had other patients to see. But I feel that in the doctor, uh, urologist office there should be someone after someone is given that diagnosis to sit with them and chat with them and-and make sure they're-they're all right before they walk out of the office. So I felt, uh, I felt that-- I felt in some way that was lacking..***”

| Participant 2024 |



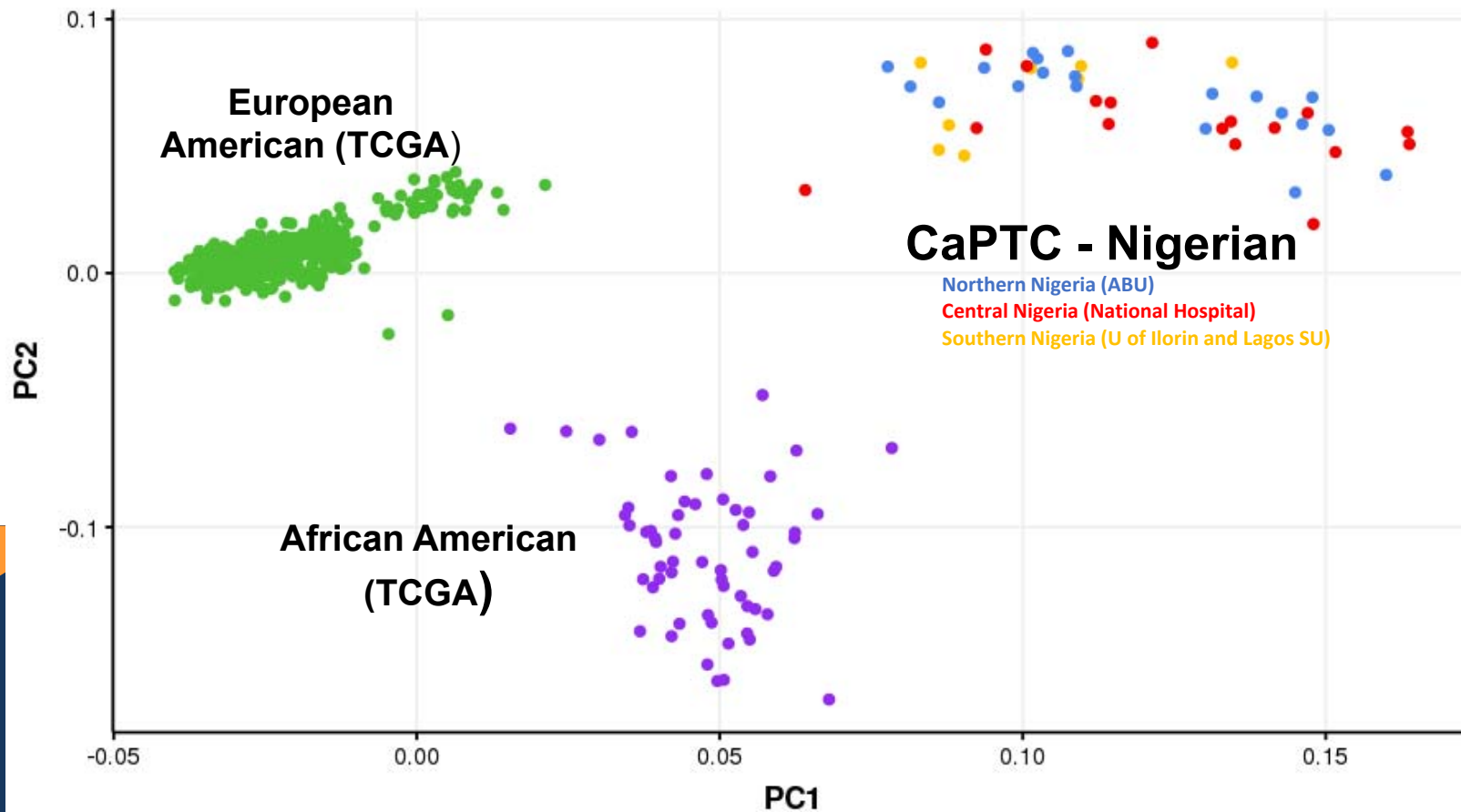
How are we addressing Diagnosis Disparities?

