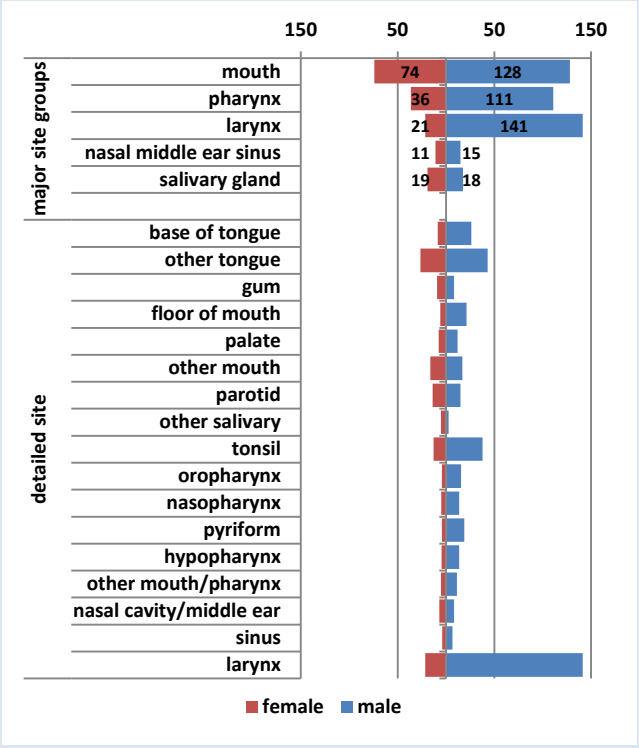
National Cancer Registry Ireland **Cancer Trends**

Cancers of the head and neck

Incident case numbers

Cancers of the head and neck (H&N) are a heterogeneous group, consisting of cancers of the mouth (base of tongue, other tongue, gum, floor of mouth, palate and other mouth; ICD 10 codes C01–C06); salivary glands (C07–C08); pharynx (tonsil, oropharynx, nasopharynx, pyriform fossa, hypopharynx, other mouth/pharynx; C09-C14) nasal cavity/middle ear and sinuses (C30–C31) and larynx (C32). Cancer of the lip and thyroid are not included in 'head and neck cancer' in this report.

Figure 1. Anatomical site of cancer by sex, average number of cases per year, 2010-2012



An average of 574 head and neck cancers was registered annually between 2010 and 2012 (Table 1). Cancer of the mouth was the most common site, with 202 cases per year. The next most frequent sites were larynx (162 cases per year) and pharynx (147 cases per year).

Generally, H&N cancer were more common in men (Figure 1). The highest male/female ratio was for laryngeal cancers (7:1), followed by mouth (3:1), pharynx (3:1) and nasal cavity/middle ear (3:2). H&N cancer made up almost 4% of all invasive tumours (excluding non-melanoma skin cancer) diagnosed in males over the period 2010-2012, and almost 2% in females.

Table 1. Annual average number, percentage composition and subtype of head and neck cancer, 2010-2012

	females	males	total
incident cases: annual average	161	413	**574**
rate (cases per 100,000 per year)	6.9	19.2	**12.9**
% all invasive cancers (excl. skin)	1.7%	3.9%	**2.9%**
Sub sites			
C01-06: mouth	74(46%)	128(31%)	**202(35%)**
C09-14: pharynx	36(22%)	111(27%)	**147(26%)**
C32: larynx	21(13%)	141(34%)	**162(28%)**
C30-31: nasal cavity/middle ear/sinus	11(7%)	15(4%)	**26(5%)**
C07-08: salivary gland	19(12%)	18(4%)	**37(6%)**

Age profile

Approximately 57% of males and females were under 65 years when diagnosed (Figure 2). The proportion of women in the 15-44 year age range was double that of males (12% vs 6%).

Figure 2. Age at diagnosis: head and neck cancer 2010–2012

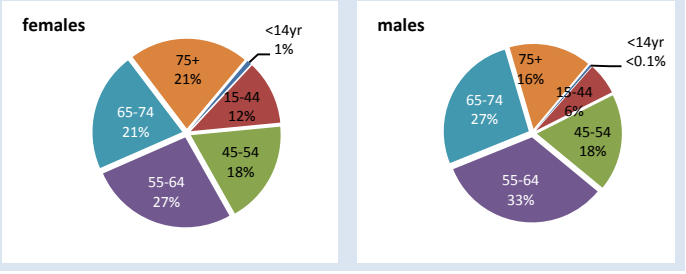
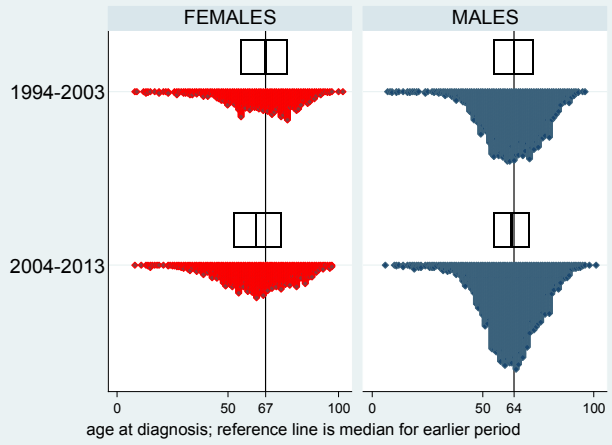


Figure 3. Age distribution at diagnosis: head and neck cancer, by sex and diagnostic periods 1994-2003 and 2004-2013



In females, the median age at diagnosis fell significantly from 67 years in 1994-2003, to 63 years in 2004-2013 (Figure 3, Table 2). In males, the median age at diagnosis fell from 64 to 63 years over the same periods (Figure 3, Table 2). There were significant decreases in age at diagnosis in the major sub-sites of head and neck cancer in females (but not in males), including, pharynx, larynx, nasal/middle ear/sinus and salivary glands. There was no change in the age of incidence for cancer of the mouth in either sex (Table 2).

