

**Radiotherapy treatment
in DAHNO2010/11**
National Head and Neck Cancer

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Introduction

Adjuvant radiotherapy is a key part of many head and neck treatment plans. In the latest report from the National Head and Neck Cancer Audit (DAHNO)¹, fewer patients were reported having postoperative radiotherapy than would be expected in clinical practice, suggesting that recording of radiotherapy treatment in DAHNO is less complete than the recording of surgical treatment.

In future years, it is hoped that input to the audit from the Radiotherapy Data Set (RTDS)², should improve the level of recording of radiotherapy treatment.

The purpose of this report is to assess whether DAHNO is under reporting radiotherapy treatment or not, and if so, whether there are any variations by cancer site and cancer network. To do this the cancers included in the latest DAHNO dataset were matched to the RTDS dataset and all radiotherapy treatment found were linked to the DAHNO cancer record. The proportion of DAHNO cases that had no radiotherapy record on DAHNO but did have a record on RTDS were then calculated.

Method

DAHNO

The DAHNO (Data for Head and Neck Oncology) system, which supports the National Head and Neck Cancer Audit, began a phased roll out and started receiving cases in 2004 on larynx and oral cavity cancers. Some organisations submitted a broader range of tumour site groups (in addition to larynx and oral cavity) at inception whilst others have retrospectively populated the DAHNO database in these site group areas. Formal national collection on pharynx and major salivary gland cancers began in 2008. Initially restricted to English cancer networks and subsequently eligible to Wales, all cancer networks in England and Wales now submit data to the audit. For 2010/11, only one trust did not contribute any data.

DAHNO data for the period 1st November 2010 to 31st October 2011 formed the basis for the analysis. The DAHNO data set includes data for Wales which was not required for this analysis as the RTDS data is for England only.

For each tumour in the dataset, all recorded radiotherapy treatment was extracted. To ensure that the radiotherapy treatment was for the current tumour, a period between diagnosis date and treatment start date of 30 days before and up to six months after the diagnosis date was allowed. Where a tumour had more than one radiotherapy treatment recorded, the earliest only was selected.

Of the 6443 head and neck tumours in the DAHNO dataset, 2085 tumours, or 32.4%, had radiotherapy treatment recorded.

RTDS

The Radiotherapy Dataset (RTDS) facilitates the routine collection of all activity undertaken on teletherapy and brachytherapy machines, from each radiotherapy centre in England. Data are submitted to the National Cancer Services Analysis Team (NATCANSAT) on a monthly basis, and has been mandatory since April 2009. Various extracts are produced monthly, including national tumour site specific ones, such as for head and neck cancer.

The head and neck cancer extract includes 22387 radiotherapy episodes, with first appointments between 01/04/2009 and 31/07/2012. It includes some tumour sites not usually included by DAHNO, for example C14 other and ill-defined sites of lip, oral cavity and pharynx, C30 nasal cavity and middle ear, C31 accessory sinuses, and C73 thyroid. DAHNO defines head and neck cancers using four digit ICD10 codes, whereas RTDS records tumour site using three digit ICD10 codes.

Linking the two datasets

Linking the two datasets was a two stage process: first linking on patient information and then linking on tumour information.

The two datasets were linked by NHS number, so that if any patient with a tumour on DAHNO had a radiotherapy record on RTDS, that treatment information was attached to the DAHNO tumour record. Not all records in RTDS had an NHS number recorded, so a second linking process was performed using the patient's name, date of birth and postcode of residence at diagnosis.

A treatment on RTDS was matched to a tumour on DAHNO, where the treatment start date was between 30 days before and up to six months after the diagnosis date. Where more than one radiotherapy treatment matched to a tumour, the earliest treatment only was selected.

Linking the two datasets by tumour site could not be done exactly for the reasons outlined above. An initial analysis, which excluded the sites listed above (C14, C30, C31 and C73), resulted in some tumours not matching when all other data suggested they should. It was decided to leave these sites in the RTDS data and not to include tumour site in the matching process.

