



Distinct epidemiologic characteristics of tongue cancer in the young population: a population-based epidemiological study



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IMPORTANCE: Recent epidemiology studies have revealed an increasing incidence for young tongue cancer patients. However, the anatomical subsite as well as the survival data associated with this change in incidence is unknown.

OBJECTIVE: To examine the incidence, overall survival (OS), and disease-specific survival (DSS) of patients with tongue cancer stratified by the age and year of diagnosis.

DESIGN, SETTING, AND PARTICIPANTS: A population-based cohort analysis was performed using the surveillance, epidemiology, and end results (SEER) database to identify patients with tongue cancer from 1973 to 2012.

MAIN OUTCOMES AND MEASURES: OS and DSS.

RESULTS: A total of 50,416 cases of cancer involving the tongue as the primary site were identified. About 68.2% of these cases affected males, and 31.8% affected females. The mean age at the time of diagnosis was 62.14 years (range 0-105). The White race accounted for 85.5% of the cases. The most common site for was the base of tongue (48.4%). By far, squamous cell neoplasms comprised the most number of cases (93.0%). When separated into different age groups, the young adult group (15-34) had the most frequent cases at the border of the tongue. In other age groups, the most common subsite was base of tongue. Kaplan-Meier survival analysis showed that tongue cancer in the minor (0-18) and young adult groups had better OS (330.14 ± 33.23 and 282.34 ± 8.15 months, respectively) compared to the middle age and older adult groups (179.42 ± 2.67 and 83.58 ± 0.68 months, respectively). In addition, the DSS of the minors and young adult groups (367.41 ± 29.01 and 313.54 ± 8.20 months, respectively) was greater than that of the middle age and older adult groups (271.80 ± 368 months and 202.34 ± 2.67 months, respectively).

CONCLUSIONS AND RELEVANCE: The results of this study demonstrate that tongue cancers in younger individuals are uniquely found most commonly at the oral tongue compared to tongue cancers in older adults. A higher prevalence of oral tongue cancer in young adult patients suggests an infectious and/or environmental etiology. The OS and DSS were both higher in the younger cohort compared to the older cohort. Future studies should focus on addressing the causes of the rise in incidences as well as any other variables that might be affecting the survival.

INTRODUCTION

Tongue cancer is the most prevalent intraoral malignancy, accounting for about 20% of malignancies in the oral cavity. The most common type of tongue cancer is by far squamous cell carcinoma (SCC). It is often associated with old age, tobacco use, and alcohol use. In recent decades, the incidence of tongue SCC has been on the rise internationally, with reported increases in the United States, Asia, and Europe.

In recent decades, a global increase of oral cavity cancers amongst the younger population has been observed, particularly amongst women who do not consume alcohol or tobacco. Among head and neck SCCs, young patients (<35 years old) had predominant SCC involving the oral tongue (76%), whereas older adults had about 35% tongue involvement when looking at all head and neck cancers. The rise of oral tongue cancer, and especially oral tongue SCC, is most pronounced amongst young white women when compared to other ethnicities. The survival data of this new rising population with tongue cancer has been ambivalent; some report better survival and others report poor survival. One of the limitations of these studies is that they have been limited to case series. Here, we sought to capture this rising population of young tongue cancers and characterize their epidemiology using a population database.

METHODS

A population-based cohort analysis was performed using patient information in the case listing session of the SEER 18 database (www.seer.cancer.gov). Patients with cancer of the tongue from 1973 to 2012 were identified using the primary site codes of C01.9 (base of tongue, NOS), C02.0 (dorsal surface of tongue, NOS), C02.1 (border of tongue), C02.2 (ventral surface of tongue, NOS), C02.3 (anterior 2/3 of tongue, NOS), C02.4 (lingual tonsil), C02.8 (overlapping lesion of tongue), and C02.9 (tongue, NOS).

RESULTS

Table 1. Demographics of patients with tongue cancer

Age	Years
Mean (Range: 0-105)	62.14 ± 13.29
Sex	
Female	31.8% (16049)
Male	68.2% (34367)
Race	
White	85.5% (43100)
Black	8.4% (4227)
Asian or Pacific Islander	5.1% (2559)
American Indian/Alaska Native	0.4% (210)
Unknown	0.6% (320)

Table 2. Anatomical subsites of tongue cancer

Primary Site	Percentage (Count)
Base of tongue, NOS	48.4% (24403)
Dorsal surface of tongue, NOS	2.8% (1421)
Border of tongue	13.2% (6646)
Ventral surface of tongue, NOS	6.4% (3203)
Anterior 2/3 of tongue, NOS	9.8% (4961)
Lingual tonsil	1.0% (523)
Overlapping lesion of tongue	3.0% (1531)
Tongue, NOS	15.3% (7728)