Figure 4. Age distribution at diagnosis, by sub-site: females

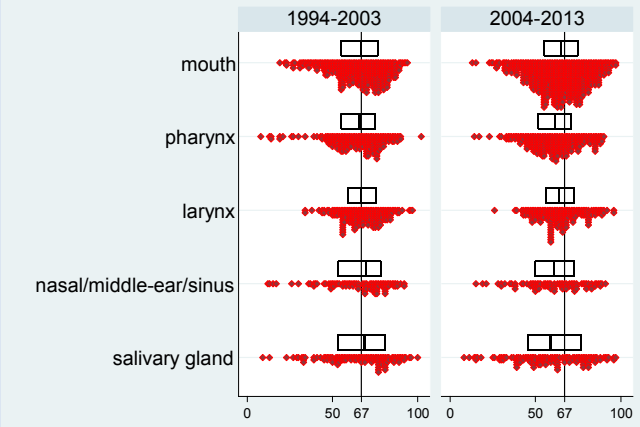


Figure 5. Age distribution at diagnosis, by sub-site: males

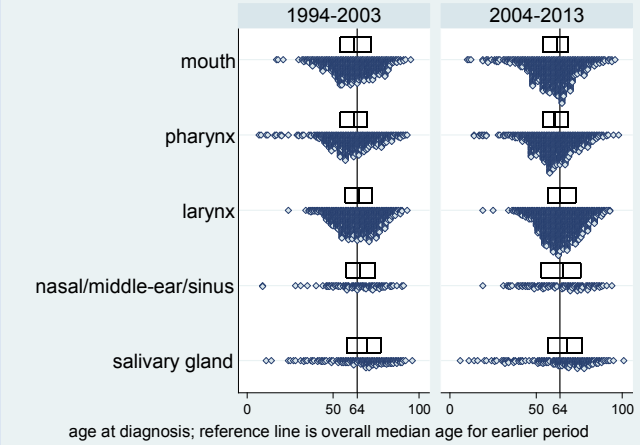


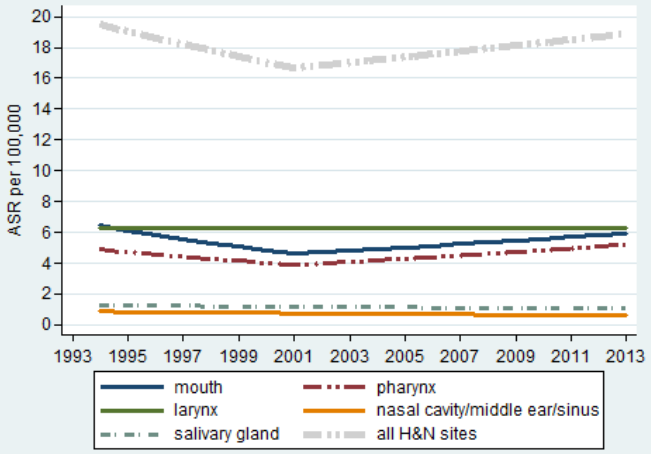
Table 2. Median age at diagnosis, by site and sex

	FEMALES			MALES		
main sites	1994-2003	2004-2013	p	1994-2003	2004-2013	p
mouth	67	65		62	62	
pharynx	66	61.5	*	62	61	
larynx	67	64	*	65	64	
nasal/middle-ear/sinus	70	61	*	65	66	
salivary gland	69	59	*	70	68	
specific sites						
base of tongue	65	60.5		62	61.5	
other tongue	64	63		61	62	
gum	75	70		68.5	63	*
floor of mouth	65.5	65		61	62	
palate	65	66		63.5	60	
other mouth	72	68		65	62	
parotid	69	62	*	71	69	
other salivary	67	53	*	64	64.5	
tonsil	58	54		59	58	
oropharynx	56	64		63	61	
nasopharynx	63	54.5		56	56	
pyriform	69.5	70		63	63.5	
hypopharynx	70	67.5		67.5	66	
other mouth/pharynx	68	61.5		62.5	65	
nasal cavity/middle ear	69	60	*	65	65	
sinus	70	63		65	66	
larynx	67	64	*	65	64	
all sites	67	63	***	64	63	*

***p<0.0001, **p<0.001, *p<0.05 Wilcoxon rank sum test

Time trends in incidence

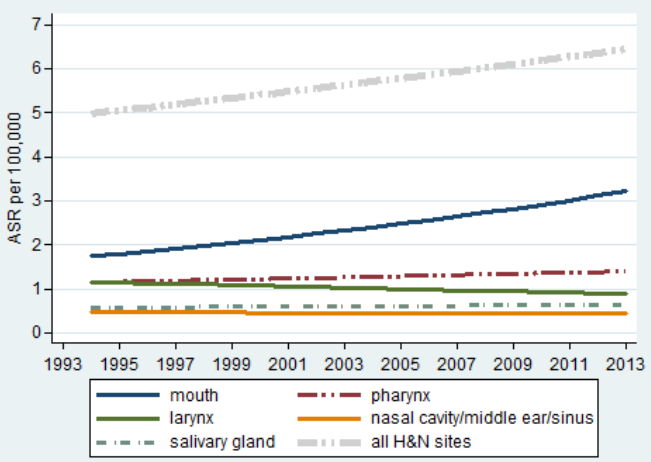
Figure 6. Fitted age standardised incidence rate, by site: 1994-2013: males



site - Joinpoint trend	period	annual % change	95%CI	p-value
C01-06: mouth	1994-2001	-4.7	[-8.2,-0.9]	<0.0001
	2001-2013	2.2	[0.6, 3.7]	<0.0001
C09-14: pharynx	1994-2001	-3.2	[-8.1, 1.9]	0.2
	2001-2013	2.5	[0.4, 4.6]	<0.0001
C32: larynx	1994-2013	0.0	[-0.9, 0.9]	1.0
C30-31: nasal/middle ear/sinus	1994-2013	-2.0	[-4.5, 0.6]	0.1
C07-08: salivary gland	1994-2013	-1.0	[-2.8, 0.8]	0.2
All sites	**1994-2000**	**-1.5**	**[-2.0,-0.5]**	**<0.0001**
	2001-2013	**1.1**	**[0.1, 2.0]**	**<0.0001**

Joinpoint regression was used to plot and calculate trends over time. [1] In males, H&N cancer incidence decreased at 1.5% annually during 1994-2000 and then increased again at 1.1% annually during 2001-2013 (Figure 6). Of the sub-sites examined, mouth cancer increased at 2%, and cancer of the pharynx 2.5% annually from 2001 to 2013. Females showed an overall increase of 1.4% annually in the incidence of head and neck cancer during 1994-2013. Of the sub-sites, cancer of the mouth increased significantly (3.3% annually, Figure 7).

