

# Oral and oropharynx cancer in South America: Incidence, mortality trends and gaps in public databases as presented to the Global Oral Cancer Forum

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## Abstract

**Objectives:** To describe the incidence and mortality of oral and oropharynx cancers in South America using available public databases and to discuss the main pitfalls for acquiring reliable data.

**Methods:** The incidence data for oral cavity and oropharynx cancers for South America were obtained from Cancer Incidence in Five Continents/International Agency for Research on Cancer for the period 1998–2007. Mortality rates in South America were obtained from the World Health Organization/IARC database for the period 1999–2012. The number of cases for Brazil was obtained from the National Cancer Institute/missing stage for the period 2000–2010, whereas the São Paulo cancer registry was used to collect data from the most populated state in Brazil for the period 2000–2008.

**Results:** The incidence of oral and oropharynx cancers in South America varied, with the highest rates observed in Brazil among males. The mortality data in selected South American countries ranged from 0.72 to 6.04/100,000 and the proportion of ill-defined deaths in South America varied from 5.0% to 22.0%. Mortality trends for males decreased about 2.5% in most of the countries, excluding Brazil, whereas among females, a significant decrease occurred only in Colombia, with an increase in Brazil and Peru.

**Conclusion:** Although there is a lack of reliable databases in South America, the available data demonstrate a decrease in mortality trends in most countries and the highest incidence in Brazil. The development and improvement of national cancer public databases in South America are highly desirable and necessary to better understand the characteristics and distribution of these neoplasms.

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## Keywords

Oral cancer, oropharyngeal cancer, epidemiology, South America, trends

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## Introduction

Estimates for 2012 showed that oral and oropharyngeal cancers would account for approximately 442,760 new cases, of which 314,106 cases would affect males and 128,654 females, representing the sixth most common malignancy worldwide.<sup>1-3</sup> Specifically for South America, Globocan estimated 22,773 new cases of oral cavity and other pharynx cancers for 2012 (15,695 in males with an age-standardized rate (ASR) of 8.2/100,000 and 7078 new cases in females with an ASR of 3.0/100,000). Meanwhile, mortality by these cancers in the world accounts for 241,458 deaths per year in both genders (175,538 in males and 65,920 in females), whereas in South America, 11,123 new deaths per year were estimated (8420 male deaths and 2703 female deaths).<sup>3</sup>

There is a remarkable variability in the global incidence of these cancers, which is attributed to cultural habits that involve the consumption of tobacco and alcohol, the two most widely known risk factors for oral cavity cancer, and to the prevalence of human papillomavirus (HPV) infection, which represents the main aetiological factor for oropharynx cancer.<sup>1,4-6</sup> In these anatomical sites, squamous cell carcinoma (SCC) is the most common histological subtype, representing up to 90% of cases, and despite the progress in oral cancer treatment, it continues to rank among the leading causes of cancer-related deaths, particularly in developing countries, with 5-year survival rates of approximately 50%. On the other hand, recent studies have shown an increased survival for patients affected by HPV-associated oropharynx SCC.<sup>6-8</sup>

Different studies are available demonstrating the incidence of oral and oropharynx cancers in developed countries, but the distribution of these neoplasms in South America remains to be fully addressed, with few reports in the current literature.<sup>9-11</sup> Although the Brazilian National Institute of Cancer estimated 11,280 new cases in men and 4010 in women to be diagnosed in 2014,<sup>12</sup> determining the real incidence and trends of these cancers in Brazil and the other South America countries is still a challenge due to major gaps in the available public databases or the complete absence of such databases in some regions.

Therefore, the objective of this study is to describe the incidence and mortality rates of oral and oropharynx cancers in South America using available public databases, not only describing their epidemiology but also discussing the main pitfalls for acquiring reliable data.

