

Influence of Social Determinants of Health on Cutaneous Head and Neck Squamous Cell Carcinoma

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Background

Between 43% and 72% of cutaneous squamous cell carcinoma involve the head and neck (cHNSCC). Lesions in this region carry a significant risk of nodal metastasis, and treatment of large tumors can result in significant cosmetic deformity and morbidity.⁴⁻⁶ Tumor thickness, perineural invasion, immunosuppression, and location on the ear, lip, or temple have all been associated with worse prognosis.⁷⁻¹⁰ In breast cancer, being African American, having low income, nonprivate health insurance, never having been married, and lack of transportation are all predictors of advanced-stage disease.¹⁴ Similar disparities based on socioeconomic status and race have been observed in colorectal and prostate cancers.¹⁵⁻¹⁷ This study aims to identify and characterize socioeconomic factors influencing the presentation and outcomes of cHNSCC.

Methods

A single-institution retrospective cohort study of patients treated at the University of California San Diego Moores Cancer Center for invasive cHNSCC between 2008-2022. Demographic, socioeconomic data, and disease characteristics were obtained from medical record abstraction. Outcome measures included tumor stage, number of distinct primaries, recurrence, and disease-related death. χ^2 and Mann-Whitney tests were implemented to evaluate clinicopathologic distributions across disease stages. Survival analyses were performed using Cox regression and Kaplan-Meier analysis.

Results

A total of 346 patients met the inclusion criteria. The median age at presentation and length of follow-up was 70.8 and 3.1 years, respectively. The majority of the cohort was white, male, and English-speaking. 13.3% of patients were underinsured and 27.5% were immunosuppressed. Patients who presented with advanced disease were more likely to be underinsured (21.7% vs 9.6%, $P = .006$) and have a history of homelessness (8.5% vs 2.1%, $P = .014$). Immunosuppressed patients were more likely to be underinsured ($P = .009$). Insurance status (1.97 [1.06-3.66], $P = .032$) and immune status (2.35 [1.30-4.26], $P = .005$) were independently associated with worse recurrence-free survival.