Of the 6443 head and neck tumours in the DAHNO dataset, 4031 tumours, or 62.6%, could be linked to an RTDS record.

Results - summary

Of the 6443 tumours recorded in DAHNO and diagnosed in the period November 2010 to October 2011, 2085 or 32.4% had radiotherapy treatment recorded. When matched to the RTDS, an additional 1891 tumours, 29.3%, were found to have had radiotherapy, giving a total of 3976 tumours having had radiotherapy treatment, or 61.7%.

There is an apparent under reporting of radiotherapy treatment in DAHNO of nearly 30%.

Figure 1: Proportion of head and neck cancers recorded in DAHNO, diagnosed in the period November 2010 to October 2011 and having radiotherapy treatment, by data source

	Number of tumours	%	Cumulative %
Radiotherapy recorded in DAHNO	2085	32.4	32.4
Radiotherapy recorded on RTDS dataset ONLY	1891	29.3	61.7
No radiotherapy recorded in either dataset	2467	38.3	100.0
DAHNO total	6443	100.0	
Radiotherapy recorded on both DAHNO and RTDS	1922	29.9	
Radiotherapy recorded on DAHNO but not on RTDS	163	2.5	

These results are further analysed by tumour site group and cancer network.

Results - tumour site group

Under reporting of radiotherapy treatment in DAHNO appears in all tumour site groups, and ranges from oral cavity with 22.0% under reported, to oropharynx with 37.7%.

Oropharynx cancers had the highest proportion of radiotherapy treatment recorded in DAHNO and gained the greatest proportion of additional radiotherapy from RTDS, resulting in a total of 80.6% of oropharynx cancers recording radiotherapy. Oral cavity cancers had the lowest proportion of radiotherapy treatment recorded in DAHNO and gained the least additional radiotherapy from RTDS, resulting in a total of 37.7% of cancers recording radiotherapy.

Figures 2 and 3 show the amount of radiotherapy recorded from the two data sources, DAHNO and RTDS, for each tumour site group.

Figure 2: Proportion of head and neck cancers recorded in DAHNO having radiotherapy treatment, by tumour site group and data source

Tumour site group	Number of tumours in DAHNO dataset	% having radiotherapy treatment in DAHNO	% having radiotherapy treatment RTDS only	% having radiotherapy treatment DAHNO plus RTDS
Hypopharynx	440	38.0	29.8	67.8
Larynx	1667	39.4	27.1	66.5
Major salivary glands	375	24.5	33.1	57.6
Nasopharynx	160	37.5	31.9	69.4
Oral cavity	1913	15.7	22.0	37.7
Oropharynx	1888	42.9	37.7	80.6
England total	6443	32.4	29.3	61.7

Figure 3: Proportion of head and neck cancers recorded in DAHNO having radiotherapy treatment, by tumour site group and data source