- Understanding the genetic etiology of the disease

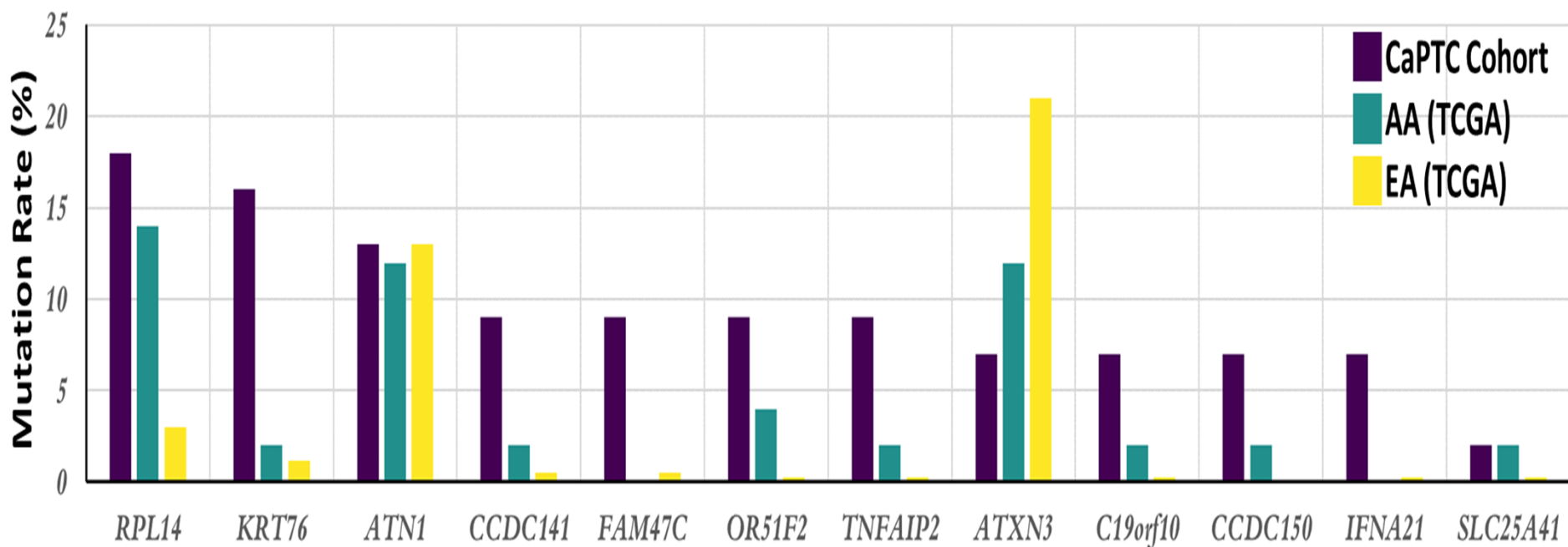


Principal Component Analysis CaPTC and The Cancer Genome Atlas Tumors (TCGA) Tumors

Nigerian and AA are shifted towards the right, which means they are more similar than EA on the left.

