



# Exploring Prostate Cancer Characteristics & Ethnicity

An Analysis using the Simulacrum Dataset

Group 9

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# Introduction: Unpacking Disparities in Prostate Cancer


Prostate cancer, a significant health concern for men globally, exhibits complex patterns influenced by various factors, including ethnicity. This presentation explores the intricate links between ethnic background and prostate cancer characteristics, leveraging the unique capabilities of the Simulacrum Dataset.

## The Simulacrum Dataset

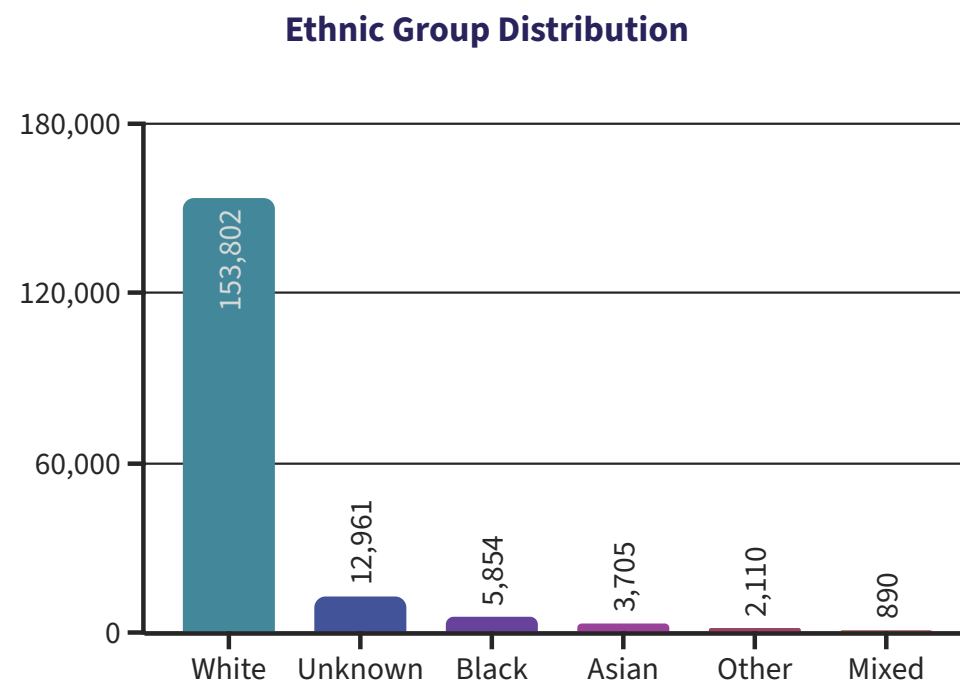
A sophisticated synthetic healthcare dataset designed for research and training. It mirrors real-world patient data while rigorously protecting privacy.

## Our Purpose

To identify potential trends and disparities in prostate cancer presentation across different ethnic groups, informing future research and clinical strategies.

 **Important Note:** As synthetic data, interpretations should be made with caution. While designed for realism, it may have inherent limitations or missing information compared to real-world patient records.

# Patient Demographics: A Diverse Cohort



Understanding the demographic makeup of our study population is the first step in identifying potential disparities. Our analysis of the Simulacrum Dataset reveals a diverse patient cohort across various ethnic groups.

**Observation:** The majority of patients within the Simulacrum Dataset are from the **White** ethnic group, consistent with many real-world epidemiological datasets. This demographic skew is important context for our subsequent findings.

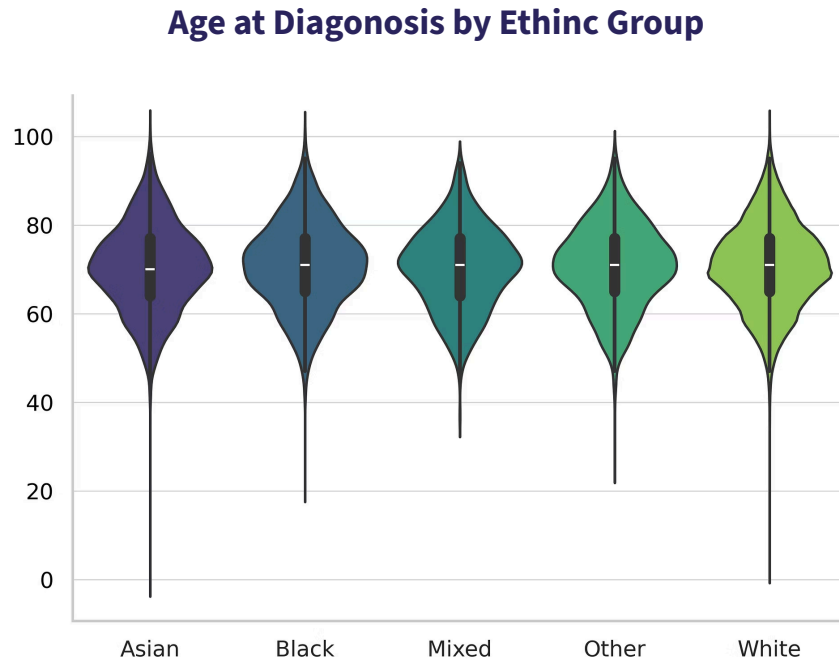
# 1. Age at Diagnosis: Exploring the Impact of Ethnicity

A key question in cancer epidemiology is whether demographic factors influence the age at which a disease is detected. We investigated: **Does ethnicity affect the age at prostate cancer diagnosis?**

Age at diagnosis is a crucial factor in cancer management, significantly influencing treatment options, disease progression, and the potential effectiveness of screening programs. Generally, an earlier diagnosis can lead to more favorable outcomes, while a later diagnosis might indicate a more advanced stage of disease or potential barriers to timely healthcare access.