## Material and methods

The incidence data of oral cavity (International Classification of Diseases (ICD)-O3:C02–C06) and oropharynx (ICD-O3: C01, C09 and C10)<sup>13</sup> cancers for South America were obtained from the public databases of the Cancer Incidence in Five

Continents (CI5) publication of the International Agency for Research on Cancer (IARC) volume IX (period 1998–2002) for population-based cancer registries of Bahia Blanca (Argentina); Brasília, Cuiabá, Goiânia, São Paulo (Brazil); Chile; Colombia; Costa Rica; Ecuador<sup>14</sup> and volume X (period 2003–2007) for the population-based cancer registries of Bahia Blanca, Cordoba, Mendoza, Tierra del Fuego (Argentina); Aracaju, Belo Horizonte, Cuiabá, Fortaleza, Goiânia, São Paulo (Brazil); Valdivia, Provincia Bio Bio, Antofagasta (Chile); Cali, Bucaramanga, Manizales, Pasto (Colombia); Costa Rica; Villa Clara (Cuba); Quito and Cuenca (Ecuador) (available at: <http://ci5.iarc.fr/CI5I-X/Pages/download.aspx>).<sup>15</sup>

Data specifically for Brazil were obtained from the National Cancer Institute (INCA) (available at: <https://irhc.inca.gov.br/RHCNet/visualizaTabNetExterno.action>, in the period 2000–2010 stratified by sex and Brazilian region (Central-Western, North, Northeast, South and Southeast) – (accessed 22 November 2015)) and data for São Paulo state were obtained from hospital cancer registries (HCRs) of the Fundação Oncocentro De São Paulo (FOSP – São Paulo/Brazil) from 2000 to 2008 – available at: <http://200.144.1.68/cgi-bin/dh?rhc/rhc-geral.def>, accessed 22 November 2015).

Data on mortality for lip, oral cavity, and other pharynx cancers for South America were obtained from the World Health Organization (WHO/IARC) database in the period 1999–2012 for the following South American countries: Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela (accessed 20 February 2016). Mortality trends for these neoplasms were modelled using the linear regression analysis software Joinpoint (version 4.2.0.2) (INCA, 2015).<sup>12</sup>

## Results

The incidence of oral cavity cancer in South America varied and the highest rates were observed in Brazil for males, up to three times higher compared to the other cancer registries in South America. The city of São Paulo has the highest incidence, with rates ranging from 10.38/100,000 in the period 1998–2002 to 9.14/100,000 in the period 2003–2007 in males. Incidence rates of oral cavity in females were lower, with rates below 2.5/100,000. The highest incidence for oropharynx cancer among males was also observed in Brazil in the city of São Paulo, with an incidence rate ranging from 4.96/100,000 for the period 1988–2002 to 4.77/100,000 for the period 2003–2007; in females, the incidence for this cancer was lower (Table 1).

In Brazil, the INCA has the objective of performing a cancer surveillance by processing cancer data derived from different population-based cancer registries (currently, there are 32 in

**Table 1.** ASR for incidence of oral cavity and oropharynx cancers (cases/100,000 individuals), in population based cancer registries of South America, in the period 1998–2007 (based in CI5 vol. IX – 1998–2002 and vol. X – 2003–2007).

