



# Oncologic Outcomes in Predominantly Minority Underserved Patients Presenting with Oropharyngeal Squamous Cell Carcinoma

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## Background

- The incidence and prevalence of oropharyngeal squamous cell carcinoma (OPSCC) has significantly increased in the United States in the last 40 years largely due to the increased incidence of HPV-mediated oropharyngeal cancer.
- Five-year survival for OPSCC is reported between 50-66% depending on the underlying patient demographics and tumor characteristics<sup>1</sup>.
- Access to and delivery of timely multimodality treatment for oropharyngeal squamous cell carcinoma (OPSCC) remains a challenge, particularly in underserved and minority patients. Previous literature contains discrepancies regarding the correlation of race/ethnicity with oncologic outcomes.
- Because OPSCC is most prevalent in non-Hispanic white males, they remain the most studied patient population<sup>2</sup>. However, it is important to study oncologic outcomes of other races and ethnicities in order to disclose and improve upon discrepancies in care and outcomes.
- Previous studies have demonstrated that outcomes are worse for non-white patient populations. However, this is thought to be correlated with the lower incidence of HPV-driven tumors and increased prevalence of smoking in these patient populations<sup>3,4</sup>. By studying OPSCC outcomes at a single tertiary care public, safety-net hospital that primarily serves minority and underserved patients, providing the same access to and quality of care to all patients, we were able to focus on the impact of race/ethnicity without some of the previously mentioned confounding factors.

## Methods

This is a retrospective cohort study that included patients (n=180) with a new diagnosis of OPSCC between 2008-2016 in a large tertiary-care, public hospital. Analysis of patient demographics, tumor and treatment characteristics, and oncologic outcomes were performed.

## Results

- Patient characteristics:** detailed in Table 1. The majority of patients were male (87%) with an average age of 56 years. 48% of patients self-identified as white, 28% as African American, and 22% as Hispanic. Most patients had a history of tobacco exposure (79%) and alcohol use (73%).
- Tumor characteristics:** detailed in Table 2. The majority of patients presented with advanced disease and the most common T stage at presentation was T4 (40%) with 86% of patients having nodal disease. Limited data was available for p16 testing, however p16 testing increased starting in 2012 (Figure 1). There was no significant difference in testing status for different races as 31% of whites, 30% of African Americans, and 37% of Hispanics were tested. Additionally, of those tested, there was no significant difference in the proportion of patients with p16 positive tumors (38% of whites, 40% of African Americans, and 43% of Hispanics).
- Treatment characteristics and delivery:** Majority (80%) of patients presented to the Otolaryngology service already with a diagnosis of OPSCC. Treatment was initiated with a median of 71 days from day of diagnosis. African American patients had a more delayed time to treatment initiation compared to white patients (56 vs. 20 days, p=0.04)(Figure 2A), however overall time to treatment initiation did not have a significant effect on overall survival. NCCN complaint treatment was delivered for 85% of patients, and 15% of patients did not receive curative-intent treatment. Patients that did not receive curative-intent treatment were likely to live farther away (P<0.001)(Figure 2B), however patients that lived further from the medical center did not have a worse overall survival if they received treatment.
- Oncologic outcomes:** Overall survival at 5-years for the entire cohort was 40% and was significantly worse in patients who did not receive curative-intent treatment (16% vs. 44% 5 year-survival, p<0.001)(Figure 3A). Non-smokers demonstrated improved overall survival compared to smokers (60% vs. 31% 5-year survival, p=0.02)(Figure 3B). P16 positivity is associated with an improved overall survival (69% vs. 44% 5-year survival, p=0.05). Race was not associated with a worse overall survival (Figure 3C). Race was also not associated with a worse disease free survival (DFS)(Figure 3D). Although not statistically significant, there was a trend toward a lower DFS survival advantage in African American patients compared to white patients (45% vs. 64%, p=0.08)