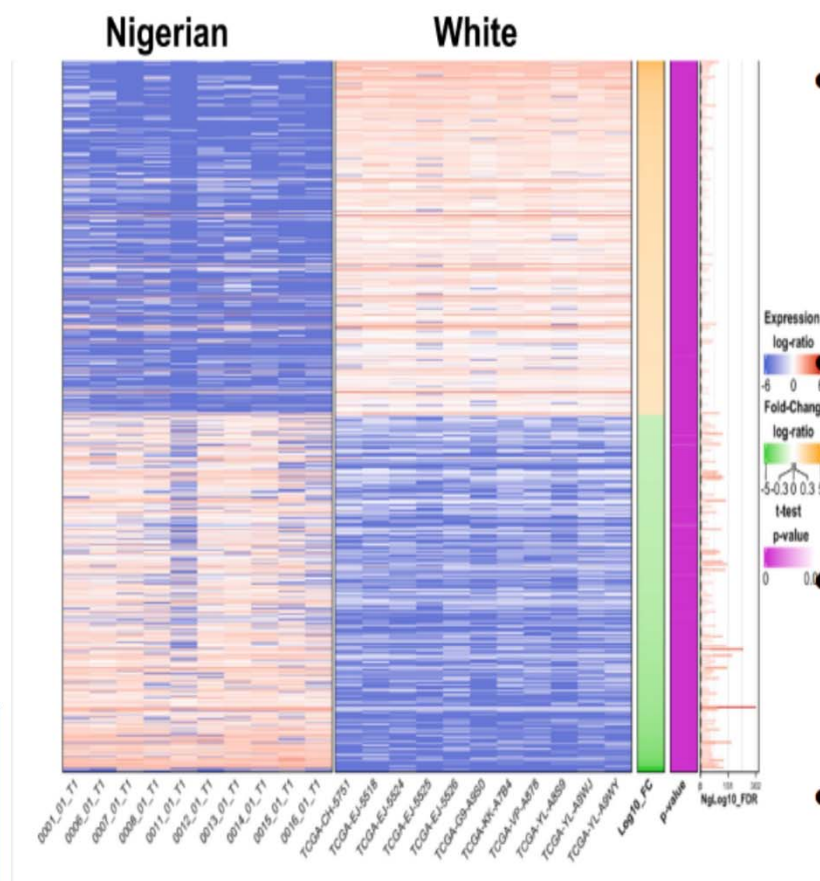


CaPTC Driver Gene Comparison with TCGA



Pattern of Immuno-Inflammatory Gene Expression

Dr. Solomon Rotimi
CaPTC Director
Translational Research
Africa



- RNAseq analysis of high grade prostate cancer of Nigerian men shows unique expression pattern of immuno-inflammatory genes.
- Prostate cancer is driven by unique biological/genetic factors in Nigerian men.
- This implies that prostate cancer is not the same disease in both Nigerians and whites.
- Nigerian men required population specific precision intervention to improve the clinical outcome

Rotimi et al: Oral Presentation ICW 030
on 28/10/20 @ 10:40am-10:50am



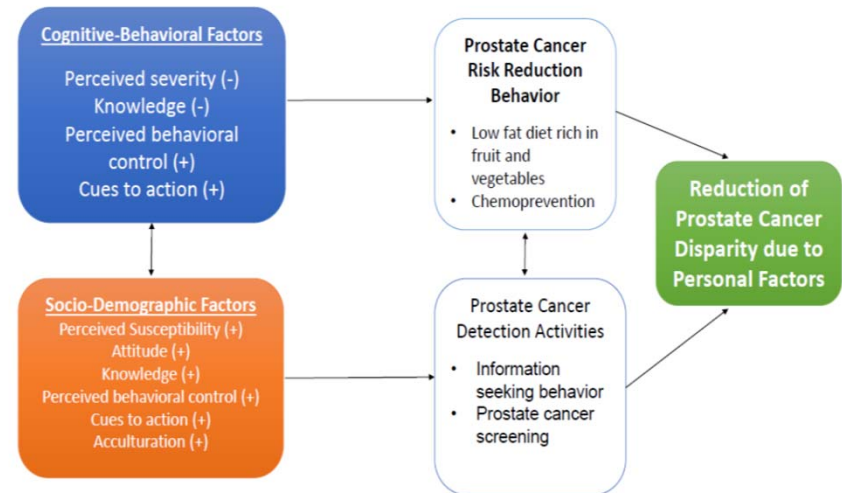
Odedina, FT (Contact PI), Rotimi S, Reams RR et al. Prostate Cancer Transatlantic Consortium (CaPTC) CPTAC Tissue Source Sites. National Cancer Institute/Leidos Inc, 10/01/2021 – 9/30/2026, \$928,832.98.