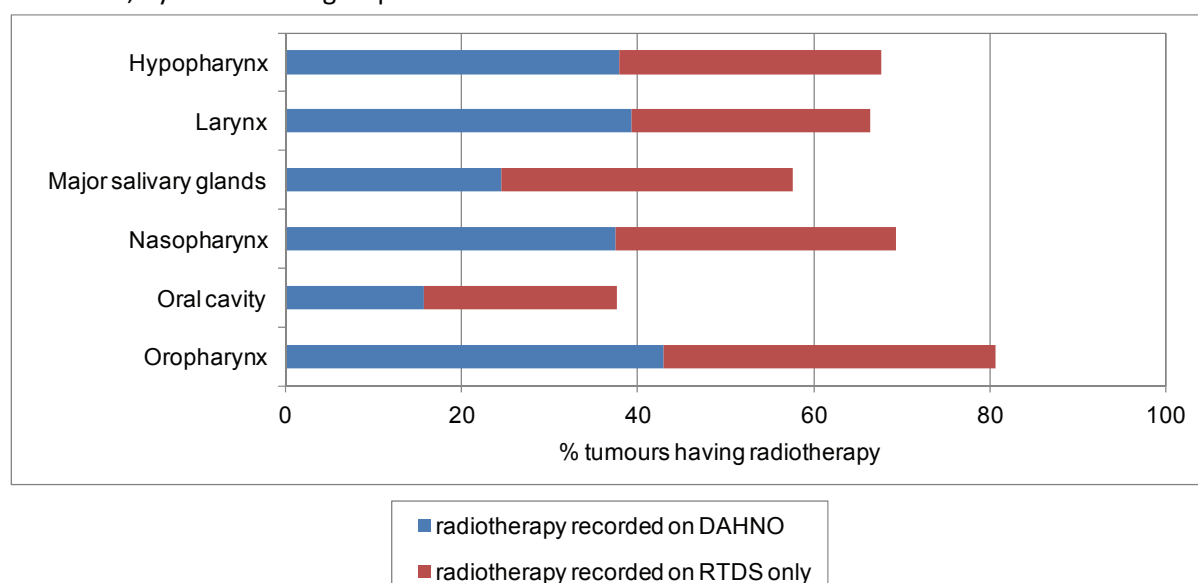
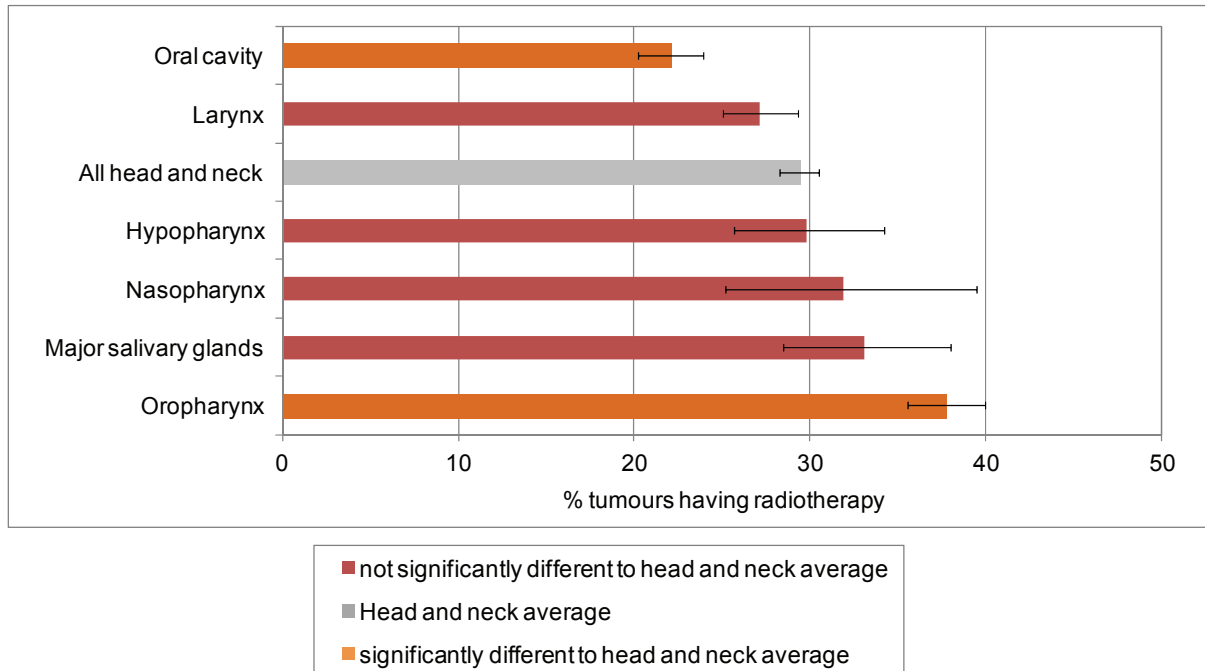


Figure 4 compares the proportions of additional radiotherapy found from RTDS for each tumour site group, with the average for all head and neck sites. Oropharynx cancers have a significantly higher level of under reporting of radiotherapy at 37.7% compared to the average of 29.3%. Oral cavity cancers have a significantly lower level of under reporting at 22.0%.