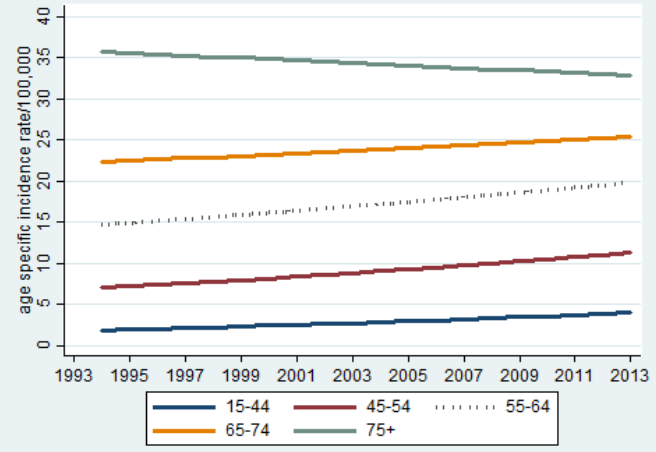
Figure 7. Fitted age standardised incidence rate, by site: 1994-2013: females



site - Joinpoint trend	period	annual % change	95%CI	p-value
C01-06: mouth	1994-2013	3.3	[2.0, 4.6]	<0.0001
C09-14: pharynx	1994-2013	1.0	[-0.3, 2.3]	0.1
C32: larynx	1994-2013	-1.4	[-3.0, 0.2]	0.1
C30-31: nasal/middle ear/sinus	1994-2013	-0.4	[-3.3, 2.5]	0.8
C07-08: salivary gland	1994-2013	0.7	[-2.2, 3.6]	0.6
All sites	**1994-2013**	**1.4**	**[0.4, 2.3]**	**<0.0001**

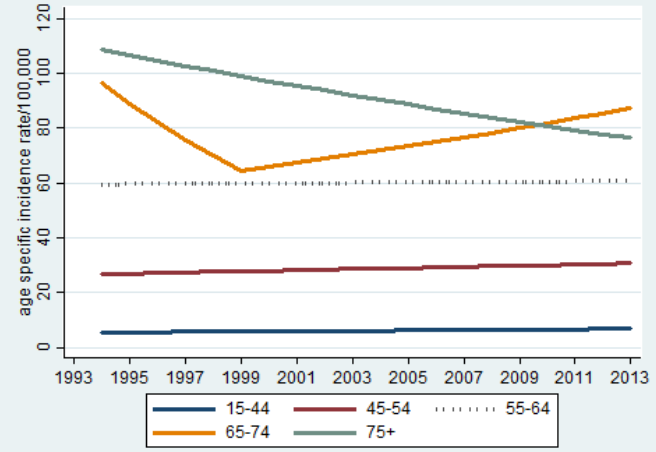
There was a significant increase of greater than 4% annually in the rate of head and neck cancer in young women (15-44) during the period 1994-2013 (Figure 8). The 45-54 age group also showed a 2.5% annual increase over the same period. The pattern in males was different; there was a significant increase of >2% annually in the rate of H&N cancer from 1999 to 2013 in the 65-74 age group, in tandem with a decrease of almost 2% annually in the 75+ age group over the full 19 year period (Figure 9).

Figure 8. Fitted age specific rate, all head and neck cancers 1994-2013: females



age- Joinpoint trend	period	annual % change	95%CI	p-value
15-44	1994-2013	4.1	[1.4, 6.8]	<0.0001
45-54	1994-2013	2.5	[-0.2, 5.4]	0.1
55-64	1994-2013	1.6	[-0.3, 3.5]	0.1
65-74	1994-2013	0.7	[-1.0, 2.4]	0.4
75+	1994-2013	-0.4	[-2.2, 1.3]	0.6

Figure 9. Fitted age specific rate, all head and neck cancers 1994-2013: males



age- Joinpoint trend	period	annual % change	95%CI	p-value
15-44	1994-2013	1.1	[-1.1, 3.3]	0.3
45-54	1994-2013	0.7	[-0.9, 2.4]	0.4
55-64	1994-2013	0.1	[-1.1, 1.4]	0.9
65-74	1994-1999	-7.7	[-15.9, 1.4]	0.1
	1999-2013	2.2	[0.2, 4.2]	<0.0001
75+	1994-2013	-1.8	[-3.3, -0.4]	<0.0001

Geographical distribution

Table 3 Incidence rates (cases per 100,000 per year) by HSE region, head and neck cancer (2011)

	HSE area	rate	95%CI	Cumulative risk to age 75y (%)
males	Dublin & mid Leinster	21.1	[16.8, 25.3]	1.74
	Dublin & north east	12.4	[8.9, 15.9]	1.21
	South	18.7	[14.9, 22.6]	1.50
	West	20.1	[16.2, 24.1]	1.73
	Ireland overall	**19.2**	**[17.3, 21.1]**	**1.61**
females	Dublin & mid Leinster	6.0	[3.9, 8.0]	0.47
	Dublin & north east	5.7	[3.7, 7.8]	0.49
	South	6.4	[4.3, 8.6]	0.51
	West	7.6	[5.0, 10.2]	0.65
	Ireland overall	**6.9**	**[5.8, 8.0]**	**0.56**

In males, the rate was highest in the HSE Dublin & mid-Leinster region and lowest in the HSE Dublin & northeast. In females the rate was highest in HSE west and lowest in HSE Dublin & northeast (Table 3). In 2011, males resident in the most deprived urban areas were more likely to be diagnosed with H&N cancer (Figure 10). A similar, though less dramatic pattern of incidence was also evident in females (Figure 11).

