

# Oropharynx

---

## 1. Introduction

### 1.1 General Information and Aetiology

The oropharyngeal region is located between the soft palate (uvula) superiorly and the hyoid bone inferiorly, it is continuous with the oral cavity anteriorly and communicates with the nasopharynx superiorly and the supraglottic larynx and hypopharynx inferiorly. The oropharynx is divided into the following sites (Figure 1): base of the tongue, the tonsillar region and the soft palate [1].

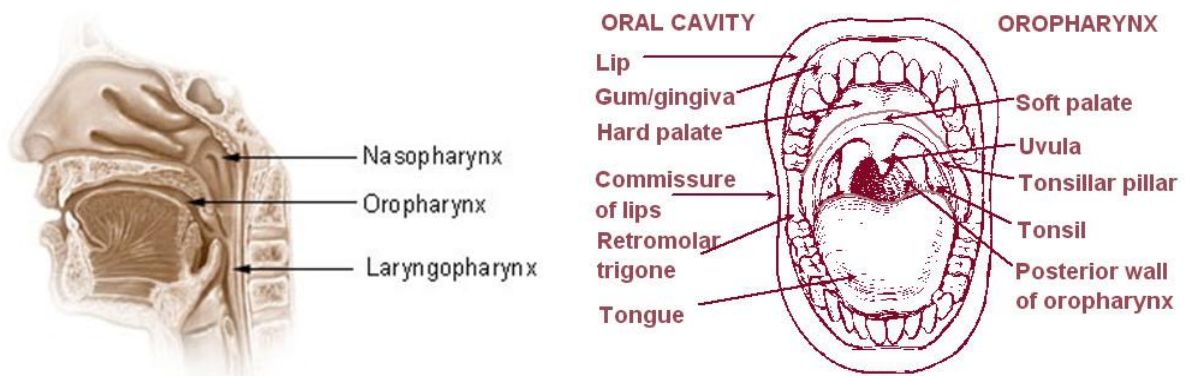


Figure 1. Location and Anatomy of the Oropharynx

Oropharyngeal cancer is uncommon and typically involves patients in the fifth through seventh decades of life. Men are affected 3 to 5 times more often than women. Similar to other cancers in the head and neck region, the most common risk factors to develop cancer of the oropharynx are tobacco and alcohol consumption. Infection with carcinogenic subtypes of human papillomavirus (HPV; especially HPV-16) is also an important risk factor. Another possible, but less established risk factor includes poor diet habits. A large part of the patients presents with lymph node involvement at time of diagnosis.

### 1.2 Diagnosis and Treatment

Diagnosis starts with a clinical examination. Adequate inspection with direct or indirect endoscopy plays an important role. Palpation of the location itself (if possible) and additionally of the lymph

nodes of the neck is also necessary. Clinical staging is completed with magnetic resonance imaging (MRI) or computed tomography (CT). Pathological staging is done by histological examination of the surgically resected primary tumour and lymph nodes. HPV testing is recommended because HPV infection is related to the development of an important proportion of oropharyngeal tumours[1-3].

Oropharyngeal cancer can be treated with several treatment options, concerning primary surgery, radiotherapy or chemoradiotherapy. The treatment choice depends on the stage of the disease, the operability and the general condition of the patient. Depending on the pathologic result of the resected specimen, adjuvant radio- or chemoradiotherapy may be necessary. When the patient is treated with primary radio- or chemoradiotherapy, surgery may be necessary for the management of residual or recurrent diseases.

There is no experts agreement on the possibility of induction chemotherapy [2].

## **2. Data Selection**

All oropharyngeal cancers diagnosed between 2004 and 2007 for patients with an official residence in the Flemish Region are selected, resulting in 923 cases (for detailed information on selected topography and morphology codes, see Appendix A). As described in Figure 2, 112 of them are excluded resulting in 811 patients for which results are presented in this chapter.