- Sponsors
 - NIH/National Cancer Institute (NCI)
 - Leidos Biomedical Research, Inc.
- **Clinical Proteomic Tumor Analysis Consortium (CPTAC)** contract
- Provide CPTAC with high-quality, clinically annotated, untreated tumor specimens and whole or processed blood specimens from West Africa Black men with diagnosis of prostate cancer.



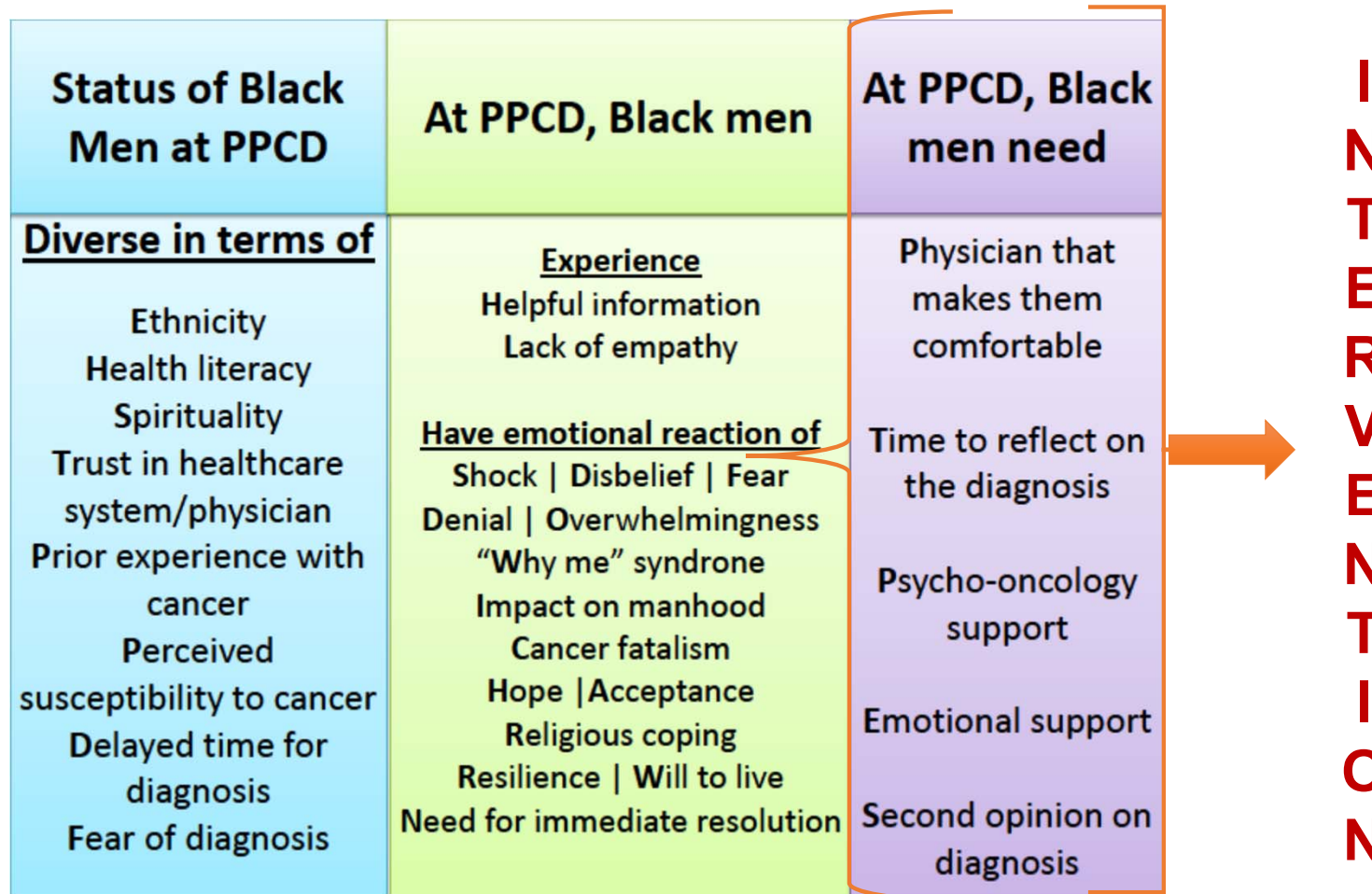
How are we addressing Diagnosis Disparities?