| Total number       | 180        |
|--------------------|------------|
| Age (mean, range)  | 56 (35-85) |
| Sex (%)            |            |
| Male               | 87         |
| Female             | 13         |
| Race (%)           |            |
| African American   | 28         |
| White              | 48         |
| Hispanic           | 22         |
| Other              | 2          |
| Marital status (%) |            |
| Married            | 18         |
| Tobacco (%)        | 79         |
| Alcohol (%)        | 73         |
| Site (%)           |            |
| Tonsil             | 44         |
| Base of tongue     | 39         |
| Soft palate        | 9          |
| Other              | 8          |
| HIV (%)            | 7          |
| Trach (%)          | 32         |
| PEG (%)            | 60         |
| Any treatment (%)  | 85         |
| Surgery (%)        | 8          |
| Radiation (%)      | 78         |
| Chemotherapy (%)   | 73         |

Table 1: Patient Characteristics

| Total number | 180 |
|--------------|-----|
| Stage (%)    |     |
| T            |     |
| T1-T2        | 33  |
| T3-T4        | 65  |
| N            |     |
| 0            | 9   |
| 1            | 9   |
| 2-3          | 75  |
| M            |     |
| 0            | 80  |
| 1            | 4   |
| Grade        |     |
| Well         | 8   |
| Moderate     | 30  |
| Poor         | 27  |
| HPV          |     |
| p16+         | 15  |
| p16-         | 16  |
| unknown      | 68  |

