

FLÁVIA NASCIMENTO DE CARVALHO<sup>1</sup>; IZABELLA COSTA<sup>2</sup>; FERNANDO DIAS<sup>2</sup>; LUIZ CLÁUDIO SANTOS THULER<sup>3</sup>; ANKE BERGMANN<sup>3</sup>; LUIS FELIPE RIBEIRO PINTO<sup>1</sup>

Authors affiliation: 1- Molecular Carcinogenesis Program – National Cancer Institute, Rio de Janeiro, Brazil; 2) Head and Neck Surgery – National Cancer Institute, Rio de Janeiro, Brazil; 3) Clinical Research - National Cancer Institute, Rio de Janeiro, Brazil

## INTRODUCTION

In developing countries head and neck cancer (HNC) are diagnosed in advanced stages leading to worst outcomes.

## METHODS AND RESULTS

An observational study of Brazilian Cancer Registry. SCC cases, from 2001 to 2010 were included. Age under 18 and 100 years or over; missing information; and previous treatment of cancer were excluded. Descriptive analysis was performed. Logistic regression was performed to evaluate the associated factors. The variables with  $p < 0.20$  were selected for the multiple model and  $p < 0.05$  was considered for the final model. SPSSv.20 was used for data analysis. This study was approved by the Research Ethics Committee of the INCA (n°128/11). A total of 64,068 cases of HNC were eligible. The mean age was 61 years ( $\pm 10.9$ ). About 40% were oral cavity cancer. The majority were male (83.2%). About 70% low schooling, 60% living with partner, 65% alcohol consumers, 80% smokers, 85% coming from the interior, 80% referred by SUS units, 60% not confirmed diagnosis of cancer at the admission, and 95% SCC not otherwise specified (NOS). Except for lip, the diagnosis occurred in advanced stages. An increased percentage of clinical staging IV was observed in the recent years. For lip cancer, black/brown were associated with advanced stage [OR 1.44 (1.26-1.65)], age  $\geq 65$  years [OR 1.26 (1.11-1.42)], black/brown [OR 1.21 (1.08-1.36)], low schooling [OR 1.23 (1.08-1.36)], living without partners [OR 1.26 (1.12-1.41)], smoking [OR 1.62 (1.41-1.86)] and SCC NOS [OR 1.87 (1.37-2.54)]. For oropharynx: male gender [OR 1.44 (1.09-1.89)], alcohol consumption [OR 1.43 (1.08-1.88)], smoking [OR 1.76 (1.30-2.38)], unconfirmed diagnosis [OR 1.41 (1.14-1.76)] and not living with a partner [OR 1.35 (1.09-1.68)]. For the hypopharyngeal: male gender [OR 1.86 (1.31-2.64)], age  $\geq 65$  years [OR 1.64 (1.28-2.10)], low schooling [OR 1.62 (1.27-2.07)] and SCC NOS [OR 2.31 (1.21-4.39)]. For the larynx: age  $\geq 65$  years [OR 1.44 (1.27-1.64)], low schooling [OR 1.37 (1.20-1.58)], living without a partner [OR 1.19 (1.04-1.36)], alcohol consumption [OR 1.39 (1.20-1.62)], smoking [OR 1.58 (1.33-1.88)], unconfirmed diagnosis [OR 1.22 (1.07-1.39)] and SCC NOS [OR 2.82 (2.02-3.93)].