Figure 10. Incidence of H&N cancer and variation with deprivation index (DI)[2] and urban/rural area of residence-2011 ***(rural areas defined by population density <1 person per hectare)***

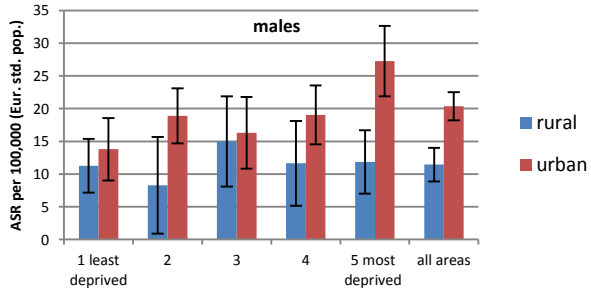
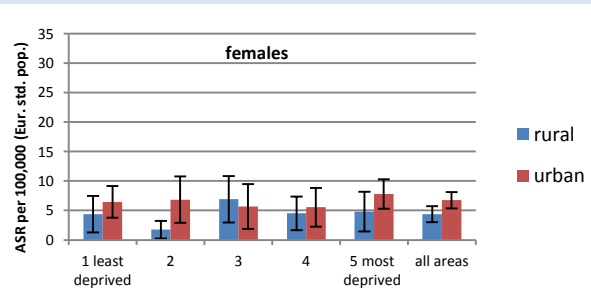


Figure 11. Incidence of H&N cancer and variation with deprivation index (DI)[2] and urban/rural area of residence-2011 ***(rural areas defined by population density <1 person per hectare)***



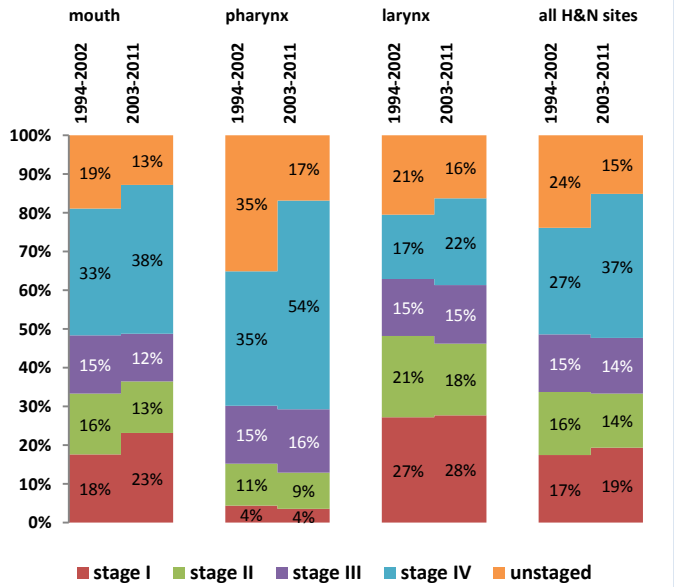
Stage at diagnosis

For H&N cancer overall, the percentage of patients diagnosed with stage IV disease increased from 27% in 1994-2002 to 37% in 2003-2011, accompanied with a commensurate fall in the percentage of unstaged cases (Figure 12). Cancer of the mouth was most likely to be diagnosed at stage IV (38%) or stage I (23%) during 2003-2011. Cancer of the pharynx, a more sequestered site, was more likely to

be diagnosed at stage IV (54% during 2003-2011). There was a substantial proportion of patients who remained unstaged (15% of all head and neck cancers during 2003-2011), although this proportion had reduced significantly from 24% observed during 1994-2002.

The proportion of unstaged cancers of pharynx decreased noticeably from 35% during 1994-2002, to 17% during 2003-2011. Cancers of the larynx, where symptoms occur earlier in the course of the disease were most likely to be diagnosed at stage I (28% in 2003-2011).

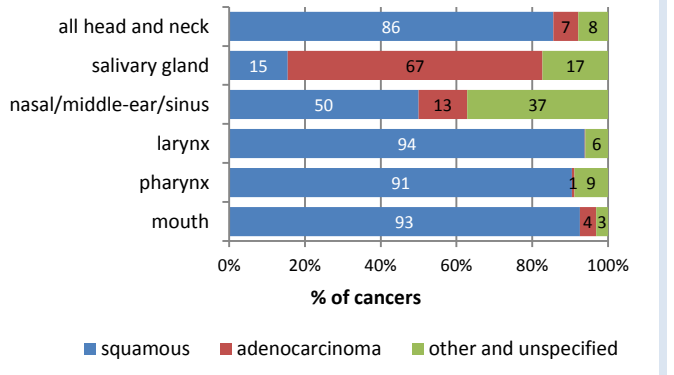
Figure 12 Percentage of cases by diagnostic stage: 1994-2011



Histological type at diagnosis

Squamous cell tumours were the most common morphology in head and neck cancer and made up 86% of H&N tumours in the period 2010-2012 (Figure 13). However, salivary gland tumours were more likely to be adenocarcinomas. Cancers of the mouth, pharynx and larynx were almost exclusively of the squamous cell type (>90%).

Figure 13. Histological types of head and neck cancer: 2010-2012



Treatment

Radiotherapy was the main treatment for H&N cancer where 67% of patients received this modality (74% of <65 year olds, 60% of 65+'s), either as the sole treatment, or in combination with surgery and chemotherapy (Table 4). Tumour directed surgery was the next most frequently used treatment (46% overall; 52% of <65 year olds, 40% of 65+'s). Chemotherapy was used in 19% of patients (26% of <65 year olds, 10% of 65+'s).

Table 4. Main categories of treatment for head and neck cancer patients by age group, within 1 year of diagnosis: 1994-2011

	<65 years	65+ years	all ages
surgery	51.6%	39.5%	45.8%
radiotherapy	74.0%	60.1%	67. 4%
chemotherapy	26.1%	10.3%	18.6%
Total cases	**4,043**	**3,639**	**7,682**

Radiotherapy was the main treatment option; it was the sole treatment in 28% of cases (Table 5), but was commonly used in combination with surgery (27%), and more so in patients <65 year old (33%), (Table 5). Of the 65+ age group, 20% received no tumour directed treatment compared with only 7% of patients <65 years old. However, these figures do not take into account other symptom relieving treatments that were commonly undertaken in H&N cancer.