Understanding whether specific ethnic groups are diagnosed at different ages for prostate cancer is vital. Such disparities could point towards underlying genetic predispositions, varying environmental exposures, differences in health-seeking behaviors, or systemic inequities in healthcare access and screening practices. This analysis aims to illuminate any significant variations in age at diagnosis across ethnic groups within the Simulacrum Dataset, providing foundational insights for future research and targeted public health strategies.

# Findings



**No statistically significant difference was observed in the average age at prostate cancer diagnosis across the diverse ethnic groups represented in our dataset.**

This suggests that, based on this synthetic data, ethnicity alone does not appear to be a primary driver of diagnostic age.

## 2. Cancer Stage at Diagnosis: Exploring the Impact of Ethnicity

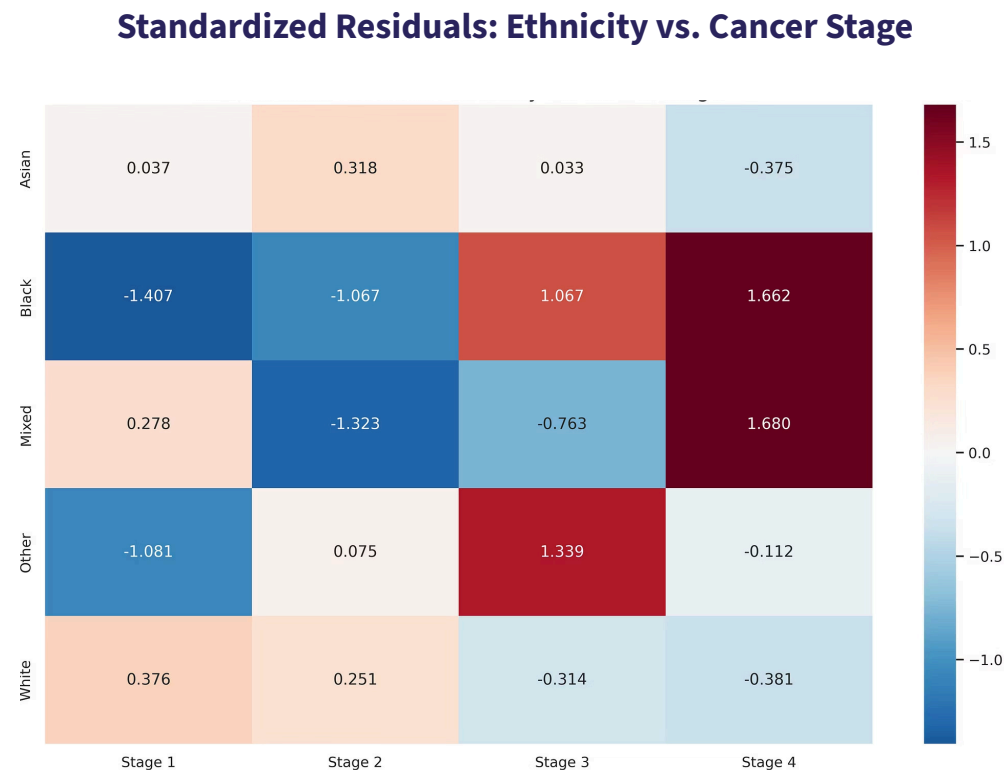
Following our analysis of age at diagnosis, we now investigate a crucial aspect of prostate cancer progression: **Does ethnicity affect the age at prostate cancer diagnosis?**

Understanding disparities in cancer stage at diagnosis is paramount because it can highlight inequities within the healthcare system, access to screening, or differences in health-seeking behaviors across various populations. For instance, if certain ethnic or socioeconomic groups are consistently diagnosed at later stages, it suggests a need for targeted interventions to improve early detection and access to care within those communities.

This question delves deeper into potential inequalities, moving beyond merely when cancer is found, to how advanced it is when detected.



# Findings



**Key Insight:** Patients from the Mixed and Black ethnic groups appear to be diagnosed at later stages (Stage 3 & 4) more often than statistically expected, suggesting potential disparities in access, screening, or awareness.

Our analysis of the Simulacrum Dataset reveals a **significant association** between ethnicity and the stage of prostate cancer at diagnosis.

Conversely, the White ethnic group showed a higher-than-expected proportion of early-stage diagnoses.