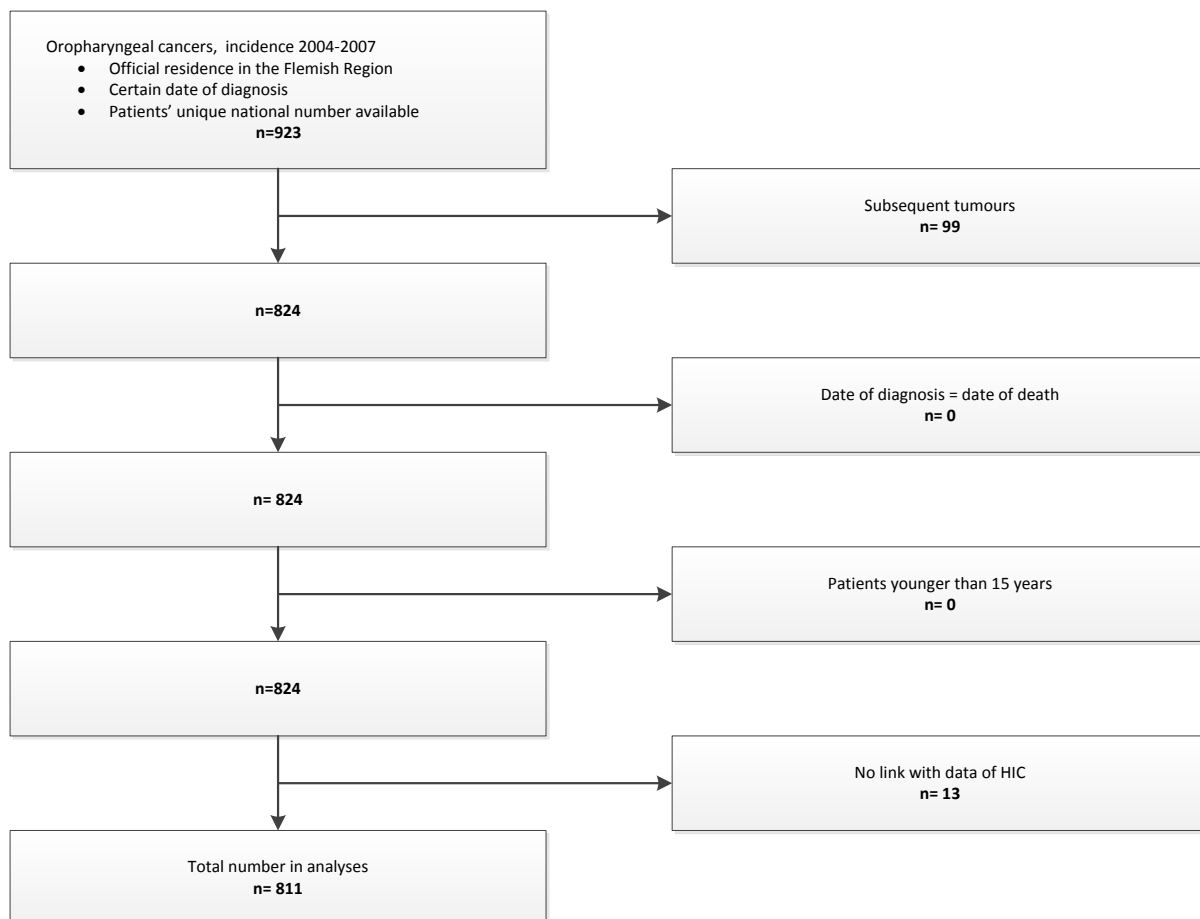


Figure 2. Selection of Oropharyngeal Tumours (Flemish Region, 2004-2007)

### 3. Patient Characteristics

Males are more frequently diagnosed with a tumour of the oropharynx than females (male/female ratio = 3.97) during the observed period (Table 1). No clear trend in age standardised rates can be observed over the years 2004-2007.

The median age is 59 years for males and 60 years for females. For further analyses, the patients are divided in three age categories: 15 -54 years, 55-64 years and 65 years and older (Table 2).

Table 1. Oropharyngeal Cancer: Incidence (Flemish Region, 2004-2007)

Incidence year	Males		Females		Total	
	n	ESR	n	ESR	n	ESR
2004	152	4.62	42	1.12	194	2.84
2005	138	4.13	38	1.05	176	2.56
2006	159	4.56	50	1.35	209	2.91

2007	189	5.41	43	1.20	232	3.26
2004-2007	638	4.69	173	1.18	811	2.90

ESR: age-standardised rate, using the European Standard Population (n/100,000 person years)

**Table 2. Oropharyngeal Cancer: Age Distribution (Flemish Region, 2004-2007)**

	Males	Females	Total
15-54 years	220	56	276
55-64 years	234	54	288
65+ years	184	63	247

## 4. Tumour Characteristics

Sublocalisation, morphology, differentiation grade and stage (clinical, pathological and combined stage) of the selected oropharyngeal cancers are described in Table 3. Hundred-twenty tumours (14.8%) cannot be staged because their localisation is coded as C10.8 (overlapping region of the oropharynx) or C10.9 (oropharynx, not otherwise specified). These tumours are displayed as stage 'NA'.

**Table 3. Oropharyngeal Cancer: Tumour Characteristics (Flemish Region, 2004-2007)**

	N	% of total	% of known
<b>Localisation</b>			
Base of tongue (C01.9)	144	17.8	24.4
Soft palate and uvula (C05.1, C05.2)	65	8.0	11.0
Tonsil (C09)	380	46.9	64.5
Oropharynx, other and unspecified (C02.4, C02.8, C05.9, C10.0, C10.1, C10.2, C10.3, C10.8, C10.9)	222	27.4	/
<b>Morphology</b>			
Squamous cell carcinoma	798	98.4	/
Other Specified Carcinoma	13	1.6	/
<b>Differentiation grade</b>			
Well differentiated	91	11.2	13.5
Moderately differentiated	321	39.6	47.6