Table 5. Combinations of the main categories of treatment for head and neck cancer patients by age group: 1994-2011

	<65 years	65+ years	all ages
surgery only	18.7%	20.1%	19.3%
surgery+ radiotherapy	24.2%	16.2%	20.4%
surg+chemo+ radiotherapy	8.7%	3.2%	6.1%
radiotherapy only	23.7%	33.7%	28.4%
chemo+radiotherapy	17.4%	7.1%	12.5%
no tumour directed treatment	7.4%	19.8%	13.3%
Total cases	**4,043**	**3,639**	**7,682**

Figure 14 shows the variation in treatment over the period 1994-2011 for all head and neck cancers. Between 1994 and 2011 the percentage of all patients who received some form of radiotherapy regimen was fixed at around 67%. However, it was notable that the chemo-radiation combination increased substantially from only 3% in 1994 to 19% in 2011. The percentage undergoing surgery, either as sole treatment or in combination remained fixed at 46-47% over the period.

Figure 15 shows the variation in treatment combinations employed over the period 1994-2011 for cancer of the mouth. Between 1994 and 2011 the percentage of patients who received some form of radiotherapy regimen fell from 56% to 50%. The chemo-radiation combination increased from 3% in 1994 to 11% in 2011. The percentage undergoing tumour directed surgery; either as sole treatment or in combination remained fixed at 68% over the period. The percentage undergoing surgery alone increased from 31% in 1994 to 41% in 2011.

Figure 14. Percentage treated; all head and neck cancer: 1994-2011

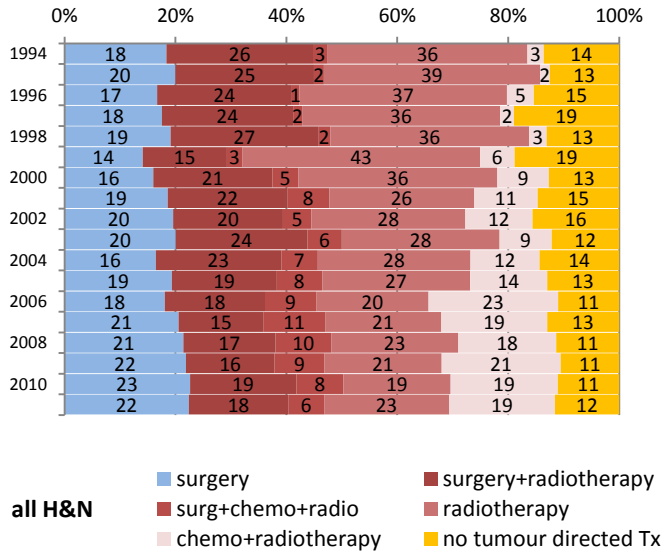


Figure 15. Percentage treated; cancer of the mouth: 1994-2011

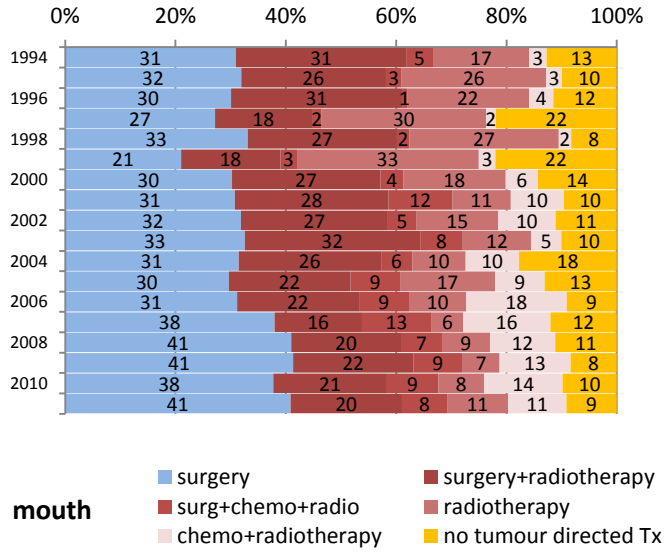
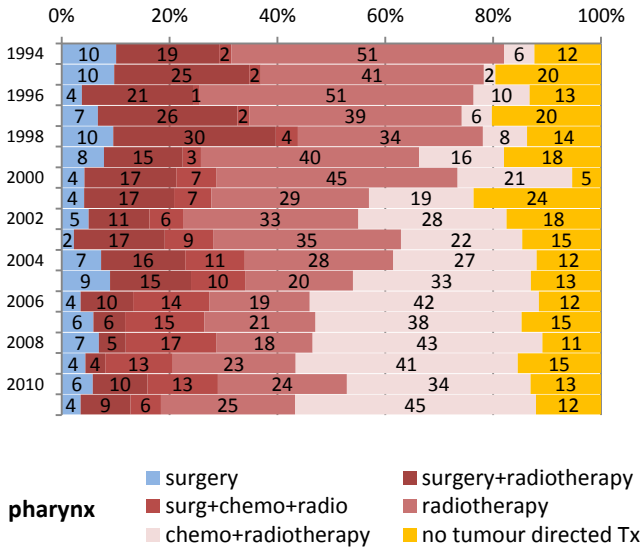


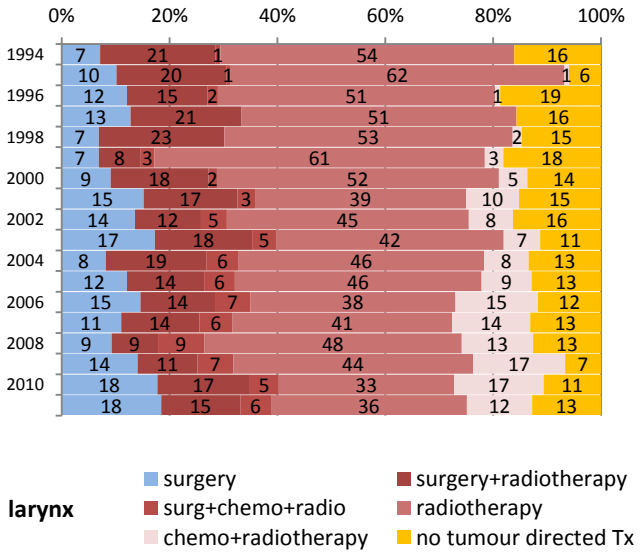
Figure 16 shows the variation in treatment over the period 1994-2011 for cancer of the pharynx. Radiotherapy was the main treatment for cancer of the pharynx. The percentage of patients who had some form of radiotherapy increased from 78% in 1994 to 85% in 2011. The chemo-radiation combination increased substantially from 6% in 1994 to 45% in 2011. The percentage undergoing surgery, either as sole treatment or in combination fell from 31% in 1994 to 19% in 2011. The percentage undergoing surgery alone decreased from 10% in 1994 to 4% in 2011.