	Oral cavity				Oropharynx			
	Males		Females		Males		Females	
	1998–2002	2003–2007	1998–2002	2003–2007	1998–2002	2003–2007	1998–2002	2003–2007
	(n) ASR	(n) ASR	(n) ASR	(n) ASR	(n) ASR	(n) ASR	(n) ASR	(n) ASR
Brazil, Sao Paulo	(2122) 10.38	(1989) 9.14	(609) 2.35	(659) 2.36	(1017) 4.96	(1032) 4.77	(184) 0.72	(221) 0.82
Brazil, Brasilia	(185) 8.19		(62) 2.5		(57) 2.46		(14) 0.54	
Brazil, Cuiaba	(57) 8.14	(82) 8.83	(16) 2.29	(25) 2.58	(31) 4.45	(36) 3.64	(7) 1.05	(6) 0.5
Brazil, Goiania	(91) 6.10	(182) 8.73	(23) 1.31	(60) 2.4	(61) 4.3	(108) 5.23	(8) 0.38	(26) 0.99
Argentina, Bahia Blanca	(20) 2.82	(28) 3.76	(11) 1.2	(7) 0.79	(21) 3.02	(6) 0.87	(6) 0.81	(3) 0.36
Colombia, Cali	(44) 1.33	(80) 2.03	(58) 1.44	(55) 1.06	(34) 1.03	(29) 0.78	(18) 0.47	(22) 0.44
Costa Rica	(87) 1.32	(133) 1.6	(39) 0.56	(69) 0.79	(61) 0.94	(60) 0.75	(11) 0.17	(20) 0.22
Ecuador, Quito	(10) 0.43	(12) 0.5	(21) 0.76	(29) 0.88	(6) 0.24	(7) 0.27	(2) 0.07	(3) 0.09
Chile, Valdivia	(3) 0.38	(6) 0.67	(1) 0.11	(2) 0.23	(2) 0.28		(4) 0.41	(1) 0.1
Brazil, Aracaju		(45) 7.94		(7) 0.94		(28) 4.86		(3) 0.25
Brazil, Fortaleza		(189) 6.69		(70) 1.79		(94) 3.38		(21) 0.57
Brazil, Belo Horizonte		(166) 6.31		(65) 1.88		(117) 4.27		(18) 0.53
Cuba, Villa Clara		(56) 2.65		(24) 1.07		(43) 2.13		(10) 0.49
Argentina, Tierra del Fuego		(4) 2.09		(2) 0.67		(4) 1.89		(0) 0.00
Colombia, Bucaramanga		(38) 1.96		(31) 1.28		(23) 1.21		(13) 0.48
Argentina, Córdoba		(46) 1.88		(28) 0.9		(28) 1.17		(2) 0.7
Argentina, Mendoza		(65) 1.71		(36) 0.84		(35) 0.93		(5) 0.11
Colombia, Manizales		(10) 1.19		(8) 0.72		(11) 1.34		(1) 0.09
Chile, region of Antofagasta		(12) 1.11		(11) 0.95		(9) 0.72		(8) 0.69
Ecuador, Cuenca		(4) 0.53		(4) 0.39		(2) 0.27		(1) 0.11
Chile, Bio Bio Province		(5) 0.51		(3) 0.3		(0) 0		(1) 0.09
Colombia, Pasto		(3) 0.42		(9) 0.98		(0) 0		(1) 0.11

ASR: age-standardized rates.

**Table 2.** Distribution of oral cavity and oropharynx cancers in Brazilian regions in the period of 2000–2010 (based in Integrador RHC/INCA system, accessed in 20 November 2015).

Region	Oral cavity		Oropharynx	
	Males	Females	Males	Females
	n (%)	n (%)	n (%)	n (%)
Southeast	14,430 (61)	4023 (52)	11,012 (65)	1775 (56)
Northeast	4540 (19)	2414 (31)	2371 (14)	718 (23)
South	3615 (15)	823 (11)	2956 (17)	460 (15)
Central-Western	678 (3)	182 (2)	357 (2)	92 (3)
North	569 (2)	309 (4)	369 (2)	112 (3)
Total	23,832 (100)	7751 (100)	17,065 (100)	3157 (100)

RHC/INCA: Registros Hospitalares de Câncer/National Cancer Institute.

activity) and HCRs (in 2013, there were 245 registered, but not all data are continuously sent to the national system – Integrador Registros Hospitalares de Câncer (RHC/INCA). The majority of oral cavity and oropharynx cancers registered in the INCA database (Integrador RHC/INCA) is in southeast Brazil, with a M:F ratio of 3.58:1 for oral cavity cancers and 6.20:1 for oropharynx cancers (Table 2).