- Educational Interventions
- Behavioral Interventions
- Point of Prostate Cancer Diagnosis Intervention



Interpretative Framework of PPCD Status and Experiences of Black Men

Based on data gathered, this image interprets the experiences of Black men during prostate cancer diagnosis.





Disparities in Prostate Cancer Treatment



Therapy Challenges for MoAA

- Less likely to participate in Clinical Trials
- Less likely to choose active surveillance
- More likely to delay treatment
- Less likely to have access to treatment

• **Reasons for Therapy Disparities**

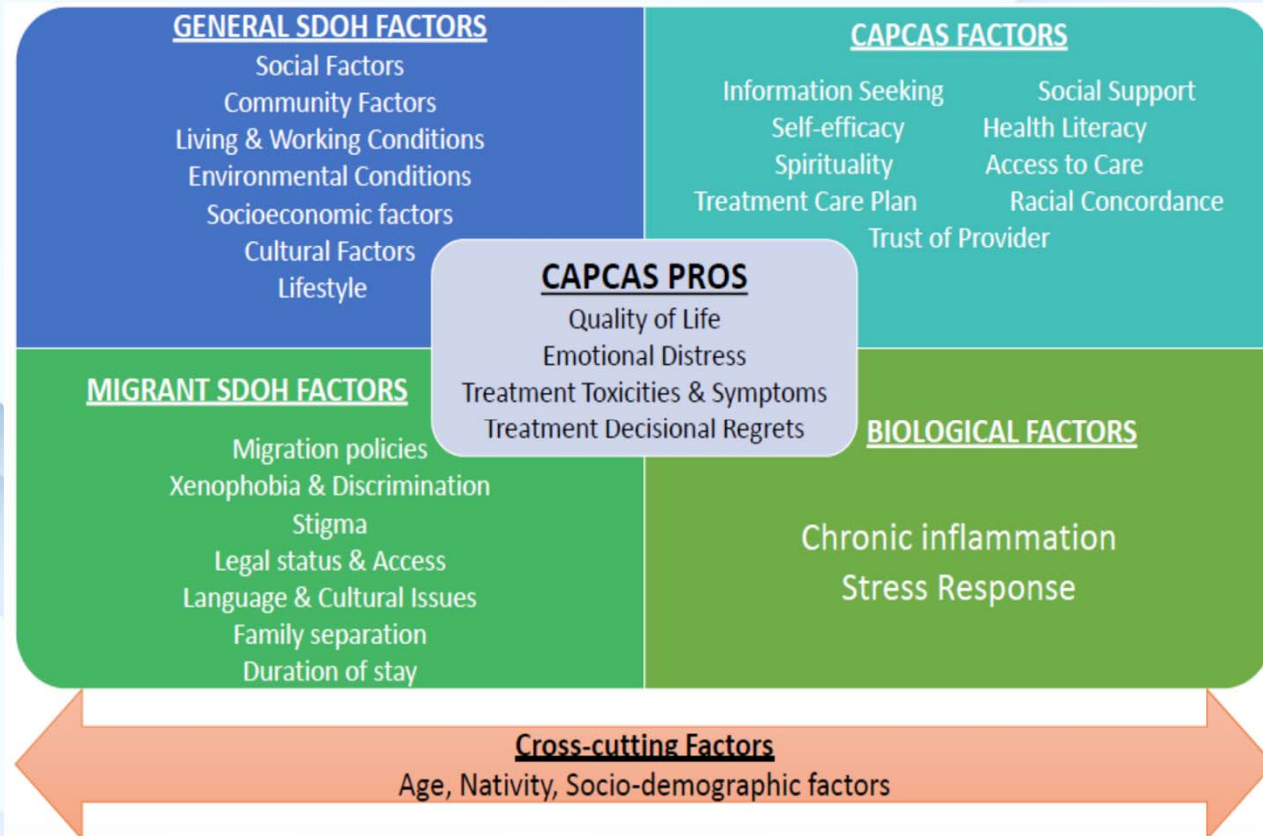
- Access to care
- Institutional racism/discrimination/bias in health care system
- Marginalization
- Social determinants of health