Poorly differentiated	245	30.2	36.3
Undifferentiated	18	2.2	2.7
Unknown	136	16.8	/
Clinical stage			
0	2	0.2	0.3
I	41	5.1	7.0
II	65	8.0	11.1
III	134	16.5	22.9
IV	344	42.4	58.7
Unknown	105	12.9	/
Pathological stage			
I	28	3.4	14.0
II	26	3.2	13.0
III	42	5.2	21.0
IV	104	12.8	52.0
Unknown	491	60.5	/
Combined stage			
I	46	5.7	7.5
II	74	9.1	12.1
III	132	16.3	21.6
IV	358	44.1	58.7
Unknown	81	10.0	/

*Note: 120 cases have a localisation for which staging is not applicable (NA)*

Almost all oropharyngeal cancers are squamous cell carcinoma. The majority of the cases originate from the tonsil region and have a moderate or poor differentiation grade. Due to the rich lymphatics in this region, the disease is often extended to the lymph nodes at diagnosis. As shown in Figure 3 and Figure 4, no major differences in stage distribution are seen between both sexes or amongst different age categories.

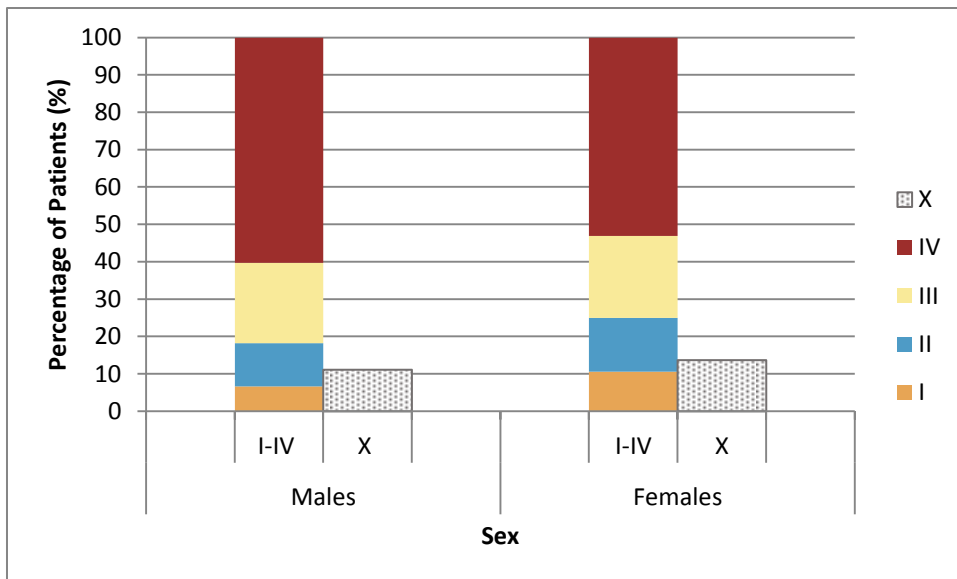


Figure 3. Oropharyngeal cancer: Stage Distribution by Sex (Flemish Region, 2004-2007)

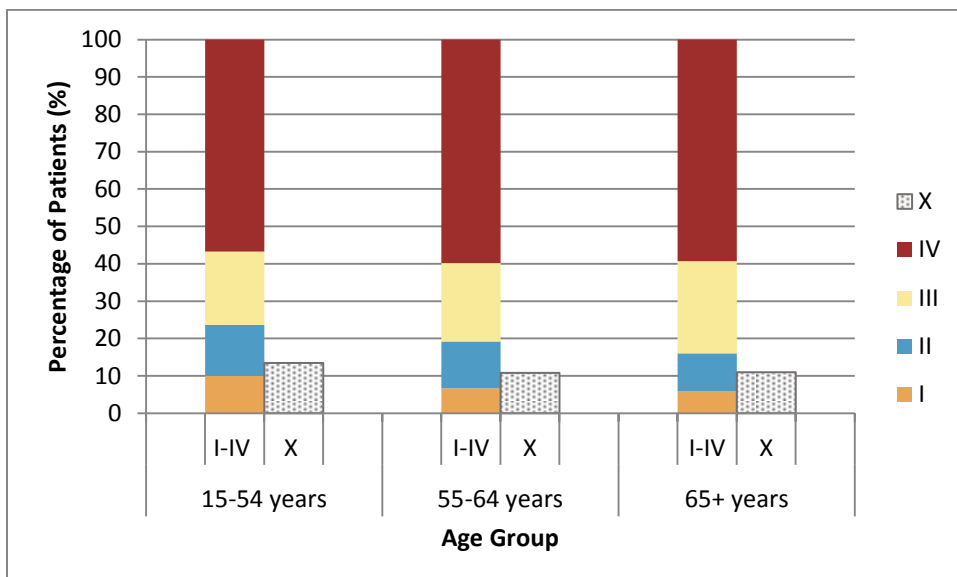


Figure 4. Oropharyngeal Cancer: Stage Distribution by Age Group (Flemish Region, 2004-2007)

## 5. Diagnostic and Therapeutic Procedures

### 5.1 Diagnosis and Staging

All procedures regarding diagnosis and staging of the oropharyngeal cancers occurring within three months around incidence date are studied (Table 4).