From HCR in Brazil (in 2013, there were 245 HCRs registered), we identified 61,840 cases of oral cavity and oropharynx

cancers in the period 2000–2010 (75% and 84% of the oral cavity and oropharynx cancers occurred in males, respectively). Regarding the clinical stage of the registered cases, we observed that advanced tumours (stage III/IV) accounted for the majority, whereas missing stage information represented about 29% of all oral cavity and oropharynx cancers (Table 3).

According to the HCRs available in the FOSP files for oral cavity and oropharynx cancers for the period 2000–2008, there were 13,025 cases (8056 cases affecting the oral cavity (61.8%) and 4969 cases affecting the oropharynx (38.2%)) with a higher proportion of males in both sites (oral cavity: 6510 males (80.8%) vs. 1546 females (19.2%); oropharynx: 4358 males (87.7%) vs. 611 females (12.3%)). Patients younger than 40 years comprised only 5% and 4.1% of oral and oropharynx cancer cases in this registry, respectively. The number of deaths from oral cavity and oropharynx cancers that occurred in males totalled 6608 cases in this period, with an average of 734 deaths per year (Table 4). Most of the oral cavity and oropharynx cases in the São Paulo state (the most economically developed in Brazil) were diagnosed in advanced clinical stages (55% and 68% of the oral cavity and oropharynx cancers, respectively). Missing information on clinical stage totalled 6% for oral cavity cancers and 10% for oropharynx cancers (Table 5).

The mortality rates in South American countries ranged from 0.72 to 6.04/100,000 (Tables 6 and 7). Mortality trends

**Table 3.** Clinical stage of oral cavity (C02, C03, C04, C05 and C06) and oropharynx (C01, C09 and C10) cancers from HCRs of Brazil, from 2000 to 2010 (based on Integrador RHC/Brazil, accessed 22 February 2016).

Clinical stage	Oral cavity			Oropharynx		
	Males	Females	Both genders	Males	Females	Both genders
	<i>n</i> (%)	<i>n</i> (%)	Total (%)	<i>n</i> (%)	<i>n</i> (%)	Total (%)
0	198 (0.5)	49 (0.1)	247 (0.7)	55 (0.2)	11 (0.1)	66 (0.3)
I	1749 (5)	799 (2)	2547 (7)	579 (2)	156 (1)	735 (3)
II	2975 (8)	1222 (3)	4197 (11)	1327 (5)	304 (1)	1631 (6)
III	4364 (12)	1325 (3)	5689 (15)	3206 (13)	581 (2)	3787 (15)
IV	10,911 (29)	2778 (7)	13,689 (36)	9959 (41)	1488 (6)	11,447 (47)
MS	7813 (21)	3164 (8)	10,977 (29)	5471 (22)	1353 (6)	6824 (28)
Total	28,011 (75)	9338 (25)	37,349 (100)	20,598 (84)	3893 (16)	24,491 (100)

MS: missing stage; HCRs: hospital cancer registries.

**Table 4.** Frequency of cases and deaths due to oral cavity (C02, C03, C04, C05 and C06) and oropharynx (C01, C09 and C10) cancer in São Paulo state Brazil, from 2000 to 2008 (based on HCRs from São Paulo state – FOSP/SP).

	Oral cavity				Oropharynx			
	Males		Females		Males		Females	
	<i>n</i> cases (%)	<i>n</i> deaths (%)	<i>n</i> cases (%)	<i>n</i> deaths (%)	<i>n</i> cases (%)	<i>n</i> deaths (%)	<i>n</i> cases (%)	<i>n</i> deaths (%)
2000–2002	2042 (31)	1266 (34)	477 (31)	225 (31)	1199 (27)	782 (28)	153 (25)	75 (23)
2003–2005	2194 (34)	1246 (33)	529 (34)	264 (37)	1477 (34)	979 (34)	207 (34)	118 (37)
2006–2008	2274 (35)	1250 (33)	540 (35)	234 (32)	1682 (39)	1085 (38)	251 (41)	130 (40)
Total	6510 (100)	3762 (100)	1546 (100)	723 (100)	4358 (100)	2846 (100)	611 (100)	323 (100)

HCR: hospital cancer registries.