### 3: Gleason Grade Group: Aggressiveness Assessment

Beyond the stage, the aggressiveness of the cancer cells themselves, assessed by the Gleason Score (or Grade Group), is a critical prognostic factor. We explored: **Does ethnicity relate to prostate cancer aggressiveness?**

The Gleason Score and its associated Grade Group are essential pathological markers used to evaluate the aggressiveness and growth patterns of prostate cancer cells. This scoring system provides critical insights that guide treatment decisions and help predict disease progression.

#### Understanding Gleason

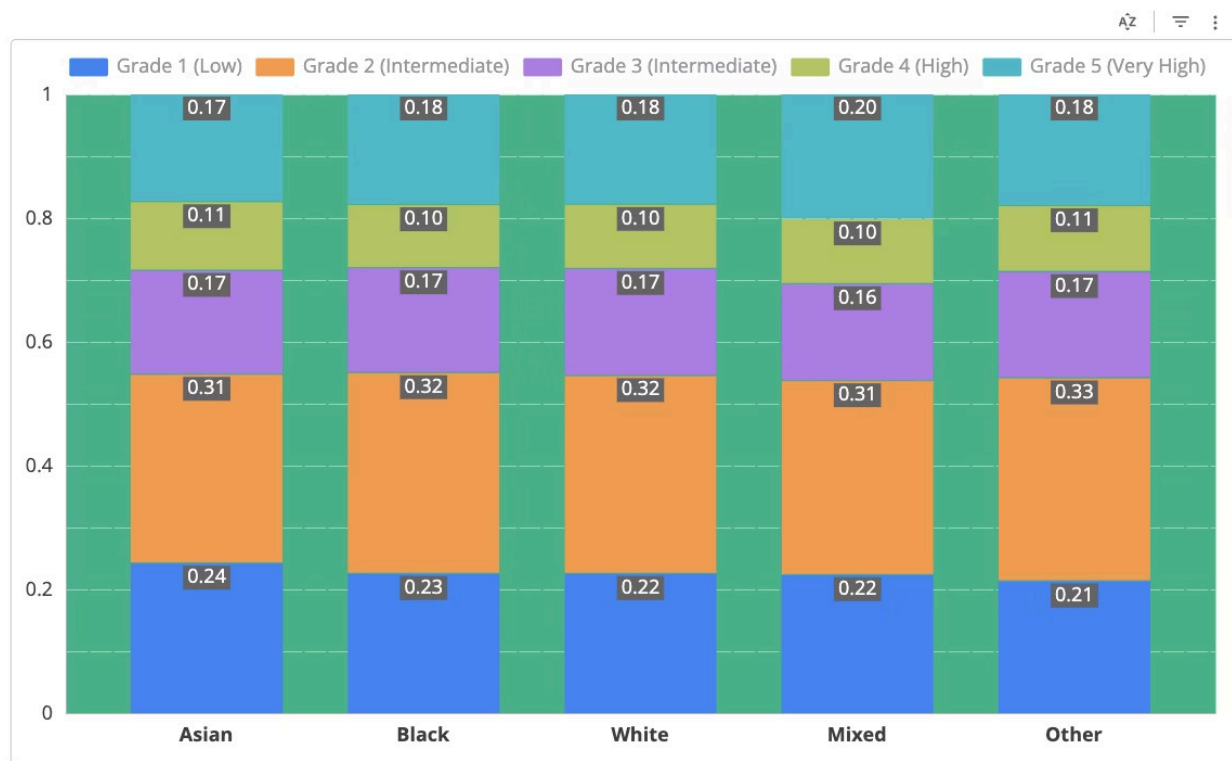
The Gleason score assesses how closely cancer cells resemble normal prostate cells under a microscope. Higher scores signify more aggressive cancer, which are then categorized into Grade Groups (1-5).

By analyzing the Gleason Score and Grade Group, clinicians can make informed decisions about the most appropriate treatments for each patient, taking into account the unique characteristics and aggressiveness of the individual's prostate cancer.



# Finding 3

Standardized Residuals: Ethnicity vs. Cancer Grade Group



No statistically significant association was found between ethnicity and the assigned cancer Grade Groups in our study.

This suggests that while the **stage** at diagnosis may differ by ethnicity, the inherent **aggressiveness** of the cancer cells themselves, as measured by Gleason, does not show a statistically significant ethnic pattern in this dataset, though further research with real-world data is needed.

# Conclusion & Key Takeaways: Unpacking Disparities

Our analysis of the Simulacrum Dataset offers critical insights into the epidemiology of prostate cancer characteristics across diverse ethnic groups.



## Main Finding

Ethnicity is significantly associated with **Cancer Stage** at diagnosis, with potential disparities for Mixed and Black ethnic groups being diagnosed at later stages.



## Other Findings

No significant link was found between ethnicity and **Age at Diagnosis** or **Gleason Grade Groups**.



## Next Steps

Further in-depth research is imperative to understand the underlying socioeconomic, healthcare access, and biological factors contributing to these stage disparities.

**Addressing these disparities in prostate cancer care is paramount for achieving equitable health outcomes.**

**Questions?**

**Thank You!**