Figure 1. Causal directed acyclic graph

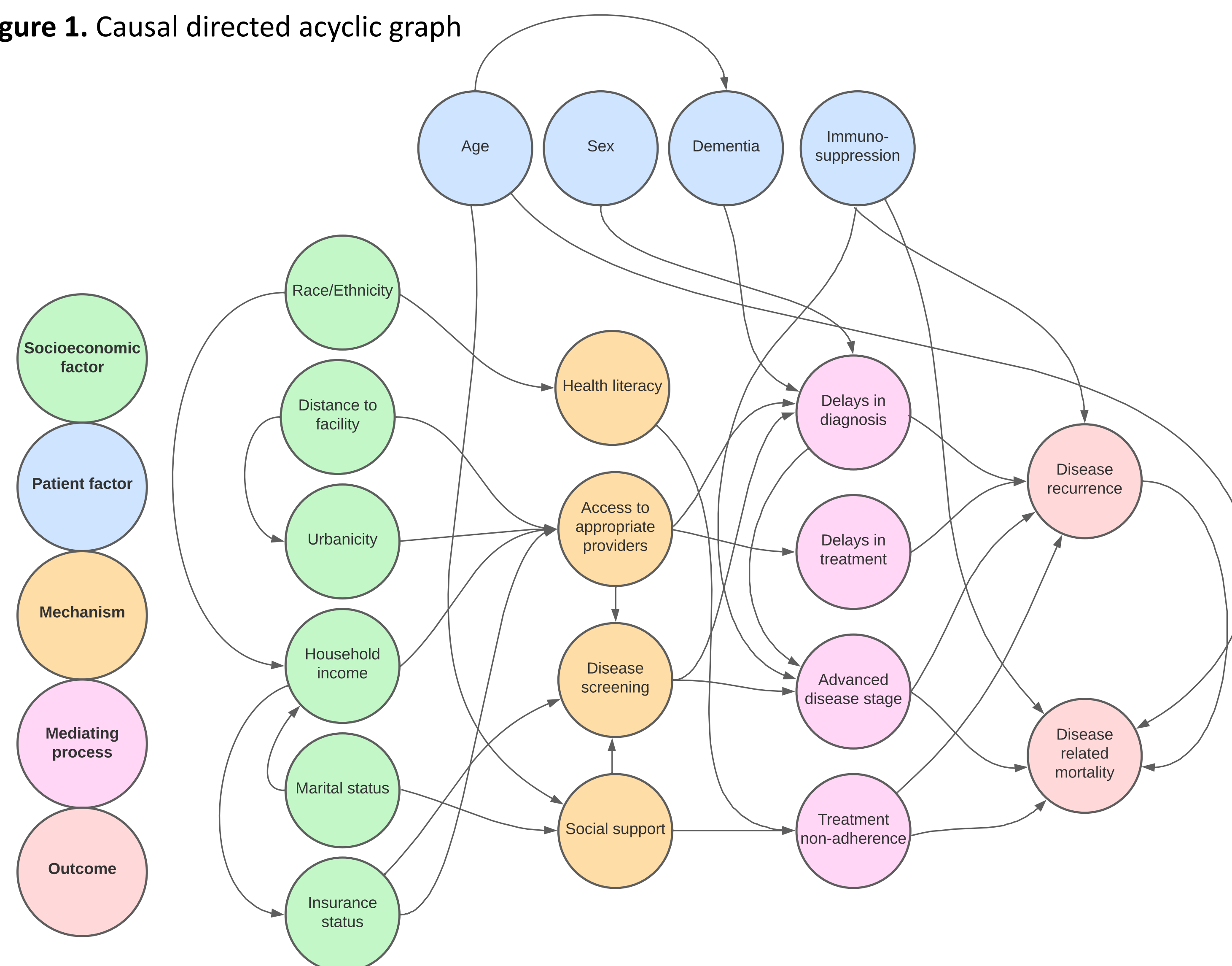


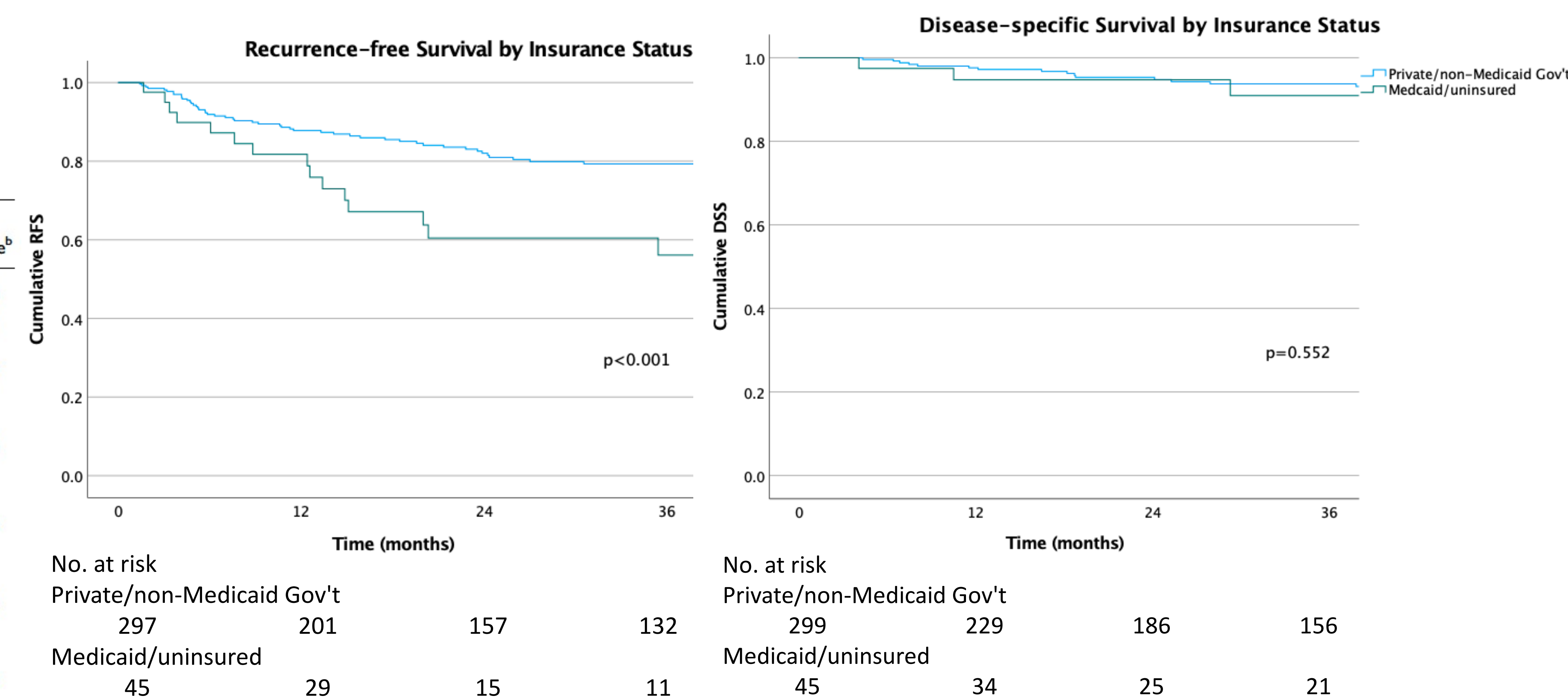
Table 1. Patient and Disease Characteristics for Individuals With cHNSCC Grouped by TNM Stage