**Table 5.** Clinical stage of oral cavity (C02, C03, C04, C05 and C06) and oropharynx (C01, C09 and C10) cancer from HCR of São Paulo state, Brazil, from 2000 to 2008 (based on FOSP/SP, accessed in 22 February 2016).

Stage TNM	Oral cavity			Oropharynx		
	Males	Females	Both genders	Males	Females	Both genders
	<i>n</i> (%)	<i>n</i> (%)	Total (%)	<i>n</i> (%)	<i>n</i> (%)	Total (%)
0	92 (0.9)	20 (0.1)	112 (1)	26 (0.5)	6 (0.1)	32 (0.6)
I	695 (8)	248 (3)	943 (11)	213 (4)	40 (1)	253 (5)
II	929 (11)	291 (4)	1220 (15)	363 (7)	46 (1)	409 (8)
III	1272 (16)	285 (3)	1557 (19)	792 (16)	113 (2)	905 (18)
IV	3216 (39)	579 (7)	3795 (46)	2608 (52)	301 (6)	2909 (58)
MS	374 (5)	138 (1)	512 (6)	404 (8)	113 (2)	517 (10)
Total	6578 (81)	1561 (19)	8139 (100)	4406 (88)	619 (12)	5025 (100)

MS: missing stage; HCR: hospital cancer registries; FOSP/SP: Fundação Oncocentro De São Paulo/São Paulo.

for males decreased about 2.5% in most of the countries, excluding Brazil, whereas for females, a significant decrease occurred only in Colombia, with an increase in Brazil and Peru (Table 8).

## Discussion

Oral and oropharyngeal cancers are highly incident malignancies throughout the world, and the great majority of cases correspond to SCC.<sup>16</sup> In the past few years, a considerable rise in

the incidence of oropharynx cancer has been described and this was attributed to an increase of HPV infection.<sup>16-18</sup> Our findings demonstrate that these cancers also have high and heterogeneous incidence and mortality rates in South American countries; however, because of the low number of population-based cancer registries that are continuously updated in this region, it is expected that the official incidence numbers may be underestimated in this large geographic area.

Data retrieved from the Brazilian National Institute of Cancer revealed that oral cavity cancer accounted for 61%

**Table 6.** Age-standardized mortality rates for lip, oral cavity and pharynx in males, from 1999 to 2012 in selected South America countries (WHO/IARC/accessed 16 February 2016).

Year	Argentina	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
1999	3.52	6.05	1.89	1.96	1.27	2.76	0.87	4.98	2.35
2000	3.33	6.16	2.00	2.03	1.10	2.74	0.72	5.33	2.22
2001	3.49	5.92	1.86	2.04	0.93	3.62	0.62	4.68	2.43
2002	2.99	6.13	1.85	2.07	0.90	3.43	0.68	4.80	2.33
2003	3.27	6.31	1.70	2.30	0.90	2.46	0.91	5.32	2.70
2004	3.17	6.19	1.63	1.92	0.95	2.77	0.69	6.32	2.34
2005	2.95	6.30	1.75	1.76	0.93	3.12	0.68	5.78	2.31
2006	2.92	6.03	1.44	1.81	1.15	2.64	0.96	4.15	2.14
2007	2.86	6.00	1.67	1.80	0.81	2.86	0.86	5.30	2.53
2008	2.75	5.98	1.53	1.76	0.75	2.17	0.87	5.15	2.22
2009	2.69	5.99	1.37	1.73	0.93	2.31	0.85	4.26	2.47
2010	2.70	6.04	1.46	1.37	0.87	3.39	0.90	3.83	2.37
2011	2.59	5.93	1.55	1.67	0.90	2.54	0.90	-	2.58
2012	2.53	5.77	1.64	1.59	0.72	2.86	0.87	4.08	2.78

WHO/IARC: World Health Organization/International Agency for Research on Cancer.