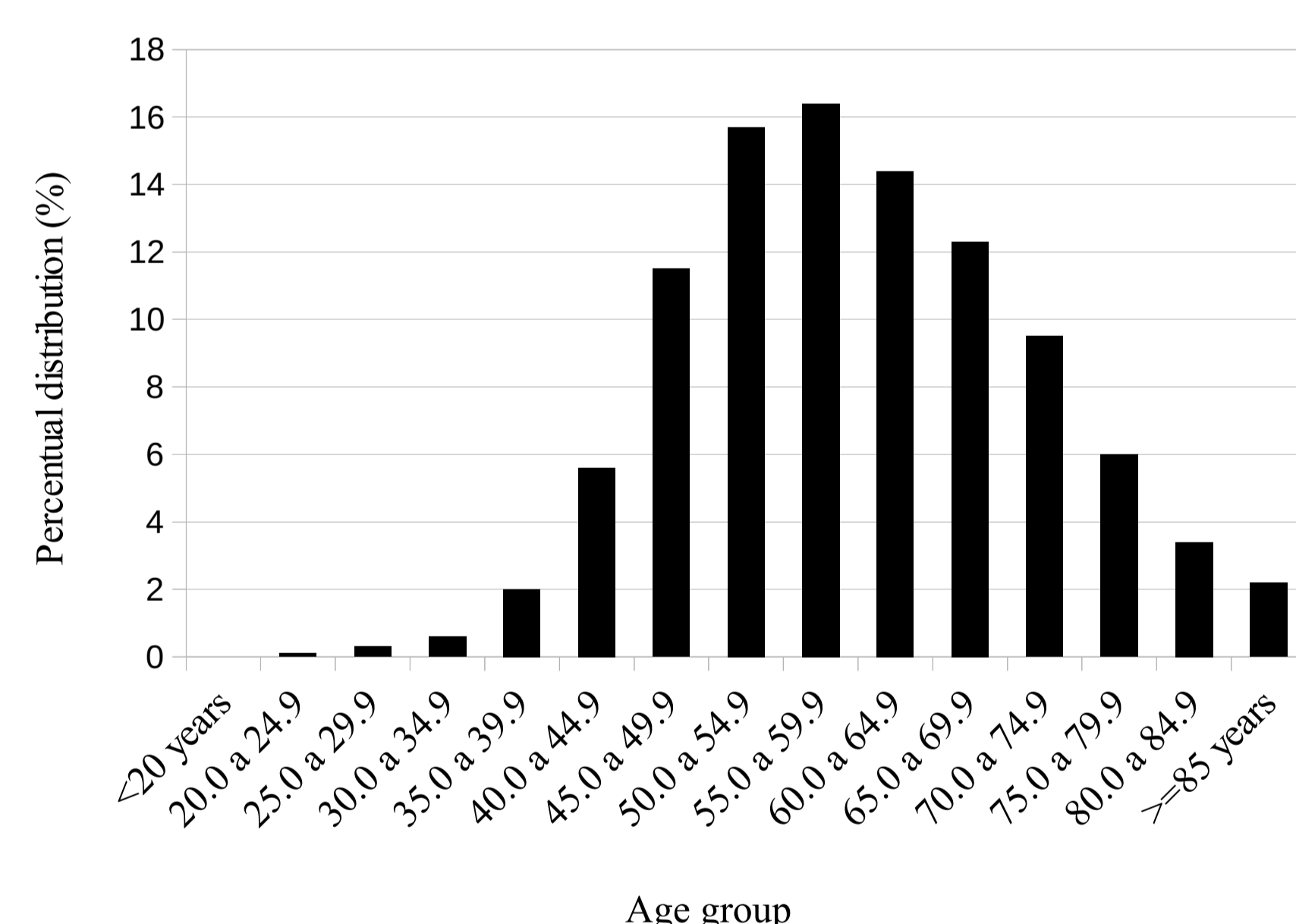


Figure 1 – Head and neck distribution by age group (n = 64,068)

Table 1 – Descriptive analysis of socio-demographic and clinical characteristics by topography