The diagnosis of cancer is confirmed by tissue examination performed by the pathologist in almost all cases (96.9%). Exceptionally, cytology is found to be the sole specimen that serves as the basis for diagnosis.

To evaluate tumour extent, imaging techniques are frequently used (97.4%). CT is used more often than more advanced techniques as MRI and PET as a staging procedure.

As indicated, most patients undergo screening for second primary cancers in the upper aerodigestive tract, especially by laryngoscopy, tracheoscopy or bronchoscopy (79.9%).

Biopsies of suspected neck lymph nodes are less frequently performed (6.3%).

Table 4. Oropharyngeal Cancer: Overview of Diagnostic and Staging Procedures (Flemish Region, 2004-2007)

Diagnostic Procedure (-3m<inc<+3m)	Total (N=811)		2004 (N=194)		2005 (N=176)		2006 (N=209)		2007 (N=232)	
	n	%	n	%	n	%	n	%	n	%
<b>Tissue Examination</b>	<b>786</b>	<b>96.9</b>	<b>185</b>	<b>95.4</b>	<b>170</b>	<b>96.6</b>	<b>205</b>	<b>98.1</b>	<b>226</b>	<b>97.4</b>
Histological Diagnosis	781	96.3	185	95.4	168	95.5	203	97.1	225	97.0
Cytology	183	22.6	46	23.7	42	23.9	42	20.1	53	22.8
<b>Imaging</b>	<b>790</b>	<b>97.4</b>	<b>187</b>	<b>96.4</b>	<b>170</b>	<b>96.6</b>	<b>204</b>	<b>97.6</b>	<b>229</b>	<b>98.7</b>
CT	777	95.8	182	93.8	168	95.5	201	96.2	226	97.4
MRI	347	42.8	77	39.7	79	44.9	94	45.0	97	41.8
Ultrasound Neck	144	17.8	34	17.5	32	18.2	44	21.1	34	14.7
PET Scan	356	43.9	56	28.9	83	47.2	97	46.4	120	51.7
Chest X-ray	673	83.0	166	85.6	147	83.5	168	80.4	192	82.8
Ultrasound Abdomen	408	50.3	98	50.5	84	47.7	99	47.4	127	54.7
<b>Screening for Second Primary Malignancies</b>	<b>711</b>	<b>87.7</b>	<b>168</b>	<b>86.6</b>	<b>159</b>	<b>90.3</b>	<b>178</b>	<b>85.2</b>	<b>206</b>	<b>88.8</b>
Respiratory Tract	648	79.9	155	79.9	142	80.7	163	78.0	188	81.0
Digestive Tract	484	59.7	110	56.7	109	61.9	118	56.5	147	63.4
<b>Other Procedures</b>										
Lymph Node Biopsy	51	6.3	10	5.2	12	6.8	10	4.8	19	8.2



## 5.2 Multidisciplinary Oncological Consult

Overall, about 65% of all oropharyngeal cancer patients are discussed at a multidisciplinary oncological consult (MOC) within 1 month before till three months after incidence date. An increase of the proportion of patients discussed at a MOC is observed during the observation period, ranging from 60% in 2004 to 70% in 2007 (Table 5).

Table 5. Oropharyngeal Cancer: Frequency of Multidisciplinary Oncological Consult (Flemish Region, 2004-2007)

Incidence year	MOC	
	n	%
2004 (n=194)	117	60.3
2005 (n=176)	110	62.5
2006 (n=209)	139	66.5
2007 (n=232)	163	70.3
Total (n=811)	529	65.2

## 5.3 Therapeutic Procedures

Three different surgery types are taken into account for the treatment analyses: major surgery for larger oropharynx tumours (e.g tonsillectomy), minor surgery (e.g. mucosal resection), and lymphadenectomies. Major surgeries always receive priority when performed within the studied timeframe. Otherwise, minor surgery or lymphadenectomy is taken into account, with preference for the surgical procedure that is closest to incidence date.

Within one month before and six months after incidence date, 43.6% of the patients undergo surgery. For half of these patients, major surgery has been performed (Table 6).

Table 6. Oropharyngeal Cancer: Overview of the Selected Surgeries (Flemish Region, 2004-2007)

Type of Surgery	n	%
Major Surgery	188	50.0
Minor Surgery	95	25.3
Lymphadenectomy	93	24.7

For 22 patients, the surgical procedure is carried out after radiotherapy (within the timeframe of six months after incidence) and therefore considered as salvage surgery. For the remaining 354

operated patients, the surgical procedure is considered to be the cornerstone of the treatment. The majority of these are postoperatively irradiated either with or without chemotherapy. The number of patients who undergo surgery without adjuvant radio- or chemotherapy is very limited.