Figure 4: Proportion of head and neck cancers recorded in DAHNO where radiotherapy was recorded on RTDS only, by tumour site group (with 95% confidence intervals)



Results - cancer network

Under reporting of radiotherapy treatment in DAHNO appears across all cancer networks, and ranges from South West London with 11.6% under reported, to Greater Manchester and Cheshire with 52.0%. Figures 5 and 6 show the amount of radiotherapy recorded from the two data sources, DAHNO and RTDS, for each cancer network in England.

South West London cancer network had the highest proportion of radiotherapy treatment recorded in DAHNO at 61.6%, but gained the least additional radiotherapy from RTDS. Greater Manchester and Cheshire cancer network had the lowest proportion of radiotherapy treatment recorded in DAHNO at 13.5% and gained the most additional radiotherapy from RTDS. When radiotherapy from both sources is combined, South East London cancer network had the highest proportion of radiotherapy treatment recorded with 75.3%.

Figure 7 compares the proportions of additional radiotherapy found from RTDS for each cancer network, with the England average. Greater Manchester and Cheshire, South East London, Pan Birmingham, Essex, North Trent, East Midlands, and Surrey, West Sussex and Hampshire cancer networks have significantly higher levels of under reporting of radiotherapy compared to the average of 29.3%. South West London, Yorkshire, Arden, North of England, Mount Vernon, Dorset, Three Counties and Thames Valley cancer networks have a significantly lower level of under reporting.

Figure 5: Proportion of head and neck cancers recorded in DAHNO having radiotherapy treatment, by cancer network and data source

Cancer network		Number of tumours in DAHNO dataset	% having radiotherapy treatment on DAHNO	% having radiotherapy treatment RTDS only	% having radiotherapy treatment DAHNO plus RTDS
N01	Lancashire and South Cumbria	231	34.6	23.8	58.4
N02	Greater Manchester & Cheshire	392	13.5	52.0	65.5
N03	Merseyside & Cheshire	430	30.5	31.4	61.9
N06	Yorkshire	363	42.4	12.7	55.1
N07	Humber & Yorkshire Coast	127	31.5	29.1	60.6
N08	North Trent	245	23.3	38.8	62.1
N11	Pan Birmingham	237	21.5	44.3	65.8
N12	Arden	103	36.9	15.5	52.4
N20	Mount Vernon	101	37.6	17.8	55.4
N21	West London	120	35.8	30.0	65.8
N22	North London	229	20.5	34.1	54.6
N23	North East London	155	30.3	25.2	55.5
N24	South East London	146	26.7	48.6	75.3
N25	South West London	164	61.6	11.6	73.2
N26	Peninsula	246	42.3	23.6	65.9
N27	Dorset	124	50.8	19.4	70.2
N28	Avon, Somerset & Wiltshire	225	28.0	26.2	54.2
N29	3 Counties	213	36.2	19.7	55.9
N30	Thames Valley	192	40.1	19.8	59.9
N31	Central South Coast	225	35.1	29.8	64.9
N32	Surrey, West Sussex & Hampshire	179	22.3	45.3	67.6
N33	Sussex	170	23.5	27.6	51.1
N34	Kent & Medway	168	37.5	33.3	70.8
N35	Greater Midlands	291	31.6	30.6	62.2
N36	North of England	473	38.9	17.3	56.2
N37	Anglia	358	36.0	25.7	61.7
N38	Essex	166	22.9	41.6	64.5
N39	East Midlands	370	31.6	35.9	67.5
England total		6443	32.4	29.3	61.7

Figure 6: Proportion of head and neck cancers recorded in DAHNO having radiotherapy treatment, by cancer network and data source