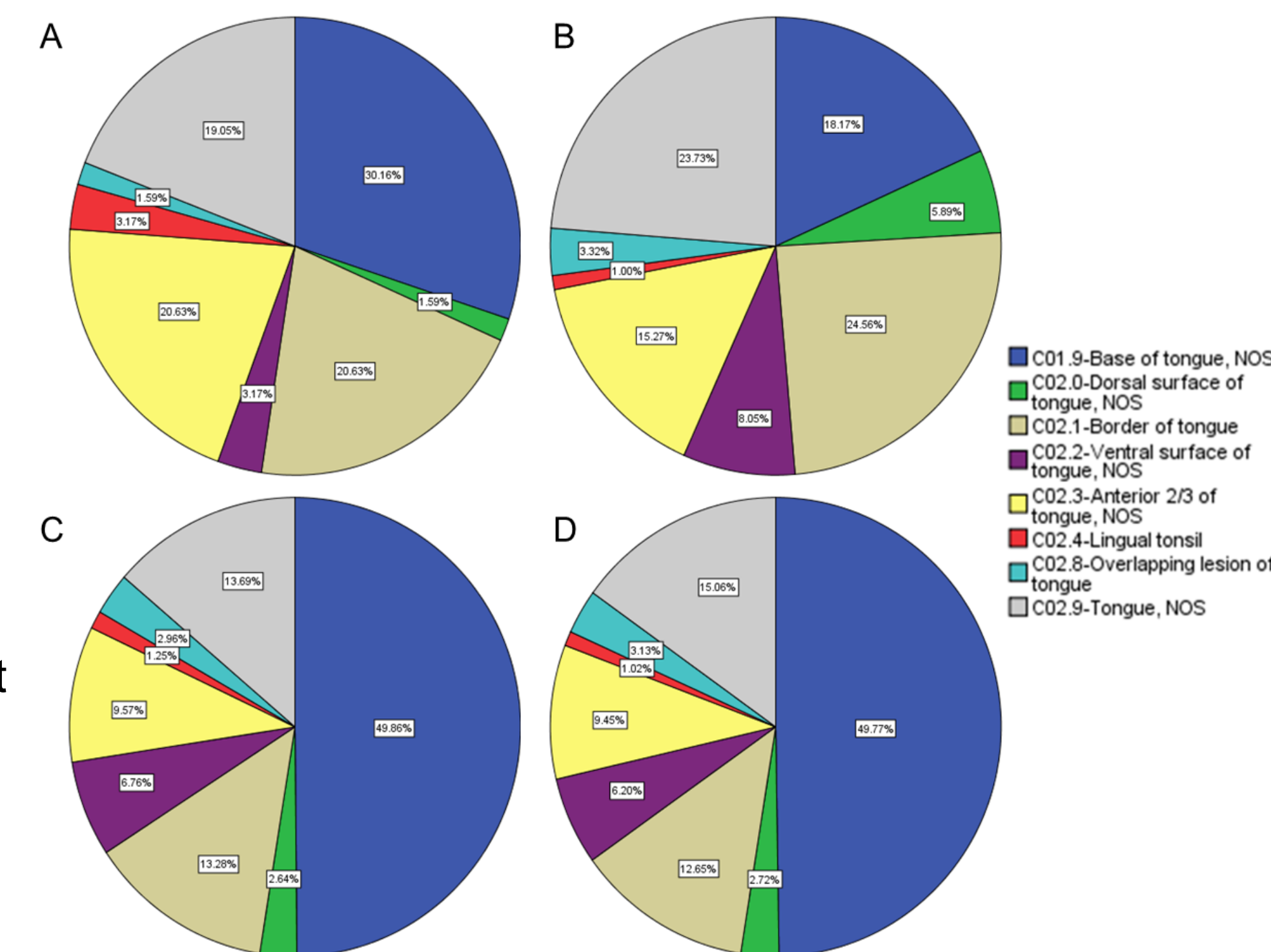


Figure 1. Proportion of each subsite of tongue cancer in minor (A), young adult (B), middle age (C), and older adult (D) groups