The other half of the patients are mainly treated with radiotherapy. This irradiation is sometimes performed alone but more frequently in combination with chemotherapy.

No indications on any oncological treatment (surgery, radiotherapy or chemotherapy) within the studied timeframe are found for only about 8% of the patients.

**Table 7. Oropharyngeal Cancer: Overview of Treatment Schemes (Flemish Region, 2004-2007)**

Treatment Scheme	n	%
<b>Surgery</b>	<b>354</b>	<b>43.6</b>
Adjuvant radiotherapy	142	17.5
Adjuvant chemoradiotherapy	146	18.0
No other therapy	56	6.9
Other therapy		
Surgery < chemotherapy	6	0.7
Chemotherapy < surgery	2	0.2
Chemotherapy < surgery < chemotherapy	1	0.1
Chemotherapy < surgery < chemoradiotherapy	1	0.1
<b>Radiotherapy only</b>	<b>130</b>	<b>16.0</b>
<b>Chemoradiotherapy</b>	<b>246</b>	<b>30.3</b>
<b>Chemotherapy only</b>	<b>19</b>	<b>2.3</b>
<b>No primary treatment registered</b>	<b>62</b>	<b>7.6</b>

## 6. Survival

### 6.1 Observed and Relative Survival

Survival of oropharyngeal cancer patients is rather poor, with less than half of the patients being still alive at five years after diagnosis (Table 8).

Table 8. Oropharyngeal Cancer: Observed and Relative Survival (Flemish Region, 2004-2007)

N at risk	Observed Survival (%)					Relative Survival (%)				
	1 year	2 year	3 year	4 year	5 year	1 year	2 year	3 year	4 year	5 year
811	76.1	61.4	53.0	48.3	43.4	77.3	63.3	55.5	51.4	46.9

## 6.2 Relative Survival by Sex

Survival is different between males and females. Already at one year after diagnosis, a 10% difference in relative survival in favour of females is noted. This disparity enlarges throughout the follow-up time (Table 9).

Table 9. Oropharyngeal Cancer: Relative Survival by Sex (Flemish Region, 2004-2007)

	N at risk	%	Relative Survival (%)				
			1 year	2 year	3 year	4 year	5 year
Males	638	78.7	75.1	60.4	52.5	47.5	43.0
Females	173	21.3	85.5	74.0	66.5	65.5	60.9

## 6.3 Relative Survival by Age Group

Patients of 65 years and older have a worse prognosis than younger patients (Table 10). The difference between patients in the age group 15-54 years and the age group 55-64 years is rather small.

Table 10. Oropharyngeal Cancer: Relative Survival by Age Group (Flemish Region, 2004-2007)

	N at risk	%	Relative Survival (%)				
			1 year	2 year	3 year	4 year	5 year
15-54 years	276	34.0	81.4	62.0	54.5	51.8	47.9
55-64 years	288	35.5	79.5	68.2	61.4	56.9	49.8
65+ years	247	30.5	69.8	58.9	49.3	43.7	41.6

## 6.4 Relative Survival by Stage

Survival is better for patients diagnosed with a Stage I tumour (5-year relative survival: 77.3%), compared with the other stages (Figure 5). Survival is worst for patients diagnosed with a Stage IV tumour (5-year relative survival: 40.8%). However, it should be noted that, in line with other head

and neck cancers, some locally or regionally advanced diseases are also categorised as stage IV (stage IVA or IVB, more precisely). Oropharyngeal tumours with distant metastases are labelled as Stage IVC, but are seldom in this study (only 23 patients in this selection of patients). Consequently, survival for stage IV cancers is rather high compared to other types of cancers.

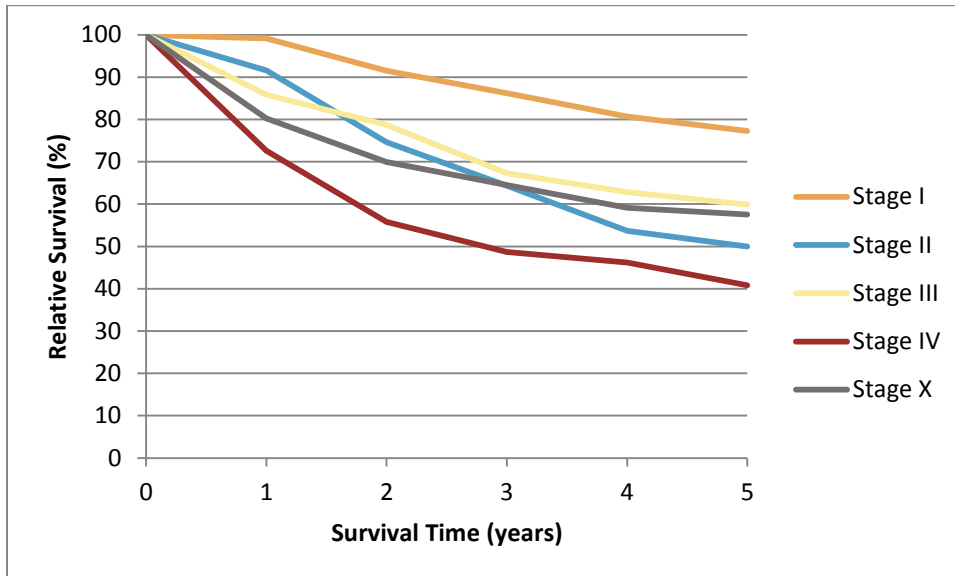


Figure 5. Oropharyngeal Cancer: Relative Survival by Stage (Flemish Region, 2004-2007)