	Total N = 346	Stage I-II ^a n = 240 (69.4)	Stage III-IV ^a n = 106 (30.6)	P value ^b
Age at presentation, y, median [IQR]	70.8 [60.1-80.2]	70.8 [60.6-81.1]	68.9 [59.1-78.2]	.300
Length of follow-up, y, median [IQR]	3.1 [1.1-5.8]	3.3 [1.1-5.8]	2.9 [1.0-5.7]	.691
Sex, n (%)				.647
Female	71 (20.5)	51 (21.3)	20 (18.9)	
Male	275 (79.5)	189 (78.8)	86 (81.1)	
Race and ethnicity, n (%)				.200
Non-Hispanic white	318 (91.9)	217 (90.4)	101 (95.3)	
Hispanic, Latino, or other ^c	28 (8.1)	23 (9.6)	5 (4.7)	
Language, n (%)				.098
English	338 (97.7)	232 (96.7)	106 (100)	
Non-English	8 (2.3)	8 (3.2)	0 (0)	
Household income, ^d n (%)				.064
>79,000	188 (59.7)	139 (63.8)	49 (50.5)	
≤79,000	127 (40.3)	79 (36.2)	48 (49.5)	
History of marriage, n (%)				.329
Yes	277 (80.1)	196 (81.7)	81 (76.4)	
No	69 (19.9)	44 (18.3)	25 (23.6)	
Insurance type, n (%)				.006
Private or non-Medicaid government	300 (86.7)	217 (90.4)	83 (78.3)	
Medicaid or uninsured	46 (13.3)	23 (9.6)	23 (21.7)	
Distance to facility, ^e miles, n (%)				.067
≤30	277 (88.2)	197 (90.8)	80 (82.5)	
>30	37 (11.8)	20 (9.2)	17 (17.5)	
RUCA score, n (%)				.067
I	316 (94.3)	223 (96.1)	93 (90.3)	
>I	19 (5.7)	9 (3.9)	10 (9.7)	
Unhoused history, n (%)	14 (4.0)	5 (2.1)	9 (8.5)	.014
Immunosuppressed, n (%)	95 (27.5)	62 (25.8)	33 (31.1)	.367
Diagnosis of dementia, n (%)	38 (11.0)	24 (10.0)	14 (13.3)	.406
Smoking status, n (%)				.278
Never or former	300 (87.5)	211 (89.0)	89 (84.0)	
Current	43 (12.5)	26 (11.0)	17 (16.0)	

Table 2. Cox Regression for Recurrence-Free and Disease-Specific Survival

	Recurrence-free survival				Disease-specific survival				
	Univariable		Multivariable		Univariable		Multivariable		
	HR (95% CI)	P	aHR ^a (95% CI)	P	HR (95% CI)	P	aHR ^a (95% CI)	P	
Insurance type									
Private or non-Medicaid government	Reference	-	Reference	-	Reference	-	Reference	-	-
Medicaid or uninsured	2.58 (1.49-4.47)	<.001	1.97 (1.06-3.66)	.032	1.38 (0.47-4.05)	.554	0.77 (0.24-2.50)	.666	
Immune status									
Immunocompetent	Reference	-	Reference	-	Reference	-	Reference	-	-
Immunosuppressed	2.45 (1.53-3.92)	<.001	2.35 (1.30-4.26)	.005	3.13 (1.39-7.05)	.006	3.67 (1.27-10.59)	.016	
Highest TNM stage									
Stage I-II	Reference	-	Reference	-	Reference	-	Reference	-	-
Stage III-IV	3.29 (2.05-5.30)	<.001	2.65 (1.56-4.52)	<.001	4.66 (1.99-10.89)	<.001	4.64 (1.79-12.03)	.002	

Figure 2. Kaplan Meier curves for (A) Recurrence-free survival and (B) Disease-specific survival by insurance status.



Conclusions

In this study, which to our knowledge represents the largest cohort focusing on SDoH in cHNSCC, we demonstrate that multiple socioeconomic factors are associated with higher cHNSCC disease stage at presentation. Moreover, insurance status was independently associated with disease recurrence. Barriers that limit health care access may delay both diagnosis and treatment, resulting in higher disease stage at presentation and ultimately worse health outcomes. Identifying and understanding these barriers may help providers and policymakers implement practices to mitigate these disparities and provide better patient outcomes.

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