Figure 16. Percentage treated; cancer of the pharynx: 1994-2011



Radiotherapy was was also the main treatment in laryngeal cancer (Figure 17). The percentage in receipt of radiotherapy fell slightly from 76% in 1994 to 69% in 2011. The chemoradiation percentage increased from <1% in 1994 to 12% in 2011. The percentage undergoing surgery, either as sole treatment, or in combination increased from 29% in 1994 to 39% in 2011.

Figure 17. Percentage treated; cancer of the larynx: 1994-2011



Trends in Irish mortality rates

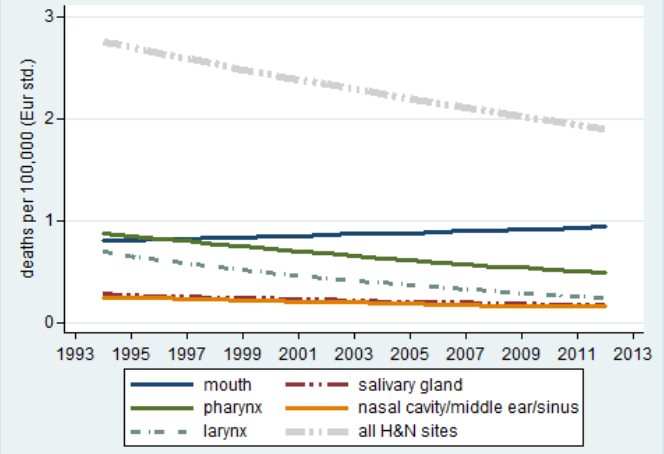
An average of 213 deaths (158 males and 55 females) was recorded annually between 2010 and 2012. [3] The ratio of male to female deaths was approximately 3:1. While the exact location of the primary tumour was not always recorded accurately in death certificates; the most common sub-sites recorded at death for males were the pharynx (33%) and larynx (32%), and the mouth in females (49%), (Table 6).

Table 6. Annual average number of deaths, percentage composition and subtype of head and neck cancer, 2010-2012

	females	males	total
annual average deaths	55	158	**213**
rate (deaths per 100,000 per year)	2.1	7.0	**4.4**
% all invasive cancer deaths	1.4%	3.7%	**2.7%**
Sub sites			
C01-06: mouth	27(49%)	40(25%)	**66(31%)**
C09-14: pharynx	12(22%)	52(33%)	**65(31%)**
C32: larynx	6(11%)	51(32%)	**57(27%)**
C30-31: nasal cavity/middle ear/sinus	2(4%)	4(3%)	**6(3%)**
C07-08: salivary gland	8(15%)	11(7%)	**19(9%)**

There was a pronounced decline in mortality from H&N cancer in females in recent years with the rate falling at 2% annually during 1994-2012 (Figure 18). Notably, the mortality rate for cancer of the larynx fell by almost 6% annually and pharynx by more than 3% annually.

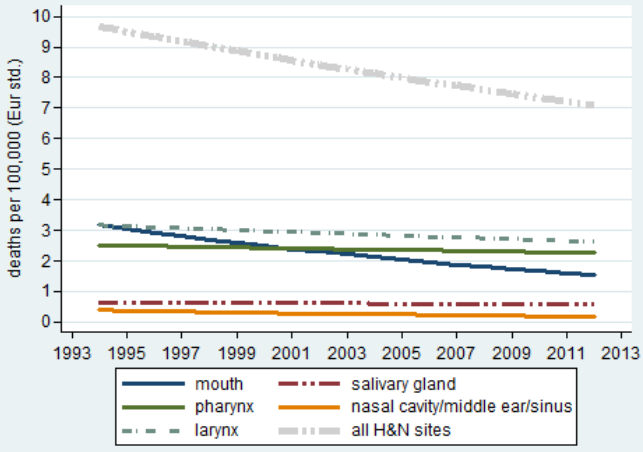
Figure 18. Fitted age standardised mortality rate in Ireland: 1994-2012: females, by site



Annual percentage change: Joinpoint	APC	95%CI	p-value
C01-06: mouth	0.8	[-1.0, 2.8]	0.36
C09-14: pharynx	-3.2	[-5.4,-1.0]	0.002
C32: larynx	-5.6	[-8.0,-3.2]	<0.001
C07-08: salivary gland	-2.5	[-7.0, 2.3]	0.27
C30-31: nasal cavity/middle ear/sinus	-2.7	[-8.0, 2.9]	0.31
all head and neck cancers	-2.0	[-3.0,-1.1]	<0.001

In males, the mortality rate for all H&N cancer fell by almost 2% annually between 1994 and 2012 (Figure 19). Mouth cancer mortality fell by 4% annually.