Characteristics	Lip (C00.0-C00.9) n=3362 (5.2%) %n (%)	Oral Cavity (C01.0-C06.9) n=26084 (40.7%) %n (%)	Oropharynx (C09.0-C10.9) n=9298 (14.5%) %n (%)	Hypopharynx (C12.9-C13.9) n=5849 (9.1%) %n (%)	Larynx (C32.0-C32.9) n=18755 (29.3%) %n (%)	Others (C14.0-C14.8) n=720 (1.1%) %n (%)	Total n=64,068 (100%) %n (%)
<b>Gender</b>							
male	2,517 (74.9)	20,580 (78.9)	8,033 (86.4)	5,308 (90.8)	16,251 (86.6)	624 (86.7)	53,313 (83.2)
female	845 (25.1)	5,504 (21.1)	1,265 (13.6)	541 (9.2)	2,504 (13.4)	96 (13.3)	10,755 (16.8)
<b>Age group (years)</b>							
≤ 40	234 (7.0)	1,166 (4.5)	356 (3.8)	172 (2.9)	413 (2.2)	35 (4.9)	2,376 (3.7)
40-64	1,505 (44.8)	16,509 (63.3)	6,566 (70.6)	11,388 (60.7)	456 (63.3)	40,348 (63.0)	21,344 (33.3)
≥ 65	1,623 (48.3)	8,409 (32.2)	8,409 (32.2)	1,753 (30.0)	3,954 (37.1)	229 (31.8)	18,514 (29.0)
<b>Skin color</b>							
black/brown	611 (35.1)	7,719 (51.9)	2,776 (51.6)	1,369 (48.7)	5,374 (48.7)	167 (42.1)	18,016 (49.2)
white and others	1,131 (64.9)	7,162 (48.1)	2,609 (48.4)	1,775 (56.5)	5,672 (51.3)	330 (57.9)	18,579 (50.8)
<b>Years of study</b>							
<8	1,903 (75.1)	13,238 (69.6)	4,592 (68.1)	3,000 (68.9)	9,083 (67.3)	350 (67.8)	32,166 (68.9)
≥ 8	630 (24.9)	5,789 (30.4)	2,154 (31.9)	1,356 (31.1)	4,419 (32.7)	166 (32.2)	14,514 (31.1)
<b>Marital status</b>							
with partner	1,051 (60.8)	8,214 (54.9)	3,099 (58.1)	1,883 (60.8)	7,194 (64.7)	216 (54.5)	21,657 (59.1)
without partner	679 (26.2)	6,739 (45.1)	2,239 (41.9)	1,216 (39.2)	3,920 (35.3)	180 (45.5)	14,973 (40.9)
<b>Alcohol consumption</b>							
yes	385 (35.1)	7,505 (66.8)	3,004 (69.7)	1,769 (72.2)	5,168 (62.4)	206 (67.1)	18,037 (65.2)
no	712 (64.9)	3,735 (33.2)	1,307 (30.3)	681 (27.8)	3,108 (37.6)	101 (32.9)	9,644 (34.8)
<b>Smoking</b>							
yes	762 (62.6)	10,066 (82.8)	3,794 (83.3)	2,229 (85.9)	7,558 (82.6)	261 (81.3)	24,670 (82.2)
never or former	455 (37.4)	2,083 (17.2)	762 (16.7)	367 (14.1)	1,596 (17.4)	60 (18.7)	5,325 (17.8)
<b>Place of residence</b>							
capital	323 (9.6)	3,732 (14.3)	1,459 (15.7)	672 (11.5)	3,035 (16.2)	111 (15.4)	9,332 (14.6)
interior	3,028 (90.1)	22,294 (85.5)	7,824 (84.1)	5,170 (88.5)	15,680 (83.6)	607 (84.5)	54,603 (85.4)
<b>Diagnostic period</b>							
2001-2005	1,691 (50.3)	11,960 (45.9)	3,988 (42.9)	2,618 (44.8)	8,350 (44.5)	379 (52.6)	36,992 (57.7)
2006-2010	1,671 (49.7)	14,124 (54.1)	5,310 (57.1)	3,231 (55.2)	10,405 (55.5)	341 (47.4)	27,076 (42.3)
<b>Referral by</b>							
SUS	1,400 (86.5)	11,092 (84.2)	3,821 (85.4)	2,265 (83.3)	7,808 (79.8)	292 (84.9)	26,678 (83.1)
non SUS	218 (13.5)	2,083 (15.8)	654 (14.6)	455 (16.7)	1,981 (20.2)	52 (15.1)	5,443 (16.9)
<b>Confirmed diagnosis at admission</b>							
no	1,379 (70.8)	14,039 (53.8)	4,831 (52.0)	3,388 (57.9)	11,922 (63.6)	433 (60.1)	36,992 (57.7)
yes	983 (29.2)	12,045 (46.2)	4,467 (48.0)	2,461 (42.1)	6,833 (36.4)	287 (39.9)	27,076 (42.3)
<b>Histological Type</b>							
SCC NOS	3,207 (95.4)	24,935 (95.6)	8,976 (96.5)	5,690 (97.3)	17,869 (95.3)	681 (94.6)	61,358 (95.8)
others	155 (4.6)	1,149 (4.4)	322 (3.5)	159 (2.7)	886 (4.7)	287 (39.9)	2,710 (4.2)
<b>Clinical staging</b>							
I	1,234 (51.5)	1,815 (8.8)	265 (3.8)	131 (2.7)	2,542 (17.5)	4 (3.0)	5,991 (12.1)
II	627 (26.2)	3,005 (14.5)	638 (9.2)	289 (6.0)	2,143 (14.7)	22 (16.5)	6,724 (13.6)
III	289 (12.1)	4,373 (21.2)	1,564 (22.5)	1,093 (22.9)	4,222 (29.0)	30 (22.6)	11,571 (23.4)
IV	246 (10.3)	11,466 (55.5)	4,485 (64.5)	3,264 (68.3)	5,657 (38.8)	77 (57.9)	25,195 (50.9)