Table 2: Tumor Characteristics

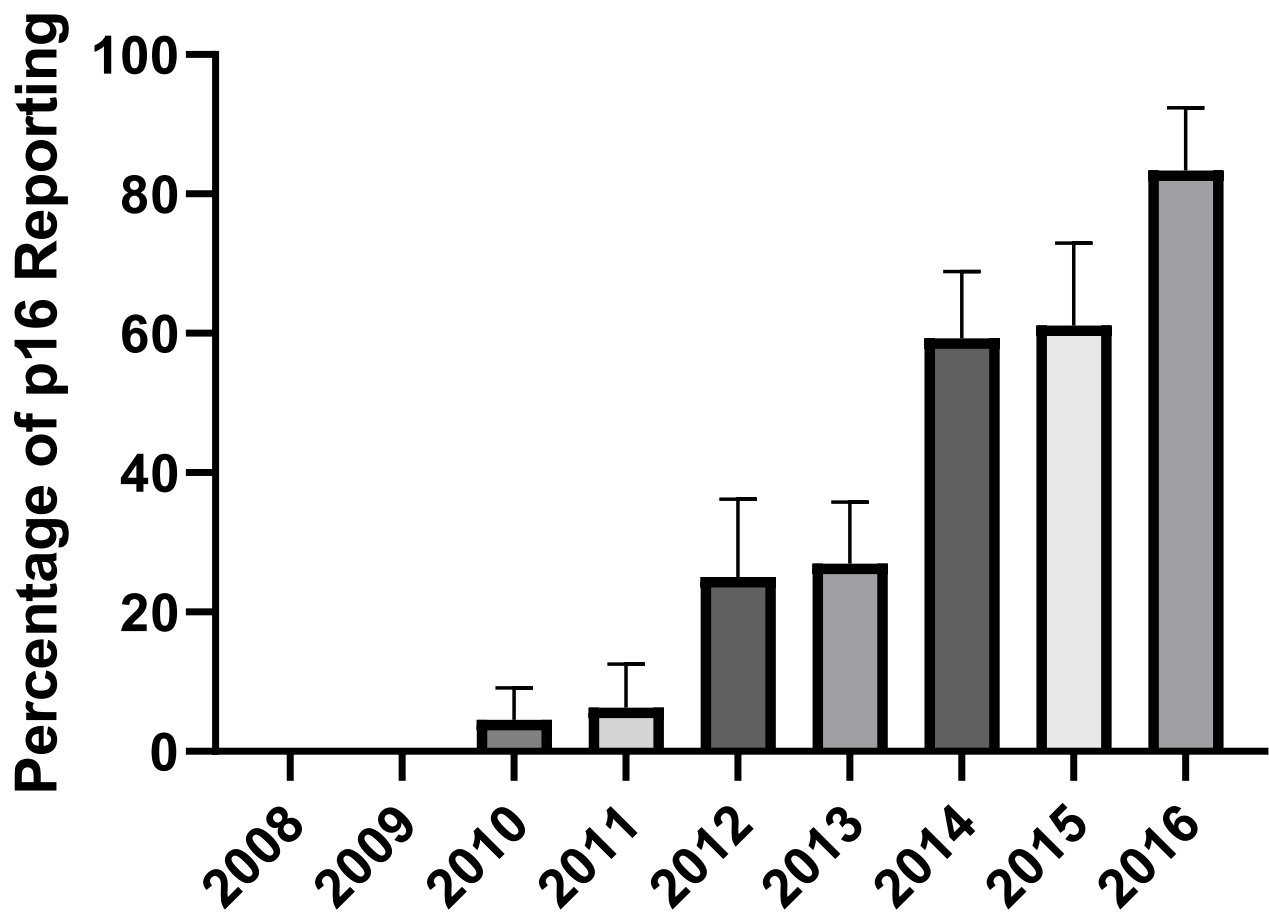
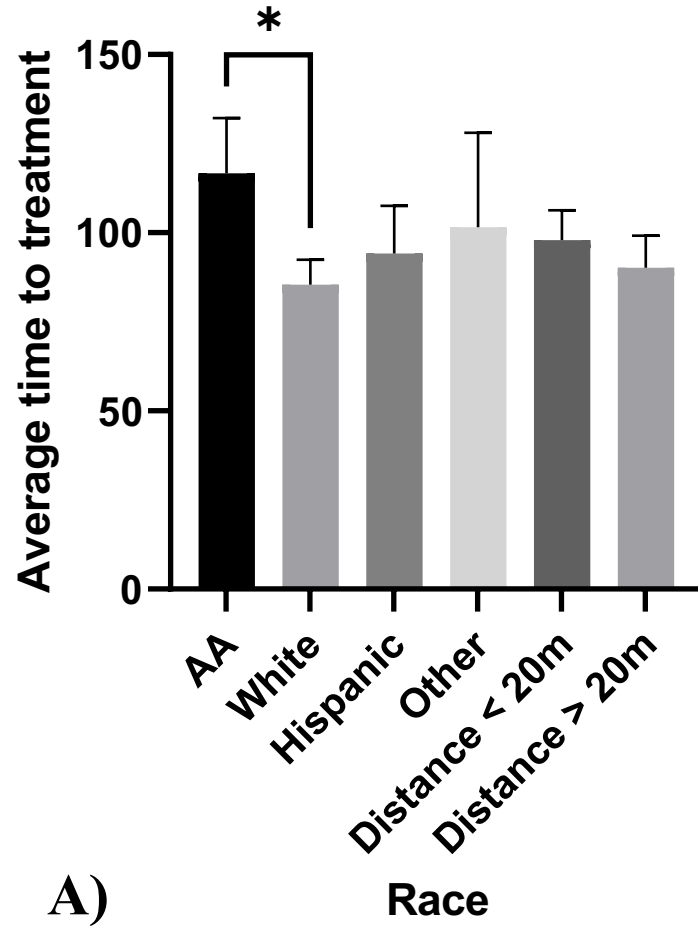