## 6.5 Relative Survival by Sublocalisation

Patients diagnosed with a tumour in the soft palate or uvula have the best prognosis (5-year relative survival: 61.7%) of all patients diagnosed with an oropharyngeal tumour. Patients with a tumour of the tonsil have a 5-year relative survival of 52.8% and patients with a tumour of the base of tongue a survival of 41.2% (Figure 6).

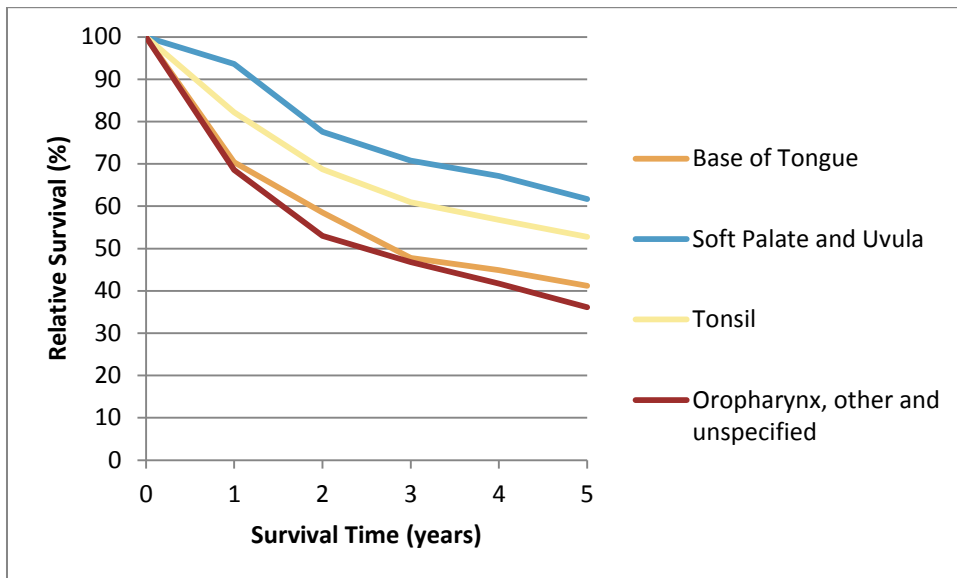


Figure 6. Oropharyngeal Cancer: Relative Survival by Sublocalisation (Flemish Region, 2004-2007)

## 6.6 Relative Survival by Primary Treatment

For all cases together, 5-year relative survival is better for patients who are primarily treated with surgery (57.3%) than for patients primarily treated with radiotherapy (41.3%) or with chemoradiotherapy (45.0%). However, different results are obtained when separating early and advanced disease stages. For early stages (stage I and II), survival is very similar for patients treated with primary surgery as for patients treated with primary radiotherapy (Figure 7, chemoradiotherapy not displayed because the number at risk is lower than 35). For the more advanced stages (Stage III to IVb), improved survival is noted for patients primarily treated with surgery and chemoradiotherapy (CHEMO/RT) in comparison to patients primarily treated with radiotherapy only (Figure 8). A preservation of more complicated treatment options for patients with an operable tumours or with a better performance status might explain this discrepancy.