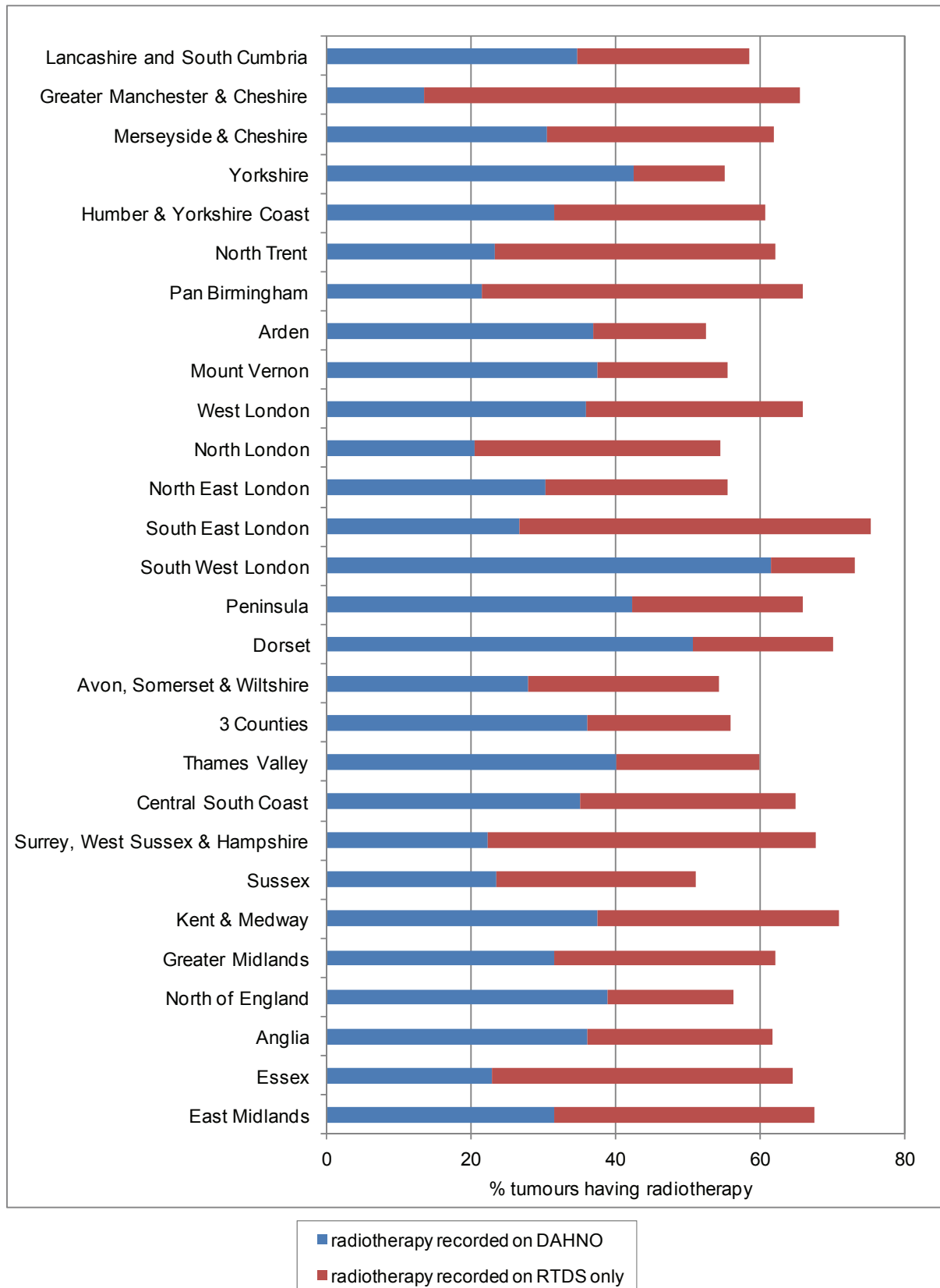