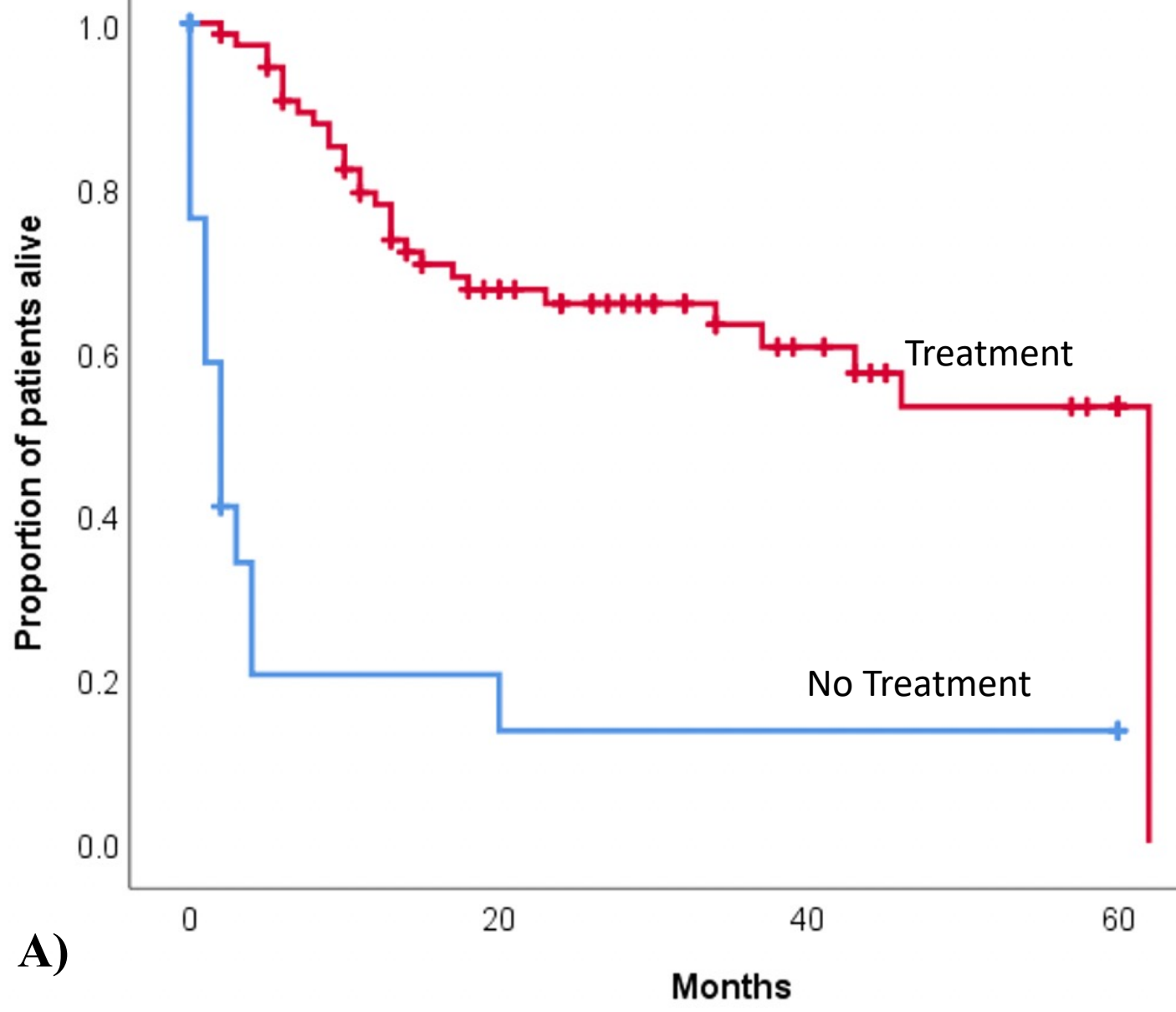
Figure 1: percentage of p16 reporting by year