**Table 7.** Age-standardized mortality rates for lip, oral cavity and others pharynx in females, from 1999 to 2012 in selected South America countries (WHO/IARC/accessed 16 February 2016).

Year	Argentina	Brazil	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela
1999	0.70	1.21	0.48	1.16	0.63	0.32	0.60	0.42	1.16
2000	0.71	1.16	0.44	1.22	0.41	0.73	0.56	0.95	0.96
2001	0.69	1.15	0.46	0.96	0.78	0.27	0.50	1.03	1.08
2002	0.67	1.24	0.47	1.05	0.49	0.54	0.38	0.98	0.97
2003	0.79	1.09	0.57	1.02	0.47	0.75	0.44	0.95	1.09
2004	0.71	1.18	0.50	0.99	0.50	0.59	0.65	0.90	1.03
2005	0.61	1.23	0.43	1.04	0.62	0.78	0.93	0.85	0.86
2006	0.70	1.25	0.48	0.96	0.69	0.41	0.60	0.99	1.00
2007	0.77	1.23	0.45	1.02	0.49	0.74	0.55	0.82	0.92
2008	0.76	1.27	0.46	0.98	0.53	0.38	0.66	0.97	1.00
2009	0.70	1.27	0.49	0.89	0.50	0.38	0.82	1.02	1.05
2010	0.71	1.20	0.43	0.73	0.68	0.88	0.75	0.88	1.00
2011	0.72	1.27	0.56	0.93	0.49	0.56	0.63	-	1.11
2012	0.75	1.25	0.56	0.75	0.57	0.48	0.75	0.62	0.80

WHO/IARC: World Health Organization/International Agency for Research on Cancer.

**Table 8.** Mortality trends on lip, oral cavity and pharynx cancer, in both genders, in South American selected countries, for the period 1999–2012 (WHO/IARC).

Country	Males				Females			
	Trends 1			Trends 1			Trends 2	
	Period	APC (95% IC)	P	Period	APC (95% IC)	p	Period	APC (95% IC)
Argentina	1999–2012	-2.5* (-2.9; -2.0)	<0.01	1999–2012	0.4 (-0.5; 1.3)	0.35		
Brazil		-0.3 (-0.6; 0.0)	0.05		0.6* (0.1; 1.2)	0.03		
Chile		-2.1* (-3.1; 1.0)	<0.01		0.7 (-0.7; 2.1)	0.03		
Colombia		-2.4* (-3.6; -1.3)	<0.01		-2.7 (-3.9; -1.5)	<0.01		
Costa Rica		-0.9 (-3.2; 1.5)	0.43		-3.8 (-8.7; 1.3)	0.13		
Ecuador		-2.4* (-4.1; -0.7)	0.01		0.0 (-2.6; 2.8)	0.95		
Paraguay		-1.0 (-3.1; 1.2)	0.32		1.6 (-3.8; 7.3)	0.53		
Peru		1.8 (-0.0; 3.6)	0.05		3.2* (0.1; 6.4)	0.04		
Uruguay		-1.8 (-3.9; 0.2)	0.06		-9.7 (-23.8; 7.2)	0.22		
Venezuela		0.7 (-0.3; 1.8)	0.19	1999–2001	48.8 (-2.6; 127.1)	0.06	-3.0 (-6.0; 0.0)	0.06

APC: annual percent change; WHO/IARC: World Health Organization/International Agency for Research on Cancer; IC: Interval of confidence; \*p &lt; 0.05.

