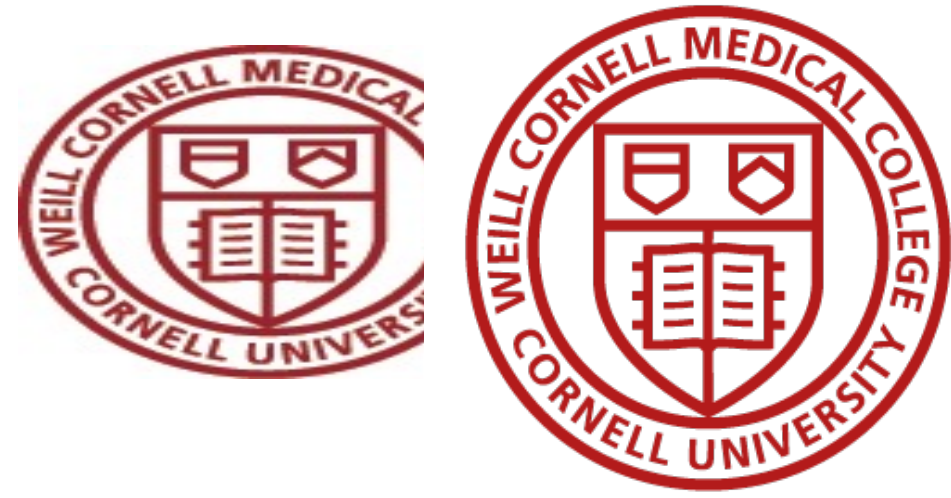




HPV-associated Survival and Rurality in Surgically-Managed Head and Neck Cancer

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INTRODUCTION & BACKGROUND

Squamous cell carcinoma of the head and neck (SCCHN) is the seventh most prevalent cancer worldwide, with incidence growing due to a rise in HPV-associated disease. While rurality has been associated with decreased survival in cancer patients^{1,2}, few studies have been conducted on the impact of rurality on survival in SCCHN, and no studies have segmented the analysis by HPV-status. The aim of this study is to characterize the impact of rural-urban status on disease-specific survival (DSS) across HPV-positive versus HPV-negative SCCHN patients explore how surgical management might impact this relationship.