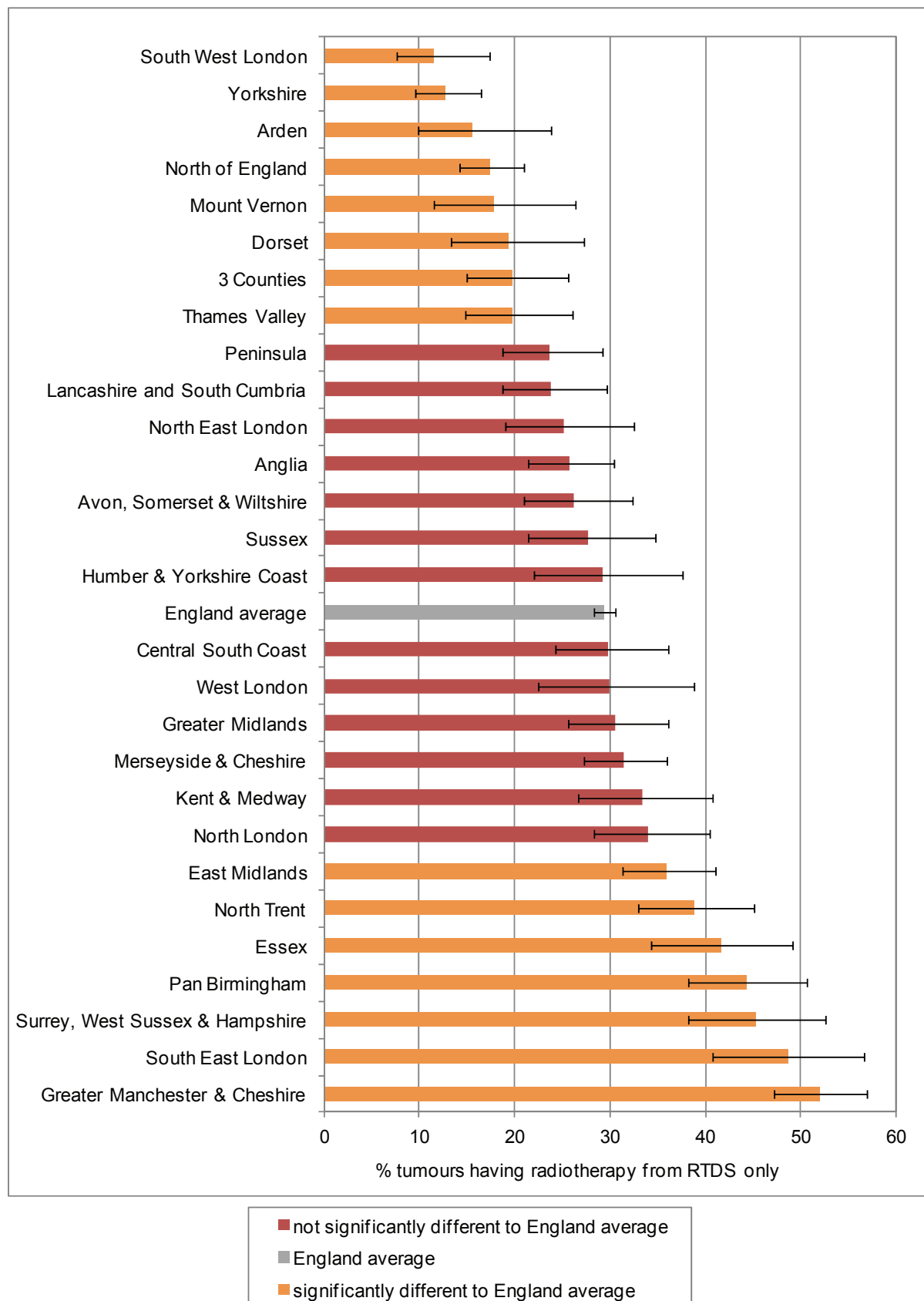