The differences in values correspond to the lack of information (missing values).

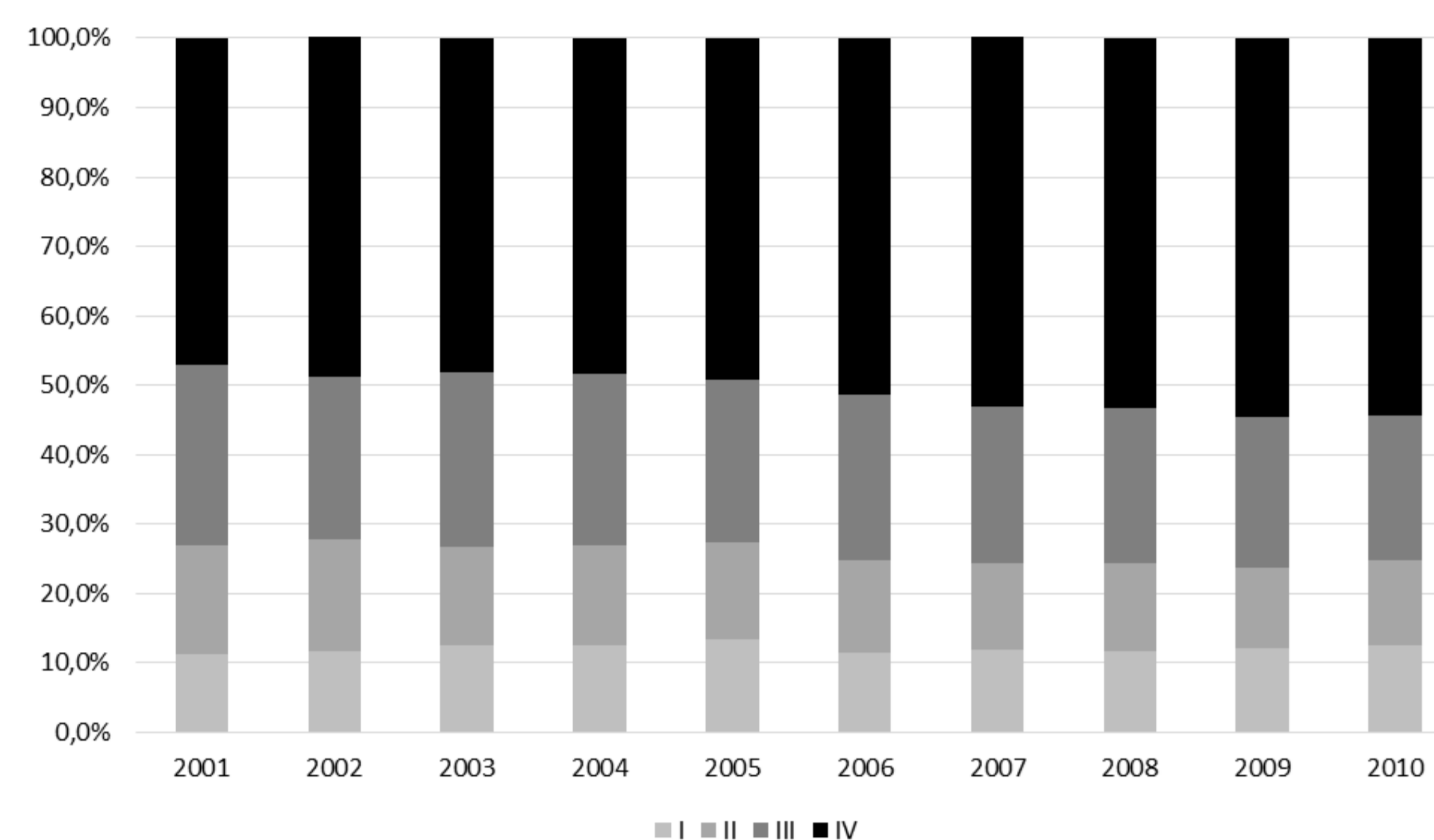


Figure 2 - Distribution of clinical staging according to year of diagnosis

Table 2 - Multiple logistic regression model of the factors associated with advanced staging according to topography