## Results (cont.)

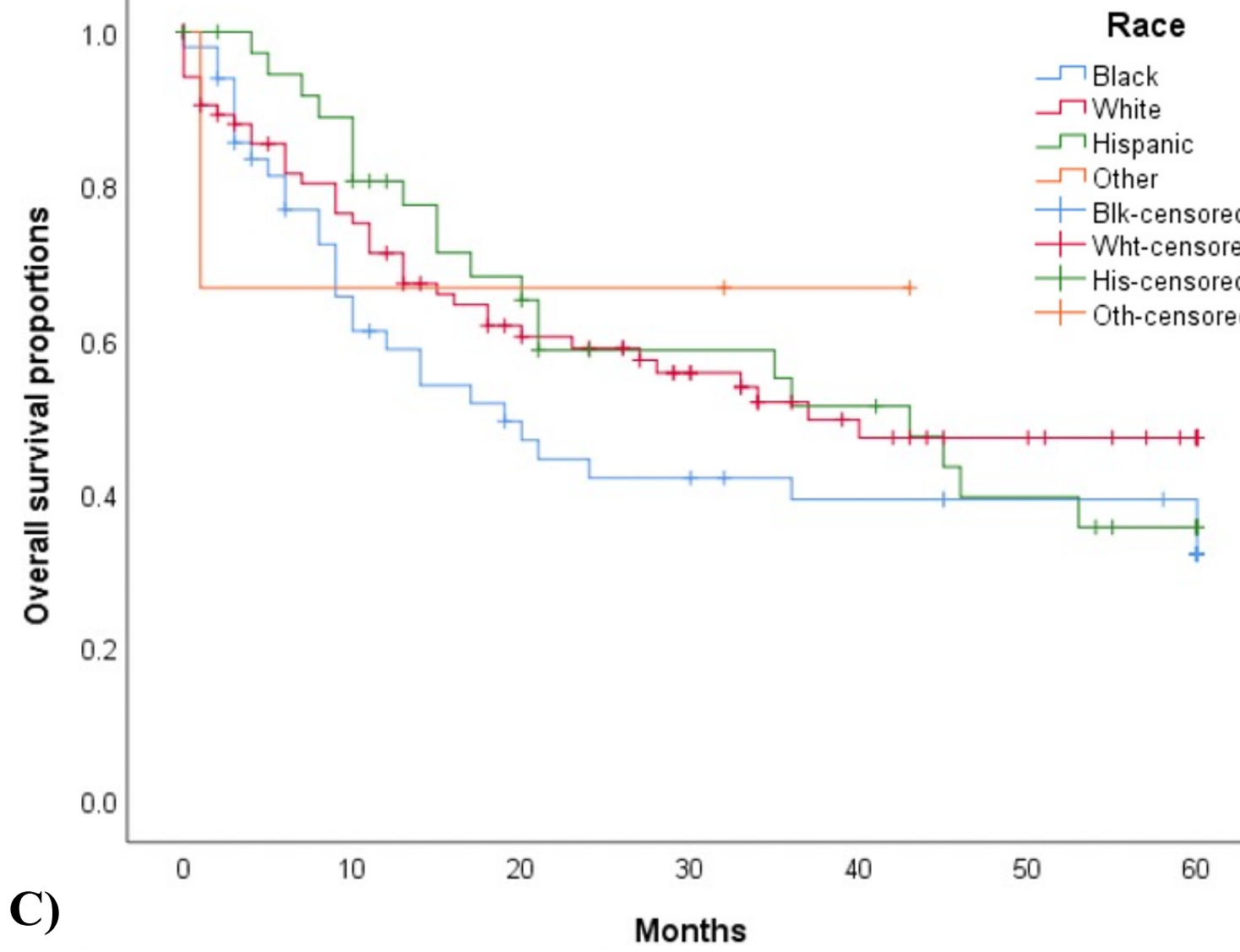


A)

Figure 2: A) time from diagnosis to treatment categorized by race/ethnicity (p=0.04 ) B) distance from Ben Taub Hospital compared to treatment compliance (p<0.001).