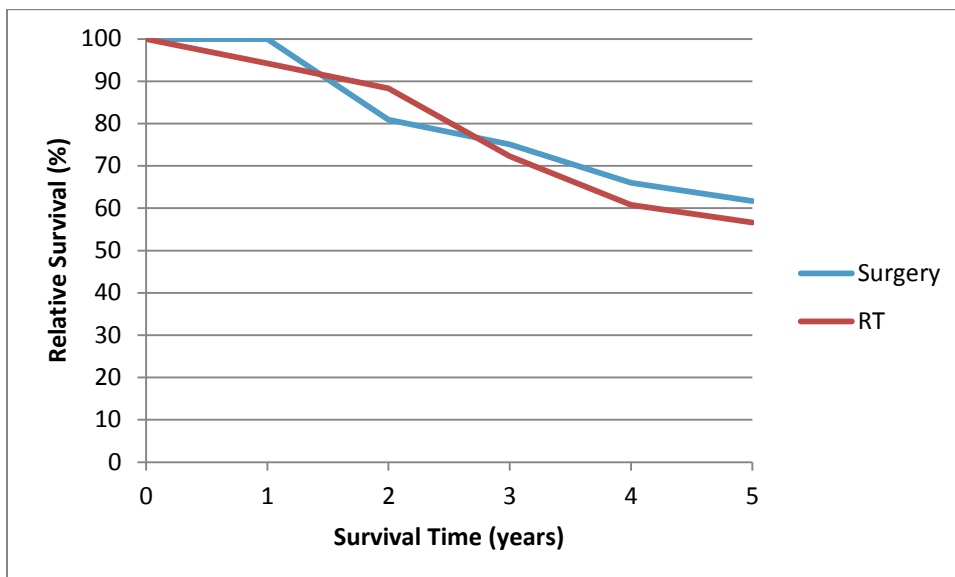


Figure 7. Oropharyngeal Cancer: Relative Survival by Primary Treatment - Stage I & II

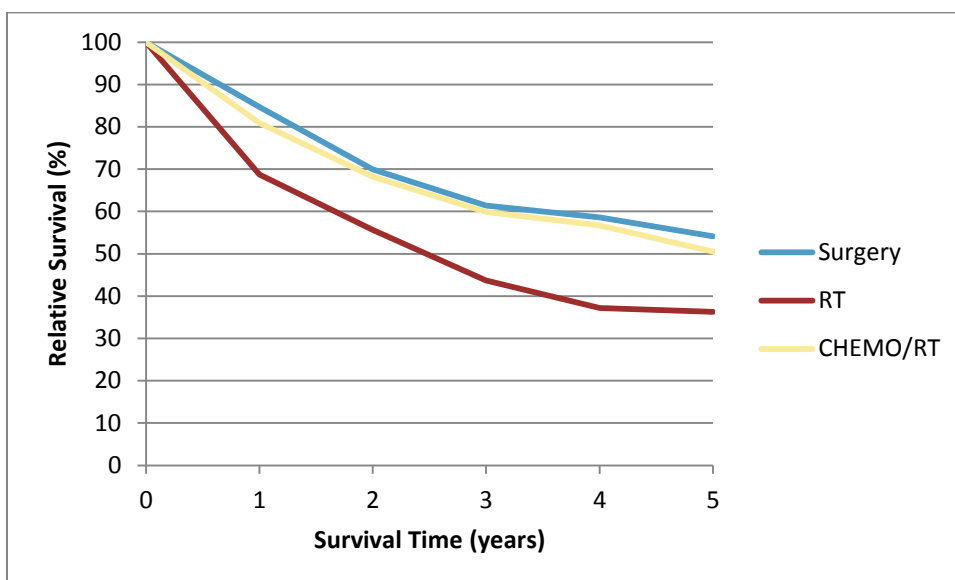


Figure 8. Oropharyngeal Cancer: Relative Survival by Primary Treatment - Stage III - IVb

## 7. Analyses by Volume

During the period 2004-2007, Belgian patients with oropharyngeal cancer are treated in 46 different Flemish hospitals. The mean number of patients (during the period 2004-2007) by hospital is 17.0 and the median number is 5, with a range between 1 and 115. The distribution of the number of patients (=volume) per hospital is displayed in Figure 9.