Figure 7: Proportion of head and neck cancers recorded in DAHNO where radiotherapy was recorded on RTDS only, by cancer network (with 95% confidence intervals)



References

1. The Information Centre (IC) for Health and Social Care. National Head & Neck Cancer Audit 2011. 2012.
http://www.ic.nhs.uk/webfiles/Services/NCASP/audits%20and%20reports/Head_and_Neck_Audit_2011/NHS_Head_Neck_Cancer_Audit_2012_Interactive_V1.0_22.06.12.pdf
2. <http://www.canceruk.net/rtservices/rtds/>

Appendix 1: Head and neck cancer ICD10 codes

Site group	ICD10 code	Description
Oral Cavity	C00.3	Lip, inner aspect, mucosa of upper
	C00.4	Lip, inner aspect, mucosa of lower
	C02.0	Tongue, dorsal surface, anterior 2/3
	C02.1	Tongue, lateral border, tip of tongue
	C02.2	Tongue, ventral, inferior surface
	C02.3	Anterior two-thirds of tongue, part unspecified
	C02.4	Lingual tonsil (previously in oropharynx)
	C02.8	Tongue, overlapping lesion of anterior two-third
	C03.0	Gum, upper (alveolar ridge, mucosa, gingiva)
	C03.1	Gum, lower (alveolar ridge, mucosa, gingiva)
	C04.0	Mouth, anterior floor
	C04.1	Mouth, lateral floor
	C04.8	Mouth, floor, overlapping lesion
	C05.0	Palate, hard
	C05.8	Palate, overlapping lesion
	C06.0	Cheek mucosa
	C06.1	Mouth, vestibule (buccal sulcus and labial)
	C06.2	Retromolartrigone
	C06.8	Overlapping lesion of other and unspecified parts of mouth
Oropharynx	C01	Base of tongue
	C05.1	Palate, soft, inferior surface
	C05.2	Uvula
	C05.8	Overlapping lesion palate
	C09.0	Tonsillar fossa
	C09.1	Tonsillar pillar, glossotonsillar sulcus
	C09.9	Tonsil, not otherwise specified
	C10.0	Vallecula (Anterior surface epiglottis – see supraglottic larynx)
	C10.2	Lateral wall oropharynx
	C10.3	Posterior wall oropharynx
	C10.8	Overlapping lesion of oropharynx
C10.9	Oropharynx unspecified	
Hypopharynx	C12	Pyriform sinus
	C13.0	Postcricoid region
	C13.1	Aryepiglottic fold, hypopharyngeal aspect
	C13.2	Hypopharynx, posterior wall
	C13.8	Hypopharynx, overlapping lesion
	C13.9	Hypopharynx unspecified

Site group	ICD10 code	Description
Larynx	C10.1	Anterior surface epiglottis
	C32.0	Glottis
	C32.1	Supraglottis
	C32.2	Subglottis
	C32.3	Laryngeal cartilage
	C32.9	Larynx, not otherwise specified
Major salivary gland	C07	Parotid gland
	C08.0	Submandibular, submaxillary gland
	C08.1	Sublingual gland
Nasopharynx	C11.0	Superior wall of nasopharynx
	C11.1	Posterior wall of nasopharynx
	C11.2	Lateral wall of nasopharynx
	C11.3	Anterior wall of nasopharynx
	C11.8	Overlapping lesion of nasopharynx
	C11.9	Nasopharynx, unspecified

Appendix 2: Statistics

95% confidence intervals for percentages

The Wilson Score method was used to calculate 95% confidence intervals. These are a measure of variability in the percentages calculated using the sample size. A 95% confidence interval is a range of values for which there is a 95% probability of including the true value.

The proportion p is given by: $p = O/n$

Using the Wilson Score method, the $100(1-\alpha)$ % confidence limits for the proportion (percentages) p are given by:

$$p_{lower} = \frac{(2O + z^2 - z\sqrt{z^2 + 4Oq})}{2(n + z^2)} \quad p_{upper} = \frac{(2O + z^2 + z\sqrt{z^2 + 4Oq})}{2(n + z^2)}$$

where:

O is the numerator observed number of individuals in the sample/population having the specified characteristics

n is the denominator total number of individuals in the sample/population

q is $1-p$

z is the $100(1-\alpha/2)$ th percentile value from the Standard Normal distribution. For example, for a 95% confidence interval, $\alpha = 0.05$ and $z = 1.96$ (i.e. the 97.5th percentile value from the Standard Normal distribution).

For further information on the National Head and Neck Cancer programme, click [here](#).

The National Cancer Intelligence Network (NCIN) is a UK-wide partnership operated by Public Health England. The NCIN coordinates and develops analysis and intelligence to drive improvements in prevention, standards of cancer care and clinical outcomes for cancer patients.

www.ncin.org.uk