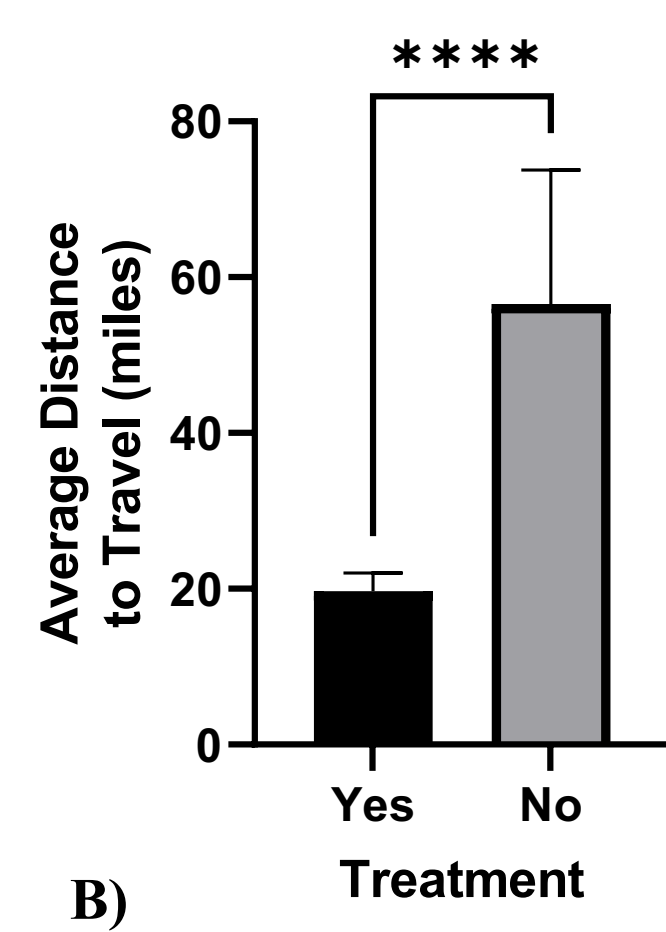


A)