METHODS

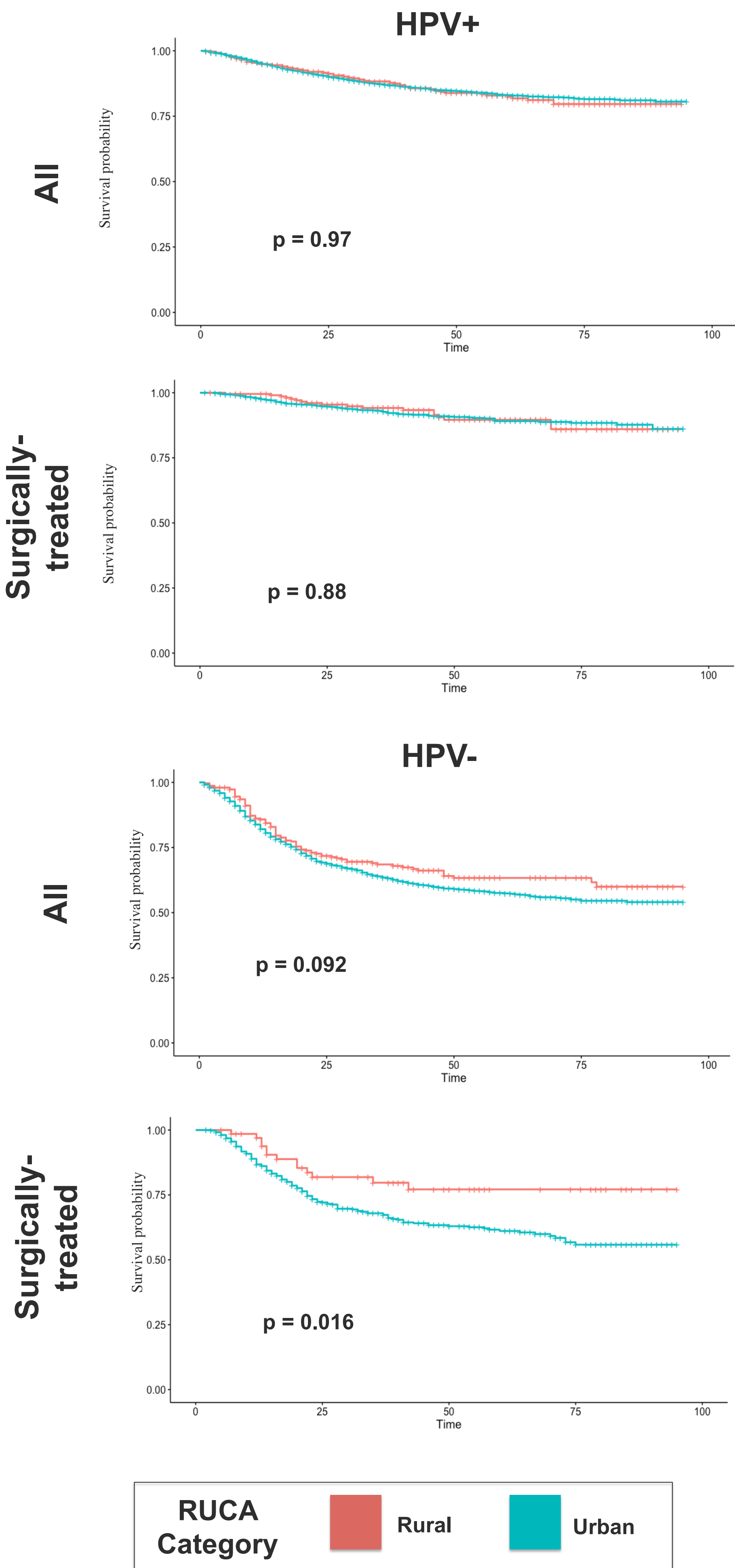
Data Source & Statistical Analysis

The SEER Research Plus Specialized Head & Neck Cancer Database was queried for patients diagnosed with malignant SCCHN between 2010-2017. Records with incomplete data were excluded, yielding a total of 9,140 patients. Kaplan-Meier survival analyses and Cox multivariate regression models were used to assess the impact rurality on DSS. Covariates included in the multivariate analysis included age, gender, race, ethnicity, primary tumor site, TNM values and treatment course. P-values less than 0.05 were considered statistically significant. All statistics were performed in RStudio with the tidyverse, survival and tableOne packages.

Cohorts

9,140 Records			
6,266 HPV Positive		2,834 HPV Negative	
1,746 Surgery	4,520 No surgery	560 Surgery	2,274 No surgery