(31,583) of the cases analysed, whereas 39% (20,222) affected the oropharynx in the period 2000–2010. Moreover, using data from the HCR databases available in the files of the São Paulo Cancer Registry (FOSP/Brazil), a slight increase in the number of oral cavity and oropharynx cancers was observed. However, because FOSP files represent a large hospital-based case series and not population-based data, they may preferentially reflect an increased access to hospital services instead of a real increase in the incidence of these cancers. On the other hand, if these results were taken as preliminary evidence of an increase of oral cavity and oropharynx cancers, they would be in agreement with recent studies.<sup>5,6,17–22</sup>

Also in accordance with the available literature, we found male patients to be more affected than females in both sites, especially in the oropharynx.<sup>7,18,23</sup> Patients older than 40 years are the great majority in both sites, with patients younger than 40 years comprising only 5% and 4.1% of oral and oropharynx cancer cases in the FOSP registry, respectively. These results confirm previous reports demonstrating the low incidence of both lesions in young individuals,<sup>24</sup> although the literature shows that patients affected by HPV-associated oropharyngeal cancer are relatively younger than those affected by oral and HPV-negative oropharynx cancers.<sup>6,21</sup>

Regarding tumour stage, this study showed that the diagnosis of oral and oropharynx cancers was achieved predominantly in more advanced stages (51% and 62%, respectively), which impairs appropriate treatment and makes a cure more unlikely, which may explain the high mortality rates found in Brazil. The higher rates of advanced-stage oropharyngeal cancers might be a consequence of the difficult clinical access to the posterior areas of the oral cavity and oropharynx as well as due to the lack of symptoms in the early stages of both cancers and difficulties in patient access to public health services.

In spite of the recent improvements in therapeutic modalities, the mortality rates of oral and oropharynx cancers are still high. Five-year survival rates remain around 50% for oral cancer,<sup>1</sup> whereas HPV-positive oropharyngeal cases demonstrate higher survival than their HPV-negative counterpart.<sup>6,25</sup> In this study, we found that mortality trends are decreasing by about 2.5% in South America, although in some regions like in Brazil and Peru there still is an increase among females. An important issue regarding mortality trends in South American public databases is the impossibility of distinguishing data between the oral cavity and oropharynx, because both sites are aggregated as one unique topography (e.g. lip, oral cavity and pharynx) (IARC, 2015). Therefore, it is difficult to verify the real mortality trends regarding oral cavity and oropharynx cancers in this population.

Although oral cavity and oropharynx cancers are well-known diseases, access to large and representative public databases to appropriately understand their incidence, distribution, and clinicopathological characteristics in South American countries is still insufficient or completely absent in some regions. In Brazil, for example, the INCA gets cancer data from the population-based cancer registries and HCRs (INCA, 2013) with the objective of gathering all available data and creates a

reliable database. However, not all data are regularly updated, and not all hospitals and states send data to this centre, making the results incomplete. As a consequence, official data on oral and oropharynx cancers incidence in Brazil are very likely to be underestimated. Another Brazilian public database, the FOSP collects data from all cancer centres of São Paulo state, the most populated and economically developed in Brazil. This database seems to be more reliable, because it is constantly updated and has a unified system to collect data; however, it represents only one state of the whole national territory, and it is formed by data from patients from São Paulo and also from different parts of Brazil to receive treatment in São Paulo. Regarding other South American countries, few WHO-validated cancer databases are currently available, and, consequently, determining oral and oropharynx cancer incidences and trends in this region is very difficult.

### Authors' note

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### Declaration of conflicting interests

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### Translational Value

In conclusion, the incidence of oral and oropharynx cancers is very heterogeneous among South American countries, whereas mortality rates are decreasing in most of them. However, this study showed that the development and improvement of national cancer databases are highly desirable and necessary to better understand the characteristics and distribution of these lesions in South America, because current databases do not seem to provide reliable data. These improvements could posteriorly allow the development of more effective public strategies to deal with oral cavity and oropharynx cancers.