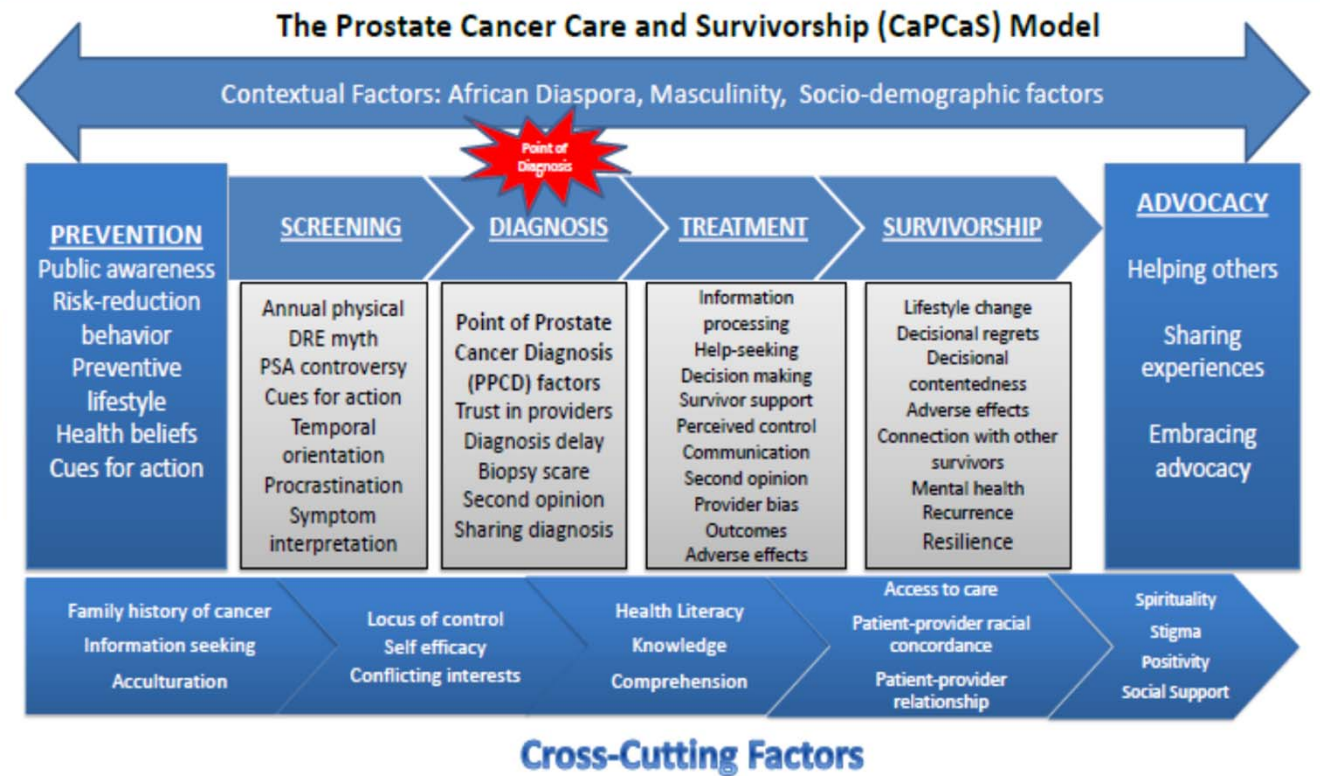
Iyengar et al. Cancer Epidemiol Biomarkers Prev. 2020 July ; 29(7): 1357–1364. doi:10.1158/1055-9965.EPI-19-1344

Chowdhury-Paulino et al. Prostate Cancer Prostatic Dis. 2021 Sep 2. doi: 10.1038/s41391-021-00451-z.