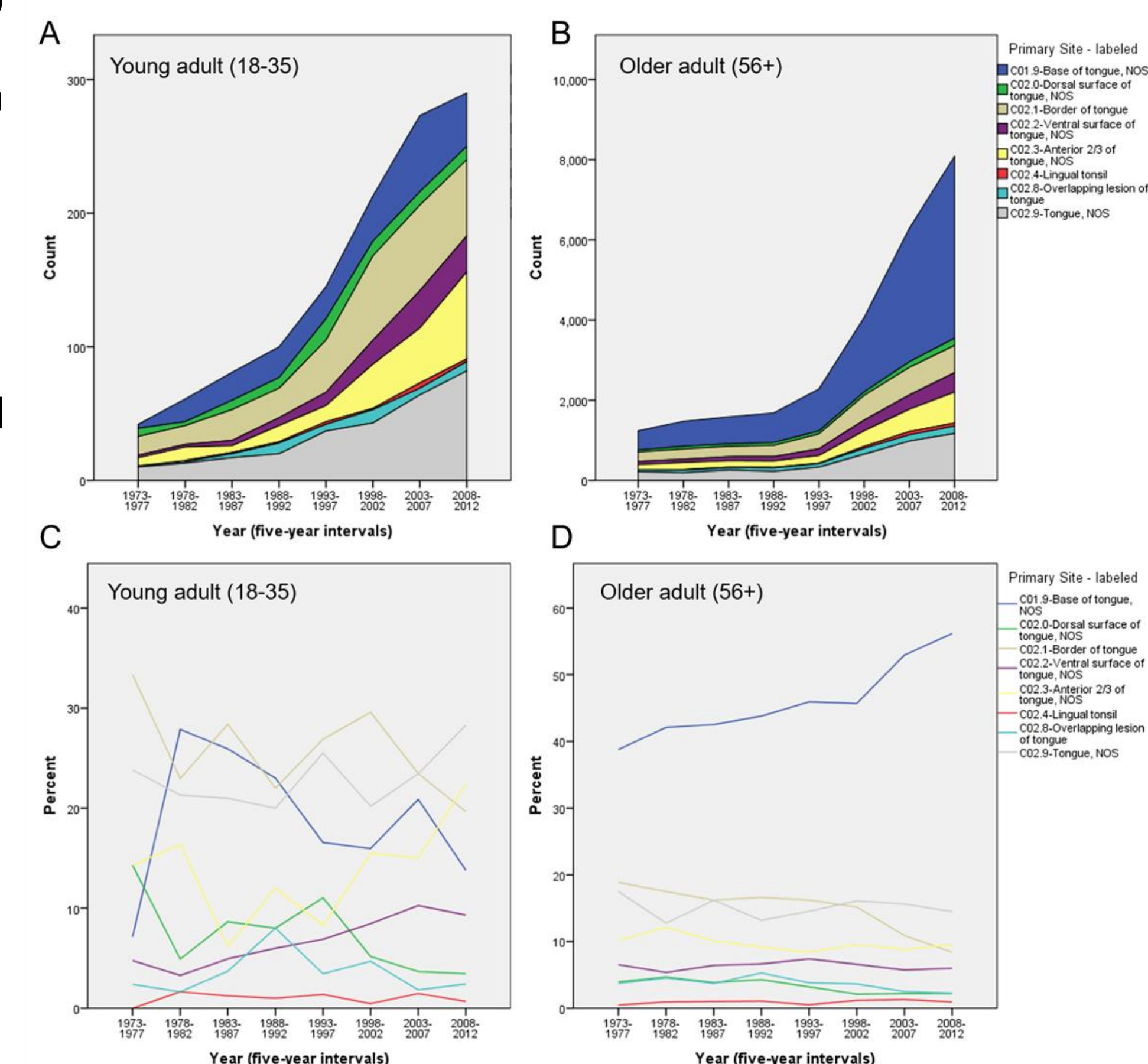


Figure 2. Subsite of tongue cancer in each five-year interval for young adult (A) and older adult (B) groups. Proportion of each subsite in younger adult (C) and older adult (D) groups