Topography	Variables	OR (95%IC)	P value	
<b>Lip</b>	skin color (black/brown x others)	1.63 (1.23 - 2.17)	0.001	
	<b>Oral cavity</b>	gender (male x female)	1.44 (1.26 - 1.65)	<0.001
		age group ( $\geq 65$ years x $< 65$ years)	1.26 (1.11 - 1.42)	<0.001
		skin color (black/brown x others)	1.21 (1.08 - 1.36)	0.001
<b>Oropharynx</b>	years of study ( $< 8$ yrs x $\geq 8$ yrs)	1.23 (1.08 - 1.36)	0.002	
	marital status (without x with a partner)	1.26 (1.12 - 1.41)	<0.001	
	smoking (yes x never or former)	1.62 (1.41 - 1.86)	<0.001	
	histological type (SCC x others)	1.87 (1.37 - 2.54)	<0.001	
	<b>Hypopharynx</b>	gender (male x female)	1.44 (1.09 - 1.89)	0.009
		alcohol consumption (yes x never or former)	1.43 (1.08 - 1.88)	0.011
smoking (yes x never or former)		1.76 (1.30 - 2.38)	<0.001	
confirmed diagnosis at admission (no x yes)		1.41 (1.14 - 1.76)	0.002	
<b>Larynx</b>	marital status (without x with partner)	1.35 (1.09 - 1.68)	0.006	
	<b>Hipopharynx</b>	gender (male x female)	1.86 (1.31 - 2.64)	<0.001
		age group ( $\geq 65$ years x $< 65$ years)	1.64 (1.28 - 2.10)	<0.001
		years of study ( $< 8$ yrs x $\geq 8$ yrs)	1.62 (1.27 - 2.07)	<0.001
histological type (SCC NOS x others)		2.31 (1.21 - 4.39)	0.011	
<b>Larynx</b>	age group ( $\geq 65$ years x $< 65$ years)	1.44 (1.27 - 1.64)	<0.001	
	years of study ( $< 8$ yrs x $\geq 8$ yrs)	1.37 (1.20 - 1.58)	<0.001	
	marital status (without x with partner)	1.19 (1.04 - 1.36)	0.011	
	alcohol consumption (yes x never or former)	1.39 (1.20 - 1.62)	<0.001	
	smoking (yes x never or former)	1.58 (1.33 - 1.88)	<0.001	
	confirmed diagnosis at admission (no x yes)	1.22 (1.07 - 1.39)	0.003	
	histological type (SCC NOS x others)	2.82 (2.02 - 3.93)	<0.001	

## CONCLUSION

Clinical and epidemiological characteristics were considered independent factors associated with advanced stages of neoplasms in different topographies of the head and neck.

## REFERENCES

- Ferlay J, Soerjomatarm I, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray F. Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer*. 2015; 136: E359–E386.
- INSTITUTO NACIONAL DE CÂNCER. INCA. Estimativa 2018: incidência de câncer no Brasil. Rio de Janeiro; 2017.
- Sharp, L.; Donnelly, D.; Hegarty, A., et al. Risk of Several Cancers is Higher in Urban Areas after Adjusting for Socioeconomic Status. Results from a Two-Country Population-Based Study of 18 Common Cancers. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*. 2014; 91(3): 510-525. doi:10.1007/s11524-013-9846-3.
- Conway, DL.; Brenner, DR.; McMahon, AD., et al. Estimating and explaining the effect of education and income on head and neck cancer risk: INHANCE consortium pooled analysis of 31 case-control studies from 27 countries. *Int J Cancer*. 2015 March 1; 136(5): 1125–1139. doi:10.1002/ijc.29063.

**Key words:** Head and Neck Neoplasms; Neoplasm Staging; Demographic Factors

No sources of financial support