**iCCaRE Consortium
CaPCaS Patient
Reported Outcomes
(PROs) Model for
MoAA**, provides an
integrated summary of
social-determinants of
health (SDOH), CaPCaS
factors and biological
factors.



Odedina FT, Yates C & Kaninjing. Prostate Cancer among African American Men. In The Health of African Americans in the Southern United States. Eds Coughlin SS, Williams L and Akintobi TH. Johns Hopkins University Press (In Press)



“You take anybody word that’s in a white coat. Now, I don’t take nobody word just from my experience -- not to say that I know everything. I’m saying by my experience on misdiagnosis, different side effects – it’s important when somebody tell me “now you got this,” I want to know how is this going to affect me down the road. Am I going to be better or am I going to be worse? If I’m going to be worse, then why am I doing this? When I don’t understand -- what I want people to understand is, when you don’t understand something, don’t leave the office like I did. I left the office in the first couple of years -- this is my fourth year -- the first two years, I just do whatever Joe Blow or Mary Ann say, I thought it was God. Now, in these last two years, I’m not taking it anymore. I’m’ asking the questions because the quality of life is what you want to know. How is my quality of life going to be better with the decision they say you need?” [Participant 2039]



“My physician told me, “Okay, 6 months to a year, you’ll be back to normal.” That’s what he told me. “6 months to a year, you’ll be back to normal.” He kept preaching that, he didn’t tell me anything different. He told me [emphasizes] 6 months to a year you’ll be back to normal.” So when I, when I went into surgery, I went into surgery with that in mind – “Hey doc, in 6 months to a year, you’ll be back to normal, okay, and you won’t have that problem.” [It’s] still ongoing. It’s almost 5 years, and it’s not back to normal”. [Participant 1881]



How are we addressing Therapy Disparities?

- Addressing SDOH challenges is tough!
- Decentralization of care and clinical trials
- Global focus on treatment in Black men
 - IRONMAN Study



Odedina, FT (Contact PI), Popoola A, Yates C et al. International Registry to Improve Outcomes in Men with Advanced *Prostate Cancer* (IRONMAN). Movember Foundation, 9/01/2020 – 8/31/2025, **\$2,300,804.**

- Sponsors
 - Movember Foundation
 - Prostate Cancer Clinical Trials Consortium (Sponsor)
- Goal is to establish a population-based registry and recruit patients across academic and community practices globally.
- Registry will help identify the treatment sequences or combinations that optimize overall survival and PROMs.
- **CaPTC expands study to West Africa.**
- **Ancillary projects focused on Prostate Cancer Clinical Trials**



Acknowledgement: The Global Team



Acknowledgement: Study Participants



Acknowledgement Funding

- ❑ NIH/NCI U54 Award 1U54CA233444
 - ❑ Florida-California Cancer Research, Education and Engagement (CaRE²) Health Equity Center
- ❑ NIH/NCI P20 Award P20CA192992
 - ❑ Florida Minority Cancer Research & Training (MiCaRT) Center
- ❑ Department of Defense PCRP Awards (2013-Present)
- ❑ NIH/National Cancer Institute Epidemiology & Genomics Research Program (2012 – Present).
- ❑ NIH/National Cancer Institute R13 grant awards (2010 – Present)
- ❑ Carnegie African Diaspora Fellowship (2017, 2018)
- ❑ US Fulbright Research Scholar Award (2006)