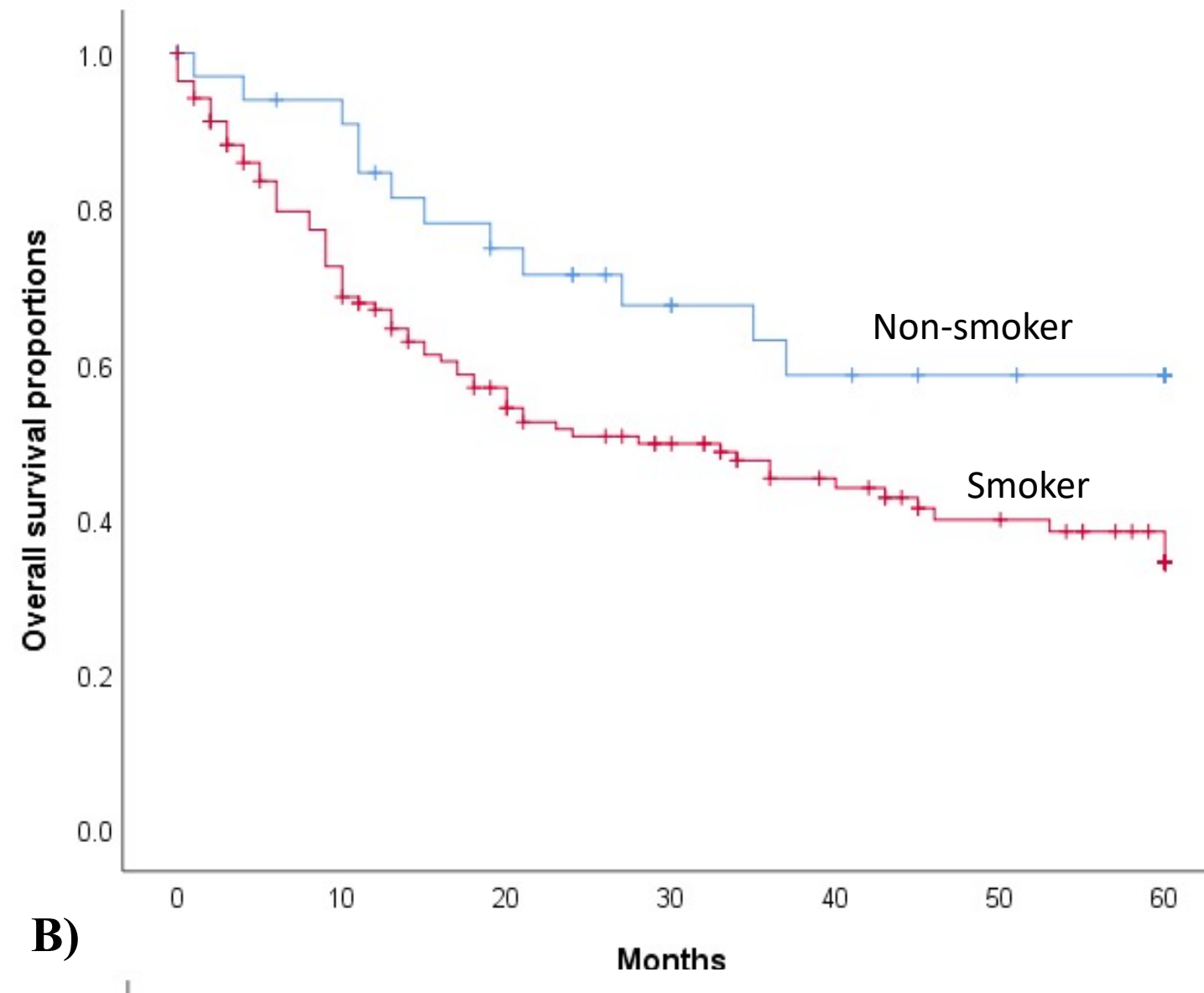


C)

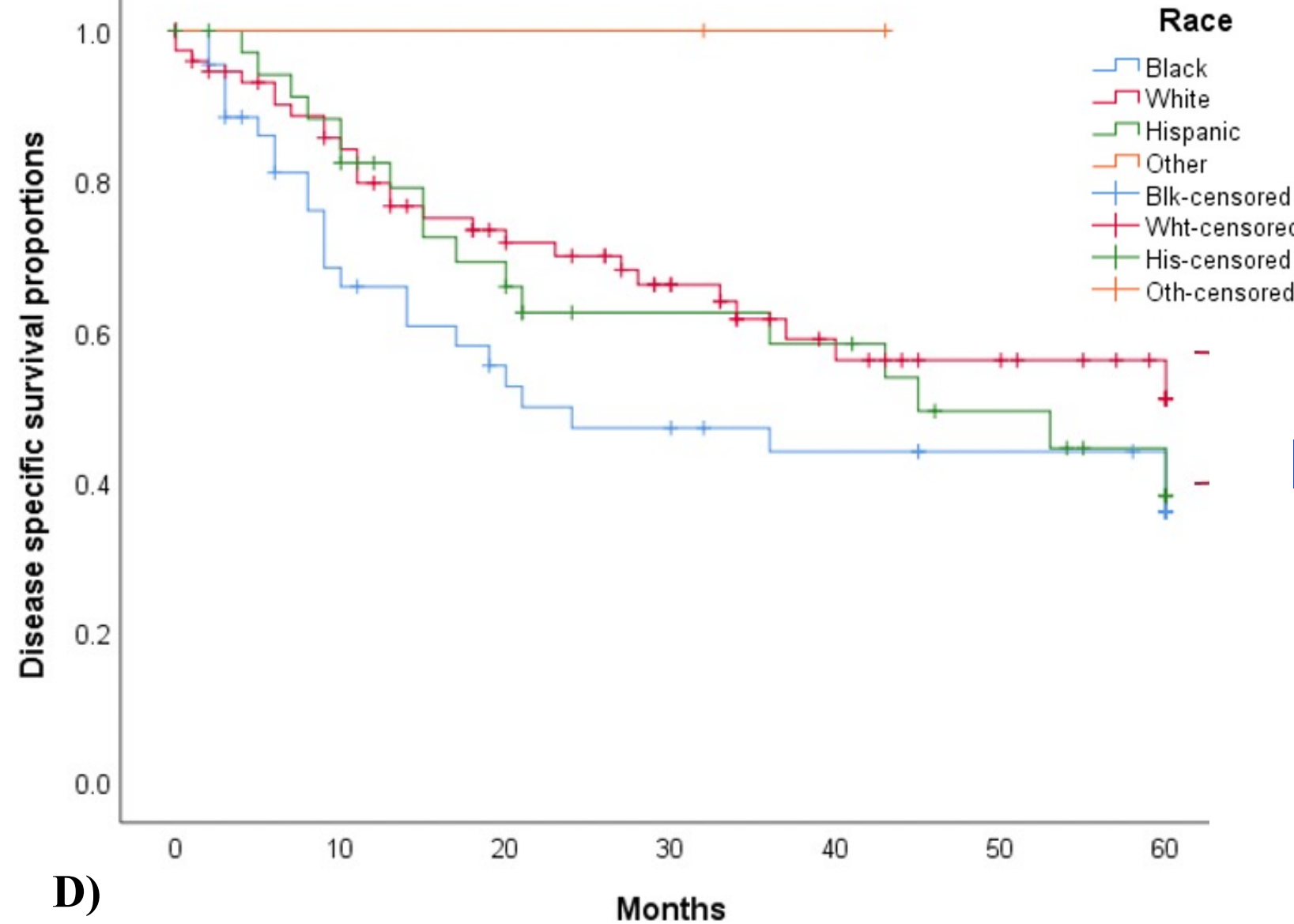
Figure 3: Kaplan Meyer Curve for overall survival stratified by A) treatment compliance (p<0.001 ) B) tobacco use status (p=0.02) C) race/ethnicity (p=ns) and D) DFS stratified by race (p=0.08)



