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Original article

# Asian Americans and prostate cancer: A nationwide population-based analysis

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## Abstract

**Introduction:** It remains largely unknown if there are racial disparities in outcomes of prostate cancer (PCa) for Asian American and Pacific Islanders (PIs) (AAPIs). We examined differences in diagnosis, management, and survival of AAPI ethnic groups, relative to their non-Hispanic White (NHW) counterparts.

**Methods:** Patients ($n = 891{,}100$) with PCa diagnosed between 1988 and 2010 within the surveillance, epidemiology, and end results database were extracted and stratified by ethnic group: Chinese, Japanese, Filipino, Hawaiian, Korean, Vietnamese, Asian Indian/Pakistani, PI, and Other Asian. The effect of ethnic group on stage at presentation, rates of definitive treatment, and PCa-specific mortality was assessed. The severity at diagnosis was defined as: localized (TxN0M0), regional (TxN1M0), or metastatic (TxNxM1).

**Results:** Relative to NHWs, Asian Indian/Pakistani, Filipino, Hawaiian, and PI men had significantly worse outcomes. Filipino (odds ratio [OR] = 1.38, 95% CI: 1.27–1.51), Hawaiian, (OR = 1.70, 95% CI: 1.41–2.04), Asian Indian/Pakistani (OR = 1.37, 95% CI: 1.15–1.64), and PI men (OR = 1.90, 95% CI: 1.46–2.49) were more likely to present with metastatic PCa ($P < 0.001$). In patients with localized PCa, Filipino men were less likely to receive definitive treatment (OR = 0.91; 95% CI: 0.84–0.97; $P = 0.005$). Most AAPI groups had lower rates of PCa death except for Hawaiian (hazard ratio = 1.52; 95% CI: 1.30–1.77; $P < 0.0001$) and PI men (hazard ratio = 1.43; 95% CI: 1.12–1.82; $P < 0.0001$).

**Conclusions:** Compared with NHWs, AAPI groups were more likely to present with advanced PCa but had better cancer-specific survival. Conversely, Hawaiian and PI men were at greater risk for PCa-specific mortality. Given the different cancer profiles, our results show that there is a need for disaggregation of AAPI data. 

*Keywords:* Prostate cancer; SEER; Racial disparities; Outcomes

## 1. Introduction

Asian American (AA) and Pacific Islanders (PI) (AAPIs) are the fastest growing racial group in the United States [1]. They are also the only racial group in which cancer is the leading cause of death [2], whereas cardiovascular disease

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is the leading cause for non-Hispanic Whites (NHW), African Americans, and Native Americans. Unsurprisingly, prostate cancer (PCa) is the most common malignancy in men for nearly all AAPI groups [3,4].

Minorities historically have been underrepresented in cancer clinical trials or even absent in epidemiological studies. The "model minority" myth further distorts the public view that AAPI health issues are either nonexistent or of limited importance. Additionally, AAPIs are a heterogeneous group, originating from more than 50 different countries with over 100 languages. The previous work has shown that incidence of PCa differs between AAPI subgroups [3]. Despite this, studies tend to place these groups under the all-inclusive umbrella of "Asian American" [1], making monitoring the health status of this group difficult. Disaggregation of AAPI data into distinct ethnic groups is an important task few researchers have taken on, and only in the past decade have studies on groups within the AAPI population begun to emerge.

Few studies have examined AAPI ethnic group patterns in PCa incidence, severity at diagnosis, rates of definitive treatment, and survival. To our knowledge, there has only been 1 study examining disaggregated data nationally. Gomez et al. [3] importantly demonstrated heterogeneity in PCa incidence and changes in incidence rates from 1990 to 2008. Given the difference in incidence trends between ethnic groups, we expect a stratified analysis based on AAPI subgroups would reveal similar heterogeneity in severity at diagnosis, rates of definitive treatment, and survival.

## 2. Material and methods

### 2.1. Patient population

Using the Surveillance, Epidemiology and End Results (SEER) database, patients ($n$ = 891,100) diagnosed between 1988 and 2010 with PCa were identified. Sponsored by the National Cancer Institute, SEER collects patient demographics and publishes cancer staging, treatment, and survival data from population-based cancer registries, covering approximately 28% of the U.S. population and approximately 97% of incident cancers [5]. When matched with 2010 Census data, SEER captures approximately 50.4% of all AAs and 66.5% of Native Hawaiian/Pacific Islanders (PIs) in the United States. Within AAs, SEER includes 49.9% of the Chinese, 64.9% of the Filipino, and 70.1% of the Japanese population [6].

The start of the timeframe was set at 1988, the year specific covariates of interest were introduced in SEER and the database adopted the third edition of the American Joint Committee on Cancer staging system. The year 2010 is the most recent year for which complete mortality data are available and thus ends the study timeframe.

Patients were excluded if $<18$ years of age, PCa diagnosed at autopsy/death certificate only, cause of death unknown, in situ disease, diagnosis with $>1$ malignancy, non-NHW/AAPI ethnicity, or missing clinical or demographic data, resulting in 470,141 patients (Fig. 1). From our AAPI cohort, we analyzed groups with $n > 500$: Chinese, Japanese, Filipino, Hawaiian, Korean, Vietnamese, Asian Indian/Pakistani, and PI. Approximately 72% of U.S. residents identify themselves as exclusively White, composing the largest demographic [7].

### 2.2. Study variables

Variables evaluated include race (AAPI vs. NHW), age at diagnosis, marital status (married, others [separated, divorced, widowed, and never married], or unknown), socioeconomic status (SES), residence type (rural/urban), year of diagnosis (1988–1995, 1996–2000, 2001–2005, or 2006–2010), severity at diagnosis, definitive treatment (surgery/radiation at the primary site), hospital region (East Coast, South, Midwest, or West), and insurance status (insured, uninsured, or unknown). Patients' age at diagnosis was examined as a continuous variable. SES was treated as ordinal.

SES was examined at baseline according to 4 county-attribute variables: median family income, percent of adults in poverty, percent unemployment, and percent of college graduates aged $\geq$25 years. Residence type was determined at the county level by linkage to the 2003 U.S. Department of Agriculture rural-urban continuum codes [8]. County level educational status (percentage of residents aged $\geq$25 years with high school education) and income (median household income) were determined through linkage to the 2000 U.S. census [9]. We created a composite SES variable for analysis using 3 of the aforementioned variables based on previous methodology [10]. First, we recoded variables individually so low values represented low SES. Second, we transformed values into standardized scores based on quintiles determined from our control NHW group. Third, we summed these scores for the composite SES.

Severity at diagnosis levels were defined as follows: localized (TxN0M0), regional (TxN1M0), metastatic (TxNx M1). Stage was determined using the American Joint Committee on Cancer third edition for diagnoses between 1988 and 2003 and the sixth edition for diagnoses between 2004 and 2010.

### 2.3. Statistical analysis

Means and standard deviations were reported for continuously coded variables. Baseline patient characteristics were compared using analysis of variance for continuous, Kruskall-Wallis analysis for ordinal, and chi-square test for categorical variables to detect statistically significant differences in means and percentages.

For severity at diagnosis, we modeled the likelihood of advanced PCa at presentation according to race using multinomial logistic regression. Each case was assigned the most