Kaplan-Meier Disease-Specific Survival by Rural-Urban Status



Cox Multivariate Proportional Hazards Model

		HPV+				HPV-			
		All		Surgically-treated		All		Surgically-treated	
		HR (CI)	P-Value	HR (CI)	P-Value	HR (CI)	P-Value	HR (CI)	P-Value
Age	Age >= 65	1.36 (1.17-1.58)	<0.001	1.56 (1.07-2.28)	0.022	1.44 (1.05-1.98)	0.026	1.15 (1.01-1.32)	0.036
	M Value	4.39 (3.48-5.54)	<0.001	3.66 (1.68-7.99)	0.001	5.11 (2.57-10.16)	<0.001	3.20 (2.59-3.95)	<0.001
N Value	N1	1.12 (0.80-1.56)	0.512	0.45 (0.22-0.91)	0.027	1.29 (0.74-2.26)	0.371	0.83 (0.66-1.05)	0.125
	N2	1.37 (1.03-1.81)	0.029	0.64 (0.37-1.11)	0.111	1.48 (0.94-2.32)	0.09	1.12 (0.93-1.35)	0.242
	N3	2.44 (1.71-3.47)	<0.001	1.58 (0.73-3.42)	0.241	1.81 (0.87-3.78)	0.112	1.77 (1.33-2.35)	<0.001
T Value	T1	0.67 (0.09-4.81)	0.687	NA	NA	NA	NA	0.21 (0.03-1.52)	0.122
	T2	0.83 (0.11-5.94)	0.850	0.88 (0.58-1.36)	0.57	NA	NA	0.25 (0.04-1.81)	0.171
	T3	1.39 (0.19-9.98)	0.745	1.62 (0.97-2.70)	0.067	NA	NA	0.40 (0.06-2.88)	0.364
	T4	2.23 (0.31-16.05)	0.424	2.86 (1.69-4.85)	<0.001	NA	NA	0.57 (0.01-2.10)	0.578
Race	Black	1.06 (0.83-1.36)	0.639	1.54 (0.83-2.85)	0.17	1.19 (0.77-1.85)	0.435	1.03 (0.86-1.23)	0.76
	Other	0.74 (0.49-1.11)	0.146	0.24 (0.03-1.71)	0.153	1.00 (0.52-1.91)	0.989	0.91 (0.71-1.16)	0.443
Rural-urban Status	Rural	0.83 (0.66-1.05)	0.121	0.65 (0.38-1.12)	0.119	0.47 (0.26-0.85)	0.013	0.74 (0.59-0.93)	0.008
Sex	Female	0.90 (0.72-1.11)	0.319	0.82 (0.49-1.39)	0.467	1.13 (0.78-1.64)	0.507	1.12 (0.96-1.30)	0.152
Primary Tumor Site	Hypopharynx	1.68 (1.17-2.42)	0.005	1.99 (0.74-5.31)	0.171	1.39 (0.93-2.09)	0.109	1.27 (1.08-1.50)	0.004
	Nasopharynx	2.48 (1.84-3.33)	<0.001	4.84 (1.08-14.02)	0.039	0.78 (0.37-1.64)	0.507	0.82 (0.65-1.04)	0.105
Treatment Course	C	1.58 (1.26-1.95)	<0.001	NA	NA	NA	NA	1.14 (0.96-1.37)	0.141
	C + R	1.38 (1.09-1.75)	0.007	NA	NA	NA	NA	0.91 (0.72-1.15)	0.445
	C + S	7.42 (3.11-13.79)	<0.001	7.32 (3.82-14.02)	<0.001	0.94 (0.51-1.76)	0.852	1.12 (0.64-1.94)	0.693
Socioeconomic Quintile	Highest 2 Quintiles	0.87 (0.71-1.07)	0.177	0.72 (0.46-1.14)	0.165	1.10 (0.70-1.73)	0.688	0.91 (0.76-1.10)	0.351
	Lowest 2 Quintiles	1.35 (1.10-1.67)	0.005	1.20 (0.75-1.91)	0.444	1.33 (0.82-2.15)	0.248	1.29 (1.07-1.56)	0.008

- Rurality did not affect DSS in HNC patients with HPV+ disease in the survival or multivariate analyses, including analyses restricted to those with a history of surgery
- Rurality was associated with significantly higher DSS in the surgically-treated HPV-negative cohort (p=0.016). On multivariate analysis, rurality was associated with decreased risk of death across all patients with HPV-negative disease regardless of treatment course as well as those with a history of surgical treatment (p=0.013, p=0.008).

CONCLUSION

The absence of a difference in survival by rural-urban status for HPV-positive SCCHN patients signals possible parity in access to treatment. The association of rural residence with improved survival for HPV-negative patients, especially those that were surgically-treated, is counter to existing literature on the impact of rurality on outcomes in other types of cancer. Future studies should further explore the role of rurality in HNC patients’ care to understand mechanisms contributing to improved survival.

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