B)



B)



D)

## Discussion & Conclusion

- Overall survival for our entire cohort was 40%, 44% for those who received treatment and 16% for those who did not receive treatment. This is lower than the national average of 66%. The lower rate of survival among the entire cohort appears to be associated with disease biology and patient risk factors, including advanced stage at presentation, high smoking prevalence and low incidence of p16 positive disease compared to the national prevalence of p16 positive tumors<sup>5</sup>. Additionally, 40% of our patients presented with advanced disease, compared to the national average of 12% reported by the T4A study using NCDB data<sup>6</sup>.
- The patient population at Ben Taub hospital is 59% Hispanic, 25% African American, and 8% white; therefore, we have access to a more diverse cohort of OPSCC patients compared to previous studies<sup>7</sup>. National data concludes that 5-year survival for African Americans is 50% and for whites is 68% but, in our study, there was no difference in oncologic outcomes among whites, African Americans, or Hispanics.
- From a socioeconomic perspective, there are several factors that can hinder access to care that leads to worse outcome. This is reflected in time to treatment initiation, in which an increased time interval between diagnosis and treatment start leads to worse outcomes for head and neck cancer<sup>8</sup>. The median time to treatment initiation in our study was 71 days, which is longer than some health systems across the country. While we did not find a significant correlation with 5-year survival and time from diagnosis to treatment at our hospital, we did find a significant association between time to treatment and race/ethnicity. African American patients had a statistically significant longer time to treatment initiation than white patients.
- Additionally, patients residing in zip codes further from the hospital had a longer time to treatment initiation. This data gives us a glimpse into the underlying effects of other socioeconomic factors on treatment characteristics and can serve as guidance for programs designed to improve access of care.
- Previous studies have argued that worse oncologic outcomes for African American patients may not be due to race/ethnicity of the patient but rather the HPV tumor status. HPV-positive tumors are more prevalent in white patients and are associated with better oncologic outcomes<sup>4</sup>. Our study found similar oncologic outcomes among African Americans and whites, but also found similar rates of p16-positive tumors in the proportion that were tested, thus agreeing with previous statements in the literature.
- In 2012, due to the increasing prevalence of HPV-related OPSCC, the NCCN recommended all OPSCC tumors undergo p16 or HPV testing. Husain et al. recently reported that the national average for patients with OPSCC that were tested for HPV status is 68.9% and more white patients were tested than African American patients<sup>9</sup>. Overall, we tested 31.8% of patients for p16 status (2008-2016), however we increased our testing rates starting in 2012. This is much lower than the national average, but we did not find a difference in proportion of patients tested based on race/ethnicity.
- Nonetheless, within our public hospital system, we continue to find no evidence of racial/ethnicity discrepancies in delivery of care and treatment, nor in oncologic outcomes. This supports the hypothesis that when patients of all races/ethnicities are given equal access to care, the oncologic outcomes are similar. Rather, advanced disease characteristics and other risk factors appear to be responsible for poor oncologic outcomes compared to other series. The racial discrepancies reported in other series might be explained by differential access to care and socioeconomic confounding variables, and this deserves future study.

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