Figure 19. Fitted age standardised mortality rate in Ireland: 1994-2012: males, by site

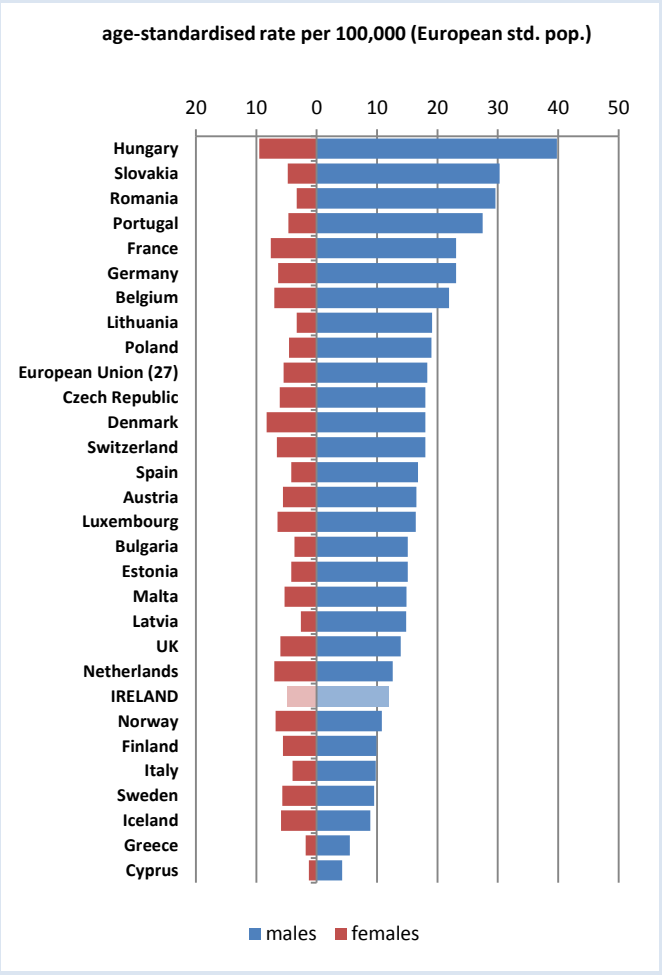


Annual percentage change: Joinpoint	APC	95%CI	p-value
C01-06: mouth	-3.9	[-5.2,-2.6]	<0.001
C09-14: pharynx	-0.6	[-1.8, 0.7]	0.31
C32: larynx	-1.0	[-2.7, 0.7]	0.19
C07-08: salivary gland	-0.5	[-3.9, 3.0]	0.76
C30-31: nasal cavity/middle ear/sinus	-4.0	[-7.0,-1.0]	0.005
all head and neck cancers	-1.7	[-2.5,-0.9]	<0.001

International variation in incidence and mortality

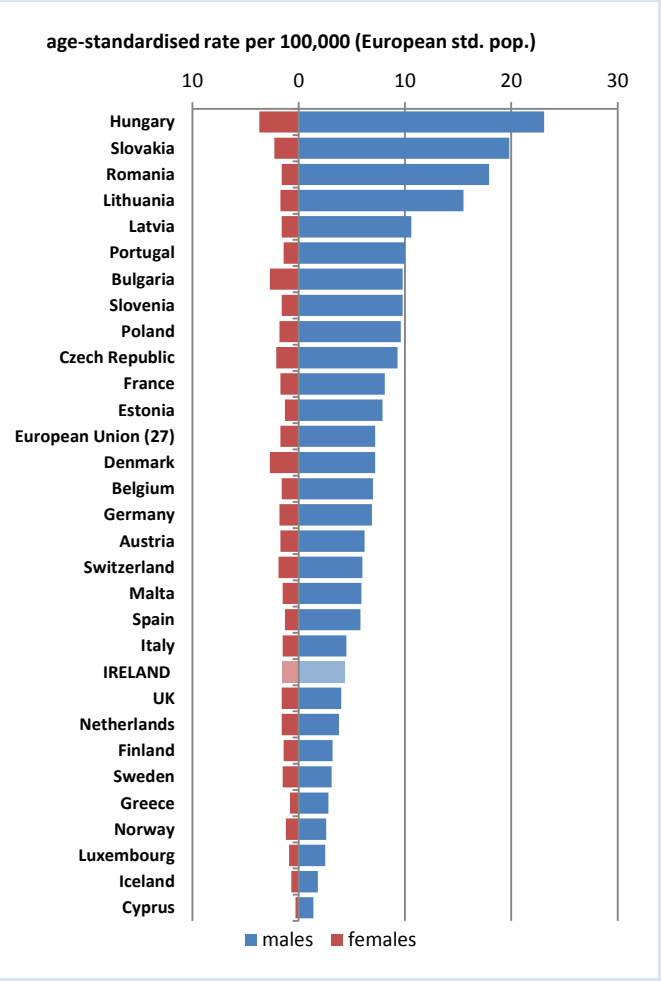
The estimated incidence of cancers of the oral cavity and pharynx in 2012 varied from 40/100,000 for men in Hungary to 4/100,000 in Cyprus, and from 10/100,000 women in Hungary to 1/100,000 in Cyprus (Figure 20). The incidence of H&N cancer was relatively low in Ireland (23rd highest in men and 18th highest in women). The male/female ratio was highest in central and eastern European countries (>5 in Romania, Slovakia, Lithuania and Latvia) and lowest in the Nordic countries (<2 in Iceland, Norway, Sweden), and was 2.4 in Ireland.

Figure 20. Estimated incidence of cancer of the oral cavity and pharynx, 2012 [4]



The estimated mortality of cancers of the oral cavity and pharynx in 2012 varied from 23/100,000 for men in Hungary to 2/100,000 in Cyprus, and from 4/100,000 women in Hungary to <1/100,000 in Cyprus (Figure 21). The mortality rate was relatively low in Ireland (21st highest in men and 20th highest in women). The male/female mortality ratio was highest in central and eastern European countries (>5 in Romania, Slovakia and Lithuania) and lowest in the Nordic countries (<2 in Iceland, Norway, Sweden and Finland), and was 2.9 in Ireland.

Figure 21. Estimated mortality from cancer of the oral cavity and pharynx, 2012 [4]



Survival in Ireland

Net survival at 5 years is the proportion who survived cancer death in the absence of other causes of death. For all head and neck cancers, net survival at five years increased from 46% to 54% between the periods 1994-1999 and 2006-2011 (Figure 22). The corresponding survival percentages for the other sub-sites were: mouth; 44% to 56%, salivary gland; 60% to 61%, pharynx; 29% to 41%, nasal cavity/middle ear/sinus; 38% to 45%. There was no improvement in 5 year survival for cancer of the larynx (62% to 60%)

International variation in survival [5]

For the diagnostic period 2000-2007, five year relative survival from head and neck cancer in Europe ranged from only 18% in Bulgaria to 54% in Finland, with the figure for Ireland (42%) slightly above the European average of 40% (Figure 23). Survival in Ireland ranked 14th highest out of 29 countries for head and neck cancer overall. Five year relative survival for laryngeal cancer ranged from only 43% in Bulgaria to 78% in Iceland (Figure 24). The figure for laryngeal cancer in Ireland was 56% for the period 2000-2007. Ireland ranked 19th out of 29 countries.