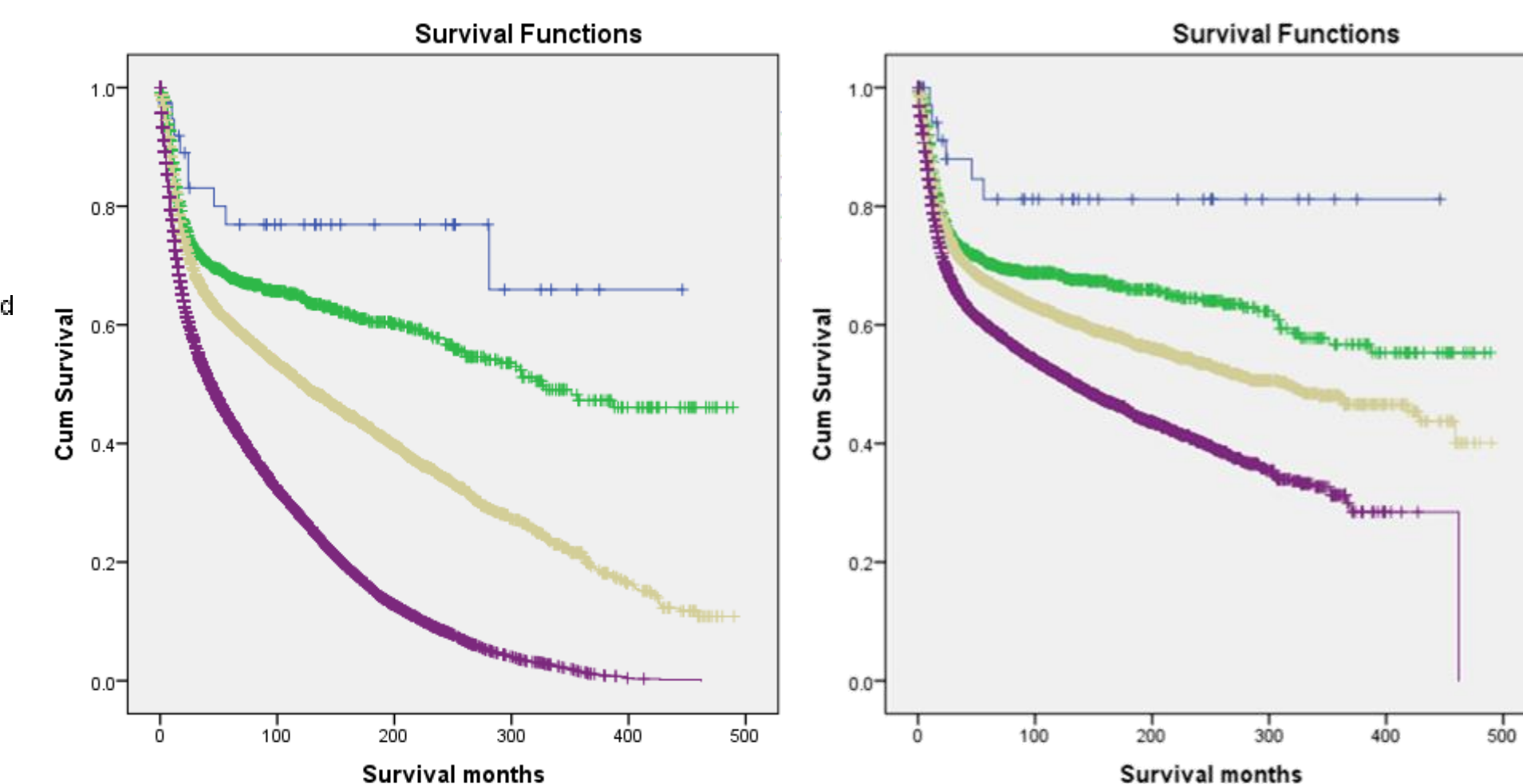


Figure 3. Overall survival (left) and disease-specific survival (right) of patients with tongue cancer.

DISCUSSION

Historically, cancer of the tongue has primarily dominated older males associated with decades of smoking and alcohol abuse. In recent decades, however, there has been a considerable rise in oral cavity cancers within the younger population, particularly amongst women who do not consume alcohol or tobacco. Recent studies have shown the increasing trend of oral tongue SCC in white men and women aged 18 to 44 years.

Our results show that the various parts of the oral tongue, namely the border of the tongue and the anterior 2/3 of the tongue, most commonly affect the young adult population. This is in sharp contrast with the older population having a prevalence of bottom of the tongue cancer. These subsites are consistent with previous reports regarding the most frequently involved subsites in tongue SCCs. However, this is the first report of our knowledge that demonstrates the difference between age and the subsite of the tongue involved. Furthermore, we have demonstrated that the rising incidence of tongue cancer has been driven by an increase in incidences involving the anterior 2/3 of the tongue in the young adult population, whereas in older adults it has been driven by the base of the tongue cancers.

Earlier authors in the 1980s and at least one newer study have demonstrated that younger patients have worse prognosis compared to the older cohort. In this study, OS and DSS was found to be better in the young cohort of tongue cancer patients compared to the older group. The differences in survival are yet to be elucidated; however, they are likely due to underlying mechanisms of carcinogenesis in the two different populations.

CONCLUSIONS

Tongue cancers in younger individuals are most commonly found at the oral tongue compared to tongue cancers in older adults. A higher prevalence of oral tongue cancer in young adult patients suggests an infectious and/or environmental etiology. The OS and DSS were both higher in the younger cohort compared to the older cohort. Future studies should address the causes of the rise in incidences as well as any other variables that might be affecting the survival.

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