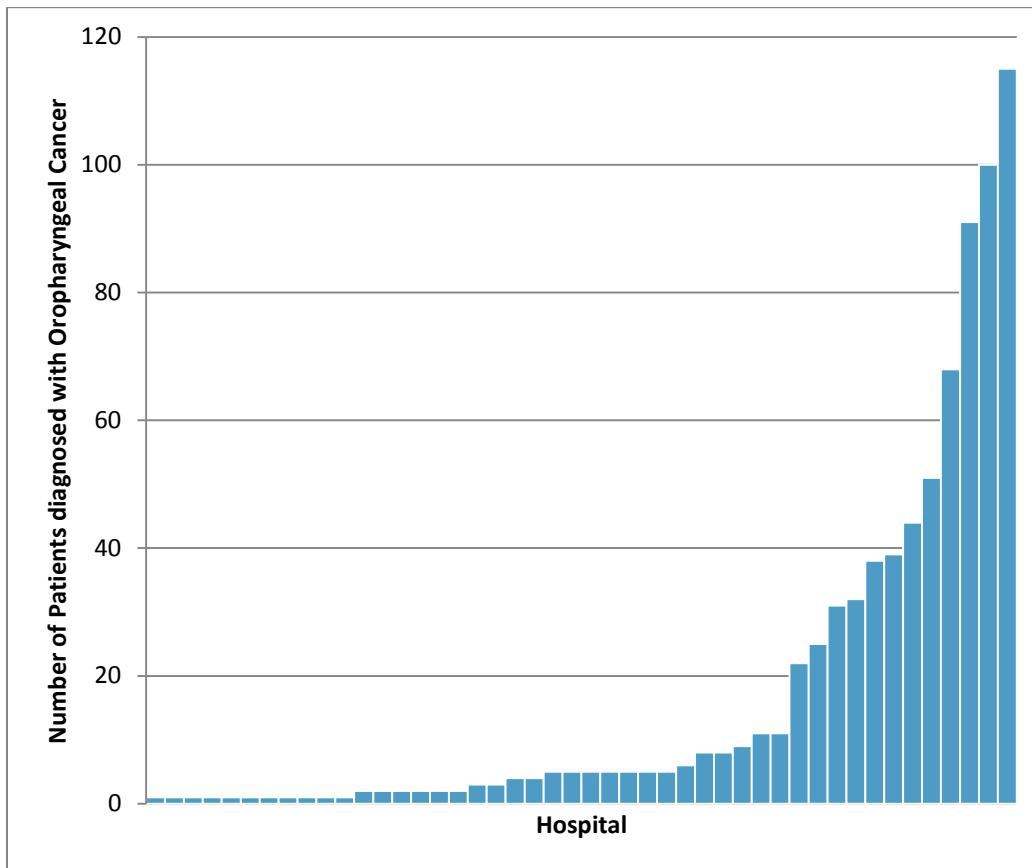


Figure 9. Oropharyngeal Cancer: Distribution of Patients by Hospital (Flemish Hospitals, 2004-2007)

768 Flemish patients (94.7%) can be assigned to a hospital (see Methodology for the rules applied to assign a patient to one hospital). Considering hospitals having taken care of 80 or more patients diagnosed during the period 2004-2007 as high-volume hospitals, 321 patients are assigned to high-volume hospitals and 447 patients are assigned to low-volume hospitals.

Treatment schemes are different for low-volume and high-volume hospitals (Figure 10). In high-volume hospitals, 19.3% of the patients is treated with RT, 36.4% is treated with chemoradiotherapy, while another 38.6% is primarily treated with surgery. For low-volume hospitals these percentages are 15.0%, 28.9% and 50.3%, respectively. The differences between high- and low volume hospitals can partly be explained because the RT centres are overrepresented in the high-volume group due to the rules for assignment that give a rather high priority to the hospital where the RT has taken place.

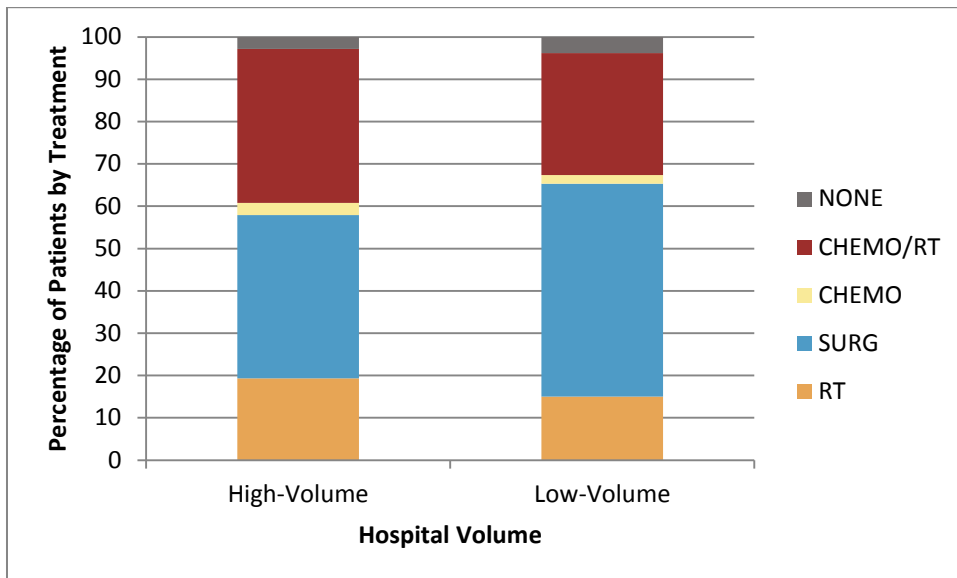


Figure 10. Oropharyngeal Cancer: Primary Treatment by Hospital Volume (High-Volume versus Low-Volume Hospitals) (Flemish Region, 2004-2007)

## 8. References

1. Roodenburg, J.L.N., Baatenburg de Jong, R.J., Reintsema, H. et al. Hoofd-halstumoren. In: van de Velde C.J.H., van der Graaf W.T.A., van Krieken, J.H.J.M., Marijnen C.A.M., Vermorken (Eds.): Oncologie. Houten, 2011.
2. NCCN guidelines ([http://www.nccn.org/professionals/physician\\_gls/f\\_guidelines.asp](http://www.nccn.org/professionals/physician_gls/f_guidelines.asp)). Accessed on October 01 2013.
3. Head and Neck. In: Edge S.B., Byrd D.R., Compton C.C., Fritz A.G., Greene, F.L., Trotti A. (eds.): AJCC cancer staging manual, seventh edition. Chicago, 2010.