Figure 22. Net survival in Ireland, head and neck cancer, comparison of three diagnostic periods: 1994-1999, 2000-2005, 2006-2011

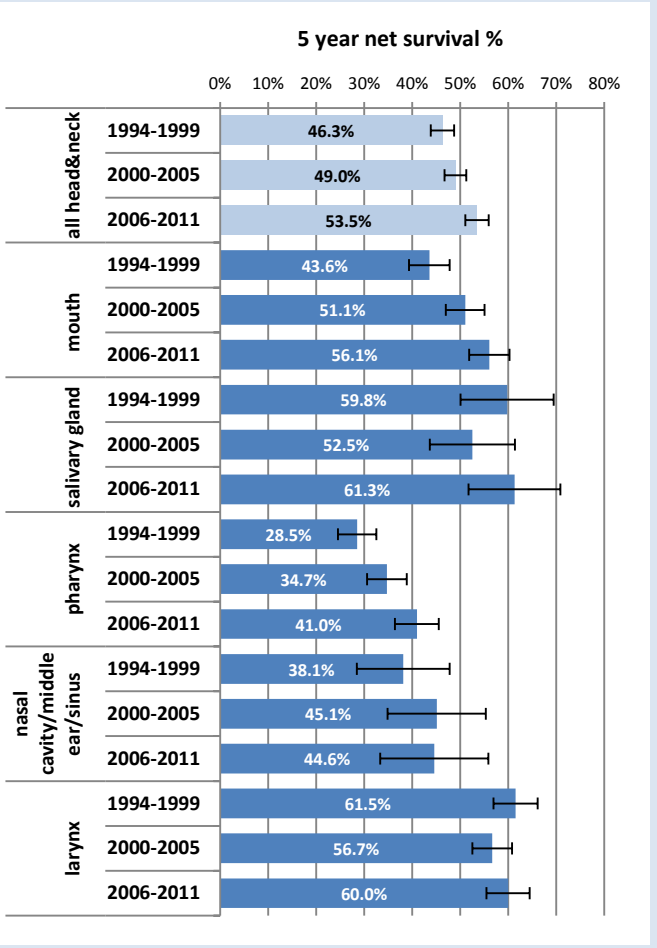


Figure 23. International comparison of five year relative survival for head and neck cancer, 2000-2007 [5]

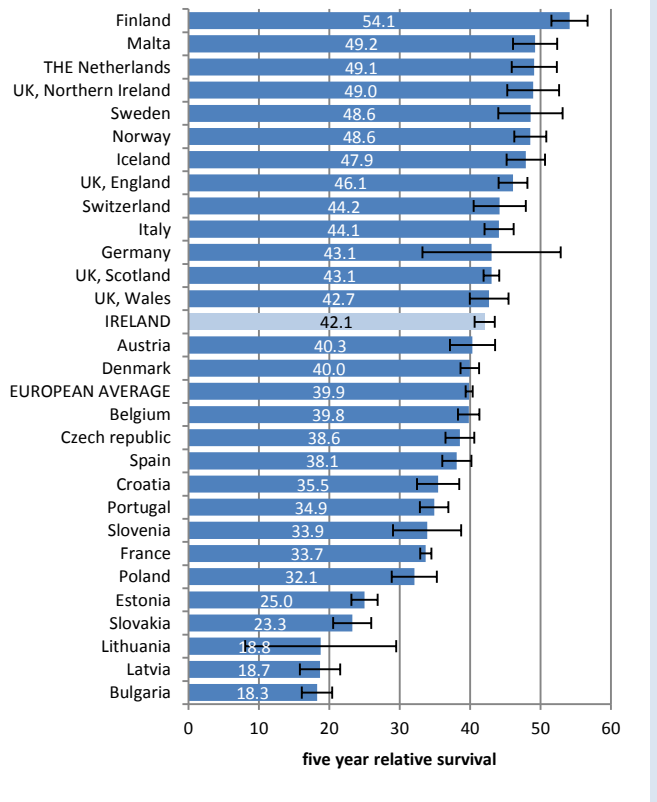
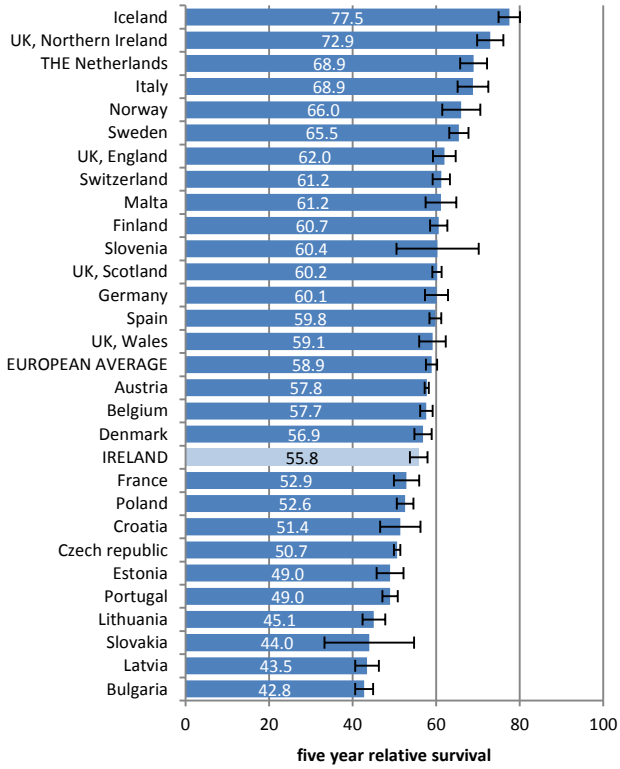


Figure 24. International comparison of five year relative survival for laryngeal cancer, 2000-2007 [5]



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